MITSUBISHI ELECTRIC

Changes for the Better

FACTORY AUTOMATION

Automating the World

LVS FAMILY

Low Voltage & Energy Monitoring

- **SUPER AE – Air Circuit Breakers**
- **WS – Moulded-case Circuit breakers**
- **MDRC – Industrial Range Modular Din Rail Components**
- **MS – Magnetic Contactors**
- **MMP-T – Manual Motor Protectors**
- **MMI – Monitor Measuring Instruments**
- **MCB – Domestic Range MCBs**

Our Factory Automation business is focused on "Automating the World" to make it a better, more sustainable environment supporting manufacturing and society, celebrating diversity and contributing towards an active and fulfilling role.

Mitsubishi Electric is involved in many areas including the following:

Energy and Electric Systems
A wide range of power and electrical products from generators to large-scale displays.

Electronic Devices
A wide portfolio of cutting-edge semiconductor devices for systems and products.

Home Appliance
Dependable consumer products like air conditioners and home entertainment systems.

Information and Communication Systems
Commercial and consumer-centric equipment, products and systems.

Industrial Automation Systems
Maximizing productivity and efficiency with cutting-edge automation technology.

SUSTAINABLE DEVELOPMENT GOALS

The Mitsubishi Electric Group is actively solving social issues, such as decarbonization and labor shortages, by providing production sites with energy-saving equipment and solutions that utilize automation systems, thereby helping towards a sustainable society.

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Breakthrough technology

Over 80 years of experience

Mitsubishi Electric has been active in the low voltage switchgear (LVS) market since 1933. Ever since Mitsubishi Electric developed and manufactured the first moulded-case circuit breakers, the company has been committed to research and development in this field, making it one of the world's leading manufacturers of circuit breakers.

Innovation

Groundbreaking research and design has resulted in innovative LV switchgear, providing users with greater quality, safety and reliability. Today's LV products feature meticulously designed technology: even the casing material is used in the PA (Polymer Ablation type Auto-Puffer) to provide greater safety and high voltage breaking performance.

Meeting global norms and standards

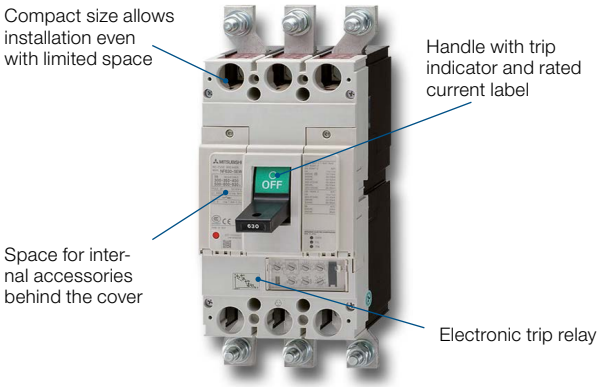
Mitsubishi Electric's low voltage switchgears meet all the standards and specifications laid down in the EU Low Voltage Directive 2006/95/EC and the Machinery Directive 98/37/EC. Needless to say, all the units carry the CE mark and are certified as conforming to UL, cUL and CCC.

Standards are at the center of our product development.

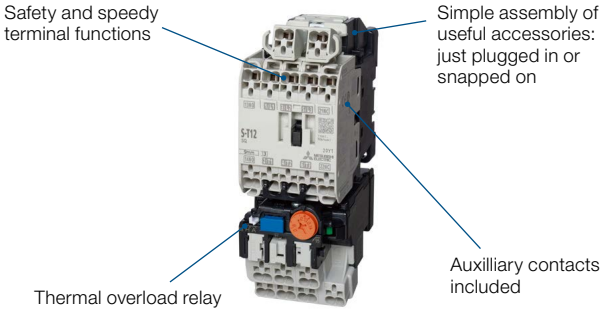
Six key reasons for choosing Mitsubishi Electric LVS

Air circuit breaker of the Super AE-SW series

Moulded-case circuit breaker of the NF-SW series



Magnetic contactor with mounted thermal overload relay of the MS series



High performance

The one class higher performance of the Mitsubishi Electric low voltage switchgears realizes superb breaking performance. Hence the safety of valuable circuits can be securely maintained.

High reliability

Reliability is provided due to high operating durability.

Global

In addition to complying with well-known international norms and standards, the low voltage switchgears are also certified by several marine approvals.

Best solution

The high flexibility of the various line-up, the plenty of accessories and the easy installation enable always the best solution for each application.

Intelligent

The main functions, including trip status, alarm and load current are displayed on the LCD screen of the SUPER AE and can also be output as signals.

Customer friendly

Functionality, compatibility and perfect mechanical design are the main features of the low voltage switchgears supplied by Mitsubishi Electric.

Not all features are available on all LVS.
Please check applicability.

Complete portfolio for power distribution with addition of MDRC range

Mitsubishi Electric SUPER AE are virtually maintenance free

Moulded-case circuit breakers in a compact housing

Air circuit breakers (ACB‘s)

Low-voltage air circuit breakers can be used as the main circuit breakers of power distribution systems for buildings, factories, ships, and more to realize high-level circuit monitoring and friendly networking.

Mitsubishi Electric‘s compact Super AE units come in a broad spectrum of performance categories from 1000 to 6300 Amps. The basic unit is available as a fixed or “draw out” design, which can be augmented with options for enhanced overload control, network and energy consumption.

Molded-case circuit breakers (MCCB‘s)

Molded-case circuit breakers are utilized to open/close low-voltage circuits and protect wiring by automatically closing circuits when overloading or short-circuiting occurs.

Mitsubishi Electric’s MCCBs of the World Super Series (WS) provide protection across the current range from 3 to 1600 Amps. Each unit is available in a fixed or slot-in design and has a range of additional options such as electronic trips.

MDRC Series - Brand New Range

Modular Din Rail Components

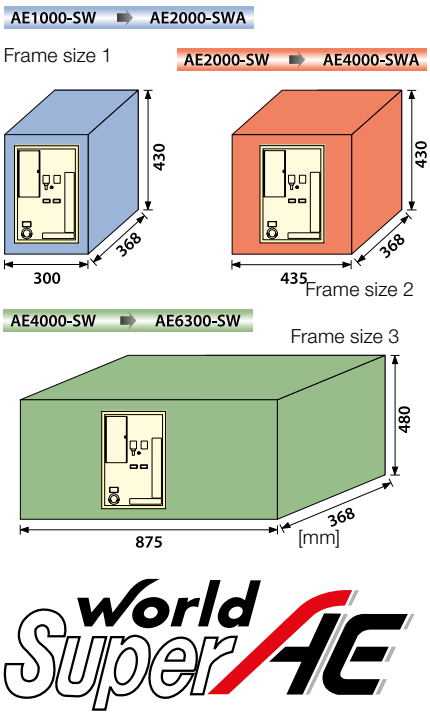
Mitsubishi Electric Europe provide a full range of Din Rail mounted Modular Protective Devices.

Our MCB, RCD, RCBO and AFDD ranges allow for a fully coordinated protection system for any power distribution system.

In series with our ACB and MCCB combinations Mitsubishi Electric devices enable you to design easily an effective technical solution at an economic cost that provides protection across your installation no matter what the prospective short circuit current.

SUPER AE – Air circuit breakers

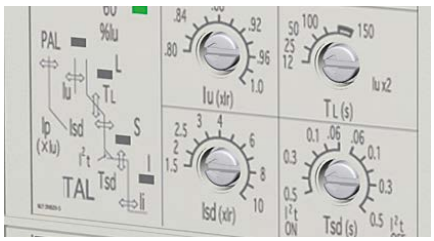
Mitsubishi Electric Air Circuit Breakers are built for the global demands of the 21st century



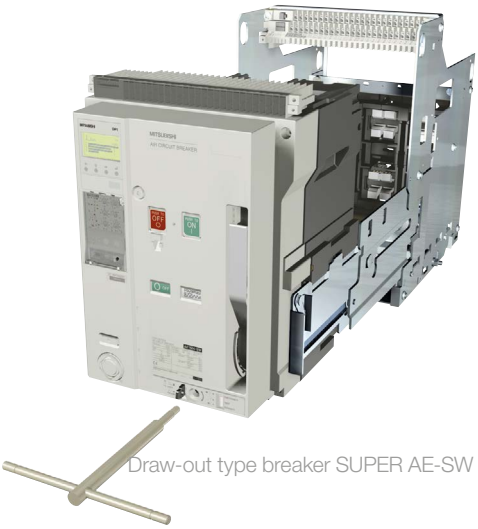
World Super AE

Very user-friendly design

All breakers in the series are available in both 3 and 4 pole versions with fixed or drawout configurations to suit your individual requirements. There are only three standard sizes, making planning much easier.



All parameters can be adjusted individually, ensuring that an optimum selectivity for every application is achieved.



Draw-out type breaker SUPER AE-SW

The range of air circuit breakers and load interrupter switches is complemented by a comprehensive range of accessories. In contrast to earlier models it is now possible to save space by installing some accessories (for example the UVT undervoltage trip) inside the breaker unit.

All live components in the vicinity of the control connections have IP20 protection rating.

Individually configured protection

The circuit breakers are delivered with an electronic trip relay. It is available in versions for all standard power supply voltages. Optional modules are also available for most common applications like protecting transformers, cables, motors and generators. This ensures optimum protection for long time, short time and instantaneous tripping.

In addition to options like pre-alarm, ground fault and earth leakage protection, the electronic trip relay provides complete protection against overloads and short circuits. The protection characteristic can be adjusted individually for the needs of your application.

The main functions, including trip status, alarm and load current are displayed on the LCD screen and can also be output as signals. For easy and quick recognition of alarms, the screen automatically turns red when a fault is detected.

Broad performance range

The growing demand for power naturally increases the levels of short circuit currents in power distribution systems. The SUPER AE series breakers deliver excellent protection against thermal and mechanical damage. The rated surge withstand capability (Uimp) is 12 kV. With a short circuit breaking capacity of 65–85 kA they cover the great majority of applications, providing very high-quality protection for your systems.

The small number of components and high production standards ensure a long service life. The breakers of the SUPER AE series are virtually maintenance-free.

Comprehensive communications capabilities

Together with optional network interface modules the SUPER AE can now become a fully integrated part of the total network and system concept.

The SUPER AE's networks enable the monitoring and control of a number of different parameters including voltage and current performance values. In addition, the networking connection can also be used to report alarm and error messages from the breaker back to a centralized control point like a PLC or a SCADA system.

In combination with an additional I/O module the breaker can be switched on and off remotely via the network. A drawout position switch can also be checked for the current drawout position via the network.

MODBUS RTU module

SUPER AE series at a glance

POWER RANGE
1000–6300 A

RATED INSULATION VOLTAGE
1000 V AC

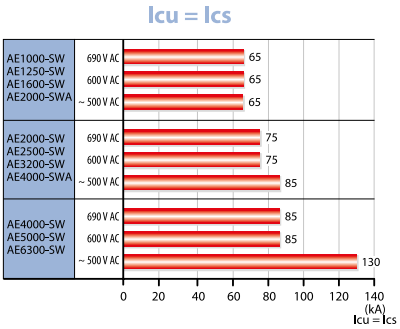
RATED OPERATION VOLTAGE
690 V AC

NUMBER OF POLES
3, 4

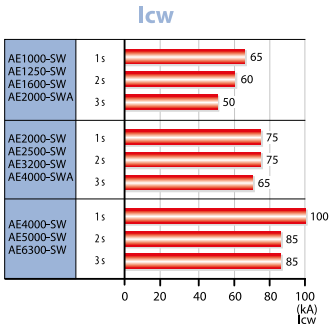
AVAILABLE TYPES
Drawout type, fixed type

NETWORK LINK*
MODBUS®

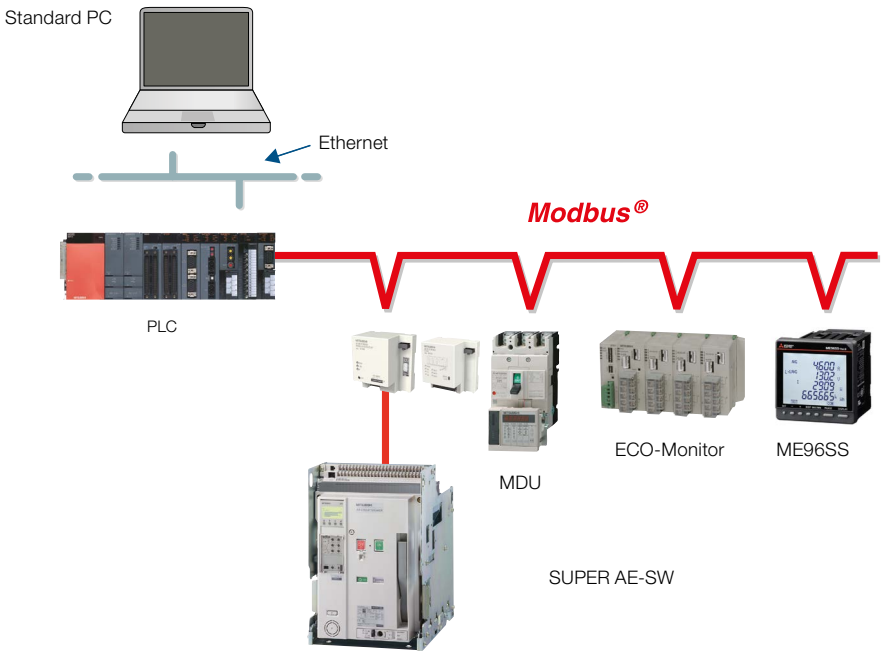
*optional



Rated short circuit breaking capacity Ics



Rated short time withstand current Icw



WS – Moulded-case circuit breakers

Distinguished and secure breaking performance where reliability is needed

Higher performance

The advanced technology of the WS series is based on a proven Mitsubishi Electric patent, and in consideration of the layout of the current leads provides excellent opening cycles of the main conductors.

The new circuit breaking technology “Expanded ISTAC” upgrades current limiting performance for a higher breaking capacity. With higher breaking capacity, lower class models can be used, thus leading to cost reduction of switch panels and machines.

Extending the conductor (reaction circuit for movable conductor) beneath the fixed conductor makes the movable conductor open faster than the conventional ISTAC mechanism. This significantly improves the current limiting performance and reduces the maximum peak current by 10 %.

Molded-case circuit breakers are utilized to open/close low-voltage circuits and protect wiring by automatically closing circuits when overloading or short-circuiting occurs.

Mitsubishi Electric is pioneering a new future for circuit breakers, working to realize market globalization by responding to international needs with products that offer enhanced ease of operation, high performance, and complying with various standards such as JIS, IEC, EN, GB, UL/CSA standards.

With its innovative breaking technology all Mitsubishi Electric breakers offer greater safety and even faster circuit-breaking speed through the use of the latest switch-off technology and innovative engineering, with an innovative electronic trip relay.

Mitsubishi Electric breakers of the WS series are available in 4 different versions with increasing breaking capacities which can be used for a wide range of applications:

NF-C economy type

Basic model with excellent cost performance. Standard products range from 30 to 250 A frames.

NF-S standard type

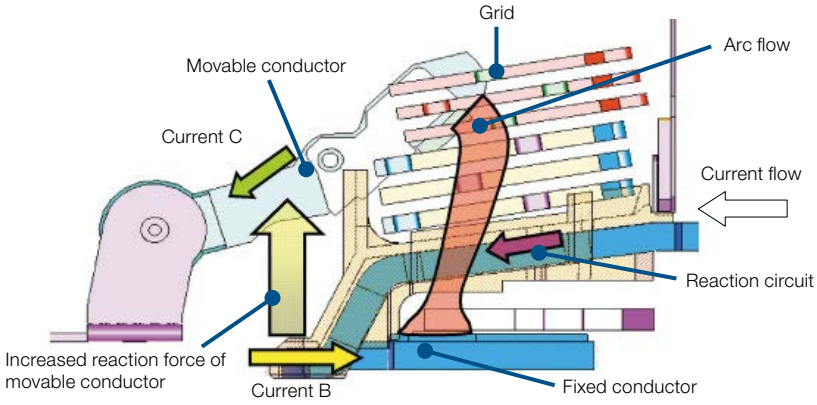
Standard model lineup, with products from 32 to 250 A frames

NF-H/-L high-performance type

High performance model lineup, with products from 63 –250 A frames

NF-U/-R ultra current-limiting type

Realizing the world’s maximum breaker capacity of 200 kA, this high breaking capacity breaker is the optimum model for backup shutdown.



Expanded ISTAC breaking technology

Vizualization of current flow

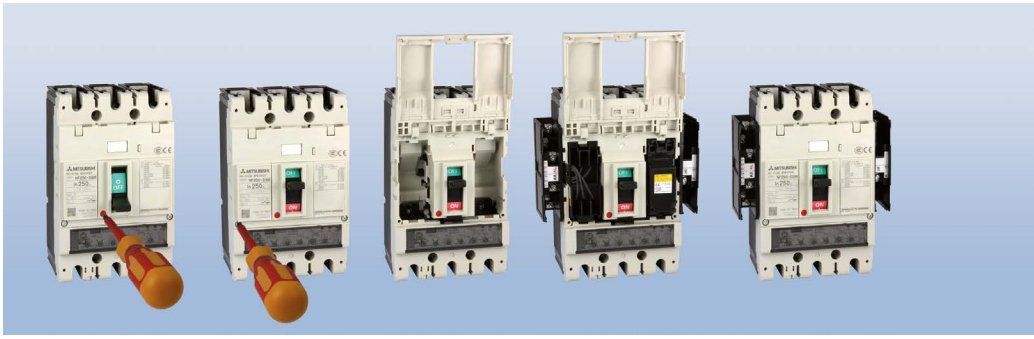
Mitsubishi Electric electronic circuit breakers of the WS series with display can display various measurement items. This will enable energy management through permanent visualization of the current in each phase, which leads to energy saving.

The easy to read display is on the circuit breaker body and shows diverse circuit informations. With the help of this display, detailed setting can be done easily. When an alarm occurs, the display turns red, so the affected breaker can be recognized quickly.

Compact design

The thermal adjustable circuit breakers and electronic circuit breakers of the WS series are very compact in size. Comparing to the predecessor series, these breakers contribute to a simplification of design and the reduction of the panel size.

Circuit breakers fixed types, thermal adjustable types and electronic types are the same size, leading to the standardization of panel design.



Easy installation of modular cassette type accessories.

Modular and standardized accessories

The arrangement and design of pluggable accessories such as indicator and auxiliary contacts allows the user to modify the circuit in a way that saves time and space – at any time, even when built in and ready for operation. The presence of separate circuit chambers makes the system even safer.

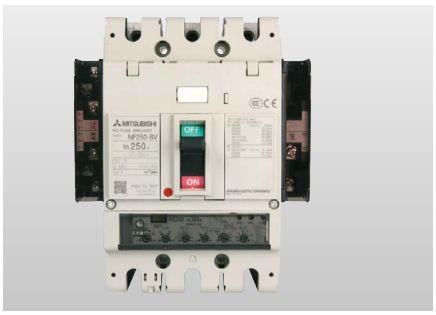
Unlike the previous models the types of internal accessories has been reduced from 3 types to 1 type. The standardization of internal accessories contributes to the reduction of stock and delivery time.

Thus cassette type accessories ensure flexibility when upgrading circuits. The cassette type accessories are available in 5 different versions and fit for breaker series from 30 up to 800 AF:

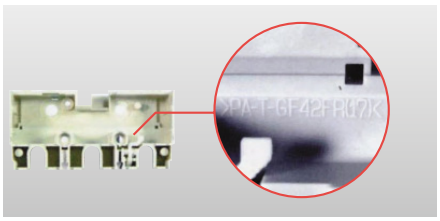
- alarm switch (AL)
- auxiliary switch (AX)
- alarm and auxiliary switch (AL+AX)
- shunt trip device (SHT)
- undervoltage trip device (UVT)

Environment friendly

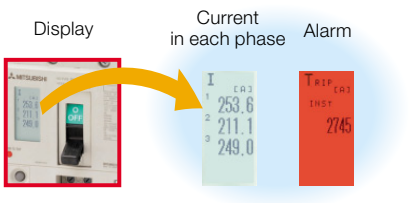
All circuit breakers of the WS series are eco-friendly designed without any hazardous substances. The circuit breakers comply with RoHS regulation. The body of the circuit breakers are made of thermo-plastic materials that are easy to recycle (some models are partially made of thermoset materials). The major plastic parts bear material identifications so that they can be recycled easily.



Breaker with accessories



Use of various recycable materials



Clear and distinctly readable display

WS series at a glance

POWER RANGE
3–1600 A

RATED INSULATION VOLTAGE
500–690 V AC

RATED OPERATION VOLTAGE
up to 690 V AC, 300 V DC

NUMBER OF POLES
3, 4

TRIPPING DEVICE
Thermal magnetic, electronic

NETWORK LINKS*
CC-Link®

***optional**

Modular DIN Rail Components

High Performance Protection and Control

Mitsubishi Electric Europe offer a complete range of Industrial Grade High Performance Modular Din Rail Components **MDRC**. The introduction of this range of products provides a solution to our customers for protection and control of their electrical power circuits at Final Circuit level. With the advent of large critical power demands for IT loads as well as more renewable power sources being introduced at micro-generation level, the demand for higher performance protective devices and control elements at sub-distribution levels is clear. Our **MDRC** ranges are designed to meet these challenges and to help our customers to design systems using our standard product ranges that provide protection to both personnel and assets.

The aim of Mitsubishi Electric Europe is to meet our customers demand for a full range of high quality power protection and control components. This new range of devices complements our ACB and MCCB ranges to ensure quality circuit protection through out the LV distribution Network. Our overriding commitment to provision of high quality in our standard component ranges ensures that our customers enjoy network security and high performance at a reasonable cost.

Standard MCB Range

Mitsubishi Electric Europe offer a range of MCBs that take clear account of these requirements. Our standard Industrial range of **MCB** are available in B, C & D curve with current ranges from 0,5A up to 63A. The short circuit breaking capacity of the standard range is excellent for sub-distribution with Icu of up to15kA according to EN60947-2. This range also has certification to EN60898.

Standard RCD Range

Our standard range of Residual Current Circuit Breakers **RCD** are type A sensitivity devices with 30mA setting. These are available from 25A to 125A in 2pole and 4pole versions. They are ideal for protecting against earth leakage faults. We also have available type B sensitivity devices for DC loads. We can also supply in 100mA and 300mA versions. Our RCD devices are certified to EN61008-1.

Standard RCBO Range

Our Standard range of Residual Current Circuit Breaker combined with Overcurrent Protection is our **RCBO** range. These match our standard MCB range and are available in 1N version with Icu of 15kA according to EN60947-2. They are also certified to EN61009-1. Available in B,C and D curve from 6-40A.

There is a 3N version in 4modules in C curve.

We also have an electronic Voltage Dependent range for the BS market available **RCBOE**.

High capacity MCB range

Our High capacity range of mcbs are available with Icu up to 25kA in 18mm module with our **MCB-T** range up to 40A and in our 27mm module **HMCB** range from 20A up to 125A. This provides excellent solutions for Sub-Distribution in areas where there is a higher prospective short circuit current.

AFDD Range

Our Standard range of Arc Fault Detection Devices AFDD provide protection against series and parallel earth faults as well as having standard RCBO protection. These are recommended for buildings where there are living quarters included and are a key asset in prevention of electrical fires. These are available in 2-pole 3 module B or C curve type A sensitivity devices.

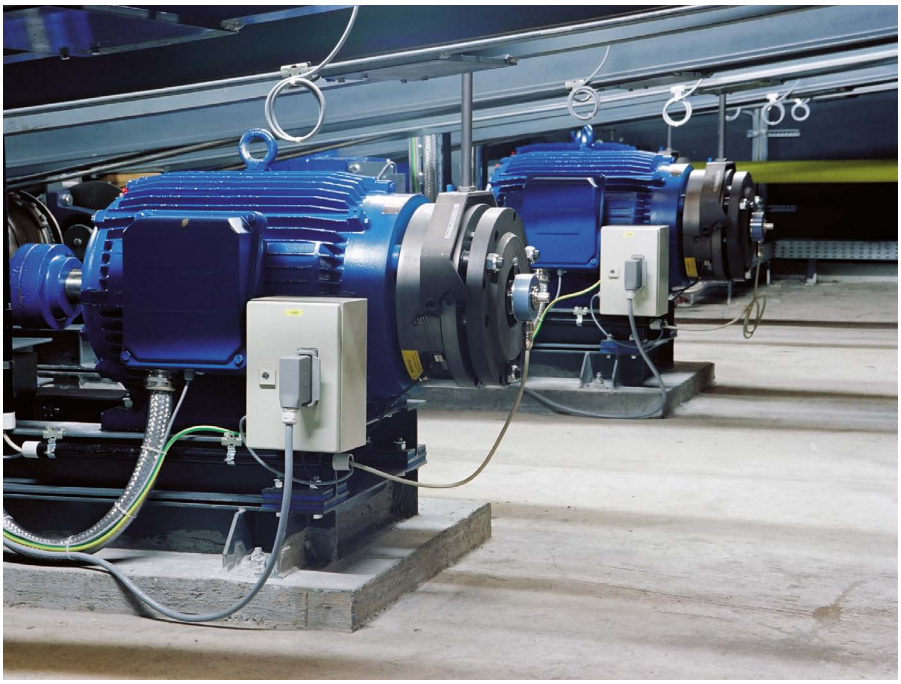
SPD Range

We offer a range of Surge Protection Devices for both Type1/2 protection for Main Incoming sections where there is a lightning protection system and also Type 2 protection for 8/20 microsecond waveform surges.

Modular Contactor Range

Our Modular Contactor Range Compliments the protective devices allowing easy integration of switching and control elements within the sub-distribution board. These are available in 25A, 40A and 63A frames with various normally open and closed contact configurations.

MS – Magnetic contactors



Mitsubishi Electric magnetic contactors protect your investment

Unified design

The design of the MS series is unified with a white front face brightening the inside of the panel and providing a cleaner image.

Reduced arc space

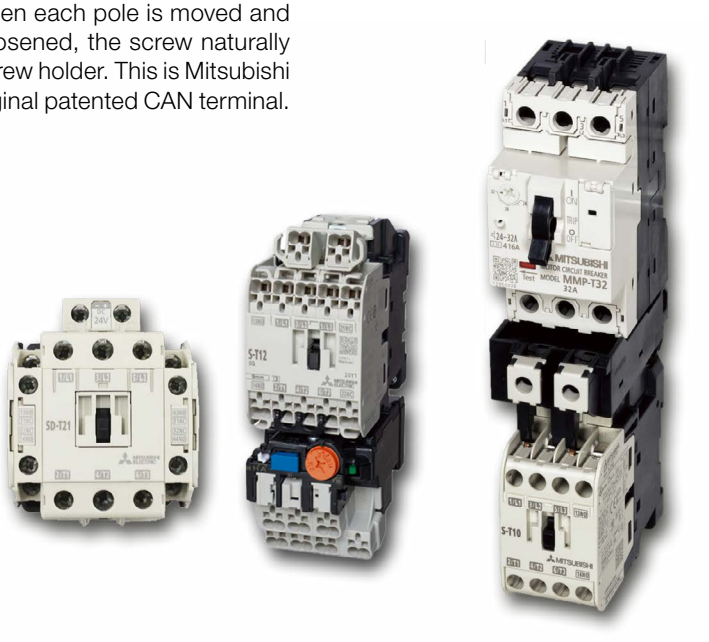
By developing a new extinguishing mechanism, the arc space has been reduced to approximately 1/3 against the previous generation. The new contactors are now significantly smaller, reducing the need for costly cubicle space and allowing the contactors to fit easily and neatly into small recesses of a machine or cabinet.

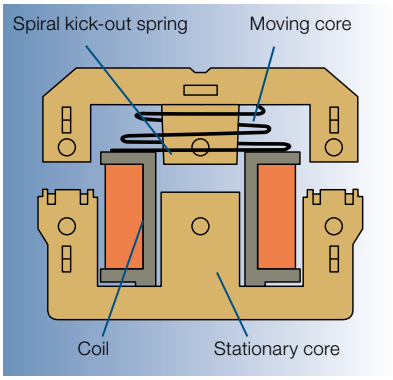
Reliable motor protection

Compact dimensions, modular expansion options and a power-saving design – those are the key characteristics of Mitsubishi Electric's low-voltage switchgear products. The MS series includes magnetic contactors, thermal overload relays and contactor relays. DIN installation rail support and standardised terminal spacing make installation and wiring particularly simple.

Incorporation of CAN terminal for simple wiring

By adopting a CAN terminal, there is no need to remove the screws. The integrated terminal screw and screw holder set in a plastic screw holder, prevent the loss of screw. When each pole is moved and the screw loosened, the screw naturally sets in the screw holder. This is Mitsubishi Electric's original patented CAN terminal.





Efficient electromagnet thanks to advanced engineering

A selection of relays for optimum motor protection characteristics is available optionally.

MS series at a glance

POWER RANGE
20–1000 A

OPERATING VOLTAGE
280–440 V AC (50/60 Hz)

INTEGRATED AUXILIARY CONTACTS
1–4 (NO and/or NC)

OPTIONS
Auxiliary contact blocks, surge absorbers, interlocks, timers, and many more

Easy mounting and wiring

MS new series contactors, starters and relays can all be mounted on DIN rail (35 mm width). For easy wiring coil terminals of those are arranged on upper side of contactors, moreover distance between center of the rail and the coil terminals are unified to 38.5 mm.

With this new wiring technology, we have designed wiring that is simple and safe for your fingers. Even a line with ring cable sockets can now be assembled fast and without any problems. The clamping screws cannot get lost.

Simple inspection

A visual check of the circuit contacts, all can be done by removing the front cover. You can check the installation after assembly.

The new contacts have led to a considerable improvement of the life and reliability of the auxiliary contacts.

Improved magnet

Use of a spiral kick-out spring improves the dynamic balance of the moving parts, extending the core life and generally stabilizing the core movement. Through the use of modern technology, the efficiency of the magnet has been improved. The contactor can withstand a voltage drop of 35 % with the contact closed.

Improved safety

The arc blow-off has been improved for safety and space conservation. This was possible due to a new extinguishing structure, that eliminates arcing toward the front (in the direction of the control panel door) when current is cut off. This new element improved safety and potentially saves space.

Considerably accessories

A cleverly compiled programme of accessories ensures use for a very wide range of applications and requirements. Here too, very simple assembly was a key aspect: the accessory is not screwed but plugged in or snapped on.

Here are some examples of the accessory that is available for the MS series:

- Auxiliary contact blocks for front and side assembly
- Surge absorbers for coils
- Mechanical interlocks
- Pneumatic timers
- DC interface modules
- Single units for overload relays
- Connecting wire kit for reversing

Where have Mitsubishi Electric products been used?

Remote management solutions include SCADA, Networking, Telemetry and Industrial Modems.

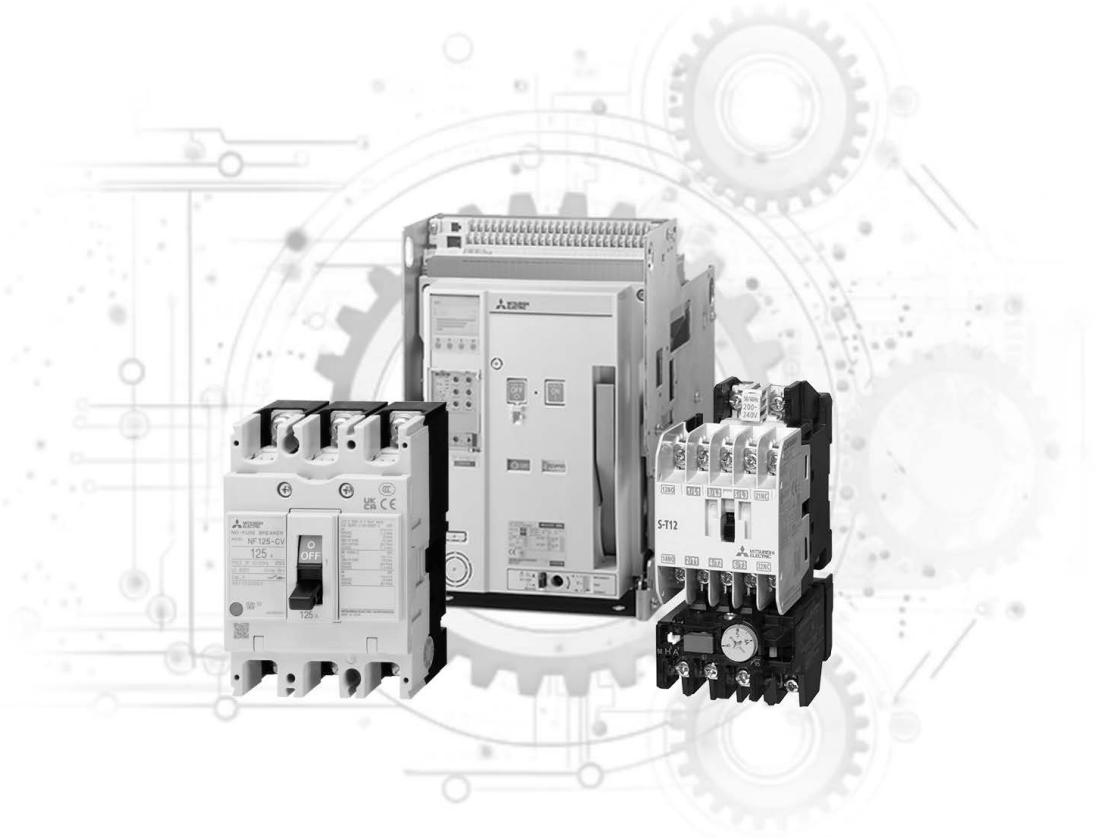
Customer applications with Mitsubishi Electric products have been wide spread from critical applications in pharmaceutical industries to sublime applications in the leisure industry.

Here are just a few examples of applications that customers have completed in the past:

- Agriculture
  - Plant watering systems
  - Plant handling systems
  - Sawmill (wood)
- Building management
  - Smoke detection monitoring
  - Ventilation and temperature control
  - Lift (elevator) control
  - Automated revolving doors
  - Telephone management
  - Energy management
  - Swimming pool management
- Construction
  - Steel bridge manufacturing
  - Tunnel boring systems
- Food and drink
  - Bread manufacturing (mixing/baking)
  - Food processing (washing/sorting/slicing/packaging)
- Leisure
  - Multiplex cinema projection
  - Animated mechatronics (museums/theme parks)
- Medical
  - Respiration machine testing
  - Sterilization
- Pharmaceutical/chemical
  - Dosing control
  - Pollution measurement systems
  - Cryogenic freezing
  - Gas chromatography
  - Packaging
- Plastics
  - Plastic welding systems
  - Energy management systems for injection molding machines
  - Loading/unloading machines
  - Blow molding test machines
  - Injection molding machines
- Automotive
- Printing
- Textiles
- Transportation
  - Sanitation on passenger ships
  - Sanitation on rail rolling stock
  - Fire tender pump management
  - Waste disposal truck management
- Utilities
  - Waste water disposal
  - Fresh water pumping
  - Clarification plants

Automotive control solutions

Technical Information Section



Low voltage & energy monitoring

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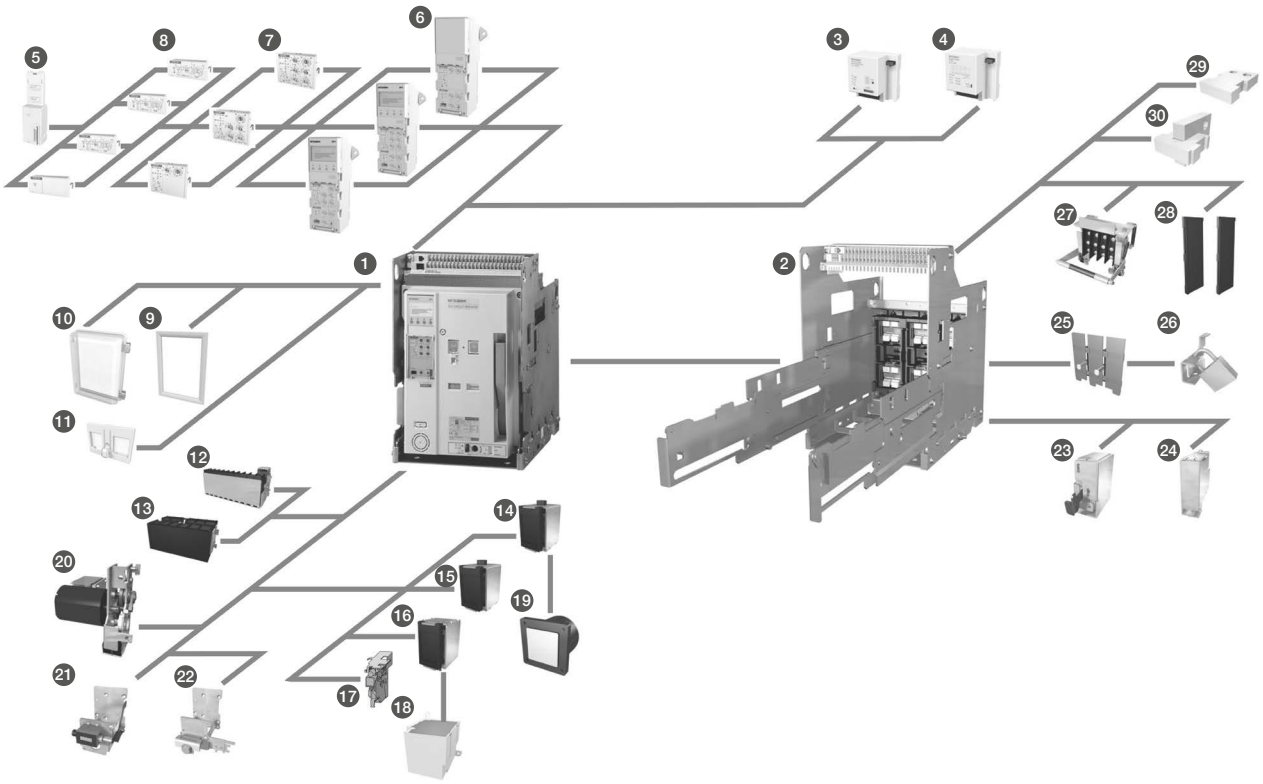
SUPER AE series air circuit breakers – Total product skeleton

Mitsubishi Electric offers a wide range of accessories for the air circuit breakers to serve almost all variations of applications.

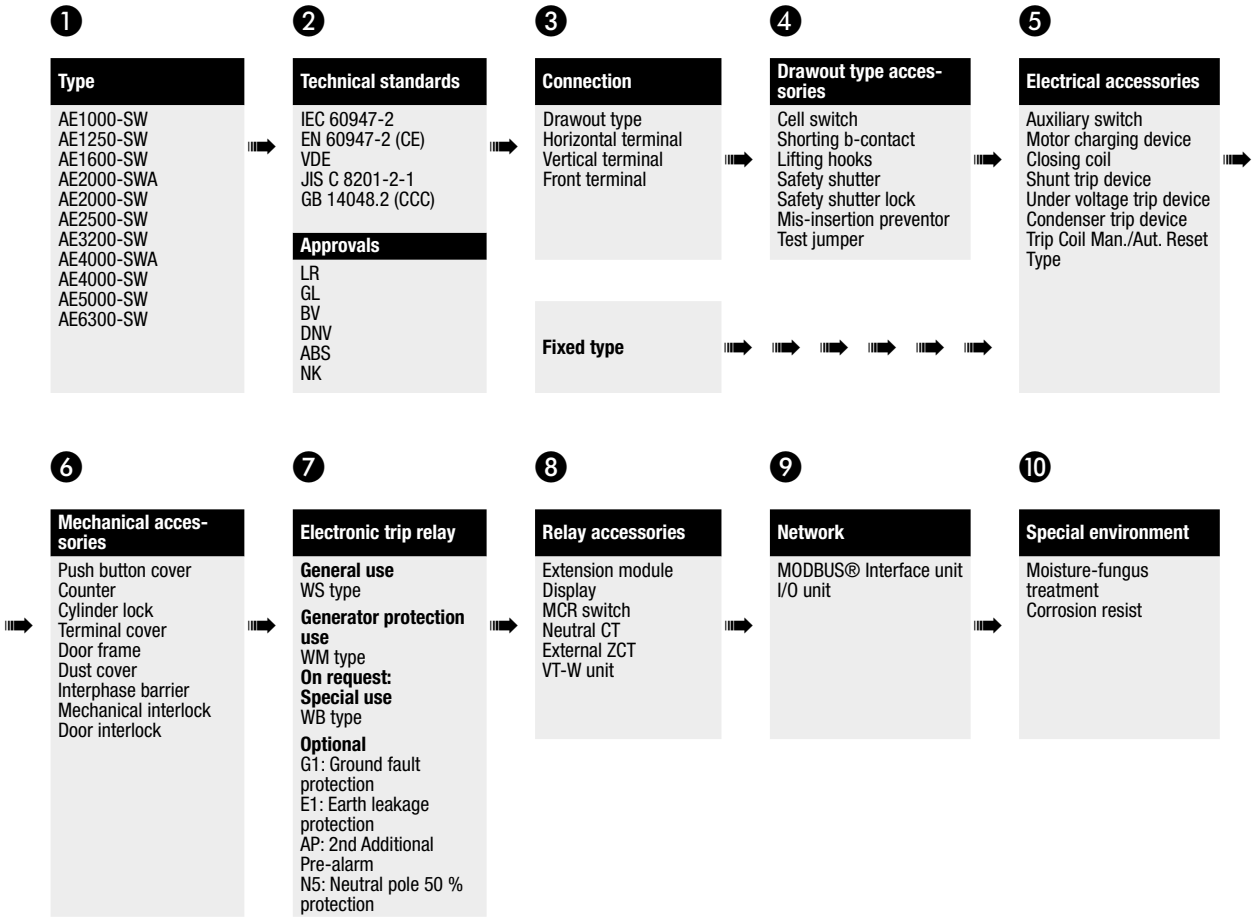


Position	Name
1	Air circuit breaker
2	Cradle
3	MODBUS® Interface unit
4	I/O unit
5	Extension module
6	ETR unit
7	Main setting module
8	Optional setting module
9	Door frame (DF)
10	Dust cover (DUC)
11	Push button cover (BC-L)
12	Auxiliary switch standard (AX)

Position	Name
13	Auxiliary switch high capacity type (HAX)
14	Shunt trip device (SHT)
15	Closing coil (CC)
16	Under voltage trip device (UVT)
17	Trip coil (TC (OCR-Alarm))
18	UVT-controller (U-CON)
19	Condenser trip device (COT)
20	Motor charging device (MD)
21	Counter (CNT)
22	Cylinder lock (CYL)
23	Door interlock (DI)

Position	Name
24	Mechanical interlock (MI)
25	Safety shutters (SST)
26	Safety shutter lock (SST-LOCK)
27	Cell switch (CL)
28	Interphase Barrier (BA)
29	Horizontal terminal
30	Vertical terminal

SUPER AE series air circuit breakers – Total product skeleton



For details on our full range including accessories contact your local distributor

Specifications

SUPER AE – WORLD SUPER SERIES				Breaker type	AE 1000- SW		AE 1250- SW		AE 1600- SW		AE 2000- SWA	
Frame size				A	1000		1250		1600		2000	
Rated insulation voltage (AC V) 50/60 Hz				U_i	1000							
Rated operating voltage (AC V) 50/60 Hz				U_e	690							
Rated impulse withstand voltage (kV)				U_{imp}	12							
Pollution degree					3							
Number of poles				P	3	4	3	4	3	4	3	4
Rated current I_n (CT rating)					1000		1250		1600		2000	
Adjustment range Rated current I_r (A)		General use (current rating adjustable 0.5 to 1.0 x I_n 0.05 step)			500-550-600-650-700-750-800-850-900-950 -1000		625-687.5-750-812.5-875-937.5-1000-1062.5-1125-1187.5-1250		800-880-960-1040-1120-1200-1280-1360-1440-1520-1600		1000-1100-1200-1300-1400-1500-1600-1700-1800-1900-2000	
		Generator protection (current rating fixed)			400 ≤ I_r ≤ 1000		800 ≤ I_r ≤ 1250		1000 ≤ I_r ≤ 1600		1250 ≤ I_r ≤ 2000	
Rated current of neutral pole				A	1000		1250		1600		2000	
IEC 60947-2, EN 60947-2, VDE, JIS C 8201-2-1	Ultimate breaking capacity I_{cu} (kA rms)	With MCR	690 V AC		65		65		65		65	
			600 V AC		65		65		65		65	
			240–500 V AC		65		65		65		65	
		Without instantaneous	690 V AC		25 ①		25 ①		25 ①		25 ①	
			500 V AC		25 ①		25 ①		25 ①		25 ①	
	Rated service breaking capacity Ics (kA rms) % I_{cu}											
	Rated making capacity I_{cm} (kA, peak)	With MCR	690 V AC		143		143		143		143	
			600 V AC		143		143		143		143	
			240–500 V AC		143		143		143		143	
		Without instantaneous	690 V AC		52.5		52.5		52.5		52.5	
			500 V AC		52.5		52.5		52.5		52.5	
Disconnector: switching capacity (6x I_r at 690V AC)					○		○		○		○	
Rated short time withstand current (kA rms) I_{cw}				1 s	65		65		65		65	
				2 s	60		60		60		60	
				3 s	50		50		50		50	
Maximum total breaking time				ms	40 ⑥		40 ⑥		40 ⑥		40 ⑥	
Closing time				ms	80		80		80		80	
Number of operating cycles (ON/OFF) ②		With rated current	500 V AC I_n		5000		5000		5000		1500	
			690 V AC I_n		5000		5000		5000		1500	
		Without rated current ④			25000		25000		25000		25000	
Connecting terminal		Horizontal terminal			○		○		○		—	
		Vertical terminal			○		○		○		○ ③	
		Front terminal			○		○		○		—	
Dimensions (HxWxD) mm		Fixed type	3-pole		410x340x290							
			4-pole		410x425x290							
		Drawout type	3-pole		430x300x368							
			4-pole		430x385x368							
Weight kg		Fixed type	3-pole		41		41		42		47	
			4-pole		51		51		52		57	
		Drawout type (with cradle)	3-pole		64		64		65		70	
			4-pole		78		78		79		84	
		Cradle only	3-pole		26		26		26		31	
			4-pole		30		30		30		35	

① The columns for "without instantaneous" are the values when the bare main body and the external relay is combined.
② The number of operating cycles without rated current also include the number of operating cycles with rated current.
③ AE4000-SW, AE5000-SW, AE6300-SW, AE2000-SWA and AE4000-SWA apply for only vertical terminal of connecting terminal.
④ This value means number of operating cycles of ACB's body not including accessories.
⑤ Products with low rating types is available.

AE 2000- SW		AE 2500- SW		AE 3200- SW		AE 4000- SWA		AE 4000- SW		AE 5000- SW		AE 6300- SW	
2000		2500		3200		4000		4000		5000		6300	
1000								1000					
690								690					
12								12					
3								3					
3	4	3	4	3	4	3	4	3	4(HN, FN) ⑦	3	4(HN, FN) ⑦	3	4(HN, FN) ⑦
2000		2500		3200		4000		4000		5000		6300	
1000-1100-1200-1300-1400-1500-1600-1700-1800-1900-2000 ⑤		1250-1375-1500-1625-1750-1875-2000-2125-2250-2375-2500		1600-1760-1920-2080-2240-2400-2560-2720-2880-3040-3200		2000-2200-2400-2600-2800-3000-3200-3400-3600-3800-4000		2000-2200-2400-2600-2800-3000-3200-3400-3600-3800-4000		2500-2750-3000-3250-3500-3750-4000-4250-4500-4750-5000		3150-3465-3780-4095-4410-4725-5040-5355-5670-5985-6300	
$800 \leq I_r \leq 2000$		$1600 \leq I_r \leq 2500$		$2000 \leq I_r \leq 3200$		$2500 \leq I_r \leq 4000$		$2500 \leq I_r \leq 4000$		$3150 \leq I_r \leq 5000$		$4000 \leq I_r \leq 6300$	
2000		2500		3200		4000		2000 (4000) ⑧		2500 (5000) ⑧		3150 (6300) ⑧	
75		75		75		75		85		85		85	
75		75		75		75		85		85		85	
85		85		85		85		130		130		130	
75		75		75		75		85		85		85	
75		75		75		75		85		85		85	
75		75		75		75		100		100		100	
45 ①		45 ①		45 ①		45 ①		65 ①		65 ①		65 ①	
45 ①		45 ①		45 ①		45 ①		65 ①		65 ①		65 ①	
100 %								100 %					
165		165		165		165		187		187		187	
165		165		165		165		187		187		187	
187		187		187		187		286		286		286	
165		165		165		165		187		187		187	
165		165		165		165		187		187		187	
165		165		165		165		220		220		220	
94.5		94.5		94.5		94.5		143		143		143	
94.5		94.5		94.5		94.5		143		143		143	
○		○		○		○		○		○		○	
75		75		75		75		100		100		100	
75		75		75		75		85		85		85	
65		65		65		65		85		85		85	
40 ⑥		40 ⑥		40 ⑥		40 ⑥		50 ⑥		50 ⑥		50 ⑥	
80		80		80		80		80		80		80	
1500		1500		1000		500		1000		1000		1000	
1500		1500		1000		500		1000		1000		1000	
20000		20000		20000		20000		10000 (3P)/5000 (4P)		10000 (3P)/5000 (4P)		10000 (3P)/5000 (4P)	
○		○		○		—		—		—		—	
○		○		○		○ ③		○ ③		○ ③		○ ③	
○		○		○		—		—		—		—	
410x475x290								414x873x290					
410x605x290								414x1003 (1133)x290 ⑧					
430x435x368						430x439x368		480x875x368					
430x565x368						430x569x368		480x1005 (1135)x368 ⑧					
60	368	61	368	63		81		160		160		160	
72	75	73	99	75		99		180 (200) ⑧		180 (200) ⑧		180 (200) ⑧	
92	78	93	103	95		108		233		233		240	
113	116	114	136	116		136		256 (279) ⑧		256 (279) ⑧		263 (286) ⑧	
35	119	35	140	35		49		118		118		125	
43	44	43	61	43		61		133 (148) ⑧		133 (148) ⑧		140 (155) ⑧	

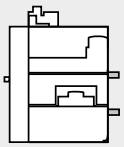
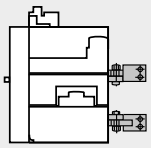
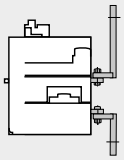
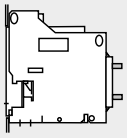
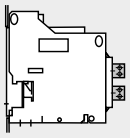
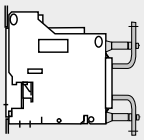
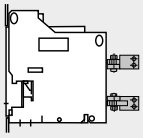
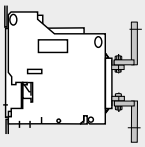
⑥ This value means the instantaneous breaking time at short-circuit interruption. As for accessories (UVT, SHT) refer to page 26 and 27.
⑦ 4 (HN) means the neutral poles current capacity is 50 % of the rated current, for 4-poles.
4 (FN) means the neutral poles current capacity is 100 % of the rated current, for 4-poles.
⑧ () shows the value for 4P FN type.

Remarks:
– All models conform the isolating function according to IEC 60947-2.
– Reverse connection is possible

Connections

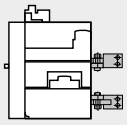
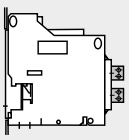
Connection arrangements

The following connecting methods are available for the **AE1000-SW – AE3200-SW.**

Connection / Mounting method	Horizontal connection Standard	Vertical connection Optional	Front connection Optional	Vertical terminal adapter Accessory	Front terminal adapter Optional
Fixed type	 (Standard)	—	—	 (FIX-VTA)	 (FIX-FTA)
Drawout type	 (Standard)	 (DR-VT)	 (DR-FT)	 (DR-VTA)	 (DR-FTA)
Remark	Standard equipment (shipping version)	Special equipment (on request)	Special equipment (on request)	Available as accessory (refer to page 29)	Optional accessory (on request)

Connection image: AE1000 – 1600-SW, 3-pole type
Standard fixed type breakers AE1000/1250/1600/2000/2500/3200-SW are also available as Drawout type. Please order the corresponding cradle with the drawout mechanism (see table on next page)

The following connecting methods are available for the **AE2000-SWA**, **AE4000-SWA** and **AE4000-SW – AE6300-SW.**

Connection / Mounting method	Vertical connection Standard
Fixed type	 (FIX-VT)
Drawout type	 (DR-VT)
Remark	Special equipment (on request)

Connection image: AE2000-SWA, 3-pole type
For AE2000-SWA, AE4000-SWA, AE4000-SW, AE5000-SW and AE6300-SW models, vertical terminal **only** is available.

Available connections

Connections / Breakers		A1000-SW	AE1250-SW	AE1600-SW	AE2000-SWA	AE2000-SW	AE2500-SW	AE3200-SW	AE4000-SWA	AE4000-SW	AE5000-SW	AE6300-SW
Fixed type (FIX)	**Horizontal**	●	●	●	—	●	●	●	—	—	—	—
	FIX-VT	—	—	—	●	—	—	—	●	●	●	●
	FIX-VTA	○	○	○	—	○	○	○	—	—	—	—
	FIX-FTA	○	○	○	—	○	○	○	—	—	—	—
Drawout type (DR)	**Horizontal**	●	●	●	—	●	●	●	—	—	—	—
	DR-VT	○	○	○	●	○	○	○	●	●	●	●
	DR-FT	○	○	○	—	○	○	○	—	—	—	—
	DR-VTA	○	○	○	—	○	○	○	—	—	—	—
	DR-FTA	○	○	○	—	○	○	○	—	—	—	—

● Standard ○ Option — Not available

Order information – Air circuit breakers

Standard series AE-SW – Fixed type

Base unit equipment	Breaker	3-pole type	Art. no.	4-pole type	Art. no.
Shipping contents: ● Electronic trip relay base unit ● Power supply PW3 ● 10 auxiliary contacts (5 NO, 5 NC contacts) ● Automatic reset type trip coil (TCA-AL-W) Further elements that must be ordered: ○ Main setting module for protection ○ Accessories as required	**AE1000-SW**	AE1000-SW 3P Fix, ETRBASE-P3, AX10	168373	AE1000-SW 4P Fix, ETRBASE-P3, AX10	168434
	AE1250-SW	AE1250-SW 3P Fix, ETRBASE-P3, AX10	168435	AE1250-SW 4P Fix, ETRBASE-P3, AX10	168436
	AE1600-SW	AE1600-SW 3P Fix, ETRBASE-P3, AX10	168437	AE1600-SW 4P Fix, ETRBASE-P3, AX10	168438
	AE2000-SW	AE2000-SW 3P Fix, ETRBASE-P3, AX10	168443	AE2000-SW 4P Fix, ETRBASE-P3, AX10	168444
	AE2500-SW	AE2500-SW 3P Fix, ETRBASE-P3, AX10	168445	AE2500-SW 4P Fix, ETRBASE-P3, AX10	168446
	AE3200-SW	AE3200-SW 3P Fix, ETRBASE-P3, AX10	168447	AE3200-SW 4P Fix, ETRBASE-P3, AX10	168448

Cradle with the drawout mechanism

Cradle	For type	Art. no.
CRD163-W	Draw Out type AE1000-AE1600 3P	170078
CRD164-W	Draw Out type AE1000-AE1600 4P	170079
CRD323-W	Draw Out type AE2000-AE3200 3P	170080
CRD324-W	Draw Out type AE2000-AE3200 4P	170081
DRMECHA-W	Drawout mechanism without drawout handle	168511
REC-FD-W	Drawout mechanism with drawout handle	169004

Note: Safety Shutters (SST) and Mis-insertion preventor (MIP) must be ordered as separate accessories.

Air circuit breaker series AE-SWA

Base unit equipment	Breaker	Fixed type	Art. no.	Draw-out type	Art. no.
Shipping contents: ● Electronic trip relay base unit ● Power supply PW3 ● 10 auxiliary contacts (5 NO, 5 NC contacts) ● Automatic reset type trip coil (TCA-AL-W) Further elements that must be ordered: ○ Main setting module for protection ○ Accessories as required	**AE2000-SWA**	AE2000-SWA 3P Fix, ETRBASE-P3, AX10	168439	AE2000-SWA 3P D/O, ETRBASE-P3, AX10	168441
	AE2000-SWA	AE2000-SWA 4P Fix, ETRBASE-P3, AX10	168440	AE2000-SWA 4P D/O, ETRBASE-P3, AX10	168442
	AE4000-SWA	AE4000-SWA 3P Fix, ETRBASE-P3, AX10	168449	AE4000-SWA 3P D/O, ETRBASE-P3, AX10	168451
	AE4000-SWA	AE4000-SWA 4P Fix, ETRBASE-P3, AX10	168450	AE4000-SWA 4P D/O, ETRBASE-P3, AX10	168452

Air circuit breaker series AE4000 – 6300-SW – Fixed/Drawout type

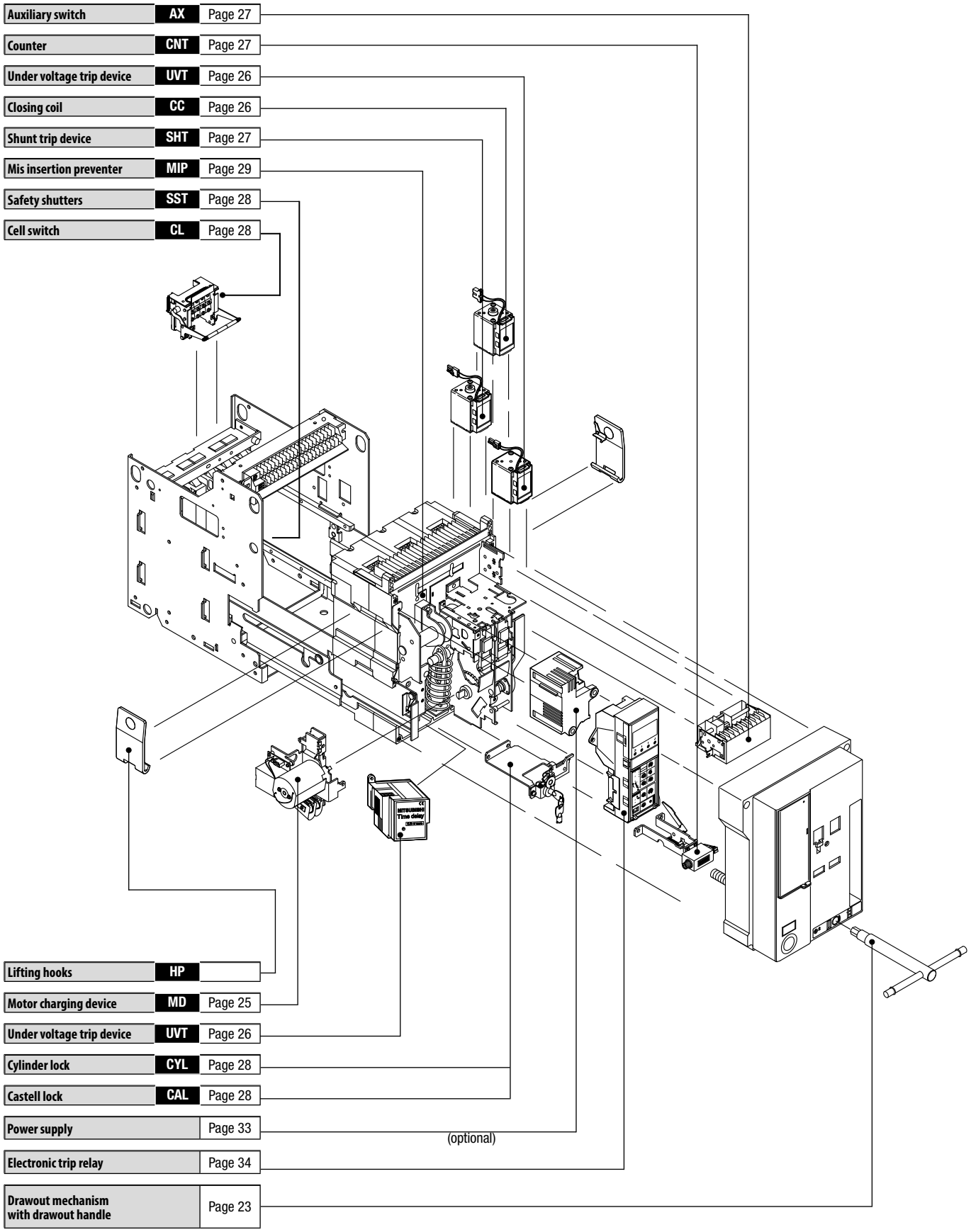
Base unit equipment	Breaker	Fixed type 3/4-pole	Art. no.	Draw-out type 3/4-pole	Art. no.
Shipping contents: ● Electronic trip relay base unit ● Power supply PW3 ● 10 auxiliary contacts (5 NO, 5 NC contacts) ● Automatic reset type trip coil (TCA-AL-W) Further elements that must be ordered: ○ Main setting module for protection ○ Accessories as required	**AE4000-SW**	AE4000-SW 3P Fix, ETRBASE-P3, AX10	205144	AE4000-SW 3P D/O, ETRBASE-P3, AX10	205153
	AE5000-SW	AE5000-SW 3P Fix, ETRBASE-P3, AX10	205145	AE5000-SW 3P D/O, ETRBASE-P3, AX10	205154
	AE6300-SW	AE6300-SW 3P Fix, ETRBASE-P3, AX10	205146	AE6300-SW 3P D/O, ETRBASE-P3, AX10	205155
	AE4000-SW HN	AE4000-SW HN 4P Fix, ETRBASE-P3, AX10	205147	AE4000-SW HN 4P D/O, ETRBASE-P3, AX10	205156
	AE4000-SW FN	AE4000-SW FN 4P Fix, ETRBASE-P3, AX10	205148	AE4000-SW FN 4P D/O, ETRBASE-P3, AX10	205157
	AE5000-SW HN	AE5000-SW HN 4P Fix, ETRBASE-P3, AX10	205149	AE5000-SW HN 4P D/O, ETRBASE-P3, AX10	205158
	AE5000-SW FN	AE5000-SW FN 4P Fix, ETRBASE-P3, AX10	205150	AE5000-SW FN 4P D/O, ETRBASE-P3, AX10	205159
	AE6300-SW HN	AE6300-SW HN 4P Fix, ETRBASE-P3, AX10	205151	AE6300-SW HN 4P D/O, ETRBASE-P3, AX10	205160
	AE6300-SW FN	AE6300-SW FN 4P Fix, ETRBASE-P3, AX10	205152	AE6300-SW FN 4P D/O, ETRBASE-P3, AX10	205161

(HN) means the neutral poles current capacity is 50% of the rated current
(FN) means the neutral poles current capacity is 100% of the rated current

Switch-disconnector AE-SW – Fixed/Drawout type

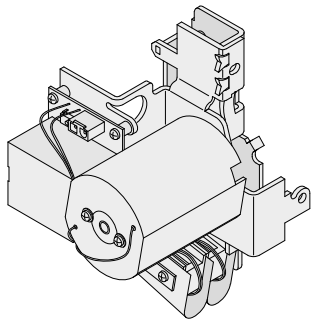
Base unit equipment	Breaker	3-pole type	Art. no.	4-pole type	Art. no.
Shipping contents: ● 10 auxiliary contacts (5 NO, 5 NC contacts) ● Switching capacity $I_{R\,x\,6}$ Further elements that must be ordered: ○ Accessories as required	**AE1000-SW**	AE1000-SW 3P Fix, Bare, AX10	193919	AE1000-SW 4P Fix, Bare, AX10	193920
	AE1250-SW	AE1250-SW 3P Fix, Bare, AX10	193921	AE1250-SW 4P Fix, Bare, AX10	193922
	AE1600-SW	AE1600-SW 3P Fix, Bare, AX10	193923	AE1600-SW 4P Fix, Bare, AX10	193924
	AE2000-SW	AE2000-SW 3P Fix, Bare, AX10	193929	AE2000-SW 4P Fix, Bare, AX10	193930
	AE2500-SW	AE2500-SW 3P Fix, Bare, AX10	193931	AE2500-SW 4P Fix, Bare, AX10	193932
	AE3200-SW	AE3200-SW 3P Fix, Bare, AX10	193933	AE3200-SW 4P Fix, Bare, AX10	193934
	AE2000-SWA	AE2000-SWA 3P Fix, Bare, AX10	193925	AE2000-SWA 4P Fix, Bare, AX10	193926
	AE4000-SWA	AE4000-SWA 3P Fix, Bare, AX10	193935	AE4000-SWA 4P Fix, Bare, AX10	193936
	AE2000-SWA	AE2000-SWA 3P D/O, Bare, AX10	193927	AE2000-SWA 4P D/O, Bare, AX10	193928
	AE4000-SWA	AE4000-SWA 3P D/O, Bare, AX10	193937	AE4000-SWA 4P D/O, Bare, AX10	193938

Overview and mounting positions of the main accessories



Overview and description on the optional accessories

■ Motor charging device (MD)



In addition to manual operation, the closing spring can be charged automatically by an electric motor every time the breaker is closed (ON charging method).

If the closing spring is to be charged automatically whenever the breaker is opened, then this can be done through an additional auxiliary contact (AXb) (OFF charging method). As soon as charging is completed, a visual display on the front says “CHARGED”.

The “CHARGED” signal is also available via the 413 (TS+) and 414 (TS-) terminals (included in the standard MD configuration).

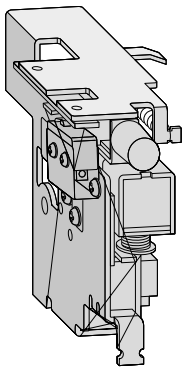
There is always the option of manual operation in an emergency. A closing coil (CC) is required for closing the breaker by remote control, and a shunt trip device (SHT) is required for opening it in this way.

This warrants the prevention of pumping, both electronically and mechanically. The circuit of the motor is separate from the ON/OFF circuit (CC, SHT).

Specifications		MD-AD125-W	MD-AD250-W	MD-DO24-W	MD-DO48-W
Rated voltage		100–125 V AC/DC	200–250 V AC/DC	24 V DC	48 V DC
Applicable voltage range	(V)	85–137.5	170–275	18–26.4	36–52.8
Applied voltage	(V)	100/125	200/250	24 V	48 V
Inrush current (peak value)	(A)	10/12	5/6	22	14
Steady current	(A)	3	1	6	3
Charging time	(sec)	≤5	≤5	≤5	≤5
Criterion for power requirement	(VA)	700/1000	700/1000	500	500
Order information	Art. no.	168514	168515	168518	168519

① These two models are only for the AE4000-SWA (4P) type breaker.

■ Trip coil (AL)



Automatic reset type (TCA-AL-W)

OCR alarm (AL) is provided as standard if ETR is equipped. OCR alarm (AL) is the contact (1a) of short-time operation (30 ms), being output when the breaker is tripped by the electronic trip relay.

The Automatic reset type will reset the breaker after tripping.

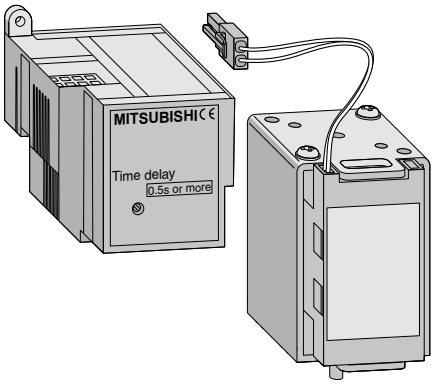
Manual reset type (TCM-AL-W)

On the manual reset type (optional), the gray manual reset button will stick out to continuously output OCR alarm (AL) if the breaker is tripped by the electronic trip relay. After tripping, the breaker can not be turned on unless the manual reset button on the front side of the breaker is pressed for resetting.

Specifications		TCA-AL-W	TCM-AL-W
Voltage	AC (V)	125/240	125/240
	DC (V)	30/125/240	30/125/240
Resistive load	AC (A)	5/3	5/3
	DC (A)	4/0.4/0.2	4/0.4/0.2
Inductive load	AC (A)	3/2	3/2
	DC (A)	3/0.4/0.2	3/0.4/0.2
Order information	Art. no.	168535 (standard)	168536

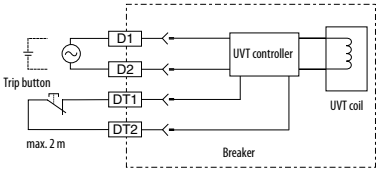
Notes:
– Though the control power supply is unnecessary to activate OCR alarm (AL), the self-holding circuit is necessary since the contact output is activated for the short time (30 ms).
– This works when tripping occurs in LTD, STD, INST, GFR or ER.
– If any continuous output of OCR alarm (AL) is necessary, use the trip indicator (TI) output contact of the electronic trip relay.

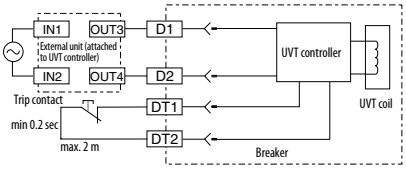
■ Undervoltage trip device (UVT)



This is the device that automatically trips the breaker when the circuit voltage drops below the nominal voltage, and comprises a UVT coil and UVT controller.

Time range for tripping time:
INST (0.2 sec or less)/0.25 sec/0.5 sec/ 0.8 sec/1.0 sec/1.5 sec/3 sec.

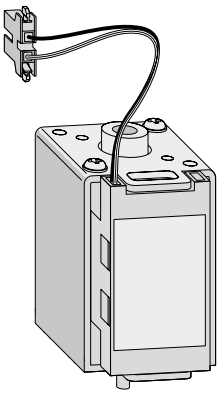


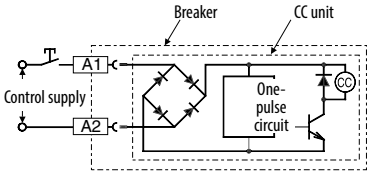


Specifications		UCON-D024B-W INST	UCON-D048B-W INST	UCON-D110B-W INST	UCON-D125B-W INST	UCON-D250B-W INST	UCON-A120B-W INST	UCON-A240B-W INST	UCON-A460B-W INST
Rated voltage	(V)	24 (DC)	48 (DC)	100–110 (DC)	120–125 (DC)	220–250 (DC)	100–120 (AC)	200–240 (AC)	380–460 (AC)
Frequency		—					50/60 Hz		
Operating time (time delay)		☐ INST (0.2 sec); ☐ 0.25 sec ; ☐ 0.5 sec ; ☐ 0.8 sec ; ☐ 1.0 sec ; ☐ 1.5 sec ; ☐ 3.0 sec							
Pick-up voltage	(V)	15.6–20.4	31.2–40.8	65–85	78–102	143–187	65–85	130–170	247–323
Drop-out voltage	(V)	10.8–16.8	21.6–33.6	45–70	54–84	99–154	45–70	90–140	171–260
Trip function		With open circuit of DT1, DT2 terminals							
Power consumption	(VA)	20							
Order information	Art. no.	203341	203342	203343	203344	203345	203346	203347	203348
Accessories		UVT coil: art. no. 168525; UCON label: art. no. 168526 (Packing unit: 10 pcs)							

Notes:
– Please order for each UCON one UVT coil, and for delay setting one UCON lable.
– In case of 380–460V AC, the external unit is attached.
– The operating time is a guarantee value when it drops from 85 % or more of rated voltage.
– Time delay should be allowed for 1.5 s between applying the voltage to the UVT and closing the breaker.
– If a remote trip function is required, remove the shorting bar (DT1–DT2) and connect a normally closed switch, rated 0.5 A at 150 V DC across them.
– Usage ambient temperature is a range of max. 40 °C to -5 °C.

■ Closing coil (CC)





Diode rectifier is not used for control source 24–48 V DC.

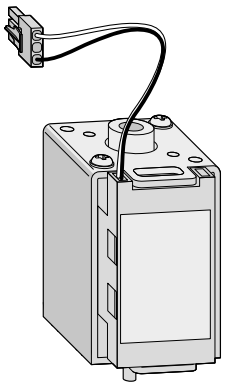
The closing coil is a device to close the breaker by remote control. Only one closing signal (about 100 ms) is sent even when the closing coil supply is maintained ON.

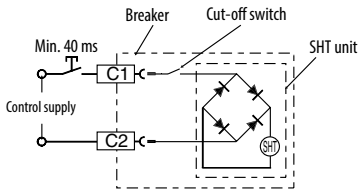
- An interlock to prevent pumping is provided electrically.
- Closing time is from the initial energization of the closing coil to the completion of the closing of the main contacts.
- As CC is one-pulse driven, it is not necessary to insert AXb for burning prevention purposes. Inserting AXb will cause anti-pumping function to be ineffective.

Specifications		CC-D048-W	CC-AD250-W
Rated voltage	(V)	24–48 DC	100–250 AC/DC
Applicable voltage range	(V)	18–52.8	75–275
Operating voltage	(V)	24/48	100/250
Inrush current	AC (A)	—	0.7/1.7 (AC 100 V 100 VA, AC 250 V 200 VA)
	DC (A)	3/6 (DC 24 V 100 W, DC 48 V 200 W)	0.8/1.8 (DC 100 V 100 W, DC 250 V 200 W)
Closing time ①	(sec)	Max. 0.08 or less	Max. 0.08 or less
Order information	Art. no.	168521	168520

① In case of double rating of rated voltage, it is the value to the lower rating.
Example: In case of DC 24 to 48, it is operating time to DC 24 V.

■ Shunt trip device (SHT)





Diode rectifier is not used for control source 24–48 V DC.

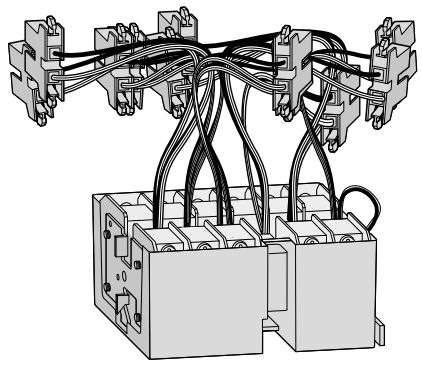
The shunt trip device is used to open the breaker by remote control.

A cut-off switch is included (AX/HAX).

Specifications		SHT-D048-W	SHT-A500-W	SHT-AD250-W
Rated voltage	(V)	24–48 DC	380–500 AC	100–250 (AC/DC)
Applicable voltage range	(V)	16.8–52.8	266–550	70–275
Operating voltage	(V)	24/48	380–500	100/250
Inrush current (peak value)	AC (A)	—	0.5/0.7 (AC 380 V 250 VA, AC 500 V 300VA)	0.4/1.4 (AC 100 V 100 VA, AC 250 V 150 VA)
	DC (A)	2.5/6.0 (DC 24 V 100 W, DC 48 V 200 W)	—	0.6/1.6 (DC 100 V 100 W, DC 250 V 200 W)
Closing time ①	(sec)	max. 0.04 or less	max. 0.04 or less	max. 0.04 or less
Order information	Art. no.	168524	168523	168522

① In case of double rating of rated voltage, it is the value to the lower rating.
Example: In case of DC 24 to 48, it is operating time to DC 24 V.

■ Auxiliary switch (AX, HAX)

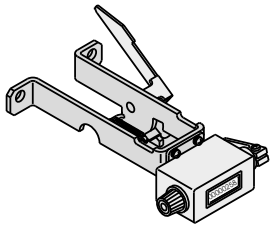


This is the contact that is used to remotely indicate the ON or OFF status of the breaker.

- The a and b contacts may turn simultaneously to ON instantaneously at the time of changing the contact; Pay attention to the contact state when designing circuits.
- The chattering time at the time of contact ON-OFF is below 0.025 sec.
- For special environment specification, the contact capacity gets deteriorated. Apply for further detail.

Specifications		AX-10-W		HAX-10-W	
Load		Resistance	Inductive	Resistance	Inductive
Contact capacity (A)	AC 250 V	10	10	10	10
	AC 125 V	10	10	10	10
	DC 250 V	0.3	0.3	3	1.5
	DC 125 V	0.6	0.6	10	6
	DC 30 V	10	6	10	10
Maximum number of contacts		5a5b		5a5b	
Order information	Art. no.	168962 (standard)		168961	

■ Counter (CNT)

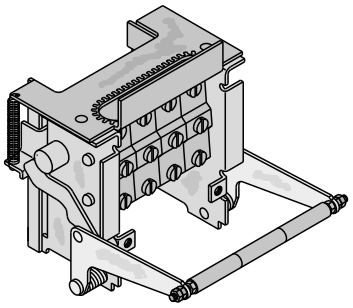


This is a mechanical counter which registers the total number of operating cycles (with 1 ON/OFF switching operation = 1 operating cycle).

The number of operating cycles is displayed on the front of the unit.

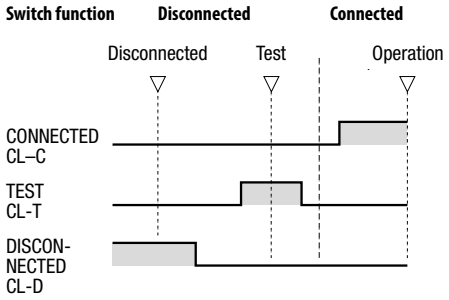
Specifications	CNT-W
Counter type	Mechanical
Display	5 digits
Order information Art. no.	168538

■ Cell switch (CL)

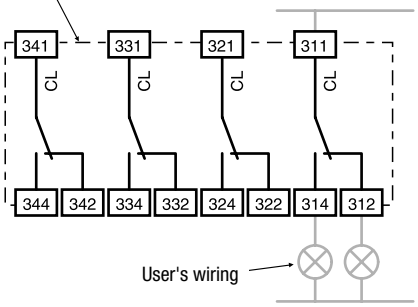


The cell switches can be set for all the relevant positions, i.e. connected, test and disconnected.

Each cell switch consists of 4 individual switches.



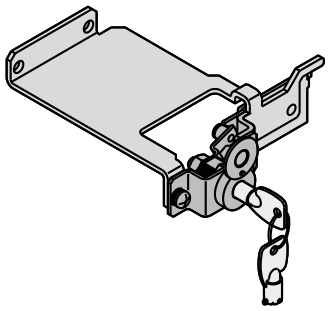
Cell switch



Specifications		CL-4-W		BIF-CL-W ①	
Load		Resistive	Inductive	Resistive	Inductive
Contact capacity (A)	AC 460 V	5	2.5	5	2.5
	AC 250 V	10	10	10	10
	AC 125 V	10	10	10	10
	DC 250 V	3	1.5	3	1.5
	DC 125 V	10	6	10	6
	DC 30 V	10	10	10	10
Maximum contacts		Total 4c			
Order information	Art. no.	168512		168575	

① BIF-CL only necessary for networks operation

■ Interlock device (CYL)



The interlock device locks the circuit breaker into the OFF position.

The relevant key can only be taken out in the OFF position of the circuit breaker, so that it can also be used for unlocking other breakers.

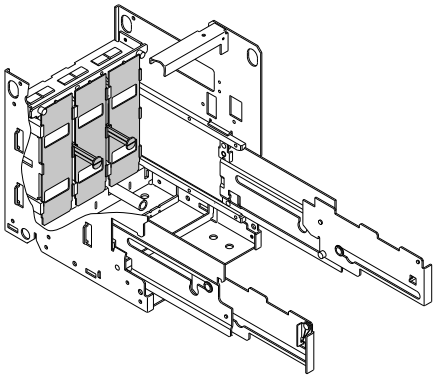
There are two locking options available:

- Cylinder lock (CYL)
- Castell lock (CAL) ①

Specifications		CYL-WK-W	CYL-WK1-W	CYL-WK2-W	CYL-WK3-W	CYL-WK4-W	CYL-NK-W
Interlock		Cylinder	Cylinder	Cylinder	Cylinder	Cylinder	Castell ①
Closing		Basic	1	2	3	4	Basic
Order information	Art. no.	168539	168540	168541	168542	168543	168544

① The closing basis for the castell lock can be designed individually. Further details on request.

■ Safety shutters (SST)



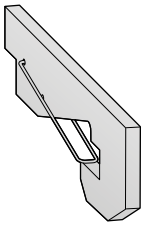
The safety shutters cover the main conductors of the cradle side (supply and load side) automatically when the circuit breaker is drawn out.

When checking the main circuit, the safety shutters on the supply and load sides can be opened independently of one another.

The safety shutters can also be locked with a mechanical locking device (SST LOCK). The padlocks have to be supplied by customer.

Specifications		SST-LOCK-W	SST-203-W	SST-204-W	SST-403-W	SST-404-W
Breaker type		Drawout				
Number of poles		3/4	3	4	3	4
Order information	Art. no.	168510	168973	168974	168975	168976

■ Mis-insertion preventor (MIP)

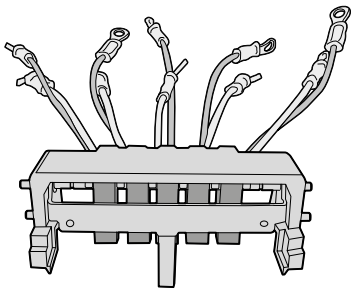


To obtain the right draw out configuration, it is extremely important that the breaker unit specifications (type, current rating, optional accessories, etc.) should match the cradle.

Mis-insertion is prevented by a combination of matching components (on the breaker and the cradle).

Specifications	MIP-W
Material	Metal
Order information Art. no.	168547

■ Shorting b-contact (SBC)

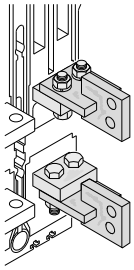


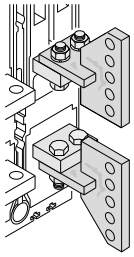
SBC-5-W

When moving the breaker from the connected to the test positions, this contact is used to short circuit auxiliary switch (AXb) thus maintaining the correct sequence of operation of the external control circuit.

Specifications		SBC-1-W	SBC-2-W	SBC-3-W	SBC-4-W	SBC-5-W
Number of contacts		1	2	3	4	5
Application (breaker)		All breakers				
Order information	Art. no.	168548	202337	202338	202339	202340

■ Vertical terminal adapter (VTA)



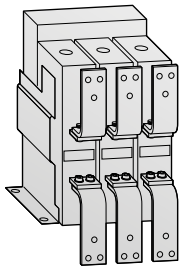


Vertical terminal adapters allow you to turn power connection by 90°.

For AE2000-SWA, AE4000-SWA, AE4000-SW, AE5000-SW and AE6300-SW models, vertical terminal only is available.

Specifications		VTA-02-W	VTA-03-W	VTA-32-W
Application (breaker)		AE1000–AE1600-SW	AE2000–2500-SW	AE3200-SW
Shipping contents	pieces	1	1	1
Order information	Art. no.	168978	168979	168980

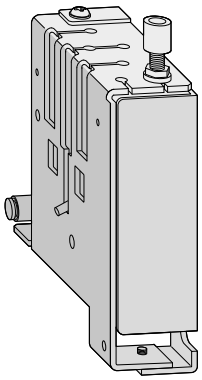
■ Front terminal adapter (FTA)



Front terminal adapters FTA allows a vertical connection for supply- and load-busbars.

Specifications		FTA-163F-W	FTA-164F-W	FTA-253F-W	FTA-254F-W	FTA-323F-W	FTA-324F-W	FTA-163D-W	FTA-164D-W	FTA-253D-W	FTA-254D-W	FTA-323D-W	FTA-324D-W
Application (breaker)		AE1000–AE1600-SW	AE1000–AE1600-SW	AE2000–AE2500-SW	AE2000–AE2500-SW	AE3200-SW	AE3200-SW	AE1000–AE1600-SW	AE1000–AE1600-SW	AE2000–AE2500-SW	AE2000–AE2500-SW	AE3200-SW	AE3200-SW
Pole		3	4	3	4	3	4	3	4	3	4	3	4
Typ		Fixed						Drawout					
Shipping contents	pieces	6	8	6	8	6	8	6	8	6	8	6	81
Order information	Art. no.	169331	169332	169333	169334	169335	169336	169337	169338	169339	169340	169341	169342

■ Mechanical interlock (MI)



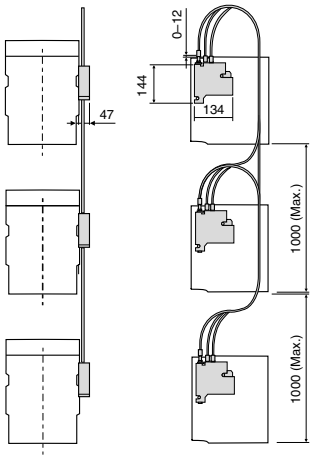
This is the device to prevent parallel charge of 2 or 3 units of breakers, and it can interlock the breakers mechanically without fail. All combinations are available among any models from AE1000-SW to AE4000-SWA.

Please apply for further details of AE4000-SW to AE6300-SW.

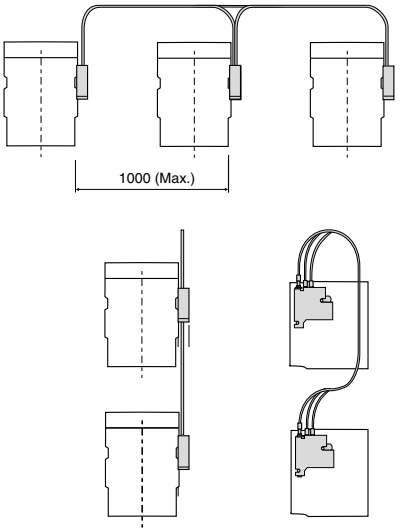
Further the interlock is possible among the different connection types or poles, such as fixed type or drawout type, 3 pole or 4 pole. In combination with electric interlock, the higher safety interlock system can be secured.

- In case of drawout type,the interlock works at “CONNECTED” position, and in another position the interlock is released, which is convenient for and easy maintenance and inspection of the breaker.
- When to turn OFF one breaker and then turn ON another breakers, please take an interval 0.5 seconds or more.
- MI for 3 breakers can not be installed to combine with Door Interlock (DI).

Vertical mounting



Horizontal mounting

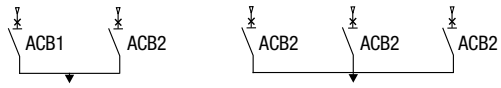


[mm]

Switching states (for 2 ACBs)

Type	①	②	③
ACB 1	○	I	○
ACB 2	○	○	I

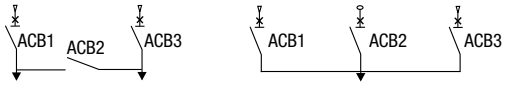
Type	①	②	③	④
ACB 1	○	I	○	○
ACB 2	○	○	I	○
ACB 3	○	○	○	I



Switching states (for 3 ACBs)

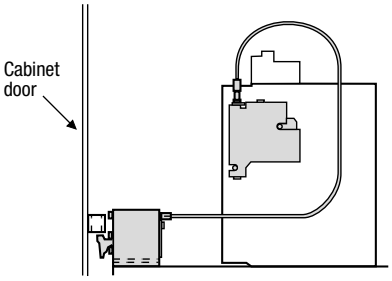
Type	①	②	③	④	⑤	⑥	⑦
ACB 1	○	I	○	○	I	I	○
ACB 2	○	○	I	○	I	○	I
ACB 3	○	○	○	I	○	I	I

Type	①	②	③	④	⑤
ACB 1	○	I	○	○	○
ACB 2	○	○	I	○	○
ACB 3	○	○	○	I	I



Specifications		MI-203F-W	MI-204F-W	MI-403F-W	MI-404F-W	MI-203D-W	MI-204D-W	MI-403D-W	MI-404D-W	MI-IW-W
Application (breaker)		AE1000–1600-SW AE2000-SWA		AE2000–3200-SW AE4000-SWA		AE1000–1600-SW AE2000-SWA		AE2000–3200-SW AE4000-SWA		Wire set for all mechanical interlock devices required for combination of 3 ACBs
Breaker type		Fixed				Drawout				
Number of poles		3	4	3	4	3	4	3	4	
Order information	Art. no.	168963	168964	168965	168966	168967	168968	168969	168970	168971

■ Door interlock (DI)



The device has been designed for panel doors with the groove on the left (standard). Locks for grooves on the right are available on request.

A wire-type mechanical interlock is used to allow flexibility in positioning breakers in the panel.

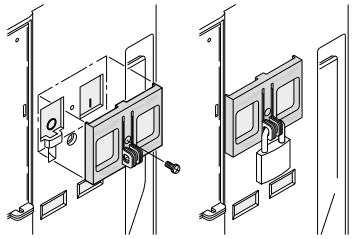
Note:

When using the door interlock (DI) the application of the mechanical interlock (MI) with 3 breakers is not possible.

This mechanical interlock device makes it impossible to open the panel door unless the circuit breaker is not switched off.

Specifications		DI-F-W	DI-D-W
Application (breaker)		For all breakers	For all breakers
Breaker type		Fixed	Drawout
Order information	Art. no.	168545	168546

■ Push button cover (BC-L)

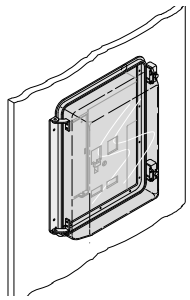


This mechanical device can be locked with a padlock or a seal (both is not included in the package) to protect the push buttons of the breaker unit against inadvertent ON/OFF operation.

The padlock has to be supplied by the customer.

Specifications	BCL-W
Material	Acrylic plate
Order information Art. no.	168537

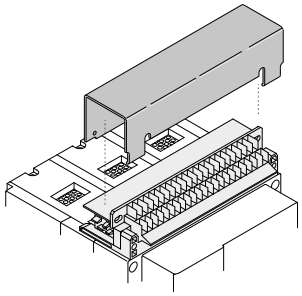
■ Dust cover (DUC)



The transparent dust cover is hinged onto the panel door. It has a screw lock and prevents dust and water entering into the circuit breaker.

Specifications	DUC-W
Protection	IP54
Order information Art. no.	168960

■ Terminal cover (TTC)



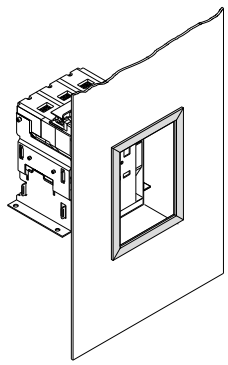
The terminal cover is a transparent cover for safety finger protection of control terminals.

The terminal cover prevents from careless touching to the live control terminals.

The TTC-F-W is included within the delivery of a fixed type AE-SW as standard.

Specifications	TTC-D-W	TTC-F-W
Application (breaker)	Dawout type	Fixed type
Protection	IP20	IP20
Order information Art. no.	168549	168972 (Standard)

■ Door frame (DF)



The door frame improves the appearance, after cutting out the panel door to install the breaker.

Details on request.

Specifications	DF-W
Application (Breaker)	For all breakers
Material	Plastic
Protection	IP20
Order information Art. no.	168513

■ Current transformer (CT)

These current transformers (CT and sensor coil) are suitable for the main conductor and the N conductor.

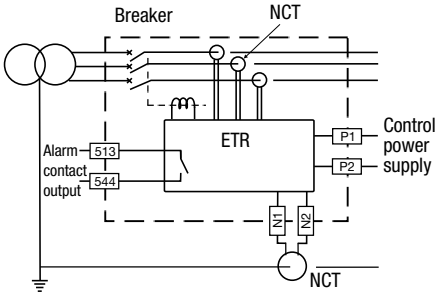
Current transformers of type CT-06□□□ serve the reduction of $I_{N\,max}$ on an AE1000.

Specifications		CT-06-W 025	CT-06-W 031	CT-06-W 050	CT-06-W 063	CT-10-W 100	CT-12-W 125	CT-20-W 125	CT-20-W 160	CT-20-W 200	CT-25-W 250
Application (breaker) ①		AE1000-SW	AE1000-SW	AE1000-SW	AE1000-SW	AE1000-SW	AE1250-SW	AE2000-SW	AE2000-SW	AE2000-SW	AE2500-SW
Rated current $I_{N\,max}$ ②	(A)	250	315	500	630	1000	1250	1250	1600	2000	2500
Order information	Art. no.	193939	193940	193941	193942	193943	193944	193946	193947	193948	193949

① Shipping contents includs CT and sensor coil for 1 pole. Other transformers on request.
② At 40 °C and 50/60 Hz

■ Neutral current transformer (NCT)

Block diagram with NCT function



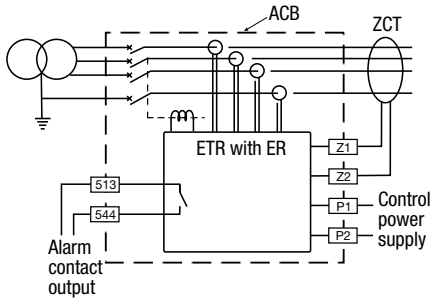
The neutral CT is used for ground fault protection when a 3 pole breaker is used on a 3 phase 4 wire system.

The ground fault protection module type G1 should be used as optional setting module.

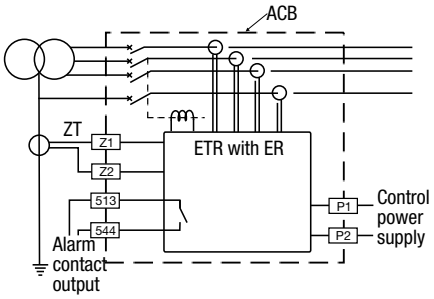
Specifications		NCT-06-W	NCT-10-W	NCT-12-W	NCT-16-W	NCT-20-W	NCT-25-W	NCT-32-W	NCT-40-W	NCT-50-W	NCT-63-W
Application (breaker)		AE630-SW	AE1000-SW	AE1250-SW AE2000-SW	AE1600-SW AE2000-SW	AE2000-SWA AE2000-SW	AE2500-SW	AE3200-SW	AE4000-SWA	AE5000-SWA	AE6300-SWA
Current range	(A)	630	1000	1250	1600	2000	2500	3200	4000	5000	6300
Order information	Art. no.	168986	168987	168988	168989	168990	168991	168992	168993	582102	416518

■ External current transformer (ZCT/ZT)

Transformer load circuit method (ZCT)



Tranformer ground wire method (ZT)



This option is used to detect several amperes of earth leakage when used in combination with an electronic trip relay that has the earth leakage tripping (ER) option.

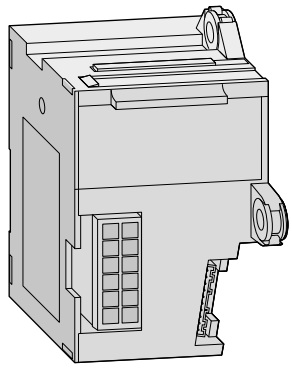
Two methods are available:

- ZCT: three-load phase conductors (and the neutral conductor in a 4-wire system) are passed through the ZCT
- ZT: The other method uses a smaller ZCT (only supply transformer ground wire passes through to earth.

Specifications		ZCT-163-W	ZCT-323-W	ZCT-324-W	ZT-15B-W	ZT-30B-W	ZT-40B-W	ZT-60B-W	ZT-80B-W	ZT-100B-W
Application		Load circuits			Transformer ground wire					
Hole diameter for wire ①	(mm)	230x60 (oval)	370x108 (oval)	500x108 (oval)	Ø 15	Ø 30	Ø 40	Ø 60	Ø 80	Ø 100
Order information	Art. no.	168994	168995	168996	168997	168998	168999	169000	169001	169002

① Further details on request.

■ Internal power supply units (PW)

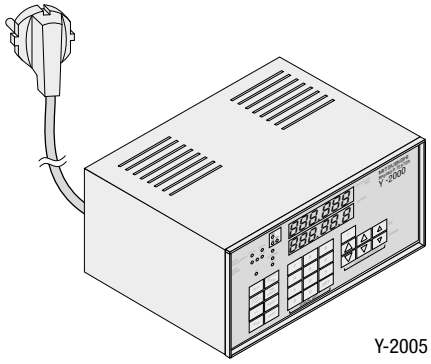


These power supplies are used for supplying the ETR base unit. They are equipped with 6 outputs (alarms and errors).

The PW3-W is included as standard power supply in the ACB's.

Specifications		PW3-W	PW4-W	PW5-W
Power supply	(V)	100–240 (AC) 100–125 (DC)	24–60 (DC)	100–240 (DC)
Output contacts		6	6	6 (SSR)
Order information	Art. no.	168985 (standard)	168562	168563

■ Field test device (Y-2005)

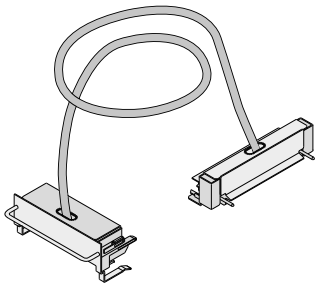


Y-2005

The electronic trip relay can be checked by this field test device when the breaker is at test or disconnect position. So it allows you to test the trip relay without the breaker being connected to the main supply. The breaker will trip when tested.

Specifications	Y-2005
Power supply	100–240 V AC, 50/60 Hz
Test functions	LTD, INST, STD, Ground fault, pre-alarm
Test current signal setting	Continuously variable (10–2500 %)
Others	Ammeter, time counter
Order information Art. no.	233426

■ Test jumper (TJ)



With the breaker taken out of its cradle, this device enables the breaker to be electrically opened and closed, and the operating sequence to be checked.

Specifications		Test jumper
Cable length	(m)	3 ①
Order information Art. no.		168977

① Other lengths on request

■ Interphase barriers

Connections		AE1000-SW – AE1600-SW	AE2000-SWA	AE2000-SW – AE3200-SW	AE4000-SWA
Fixed type	Horizontal (FIX)	●	×	●	×
	Vertical terminal (FIX-VT)	×	▲	×	▲
	Vertical terminal adaptor (VTA)	▲	×	▲	×
	Front terminal adaptor (FIX-FTA)	▲	×	▲	×
Drawout type	Horizontal (DR)	●	×	●	×
	Vertical terminal (DR-VT)	●	▲	▲	▲
	Front terminal (DR-FT)	—	×	▲	×
	Vertical terminal adaptor (VTA)	▲	×	▲	×
	Front terminal adaptor (DR-FTA)	▲	×	▲	×

● = Available for the insulation ▲ = Available for separating terminals × = Not existing type — = Attachment is impossible

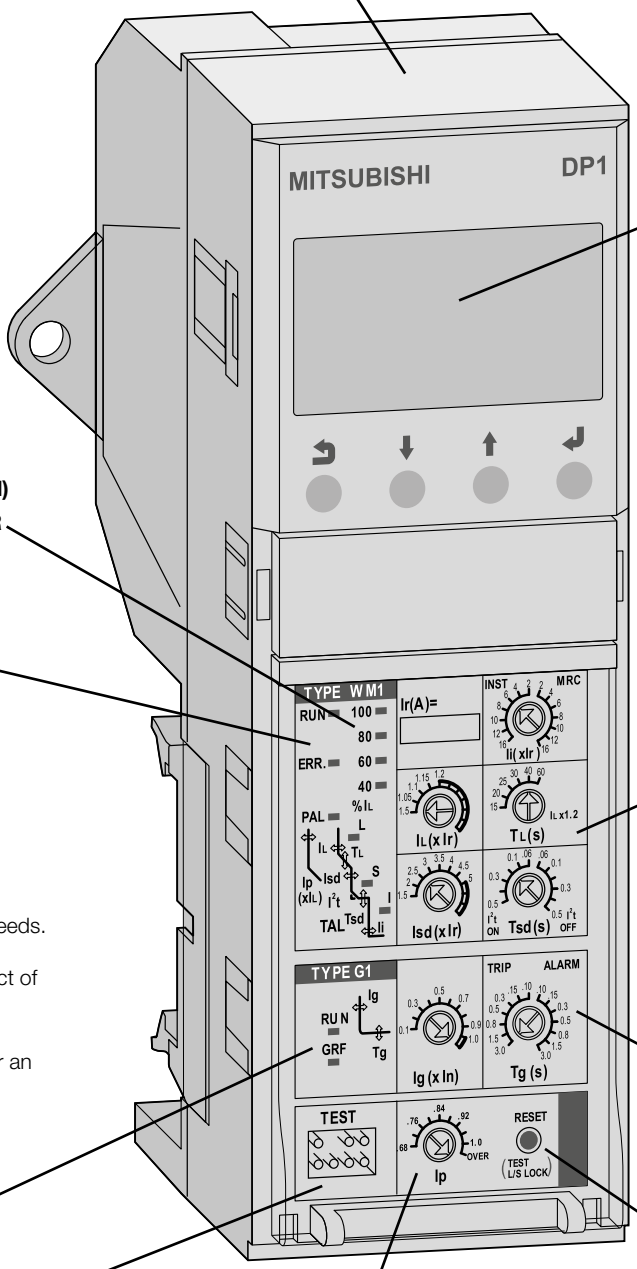
For AE4000-SW to AE6300-SW not available

Introduction and selection

Power supply module

This module provides control source for display module, trip indicator and several indicators (LEDs). (Even when the control power source is off, the function of over current protection and ground fault protection are effective.)

The power supply modules provide 6 output contacts for external use (see page 36).



Display

Several measuring data (current, voltage, power etc) and alarms can be displayed with this module. (see page 42)

Load current LED (standard)

This indicator displays the ETR situation (Run or Error)

RUN LED, ERR. LED (standard)

This indicator displays the ETR situation (Run or Error)

Main setting module

This module provides the function of over current protection. It is possible to select the two setting modules according to application (see page 36).

Neutral protection of rated current (100 %) function is standard at 4 pole breaker.

Pre-alarm (PAL) (standard)

This indicator displays the pre-alarm situation when the setting current exceeds. If a power supply module with alarm contacts is installed, the output contact of Pre-alarm is available.

* The output is reset when the electric current goes below the set level after an alarm is set off

Optional setting module (option) (figure shows G1)

Additional functions and characteristics can be selected by optional setting modules (see page 40).

Trip indicator LED (standard)

This indicator displays the trip cause.

TEST terminal (standard)

This terminal already installed as standard and is used for checking by the field test device Y2005.

Pre-alarm current level setting dial (standard)

For setting the current level for pre-alarm. If current exceeds this level, pre-alarm is indicated.

RESET button (standard)

When push this reset button, trip indicator, and pre-alarm will be reset. And when the instantaneous test by field test device Y2005 (optional) and push this reset button, as a result of LTD and STD function become ineffective.

Standard functions

■ OCR alarm (AL)

When it happens to trip by over current, ground fault (GFR) or Earth leakage (ER), this function issues a warning alarm.

■ Neutral pole overcurrent protection (NP)

When harmonics in load current are large, the current on neutral pole exceeding rated current may flow. Harmonics may cause some troubles.

Neutral pole overcurrent protection prevents them by operating at 100 % of rated current on neutral pole. Please see page 41 for 50 % neutral protection.

Special functions – optional

■ MCR: Making current release

Just under the breaker closing operation (from open to close), Instantaneous characteristic become effective, but after closing the breaker, instantaneous characteristic become ineffective.

When you order the MCR switch, MCR switch is built in the main body. If MCR switch is built in the main body and the adjust dial of INST/ MCR on main setting module is set the MCR position, MCR function become effective (see page 41).

■ NCT

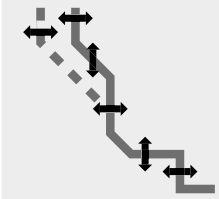
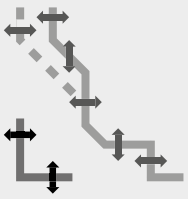
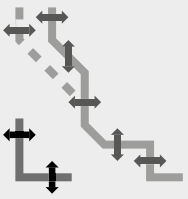
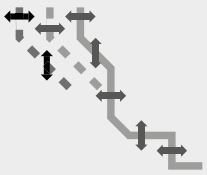
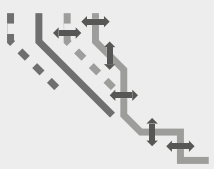
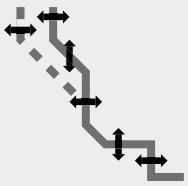
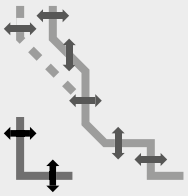
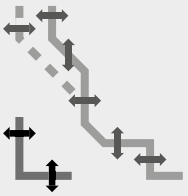
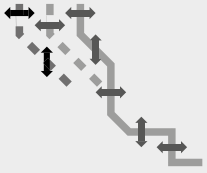
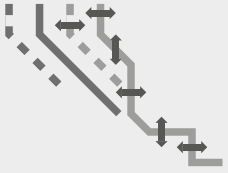
Neutral CT is required for Ground fault or Neutral pole protection, when 3 pole breaker is used for 3 phase 4 wires system. (see page 32)

■ ZCT

ZCT is required for a few amperes earth leakage protection, and is combining ER plug. (see page 32)

Characteristic table

Overview of tripping characteristics of main setting modules in combination with optional setting modules

	General protection Main setting module only	G1 Ground fault	E1 Earth leakage	AP 2nd additional Pre-alarm	N5 Neutral pole 50 % protection
WS General use LTD+STD+INST/MCR					
WM Generator protection use LTD+STD+INST/MCR					

Note:
WB type for special use is available on request.

Power supply modules

Product overview

Type	Rating	Alarm output contacts
P3	100–240 V AC 100–125 V DC	6 output contacts
P4	24–60 V DC	6 output contacts
P5	100–240 V AC	6 output contacts (SSR)

Note:
Over current protection and ground fault protection operates without control power source.

Contact capacity (Type code P3, P4)

Voltage (V)		Resistive load cosφ = 1.0	Inductive load cosφ = 4.0 L/R = 7 ms
AC	240	1 A	0.5 A
	120	1 A	1 A
DC	125	0.1 A	0.05 A
	30	1 A	1 A

Contact capacity (Type code P5)

Voltage (V)		Normal current	Peak inrush current	ON resistance (max.)
AC	240	0.1 A	0.3 A	5 Ω
	120	0.1 A	0.3 A	5 Ω
DC	125	0.1 A	0.3 A	5 Ω
	30	0.1 A	0.3 A	5 Ω

Factory setting of 6 output contacts is as follows.

G1/E1/AP	LTD	STD/INST	PAL	TAL	ERR
Refer to lower table	Self-holding	Self-holding	Non Self-holding	Non Self-holding	Non Self-holding

Type	G1	E1	AP
TRIP side	Selfholding	Selfholding	—
ALARM side	Non Self-holding	Non Self-holding	Non Self-holding

Description:
Self-holding type: The output condition is held until it is reset.
Non self-holding type: The output is reset if it is returned to the normal condition.

CT rating table

AE1000-SW		AE1250-SW	AE1600-SW	AE2000-SWA	AE2500-SW	AE3200-SW	AE4000-SWA	AE5000-SW	AE6300-SW
1000 A		1250 A	1600 A	2000 A	2500 A	3200 A	4000 A	5000 A	6300 A
250 A	315 A			**AE2000-SW**			**AE4000-SW**		
500 A	630 A			2000 A			4000 A		
				1250 A	1600 A				

Notes:
– AE1000-SW and AE2000-SW has low rating types, too.
– As for details of ratings, refer to pages 20 and 9.

Electronic trip relay (ETR configuration overview)

Main setting module

WS1, WM1	AE1000–1600-SW, AE2000–3200-SW, AE4000-SW
WS2, WM2	AE2000-SWA, AE4000-SWA, AE5000-SW
WS3, WM3	AE6300-SW

WS : General use
WM: Generator protection use

(WB: Special use: on request)

Optional setting module

G1: Ground fault protection
N5: Neutral pole 50 % protection
E1: Earth leakage protection
AP: 2nd Additional Pre-alarm

Power supply

P3: AC 100–240 V/ DC100–125 V with output contact
P4: DC 24–60 V with output contact
P5: DC 100–240 V with output contact (SSR)

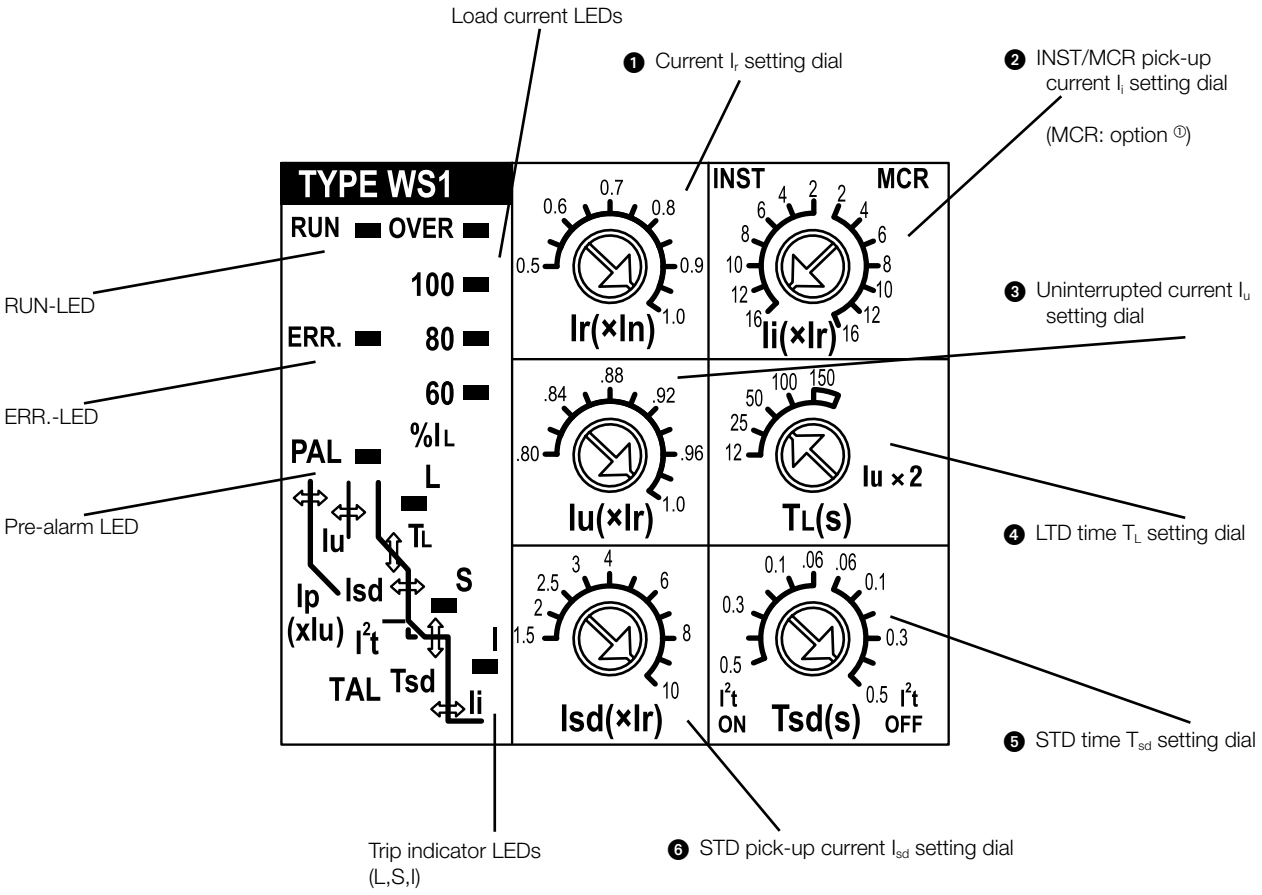
Additional function

- ■ Extension module (EX1/EX2) — Network: ■ BIF-MD
- ■ Display (DP1)
- ■ Display onto panel board (DP2)
- ■ VT unit
- ■ MCR switch (MCR-SW)

The assignment of the contacts can be changed with DP1/DP2.

The output of G1/E1/AP/PAL OUT can also be changed to the self-holding type from the non self-holding type.

S types – General protection



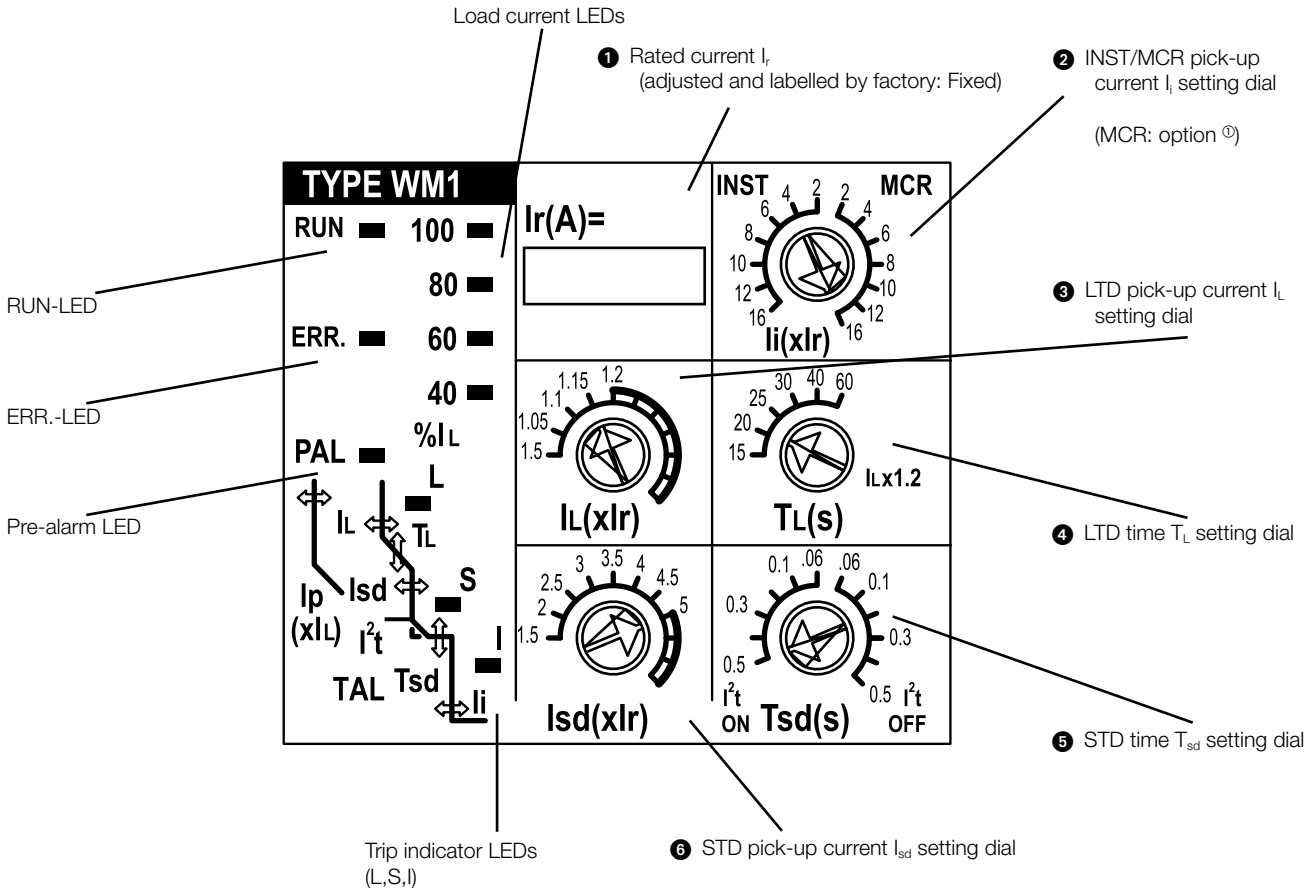
Adjustable setting range

No.	Setting item		Adjustable setting range			Accuracy	Setting for shipment
❶	Current setting	I_r	0.5–1.0 (0.05 step) x I_n (CT rating)			—	**1.0**
❸	Uninterrupted current	I_u	0.8–1.0 x I_r (0.02 step), Pick-up current: 1.15 x I_u			1.05 x I_u…Non Pick-up 1.25 x I_u…Pick-up	**1.0**
❹	LTD time	T_L	12–25–50–100–150 s at I_u x 2			±20 %	**150**
❻	STD pick-up current	I_{sd}	1.5–2–2.5–3–4–5–6–7–8–9–10 x I_r			±15 %	**10**
❺	STD time	T_{sd}	0.5–0.4–0.3–0.2–0.1–0.06 (I²t ON) – 0.06–0.1–0.2–0.3–0.4–0.5 s (I²t OFF) at I_{sd} x 1.5			±20 % This means, it operates in the range between 0.04 and 0.08 s when the time set at 0.06 s.	**0.5** (I²t ON)
❷	INST/MCR pick-up current	I_i	AE1000-SW–AE1600-SW AE2000-SW–AE3200-SW AE4000-SW	WS1	16–12–10–8–6–4–2 (INST) – 2–4–6–8–10–12–16 x I_r (MCR) ①	±15 %	WS1: **16** (INST)
			AE2000-SWA, AE4000-SWA AE5000-SW	WS2	12–10–8–6–4–2 (INST) – 2–4–6–8–10–12 x I_r (MCR) ①		WS2: **12** (INST)
			AE6300-SW	WS3	10–8–6–4–2 (INST) – 2–4–6–8–10 x I_r (MCR) ①		WS3: **10** (INST)
	Pre-alarm current	I_p	Iu x 0.68–1.0 (0.04 step) – OVER			±10 %	**OVER** ②
	Pre-alarm time	T_p	1/2 T_L (after 1/2 T_L, PAL contact output turns on.)			±20 %	—

① Upper figure and table include optional MCR function.
② Pre-alarm current "OVER" setting is equal to 1.0.

Specifications		WS1-W	WS2-W	WS3-W
Main setting module S type		WS1	WS2	WS3
Order information	Art. no.	168552	168553	205180

M types – Generator protection



Adjustable setting range

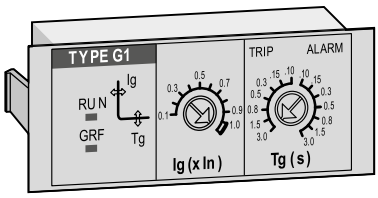
No.	Setting item		Adjustable setting range			Accuracy	Setting for shipment
❶	Current setting	I_r	0.63–1.0 x I_n (Adjust by factory: Fixed)			—	Specify when ordering
❸	ULTD pick-up current	I_L	1.0–1.05–1.1–1.15–1.2 x I_r			±5 %	**1.0**
❹	LTD time	T_L	115–20–25–30–40–60 s at I_L x 1.2			±20 %	**150**
❻	STD pick-up current	I_{sd}	1.5–2–2.5–3–3.5–4–4.5–5 x I_r			±15 %	**10**
❺	STD time	T_{sd}	0.5–0.4–0.3–0.2–0.1–0.06 (I² t ON) – 0.06–0.1–0.2–0.3–0.4–0.5 s (I² t OFF) at I_{sd} x 1.5			±20 % This means, it operates in the range between 0.04 and 0.08 s when the time set at 0.06 s.	**0.5** (I²t ON)
❷	INST/MCR pick-up current	I_i	AE1000-SW–AE1600-SW AE2000-SW–AE3200-SW AE4000-SW	WM1	16–12–10–8–6–4–2 (INST) – 2–4–6–8–10–12–16 x I_r (MCR) ①	±15 %	WM1: **16** (INST)
			AE2000-SWA, AE4000-SWA AE5000-SW	WM2	12–10–8–6–4–2 (INST) – 2–4–6–8–10–12 x I_r (MCR) ①		WM2: **12** (INST)
			AE6300-SW	WM3	10–8–6–4–2 (INST) – 2–4–6–8–10 x I_r (MCR) ①		WM3: **10** (INST)
	Pre-alarm current	I_p	I_u x 0.68–1.0 (0.04 step) – OVER			±5 %	**OVER** ②
	Pre-alarm time	T_p	1/2 T_L (after 1/2 T_L, PAL contact output turns on.)			±20 %	—

① Upper figure and table include optional MCR function.
② Pre-alarm current "OVER" setting is equal to 1.0.

Specifications	WM1-W	WM2-W	WM3-W
Main setting module S type	WM1	WM2	WM3
Order information Art. no.	168554	168555	205181

Note: WB type for special use is available on request.

■ Ground fault protection (GFR)



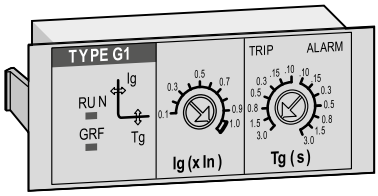
The ground fault protection (GFR) of several hundred amperes is possible.

This function can be selected for trip and alarm (no trip). Power supply is necessary for this function, even if there is not power supply, it can function at 0.2 x In or higher.

Specifications	G1-W
Optional setting module	G1 (Ground fault protection module)
Order information Art. no.	168558

Setting item		Adjustable setting range	Accuracy	Setting for shipment
GFR pick-up current	I_g	0.1–0.2–0.3–0.4–0.5–0.6–0.7–0.8–0.9–1.0 x I_n	±20 %	**1.0**
GFR time	T_g	3–1.5–0.8–0.5–0.3–0.15–<0.1 (TRIP) – <0.1–0.15–0.3–0.5–0.8–1.5–3 (ALARM) s (at 1.5 x I_g)	±20 %	**3 sec. (TRIP)**

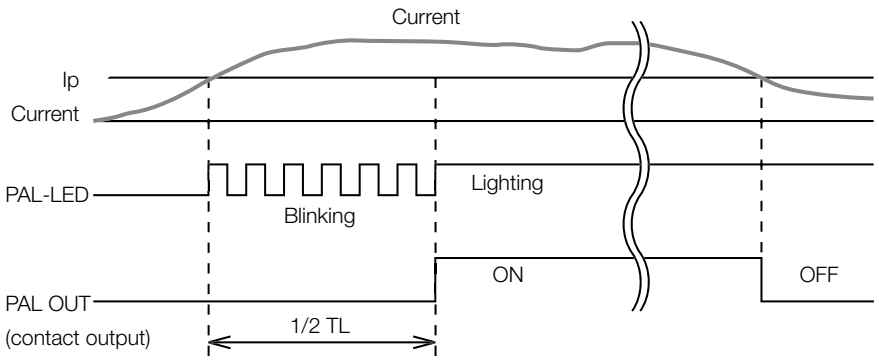
■ 2nd additional pre-alarm (AP)



The pre-alarm (1st) function already installed in standard ETR, the 2nd additional pre-alarm function can be installed as option, thereby it is possible to monitor (observer) electric circuit in more detail by 2nd additional pre-alarm function.

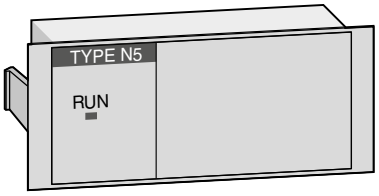
Specifications	AP-W
Optional setting module	AP (2nd pre-alarm module)
Order information Art. no.	168560

Pre-alarm timing chart



Setting item		Adjustable setting range	Accuracy	Setting for shipment
2nd additional Pre-alarm pick-up current	I_{p2}	0.5–0.6–0.7–0.8–0.84–0.88–0.92–0.96–1.0 x I_u (WS) 0.5–0.6–0.7–0.8–0.84–0.88–0.92–0.96–1.0 x I_L (WM)	±10 % (WS) ±5 % (WM)	1.0
2nd additional Pre-alarm time	T_{p2}	3–1.5–0.8–0.5–0.3–0.15–<0.1 (TRIP) – <0.1–0.15–0.3–0.5–0.8–1.5–3 (ALARM) s (at 1.5 x I_g)	±20 %	0.9 x TL

■ Neutral pole 50 % protection (N5)

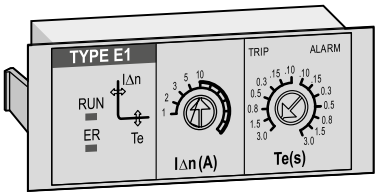


Neutral pole overcurrent protection (operating at 100 % of rated current) already installed in standard ETR.

But if you would like to operates at 50 % of rated current on neutral pole, neutral pole 50 % protection realizes it.

Specifications	N5-W
Optional setting module	N5 (Neutrale pole protection module)
Order information Art. no.	168561

■ Earth leakage protection (ER)



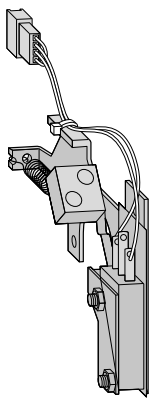
By combining the ETR with earth leakage protection (ER) and External ZCT, earth leakage protection is possible.

Earth leakage protection, earth leakage tripping and earth leakage alarm can be selected. Control supply is necessary for this function.

Specifications	E1-W
Optional setting module	E1 (Neutrale pole protection module)
Order information Art. no.	168559

Setting item		Adjustable setting range	Accuracy	Setting for shipment
ER pick-up current	$I_{\Delta n}$	1–2–3–5–10 A	+0 % –30 %	10 A
ER time	T_e	$\underset{\text{TRIP}}{3–1.5–0.8–0.5–0.3–0.15–<0.1}$ – $\underset{\text{ALARM}}{\leq 0.1–0.15–0.3–0.5–0.8–1.5–3\ \text{s (at 1.5 x } I_n)}$	±20 %	3 s (TRIP)

■ MCR switch (MCS-W)

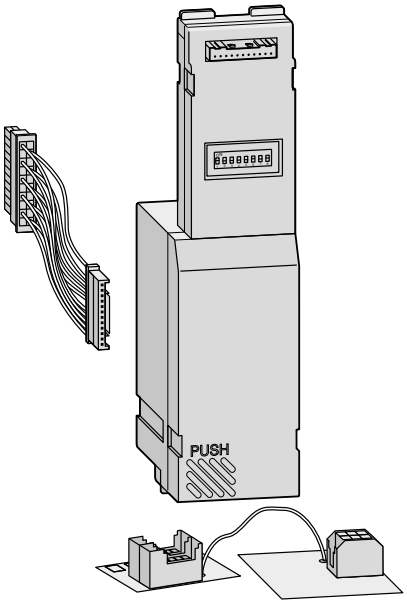


If MCR switch is built in the breaker and the dial for INST/MCR on main setting module is set to any MCR position, MCR function is operative.

MCR function: During a closing operation of the breaker, Instantaneous characteristics is operative. And it becomes inoperative when the breaker is in the closed position.

Specifications	MCS-W
Switch type	MCR
Order information Art. no.	168570

■ Extension module (EX1/EX2)



EX1 is the module that realizes various additional functions combining display module (DP1/DP2), interface unit (BIF-MD) and VT-W unit.

- **Various measuring elements, high measuring accuracy**

  By adopting high-performance ASIC, various measuring elements (load current, voltage, energy,harmonics, etc.) and high measuring accuracy are realized.

- **Communication function**

  2 display modules and 1 interface unit can be connected simultaneously by internal communication.

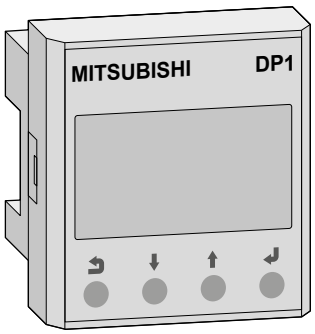
- **EX2 vs EX1**

  EX2 is a lower cost Extension Module that has some but not all of the functionality of EX1.

  The main difference is that it is not compatible with the VT module so while it can measure current, it cannot measure Voltage, Power or Energy.

Specifications		EX1-W	EX2-W
Type		Extension module	Extension module
Order information	Art. no.	710673	710673

■ Display module (DP1/DP2)



This is the module that displays and sets various information, for example, measurement, trip and alarm, setting of output contacts and so on.

- **Multi display of measuring element**

  It enables to easily monitor the comparison of each measuring element by multi display (load current 4 phases multi display and voltage multi display) on one screen.

- **2-colours back light**

  If trip or alarm occurred, back light colour changes from green to red automatically.

- **Graphical display**

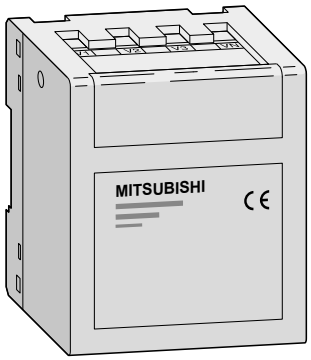
  By adopting dot matrix type LCD, graphical display such as bar graph display of load current, harmonic currents and characteristic curve are realized.

There are 2 types of this module. One is the ETR attachment type (DP1). Another is the panel attachment type (DP2) and is connected to extension terminals of control circuit by 2 m cable (5 m cable will be available on request).

Specifications		DP1-W	DP2-W
Type		Display module for ETR assembly	Display module for panel assembly
Order information	Art. no.	168565	168566

Notes:
– Extension module (EX1) is required.
– The VT-W measurement module is required to display the measured data except the electric current.

■ Measurement module (VT-W)

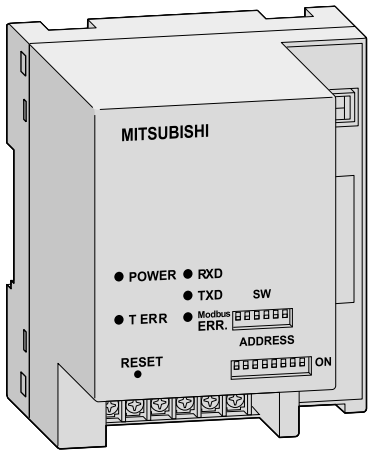


The VT-W measurement module enables to measure voltages, powers, energies, harmonic currents and etc. by connecting the ETR with Extension module (EX1).

It is to be placed separatetly outside the the breaker. A connection cable of 2 meters length is included.

Specifications		VT-W
Unit for		U/P/E/cos phi/earth leakage/average measuring/trip history/trip current measuring
Order information	Art. no.	168567

■ Interface unit (BIF-MD)



- **Intelligent control by multi-data communication**

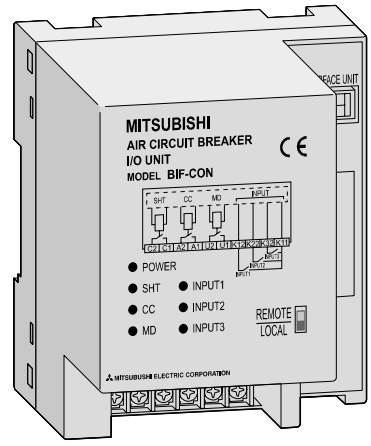
  It comes into being the Intelligent control by multi-data communication through interface to PLC/SCADA, which transfer the measurement information, setting values, error information and trip and alarm information.

Specifications	BIF-MD-W
Main setting module S type	Modbus network

Order information	Art. no.	
	168573	

Notes:
– Extension module (EX1) is required.
– The VT-W unit is required to display the measured data except the electric current.

■ I/O unit (BIF-CON/BIF-CL)



The input & output controlling unit BIF-CON is available for the remote controlling and remote monitoring of the breaker condition through the various network systems.

With this BIF-CON in addition to the interface unit, it become possible to control the breaker remotely, like a ON or OFF operations or spring-charging. Further, by combining the drawout position switch (BIF-CL), the monitoring of drawout position become available in case of the breaker drawout type.

Function	Description	Note
Control	Breaker ON operation	1 a contact for CC
	Breaker OFF operation	1 a contact for SHT (not applicable for AC 380 – 500 V rating)
	Spring charge	1 a contact for MD
Monitor	Digital Input (DI) monitoring	In case of BIF-CC and BIF-MD, max.3 contacts monitoring are available. In case of BIF-PR, 1 contact monitoring is available.
	Breaker drawout position	Position: CONNECTED, TEST and DISCONNECTED BIF-CL is required.

Specifications	BIF-CON-W
Application	I/O unit network module

Order information	Art. no.	
	168574	

Configuration table of ETR with EX1 and VT-W module

Combination sample	Display module + Extension module								Display module + Extension module + VT-W unit								Display module + Extension module										
Type	❶ = EX1 ❷ = DP1 – ❸ = DP2 ①								❶ = EX1 ❷ = DP1 – ❸ = DP2,VT-W ①								❶❷❸ : EX2 : DP1 (: DP2) ①										
❶ Main setting module	WS				WM				WS				WM				WS				WM				WB		
❷ Optional setting module	NP	AP	G1	E1	NP	AP	G1	E1	NP	AP	G1	E1	NP	AP	G1	E1	NA	AP	G1	E1	NA	AP	G1	E1	NA	G1	E1
❸ Power supply	P3 – P5								P3 – P5								P1~P5										
Measurement																											
Load current (±2.5 %)				○								○															
Leakage current (±15 %) ③	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	○
Voltage (±2.5 %)				—								○															
Power (active, reactive, apparent) (±2.5 %)				—								○															
Power factor (±5 %)				—								○															
Energy (active, reactive) (±2.5 %)				—								○															
Harmonics current (±2.5 %)				—								○ (3.5 ... 19th)															
Frequency (±2.5 %)				—								○															
Trip history																											
LTD		○				○				○				○				○				○				—	
STD		○				○				○				○				○				○				—	
INST				○								○															
GFR	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	○	—
ER	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	○
UVT				○ ②								○ ②															
Alarm history																											
PAL1				○								○															
PAL2	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	—	—
OVER				○								○															
GFR	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	○	—
EPAL	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	○
ER	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	—	—	○	
Characteristic setting (for panel attachment model DP2 only)																											
LTD		○				○				○				○				○				○				—	
STD		○				○				○				○				○				○				—	
INST				○								○															
PAL1				○								○															
PAL2	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	—	—
GFR	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	○	—
EPAL	—	—	—	●	—	—	●	—	—	—	—	●	—	—	—	●	—	—	—	●	—	—	—	●	—	—	●
ER	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	—	○	—	—	○
Setting																											
Output contacts setting change				●								●															
Date & Time				●								●															
Demand time				●								●															
Alarm holding method				●								●															
Reset																											
Trip and alarm information				●								●															
Measurement information (min. and max. values)				●								●															
ETR information																											
Main/Optional setting module information				○								○															
Error information				○								○															
CT rating				○								○															
Phase line method				○								○															
Normal connection or reverse connection				○								○															

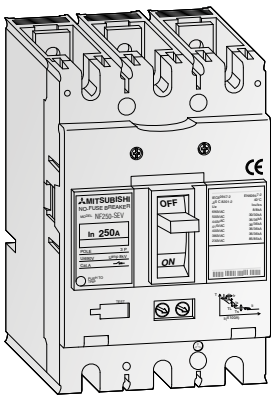
○: can be displayed by DP1/DP2 ●: can be displayed and set by DP1/DP2

① 2 units of display modules can be attached.
② Display is available only when UVT module is attached.
③ Included the accuracy of ZCT.

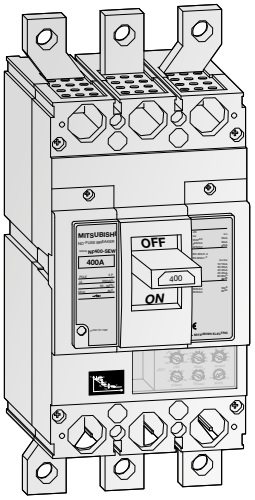
World super series – The extensive breaker series from Mitsubishi Electric

The circuits of the Mitsubishi Electric breaker series are amongst the smallest compact circuit breakers in the world with electronic overload indication of this kind.

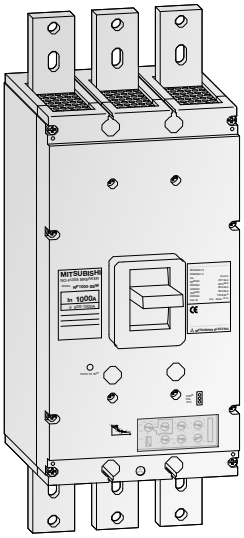
The system is based, among other things, on the well-known and proven microprocessor technology.



NF250-SEV, 3p



NF400-SEW, 3p



NF1000-SEW, 3p

WS – World super series

The WS breaker series meets national and international protection ratings according to VDE, EN, and IEC standards for industrial applications as well as for extended shipping demands.

The new tripping technology guarantees a high reliability and highest protection.

- 16 to 250 A in one model size (3- and 4-pole)
- Interchangeable relay unit (thermal type or electronic type)
- Available in fixed and plug-in versions
- Breaking capacity
- I_{cs} = 100 % I_{cu}, up to 690 V
- Additional disconnectors available

The proven world super series features technical know-how and the micro-processor technology tried and tested in longstanding experience.

The fully enclosed circuit breakers provide an increased safety and at the same time decreased switching times.

- 400 to 800 A
- 2 model sizes (3- and 4-pole)
- Electronic trip system
- Available in fixed and plug-in versions
- Additional disconnectors available

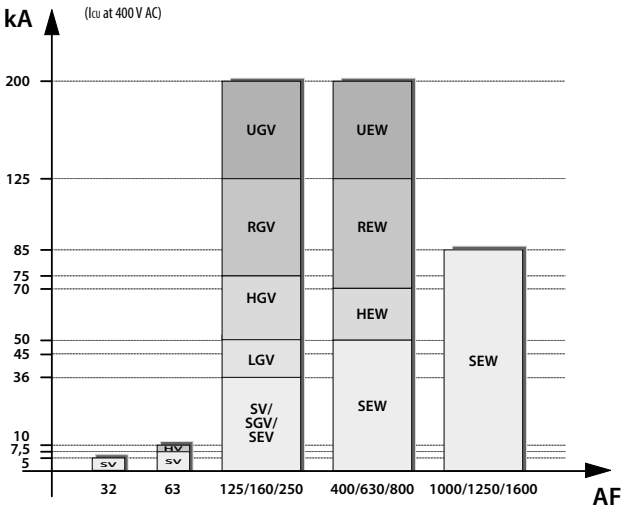
The proven standard series for a high breaking performance providing an optimum protection for transformer and generator feed in, and output breakers.

Circuit breakers can be used as section or disconnecting switch.

- 1000 to 1600 A
- 1 model size (3- and 4-pole)
- Electronic trip system
- Available in fixed versions
- Additional disconnectors available

Intelligent breaking technology for your safety

With its innovative breaking technology all Mitsubishi Electric breakers offer greater safety and even faster circuit-breaking speed through the use of the latest switch-off technology and innovative engineering, with a newly developed electronic trip relay.



Breaking performance

The complete range of moulded case circuit breakers from 3 to 1600 A.

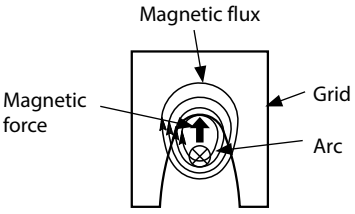
Outline

Breaking technology

With its new breaking technology the circuit breakers offer greater safety and even faster circuit-breaking speed through the use of the latest switch-off technology and innovative engineering, with a newly developed electronic trip relay.

Arc-extinguishing device

Mitsubishi Electric MCCBs feature excellent arc-extinguishing performance by virtue of the optimum combination of grid gap, shape, and material.



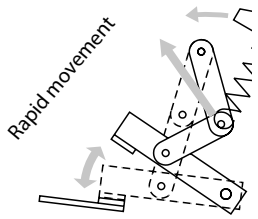
Arc extinction

Arc runner

The arc is instantaneously transferred to the arc-extinguishing chamber (see the figure above) by the arc runner, which reduces damage to contacts and improves interrupting performance.

Trip button (push to trip)

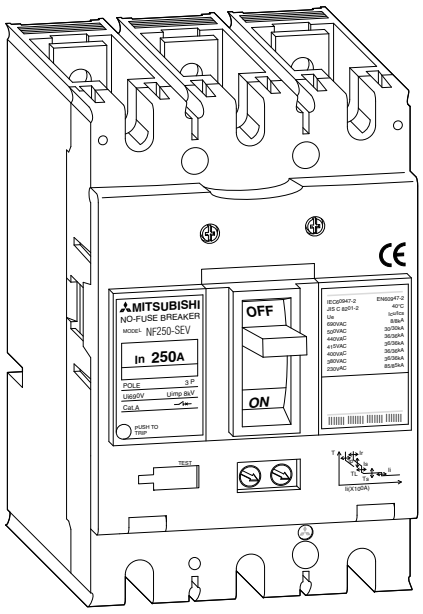
Enables tripping mechanically from outside, for confirming the operation of the accessory switches and the manual resetting function.



Switching mechanism

The contacts open and close rapidly, regardless of the moving speed of the handle, minimizing contact wear and ensuring safety.

Moulded case (cover)



Type NF250-SEV construction

Handle

- Trip indication

The automatically tripped condition is indicated by the handle in the center position between ON and OFF; the yellow or white line cannot be seen in this position.

The figure shows the handle in tripped position.

- Resetting

Resetting after tripping is performed by first moving the handle OFF position to engage the mechanism, then returning the handle to ON to reclose the circuit.

- Trip-free

Even if the handle is held at ON, the breaker will trip if an overcurrent flows.

- Contact on mechanism

Even in the worst case in which welding occurs owing to an overcurrent, the breaker will trip and the handle will maintain to ON, indicating the energizing state.

Adjustable thermal trip current value

The setting can be changed by simply turning the control dials, providing the optimum characteristics for particular road conditions.

A microcomputer and Mitsubishi Electric's original IC fulfill a new high level of safety

Safer and more reliable power

Electronic device loads, such as inverters, distort the current waveform. Mitsubishi Electric's electronic breakers use a digital detector to measure the current's effective value and minimize overload tripping errors. This enables precise protection of the circuit.

Alarm function monitors and anticipates interruptions

Our electronic moulded-case circuit breakers feature a pre-alarm system as standard. The pre-alarm outputs an alarm before the circuit breaker trip is activated. When the load current exceeds the set pre-alarm current, it outputs a pre-alarm signal (from a solid-state relay) and lights the LED.

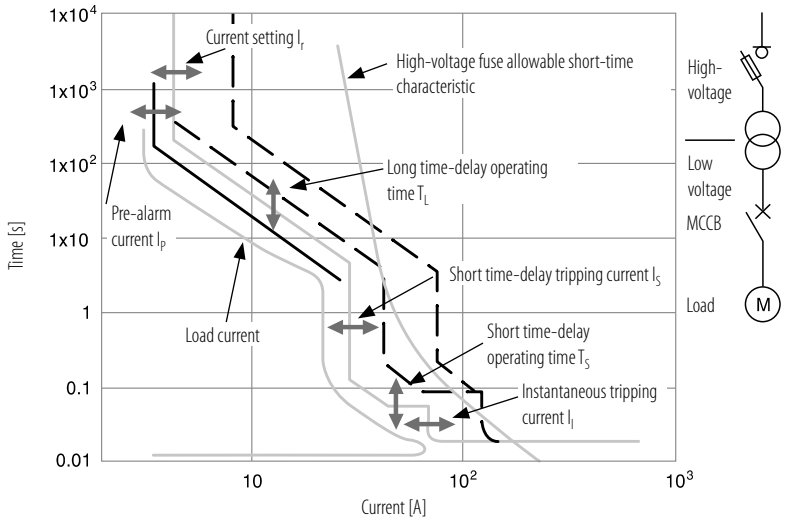
The pre-alarm module (with contact output) is optional available with electronic molded-case and earth-leakage circuit breakers (on request).

Improved protection against fluctuations in the load current

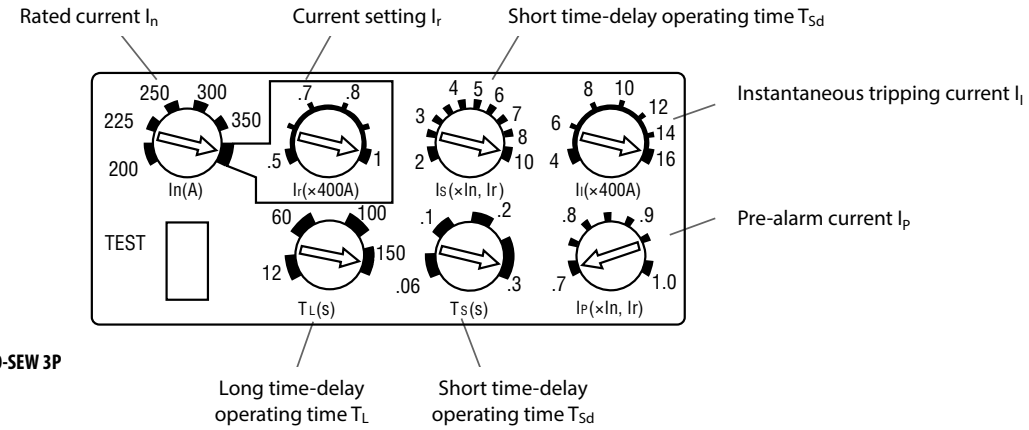
Our standard electronic trip relay offers a number of outstanding benefits.

The user has a choice of six different parameters as tripping characteristics with the multiple coordinated protection method.

Better protection can be obtained between the high-voltage fuse, OCR and the low voltage fuse.



Coordinated protection from multiple tripping characteristics



Portable tester facilitates checking and maintenance

The separately sold portable tester allows the user to check the four characteristics:

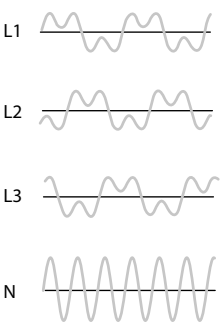
1. Long-delay tripping
2. Short-delay tripping
3. Instantaneous tripping
4. Pre-alarm characteristics

LEDs for load current, pre-alarm and over-current show the operating status.

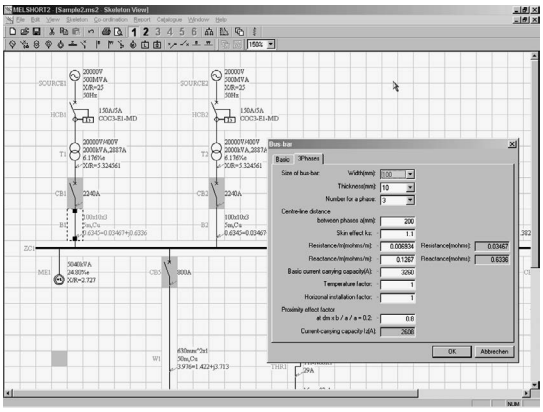
Overload protection and safety

The neutral-pole overload protection circuit is standard with 4-wire electronic moulded-case devices.

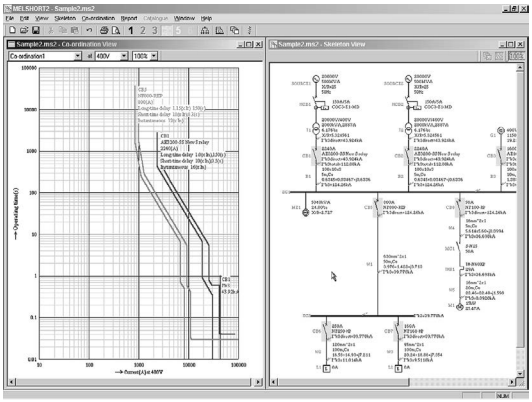
It prevents burn-out when the neutral- pole's load current is greater than the voltage pole in a 3-phase 4 wire circuit which is prone to distorted third-harmonic current flows.



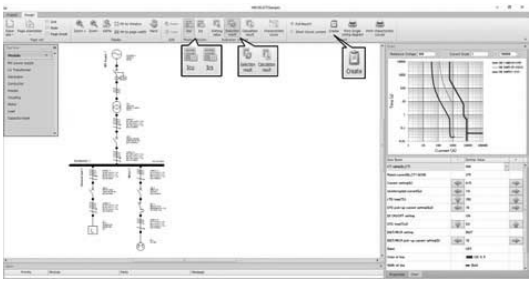
■ Calculation and selection software



Circuit diagram of the network to be calculated, with input field



Display of the trip curves of a circuit breaker in the network



Registered Products

Low-voltage Power Distribution Products: ACBs, MCCBs, ELCBs, MCBs, Contactors, Thermal relays

Features

- Calculating short circuit current and auto-selecting the suitable combination of installation components from Mitsubishi Electric ranges.
- Outputting a report of calculation and selection results.
- Checking coordination by comparing the characteristics of the selected products.
- Multi-languages available. (Japanese, English, Chinese)
- Widely-used in the world. (57 countries and regions)
- Compatibility with Windows 10.
- IEC based SLD (Single Line Diagram) indication.
- Free software open to public on Mitsubishi Electric FA Global Website and off-line operating.

MELSHORT2 – The new calculation software for low-voltage switchgears

MELSHORT2 is a software package that provides all the functions needed for planning and dimensioning switchgear systems.

Increasingly demanding technical specifications and accountability regulations are making switchgear configuration much more critical than it used to be. In the past, software for calculating and dimensioning switchgear was helpful – nowadays it's absolutely essential. It supports all modern international electrical engineering standards and shines with simple and reliable operation.

The program calculates the short-circuit levels and currents at all necessary points for all switchgear components, including the power supply transformer and circuit breakers, the emergency generators, the individual motor and capacitor group branch circuits and all the other power distribution circuits, down to the last circuit breaker. This makes it possible to select the ideal breaker for every task, for optimum performance and cost-efficiency.

MELSHORT2 has a comprehensive range of powerful, easy-to-use functions, including:

- Selective shutdown
- Backup protection
- Coordination with the main power supply systems
- Allowance for the start-up currents of electric motors

These functions make it possible to optimise the configuration of your switchgear equipment for the specific requirements of your applications.

The calculated results, the hardware model suggestions and the wiring diagram with all the relevant values can be processed and used as documentation for the switchgear installation. Another welcome extra is the free Internet update service.

MELSELECT™

System Requirements

- Operating system (OS): Microsoft Windows 10 (32/64 bit) Pro.
- Microsoft .NET Framework: Microsoft .NET Framework 4.6.
- Microsoft, Windows, .NET Framework and Word are registered trademarks of Microsoft Corporation in the United States and other countries.

Download Link

Melselect:

https://emea.mitsubishielectric.com/fa/software-download/melselect

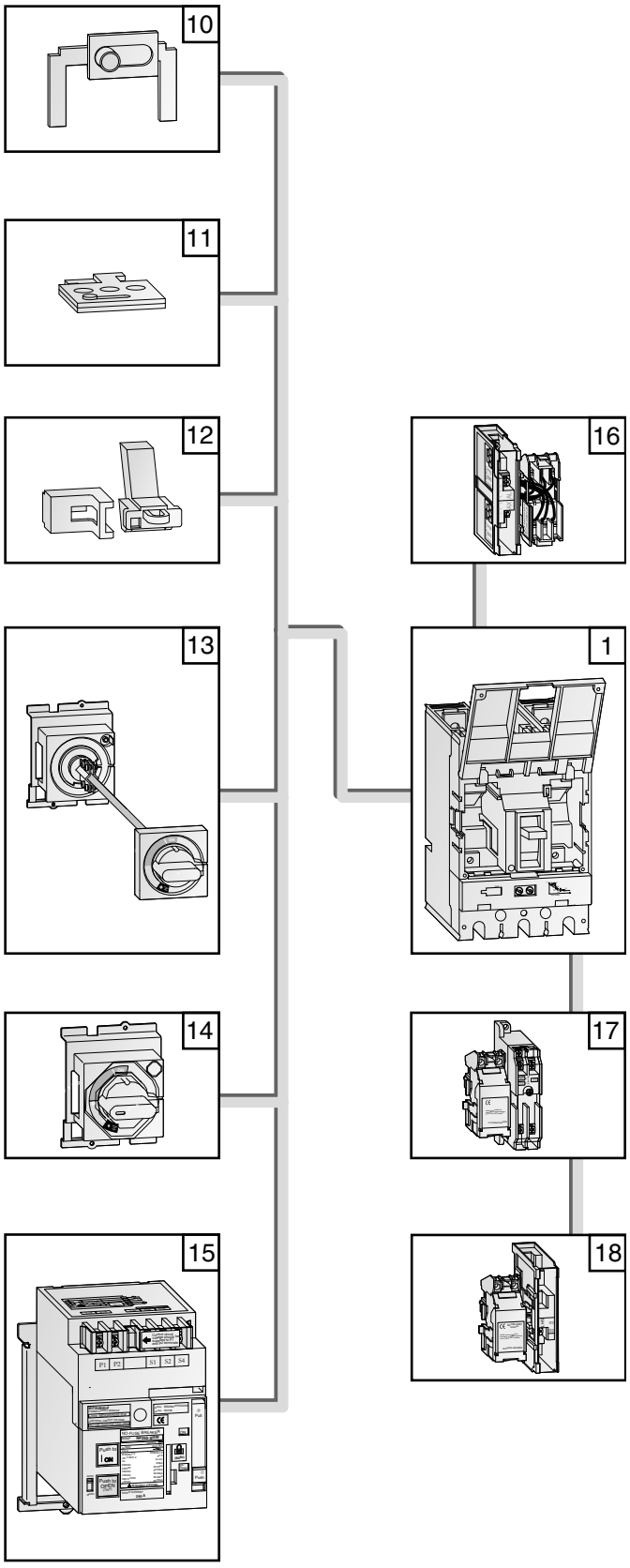
Melshort 2:

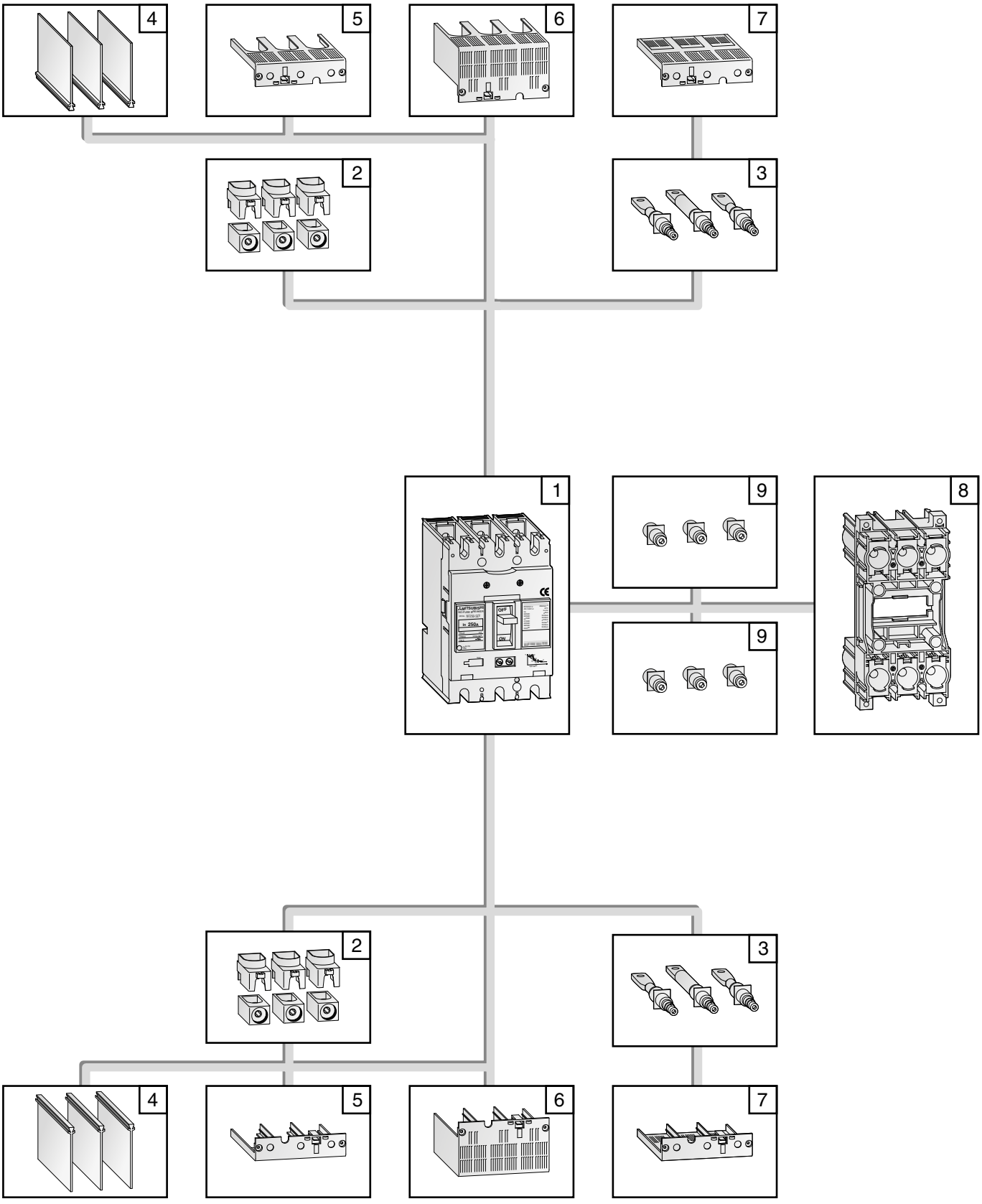
https://emea.mitsubishielectric.com/fa/software-download/melshort-2

Product skeleton of accessories

Mitsubishi Electric offers a wide range of accessories for the moulded-case circuit breakers and disconnectors to serve almost all variations of applications.
Detailled information on request.

1	Circuit breaker	see page 52
2	Solderless (box) terminals	see page 75
3	Rear connection studs	see page 75
4	Insulating barriers (BA-F)	see page 82
5	Small terminal covers (TC-S)	see page 81
6	Large terminal covers (TC-L)	see page 81
7	Rear terminal covers (BTC)	see page 81
8	Plug-in base (PM)	see page 75
9	Connections for plug-in	see page 75
10	Mechanical interlock (MI)	see page 82
11	OFF lock with 3 padlocks (HL)	see page 78
12	Handle lock device (LC, HLF, HLN, HLS)	see page 78
13	Variable-depth operating handle, V type	see page 76
14	Rotary operating handle, F type	see page 77
15	Electrical operating device (MDS)	see page 80
16	Alarm and auxiliary switches (AL, AX)	see page 68
17	Under voltage trip device (UVT)	see page 72
18	Shunt trip device (SHT)	see page 70

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Model overview and specifications

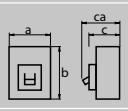
	Type/series			WS-V series					
				NF32-SV	NF63-SV	NF125-SV	NF125-SGV	NF125-SEV	NF160-SGV
S series	**Rated current** $I_{n\ max.}$ [A]			32	63	125	125*	125*	160*
	Rated insulation voltage U_i [V]		AC	600	600	690	690	690	690
	Number of poles			3	3/4	3/4	3/4	3/4	3/4
	Rated breaking capacity [kA]	IEC 947-2 EN 60 947-2 VDE 0660 AC ① (50/60 Hz)	690 V	—	—	8/8	8/8	8/8	8/8
			500 V	2.5/2.5	7.5/7.5	18/18	30/30	30/30	30/30
			440 V	2.5/2.5	7.5/7.5	25/25	36/36	36/36	36/36
			400 V	**5/5**	**7.5/7.5**	**30/30**	**36/36**	**36/36**	**36/36**
	(I_{cu}/I_{cs})		230 V	7.5/7.5	15/15	30/30	85/85	85/85	85/85
	Dimensions WxHxD		[mm]	75x130x68	75/100x130x68	90/120/x130x68	105/140x165x68	105/140x165x68	105/140x165x68
	Type					**NF125-LGV**			**NF160-LGV**
L series	**Rated current** $I_{n\ max.}$ [A]					125*			160*
	Rated insulation voltage U_i [V]		AC			690			690
	Number of poles					3/4			3/4
	Rated breaking capacity [kA]	IEC 947-2 EN 60 947-2 VDE 0660 AC ① (50/60 Hz)	690 V			8/8			8/8
			500 V			36/36			36/36
			440 V			**50/50**			**50/50**
			400 V			50/50			50/50
	(I_{cu}/I_{cs})		230 V			90/90			90/90
	Dimensions WxHxD		[mm]			105/140x165x68			105/140x165x68
	Type				**NF63-HV**	**NF125-HGV**		**NF125-HEV**	**NF160-HGV**
H series	**Rated current** $I_{n\ max.}$ [A]				63	125*		125*	160*
	Rated insulation voltage U_i [V]		AC		690	690		690	690
	Number of poles				3/4	3/4		3/4	3/4
	Rated breaking capacity [kA]	IEC 947-2 EN 60 947-2 VDE 0660 AC ① (50/60 Hz)	690 V		2.5/2.5	10/8		10/8	10/8
			500 V		7.5/7.5	50/38		50/38	50/38
			440 V		10/8	65/65		65/65	65/65
			400 V		**10/8**	**75/75**		**75/75**	**75/75**
	(I_{cu}/I_{cs})		230 V		25/19	100/100		100/100	100/100
	Dimensions WxHxD		[mm]		75/100x130x68	105/140x165x68		105/140x165x68	105/140x165x68
	Type					**NF125-RGV**			
R series	**Rated current** $I_{n\ max.}$ [A]					125*			
	Rated insulation voltage U_i [V]		AC			690			
	Number of poles					3			
	Rated breaking capacity [kA]	IEC 947-2 EN 60 947-2 VDE 0660 AC ① (50/60 Hz)	690 V			—			
			500 V			—			
			440 V			125/125			
			400 V			**150/150**			
	(I_{cu}/I_{cs})		230 V			150/150			
	Dimensions WxHxD		[mm]			105x165x68			
	Type					**NF125-UV**			
U series	**Rated current** $I_{n\ max.}$ [A]					125			
	Rated insulation voltage U_i [V]		AC			690			
	Number of poles					3/4			
	Rated breaking capacity [kA]	IEC 947-2 EN 60 947-2 VDE 0660 AC ① (50/60 Hz)	690 V			10/10			
			500 V			200/200			
			440 V			200/200			
			400 V			**200/200**			
	(I_{cu}/I_{cs})		230 V			200/200			
	Dimensions WxHxD		[mm]			105/140x240x68			
	Type			**DSN32-SV**	**DSN63-SV**	**DSN125-SGV**			**DSN160-SGV**
Disconnectors	**Rated current** $I_{n\ max.}$ [A]			32	63	125			160
	Rated insulation voltage U_i [V]		AC/DC	600	600	690			690
	Rated voltage U_e [V]		AC (50/60 Hz)/DC	500/250	500/250	690/300			690/300
	Number of poles			3	3/4	3/4			3/4
	Max. switching current [A] (breaking)		AC/DC	256/128	504/252	1000/500			1280/640
	Dimensions WxHxD		[mm]	75x130x68	75/120x130x68	105/140x165x68			105/140x165x68

① DC on request ② In case of solderless terminal, interrupting capacity reduces. * adjustable

WS-V series			WS series					
NF250-SV	NF250-SGV	NF250-SEV	NF400-SEW	NF630-SEW	NF800-SEW	NF1000-SEW	NF1250-SEW	NF1600-SEW
250	250*	250*	400*	630*	800*	1000*	1250*	1600*
690	690	690	690	690	690	690	690	690
3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
8/8	8/8	8/8	10/10 ②	10/10	10/10	25/13	25/13	25/13
30/30	30/30	30/30	30/30 ②	30/30	30/30	65/33	65/33	65/33
36/36	36/36	36/36	42/42 ②	42/42	42/42	85/43	85/43	85/43
36/36	**36/36**	**36/36**	**50/50** [b]	**50/50**	**50/50**	**85/43**	**85/43**	**85/43**
85/85	85/85	85/85	85/85 ②	85/85	85/85	125/63	125/63	125/63
105/140x165x68	105/140x165x68	105/140x165x68	140/185x257x103	140/185x257x103	210/280x275x103	210/280x406x140	210/280x406x140	210/280x406x140
	NF250-LGV							
	250*							
	690							
	3/4							
	8/8							
	36/36							
	50/50							
	50/50							
	90/90							
	105/140x165x68							
	NF250-HGV	**NF250-HEV**	**NF400-HEW**	**NF630-HEW**	**NF800-HEW**			
	250*	250*	400*	630*	800*			
	690	690	690	690	690			
	3/4	3/4	3/4	3/4	3/4			
	10/8	10/8	10/10	15/15	15/15			
	50/50	50/50	50/50	50/50	50/50			
	65/65	65/65	65/65	65/65	65/65			
	75/75	**75/75**	**70/70**	**70/70**	**70/70**			
	100/100	100/100	100/100	100/100	100/100			
	105/140x165x68	105/140x165x68	140/185x257x103	140/185x257x103	210/280x275x103			
	NF250-RGV		**NF400-REW**	**NF630-REW**	**NF800-REW**			
	250*		400*	630*	800*			
	690		690	690	690			
	3		3	3	3			
	—		15/10	20/15	20/15			
	—		70/35	70/35	70/35			
	125/125		125/63	125/63	125/63			
	150/150		**125/63**	**125/63**	**125/63**			
	150/150		150/75	150/75	150/75			
	105x165x68		140x257x103	140x257x103	210x275x103			
	NF250-UV		**NF400-UEW**		**NF800-UEW**			
	250		400*		800*			
	690		690		690			
	3/4		3/4		3/4			
	15/15		35/35		35/35			
	200/200		170/170		170/170			
	200/200		200/200		200/200			
	200/200		**200/200**		**200/200**			
	200/200		200/200		200/200			
	105/140x240x68		140/280x297/322x200		210/280x322x200			
	DSN250-SGV		**DSN400-SW**	**DSN630-SW**	**DSN800-SW**	**DSN1000-SW**	**DSN1250-SW**	**DSN1600-SW**
	250		400	630	800	1000	1250	1600
	690		690	690	690	660	660	660
	690/300		690/250	690/250	690/250	660/250	660/250	660/250
	3/4		3/4	3/4	3/4	3/4	3/4	3/4
	2000/1000		3200/1600	5040/2520	6400/3200	8000/14000	10000/5000	12800/6400
	105/140x165x68		140/185x257x103	140/185x257x103	210/280x275x103	210/280x406x140	210/280x406x140	210/280x406x140

* adjustable

Specifications of moulded-case circuit breakers 3–125 A

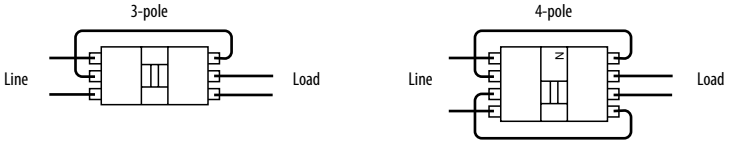
Type					NF32-SV	NF63-SV	NF63-HV	NF125-SV	NF125-SGV
Frame (A)					32	63	63	125	125
Rated data	**Rated current I_n** [A] at ambient temperature			40 °C	3, 4, 6, 10, 16, 20, 25, 32 Fixed	3, 4, 6, 10, 16, 20, 25, 32, 40, 50, 63 Fixed	10, 16, 20, 25, 32, 40, 50, 63 Fixed	75,80,100,125 Fixed	16–20, 20–25, 25–32, 32–40, 35–50, 45–63, 56–80, 70–100, 90–125 Adjustable
	Number of poles				3	3/4	3/4	3/4	3/4
	Rated insulation voltage U_i [V]			AC	600	600	690	690	690
	Rated breaking capacity [kA] (I_{cu}/I_{cs})	IEC/EN 60947-2	AC (50/60 Hz)	690 V	—	—	2.5/2.5	8/8	8/8
				500 V	2.5/2.5	7.5/7.5	7.5/7.5	18/18	30/30
				440 V	2.5/2.5	7.5/7.5	10/8	25/25	36/36
				400 V	**5/5**	**7.5/7.5**	**10/8**	**30/30**	**36/36**
				230 V	7.5/7.5	15/15	25/19	30/30	85/85
			DC	250 V	2.5/2.5	7.5/7.5	7.5/7.5④	20/20④	20/20④
	Utilization category				A	A	A	A	A
	Rated impulse withstand voltage U_{imp} [kV]				8	8	8	8	8
	Pollution degree				3	3	3	3	3
	Reverse connection				●	●	●	●	●
	Suitable for isolation				●	●	●	●	●
Mechanical data	**Dimensions** [mm] 			a	75	75/100	75/100	90/120	105/140
				b	130	130	130	130	165
				c	68	68	68	68	68
				ca	90	90	90	90	92
	Weight [kg]				0.65	0.75/1.0	0.75/1.0	1/1.3	1.6/2.0
	Cassette-type accessories	Alarm switch		(AL)	●	●	●	●	●
		Auxiliary switch		(AX)	●	●	●	●	●
		Shunt trip		(SHT)	●	●	●	●	●
		Under-voltage trip	Non-synchro-nous closing	(UVT-N)	—	—	—	—	—
			Synchronous closing	(UVT-S)	●	●	●	●	●
	Accessories connection	With terminal block		(SLT)	●	●	●	●	●
		With internal terminal type			●	●	●	●	●
	Installation and connection	Front	Screw terminal (standard)		●	●	●	●	●
			Solderless terminal		—	—	—	—	●
			Busbar terminal		—	—	—	—	—
		Rear		(B)	●	●	●	●	●
		Plug-in	Rear	(PM)	●	●	●	●	—
			Rear front IP 20 with auto trip	(PM-IP)	—	—	—	—	●
	Built-in accessories	Pre-alarm-contact output ①		(PAL)	—	—	—	—	—
		Overcurrent trip alarm ①		(OAL)	—	—	—	—	—
External accessories	**External operating handle**	Door mounting		(V)	●	●	●	●	●
		Mounted on breaker		(R)	—	—	—	—	●
	Electrical operation device			(MDS)	—	—	—	—	●
	Handle lock device	Handle lock for use with padlock		(HL)	●	●	●	●	●
				(HL-S)	●	●	●	●	●
		Lock cover		(LC)	●	●	●	●	●
	Terminal cover	Large		(TC-L)	●	●	●	●	●
		Small		(TC-S)	●	●	●	●	●
		For rear connection		(BTC)	●	●	●	●	●
		For plug-in		(PTC)	●	●	●	●	●
	Mechanical interlock			(MI)	●	●	●	●	●
	Insulating barrier	Between phases (Standard)		(BA-F)	●	●	●	●	●
	Adapter for IEC 35 mm rail				●	●	●/—	●	—
Others	**CE marking**				Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration
	CCC recognition				Recognized	Recognized	Recognized	Recognized	Recognition in process
	Automatic tripping device				Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic
	Trip button				Equipped	Equipped	Equipped	Equipped	Equipped

① Both PAL and OAL is not available. Only one specified. ② Others on request. ③ On request. ④ Use of 3- or 4-pole breaker for DC, see wiring diagram on the next page.

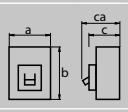
Missing specifications accord. to IEC/EN 60947-2 on request.

NF125-SEV	NF125-LGV	NF125-HGV	NF125-HEV	NF125-RGV	NF125-UV
125	**125**	**125**	**125**	**125**	**125**
16–32, 32–63, 63–125 Adjustable	16–20, 20–25, 25–32, 32–40, 35–50, 45–63, 56–80, 70–100, 90–125 Adjustable	16–20, 20–25, 25–32, 32–40, 35–50, 45–63, 56–80, 70–100, 90–125 Adjustable	16–32, 32–63, 63–125 Adjustable	16–20, 20–25, 25–32, 32–40, 40–50, 50–63, 63–80, 80–100, 100–125 Adjustable	15, 20, 30, 40, 50, 60, 75, 100, 125 Fixed
3/4	3/4	3/4	3/4	3	3/4
690	690	690	690	690	690
8/8	8/8	10/8	10/8	125/125	10/10
30/30	36/36	50/38	50/38	150/150	200/200
36/36	50/50	65/65	65/65	150/150	200/200
36/36	**50/50**	**75/75**	**75/75**	**150/150**	**200/200**
85/85	90/90	100/100	100/100	150/150	200/200
—	20/20④	40/40④	—	—	—
A	A	A	A	A	A
8	8	8	8	8	8
3	3	3	3	3	3
●	●	●	●	●	●
●	●	●	●	●	●
105/140	105/140	105/140	105/140	105	90/120
165	165	165	165	165	191
68	68	68	68	68	68
92	92	92	92	92	92
1.7/2.2	1.6/2.0	1.6/2.0	1.7/2.2	1.8	1.5/1.9
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
—	●	●	●	●	●
●	—	—	—	—	—
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
—	—	—	—	—	—
●	●	●	●	●	●
—	—	—	—	—	—/●
●	●	●	●	●	●/—
—	—	—	●	—	—
—	—	—	—	—	—
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
—	—	—	—	—	—
Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration
Recognized	Recognition in process	Recognition in process	Recognized	Recognition in process	—
Electronic	Thermal-magnetic	Thermal-magnetic	Electronic	Thermal-magnetic	Thermal-magnetic
Equipped	Equipped	Equipped	Equipped	Equipped	Equipped

Use of 3- and 4-pole breakers for DC



Specifications of moulded-case circuit breakers 160–250 A

Type					NF160-SGV	NF160-LGV	NF160-HGV	NF250-SV	NF250-SGV
Frame (A)					160	160	160	250	250
Rated data	**Rated current I_n** [A] at ambient temperature			40 °C	125–160 Adjustable	125–160 Adjustable	125–160 Adjustable	150, 160, 175, 200, 225, 250 Fixed	125–160, 140–200, 175–250 Adjustable
	Number of poles				3/4	3/4	3/4	3/4	3/4
	Rated insulation voltage U_i [V]			AC	690	690	690	690	690
	Rated breaking capacity [kA] (I_{cu}/I_{cs})	IEC/EN 60947-2	AC (50/60 Hz)	690 V	8/8	8/8	10/8	8/8	8/8
				500 V	30/30	36/36	50/38	30/30	30/30
				440 V	36/36	50/50	65/65	36/36	36/36
				400 V	**36/36**	**50/50**	**75/75**	**36/36**	**36/36**
				230 V	85/85	90/90	100/100	85/85	85/85
			DC	250 V	20/20④	20/20④	40/40④	20/20④	20/20④
	Utilization category				A	A	A	A	A
	Rated impulse withstand voltage U_{imp} [kV]				8	8	8	8	8
	Pollution degree				3	3	3	3	3
	Reverse connection				●	●	●	●	●
	Suitable for isolation				●	●	●	●	●
Mechanical data	**Dimensions** [mm]			a	105/140	105/140	105/140	105/140	105/140
				b	165	165	165	165	165
				c	68	68	68	68	68
				ca	92	92	92	92	92
	Weight [kg]				1.6/2.0	1.6/2.0	1.6/2.0	1/1.3	1.6/2.0
	Cassette-type accessories	Alarm switch		(AL)	●	●	●	●	●
		Auxiliary switch		(AX)	●	●	●	●	●
		Shunt trip		(SHT)	●	●	●	●	●
		Under-voltage trip	Non-synchro-nous closing	(UVT-N)	—	—	—	—	—
			Synchronous closing	(UVT-S)	●	●	●	●	●
	Accessories connection	With terminal block		(SLT)	●	●	●	●	●
		With internal terminal type			●	●	●	●	●
	Installation and connection	Front	Screw terminal (standard)		●	●	●	●	●
			Solderless terminal		●	●	●	—	●
			Busbar terminal		—	—	—	—	—
		Rear		(B)	●	●	●	●	●
		Plug-in	Rear	(PM)	●	●	●	●	—
			Rear front IP 20 with auto trip	(PM-IP)	—	—	—	—	●
	Built-in accessories	Pre-alarm-contact output ①		(PAL)	—	—	—	—	—
		Overcurrent trip alarm ①		(OAL)	—	—	—	—	—
External accessories	**External operating handle**	Door mounting		(V)	●	●	●	●	●
		Mounted on breaker		(R)	●	●	●	—	●
	Electrical operation device			(MDS)	●	●	●	—	●
	Handle lock device	Handle lock for use with padlock		(HL)	●	●	●	●	●
				(HL-S)	●	●	●	●	●
		Lock cover		(LC)	●	●	●	●	●
	Terminal cover	Large		(TC-L)	●	●	●	●	●
		Small		(TC-S)	●	●	●	●	●
		For rear connection		(BTC)	●	●	●	●	●
		For plug-in		(PTC)	●	●	●	●	●
	Mechanical interlock			(MI)	●	●	●	●	●
	Insulating barrier	Between phases (Standard)		(BA-F)	●	●	●	●	●
	Adapter for IEC 35 mm rail				—	—	—	●	—
Others	**CE marking**				Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration
	CCC recognition				Recognition in process	Recognition in process	Recognition in process	Recognized	Recognition in process
	Automatic tripping device				Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic
	Trip button				Equipped	Equipped	Equipped	Equipped	Equipped

① Both PAL and OAL is not available. Only one specified. ② Others on request. ③ On request. ④ Use of 3- or 4-pole breaker for DC, see wiring diagram on the next page.
Missing specifications accord. to IEC/EN 60947-2 on request.

NF250-SEV	NF250-LGV	NF250-HGV	NF250-HEV	NF-250-RGV	NF250-UV
250	**250**	**250**	**250**	**250**	**250**
80–160, 125–250 Adjustable	125–160, 140–200, 175–250 Adjustable	125–160, 140–200, 175–250 Adjustable	80–160, 125–250 Adjustable	125–160, 160–200, 200–250 Adjustable	125, 150, 175, 200, 225, 250 Fixed
3/4	3/4	3/4	3/4	3	3/4
690	690	690	690	690	690
8/8	8/8	10/8	10/8	—	15/15
30/30	36/36	50/38	50/38	—	200/200
36/36	50/50	65/65	65/65	125/125	200/200
36/36	**50/50**	**75/75**	**75/75**	**150 /150**	**200/200**
85/85	90/90	100/100	100/100	150/150	200/200
—	20/20④	40/40④	—	—	—
A	A	A	A	A	A
8	8	8	8	8	8
3	3	3	3	3	3
●	●	●	●	●	●
●	●	●	●	●	●
105/140	105/140	105/140	105/140	105	105/140
165	165	165	165	165	240
68	68	68	68	68	68
92	92	92	92	92	92
1.7/2.2	1.6/2.0	1.6/2.0	1.7/2.2	1.8	2.7/3.7
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
—	—	—	—	—	—
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
—	—	—	—	—	—
●	●	●	●	●	●
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●	●	●	●	●	●/—
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●	—	—	—	—	—
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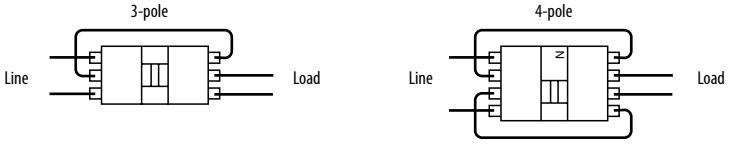
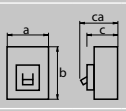
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
—	—	—	—	—	—
Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration	Self-declaration
Recognized	Recognition in process	Recognition in process	Recognized	Recognition in process	—
Electronic	Thermal-magnetic	Thermal-magnetic	Electronic	Thermal-magnetic	Thermal-magnetic
Equipped	Equipped	Equipped	Equipped	Equipped	Equipped

Use of 3- and 4-pole breakers for DC



Specifications of moulded-case circuit breakers 400–630 A

Type					NF400-SEW	NF400-HEW	NF400-REW
Frame (A)					400	400	400
Rated data	Rated current I_n [A] at ambient temperature			40 °C	200–400 Adjustable	200–400 Adjustable	200–400 Adjustable
	Number of poles				3/4	3/4	3
	Rated insulation voltage U_i [V]			AC	690	690	690
	Rated breaking capacity [kA] (I_{cu}/I_{cs})	IEC/EN 60947-2	AC ① (50/60 Hz)	690 V	10/10 (5/5) ②	10/10	15/10
				500 V	30/30 (25/25) ②	50/50	70/35
				440 V	42/42 (36/36) ②	65/65	125/63
				400 V	**50/50 (36/36)** ②	**70/70**	**125/63**
				230 V	85/85 (65/65) ②	100/100	150/75
	Utilization category				B	B	B
	Rated short-time withstand current I_{cw} [kA/s]				5/0.25	5/0.25	5/0.25
	Rated impulse withstand voltage U_{imp} [kV]				8	8	8
	Pollution degree				3	3	3
	Reverse connection				●	●	●
	Suitable for isolation				●	●	●
Mechanical data	Dimensions [mm]			a	140/185	140/185	140
				b	257	257	257
				c	103	103	103
				ca	155	155	155
	Weight [kg]				6.0/7.8	6.0/7.8	6.0
	Cassette-type accessories	Alarm switch		(AL)	●	●	●
		Auxiliary switch		(AX)	●	●	●
		Shunt trip		(SHT)	●	●	●
		Under-voltage trip	Non-synchronous closing	(UVT-N)	●	●	●
			Synchronous closing	(UVT-S)	●	●	●
	Accessories connection	With terminal block		(SLT)	●	●	●
		With internal terminal type ③			●	●	●
	Installation and connection	Front	Busbar terminal (standard)		●	●	●
		Rear		(B)	●	●	●
		Plug-in	Rear	(PM)	●	●	●
	Built-in accessories	Pre-alarm-contact output		(PAL)	●	●	●
		Trip indicator		(TI)	●	●	●
External accessories	External operating handle	Door mounting		(V)	●	●	●
		Mounted on breaker		(R)	●	●	●
	Electrical operation device	Spring-charge type		(MDS)	●	●	●
	Handle lock device	Handle lock for use with padlock		(HL)	●	●	●
				(HL-S)	●	●	●
	Terminal cover	Large		(TC-L)	●	●	●
		For rear connection		(BTC)	●	●	●
	Mechanical interlock			(MI)	●	●	●
	Insulating barrier	Between phases (Standard)		(BA-F)	●	●	●
Others	Marine approval ④ for 3 pole breakers				LR, GL, BV, DNV, AB	LR, GL, BV, AB	LR, GL, BV, AB
	Automatic tripping device				Electronic	Electronic	Electronic
	Trip button				Equipped	Equipped	Equipped

① DC type on request. ② In case of solderless terminal, interrupting capacity reduces. ③ On request. ④ Others on request.
Missing specifications accord. to IEC/EN 60947-2 on request.

NF400-UEW	NF630-SEW	NF630-HEW	NF630-REW
400	**630**	**630**	**630**
200–400 Adjustable	300–630 Adjustable	300–630 Adjustable	300–630 Adjustable
3/4	3/4	3/4	3
690	690	690	690
35/35	10/10	35/18	20/15
170/170	30/30	50/50	70/35
200/200	42/42	65/65	125/63
200/200	**50/50**	**70/70**	**125/63**
200/200	85/85	100/100	150/75
B	B	B	B
5/0.25	7.6/0.25	7.6/0.25	7.6/0.25
8	8	8	8
3	3	3	3
●	●	●	●
●	●	●	●
140/280	140/185	140/185	140
297/322	257	257	257
200	103	103	103
252	155	155	155
16.7/26.1	6.5/8.3	6.5/8.3	6.5
●	●	●	●
●	●	●	●
●	●	●	●
●	●	●	●
●	●	●	●
●	●	●	●
●	●	●	●
●	●	●	●
●	●	●	●
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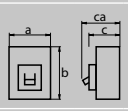
●	●	●	●
●	●	●	●
●	●	●	●
●	●	●	●
●	●	●	●
●	●	●	●
LR, GL, BV, AB	LR, GL, BV, AB	LR, GL, BV, AB	LR, GL, BV, AB
Electronic	Electronic	Electronic	Electronic
Equipped	Equipped	Equipped	Equipped

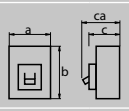
Specifications of moulded-case circuit breakers 800–1600 A

Type					NF800-SEW	NF800-HEW	NF800-REW
Frame (A)					800	800	800
Rated data	Rated current I_n [A] at ambient temperature			40 °C	400–800 Adjustable	400–800 Adjustable	400–800 Adjustable
	Number of poles				3/4	3/4	3
	Rated insulation voltage U_i [V]			AC	690	690	690
	Rated breaking capacity [kA]	IEC/EN 60947-2	AC ① (50/60 Hz)	690 V	10/10	15/15	—
				500 V	30/30	50/50	70/35
				440 V	42/42	65/65	125/63
				400 V	**50/50**	**70/70**	**125/63**
	(I_{cu}/I_{cs})			230 V	85/85	100/100	150/75
	Utilization category				B	B	B
	Rated short-time withstand current I_{cw} [kA/s]				9.6/0.25	9.6/0.25	9.6/0.25
	Rated impulse withstand voltage U_{imp} [kV]				8	8	8
	Pollution degree				3	3	3
	Reverse connection				●	●	●
	Suitable for isolation				●	●	●
Mechanical data	Dimensions [mm]			a	210/280	210/280	210
				b	275	275	275
				c	103	103	103
				ca	155	155	155
	Weight [kg]				10.9/14.2	10.9/14.2	10.9
	Cassette-type accessories	Alarm switch		(AL)	●	●	●
		Auxiliary switch		(AX)	●	●	●
		Shunt trip		(SHT)	●	●	●
		Under-voltage trip	Non-synchro-nous closing	(UVT-N)	●	●	●
			Synchronous closing	(UVT-S)	●	●	●
	Accessories connection	With terminal block		(SLT)	●	●	●
		With internal terminal type ③			●	●	●
	Installation and connection	Front	Busbar terminal (standard)		●	●	●
		Rear		(B)	●	●	●
		Plug-in	Rear	(PM)	●	●	●
	Built-in accessories	Pre-alarm-contact output		(PAL)	●	●	●
		Trip indicator		(TI)	●	●	●
External accessories	External operating handle	Door mounting		(V)	●	●	●
		Mounted on breaker		(R)	●	●	●
	Electrical operation device	Spring-charge type		(MDS)	●	●	●
	Handle lock device	Handle lock for use with padlock		(HL)	●	●	●
				(HL-S)	●	●	●
	Terminal cover	Large		(TC-L)	●	●	●
		For rear connection		(BTC)	●	●	●
	Mechanical interlock			(MI)	●	●	●
	Insulating barrier	Between phases (Standard)		(BA-F)	●	●	●
Others	Marine approval ④ for 3 pole breakers				LR, GL, BV, DNV, AB	LR, GL, BV, AB	LR, GL, BV, AB
	Automatic tripping device				Electronic	Electronic	Electronic
	Trip button				Equipped	Equipped	Equipped

① DC type on request. ② On request. ③ Others on request. ④ Assembly by factory.
Missing Specifications accord. to IEC/EN 60947-2 on request.

NF800-UEW	NF1000-SEW	NF1250-SEW	NF1600-SEW
800	**1000**	**1250**	**1600**
400–800 Adjustable	500–1000 Adjustable	600–1250 Adjustable	800–1600 Adjustable
3/4	3/4	3/4	3/4
690	690	690	690
35/35	25/13	25/13	25/13
170/170	65/33	65/33	65/33
200/200	85/43	85/43	85/43
200/200	**85/43**	**85/43**	**85/43**
200/200	125/63	125/63	125/63
B	B	B	B
9.6/0.25	20/0.3	20/0.3	20/0.3
8	8	8	8
3	3	3	3
●	●	●	●
●	●	●	●
210/280	210/280	210/280	210/280
322	406	406	406
200	140	140	140
252	190	190	190
27.6/33.7	23.5/30.7	23.5/30.7	34.5/41.2
●	●	●	●
●	●	●	●
●	●	●	●
●	●	●	●
●	●	●	●
●	●	●	●
●	●	●	●
●	●	●	●
●	—	—	—
—	—	—	—
●	●	●	●
●	●	●	●
—	●	●	●
—	●	●	●
●	●	●	●
●	●	●	●
●	—	—	—
●	●	●	—
●	—	—	—
●	●	●	●
●	●	●	●
—	LR, GL, AB	LR, GL, AB	—
Electronic	Electronic	Electronic	Electronic
Equipped	Equipped	Equipped	Equipped

Specifications of disconnectors DSN, IEC 60947-3, EN 60947-3

Type					DSN32-SV	DSN63-SV	DSN125-SGV	DSN160-SGV	DSN250-SGV
Rated data	**Rated current** I_n [A]			40 °C	32	63	125	160	250
	Number of poles				3	3/4	3/4	3/4	3/4
	Rated insulation voltage U_i [V]				600	600	690	690	690
	Rated voltage U_e [V]			AC	500	500	690	690	690
				DC	250	250	300	300	300
	Rated impulse withstand voltage U_{imp} [kV]			kV	6	6	8	8	8
	Pollution degree				2	2	3	3	3
	Utilization category				AC-23A, DC-23A	AC-23A, DC-23A	AC-23A, DC-23A	AC-23A, DC-23A	AC-23A, DC-23A
	Making and braking current	Making current	AC/DC	A	320/128	630/252	1250/500	1600/640	2500/1000
			Cycles		5	5	3/5	3/5	3/5
		Breaking current	AC/DC	A	256/128	504/252	1000/500	1280/640	2000/1000
			Cycles		5	5	3/5	3/5	3/5
	Operational performance	Without current			10000	15000	50000	40000	25000
		With current (440 V/690 V)			6000/—	8000/—	30000/1000	20000/1000	10000/1000
	Short-time withstand current I_{cw}	1 s		A	1000	1000	2000	3000	4000
	Short-circuit making capacity I_{cm}	1 s		A	1500	1500	3000	4000	6000
	Max. switching current ①		AC/DC	A	192/80	378/155	750/315	960/400	1500/625
			Cycles		12	12	12	12	12
	Suitable for isolation				●	●	●	●	●
Mechanical data	**Dimensions** [mm]			a	75	75/100	105/140	105/140	105/140
				b	130	130	165	165	165
				c	68	68	86	86	86
				ca	90	90	110	110	110
	Weight [kg]				0.55	0.6/0.7	2.0/2.6	2.0/2.6	2.0/2.6
	Cassette-type accessories	Alarm switch		(AL)	●	●	●	●	●
		Auxiliary switch		(AX)	●	●	●	●	●
		Shunt trip		(SHT)	●	●	●	●	●
		Undervoltage trip		(UVT)	●	●	●	●	●
	Accessories connection	With terminal block		(SLT)	●	●	●	●	●
		With internal terminal type ②			—	—	●	●	●
	Installation and connection	Front	Screw terminal		● ③	● ③	● ③	● ③	● ③
			Solderless terminal		—	—	●	●	●
			Busbar terminal		●	●	●	●	●
		Rear		(B)	●	●	●	●	●
		Plug-in	Rear	(PM)	●	●	—	—	—
			Rear front IP 20 with auto trip	(PM-IP)	—	—	●	●	●
External accessories	**External operating handle**	Door mounting		(V)	●	●	●	●	●
		Mounted on breaker		(R)	—	—	●	●	●
	Electrical operation device			(MDS)	—	—	●	●	●
	Handle lock device	Handle lock for use with padlock		(HL)	●	●	●	●	●
				(HL-S)	●	●	●	●	●
		Lock cover		(LC)	●	●	●	●	●
	Terminal cover	Large		(TC-L)	●	●	●	●	●
		Small		(TC-S)	●	●	●/—	●/—	●
		For rear connection		(BTC)	●	●	●/—	●/—	●
	Mechanical interlock			(MI)	●	●	●	●	●
	Insulating barrier	Between phases (Standard)		(BA-F)	●	●	●	●	●
	Adapter for IEC 35 mm rail				●	●	—	—	—
	Corresponding type of circuit breaker				NF32-SV	NF63-SV	NF125-SGV	NF160-SGV	NF250-SGV

① This performance is accordance with IEC60947-2 clause 7.2.4.1. ② On request. ③ Standard. ④ Assembly by factory. ⑤ TC-N.
Missing specifications accord. to IEC/EN 60947-2 on request.

DSN400-SW	DSN630-SW	DSN800-SW	DSN1000-SW	DSN1250-SW	DSN1600-SW
400	630	800	1000	1250	1600
3/4	3/4	3/4	3/4	3/4	3/4
690	690	690	690	690	690
690	690	690	690	690	690
250	250	250	250	250	250
8	8	8	8	8	8
3	3	3	3	3	3
AC-23A, DC-23A	AC-23A, DC-23A	AC-23A, DC-23A	AC-23A, DC-23A	AC-23A, DC-23A	AC-23A, DC-23A
4000/1600	6300/2520	8000/3200	10000/4000	12500/5000	16000/6400
3/5	3/5	3/5	3/5	3/5	3/5
3200/1600	5040/2520	6400/3200	8000/4000	10000/5000	12800/6400
3/5	3/5	3/5	3/5	3/5	3/5
6000	6000	4000	3000	2500	2500
1000	1000	500	500	500	500
6000	8000	10000	12000	12000	16000
10200	13600	17000	24000	24000	32000
2400/1000	3780/1575	4800/2000	6000/2500	7500/3125	9600/4000
12	12	12	12	12	12
●	●	●	●	●	●
140/185	140/185	210/280	210/280	210/280	210/280
257	275	275	406	406	406
103	103	103	140	140	140
155	155	155	190	190	190
5.7/7.5	6.2/8.0	10.9/14.2	23.0/30.2	23.0/30.2	34.0/40.7
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
—	—	—	—	—	—
—	—	—	—	—	—
● ①	● ①	● ①	● ①	● ①	● ①
●	●	●	● ④	● ④	● ④
●	●	●	● ④	● ④	● ④
—	—	—	—	—	—
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
—	—	—	—	—	—
●	●	●	● ⑤	● ⑤	—
—	—	—	—	—	—
●	●	●	●	●	●
●	●	●	●	●	●
●	●	●	●	●	●
—	—	—	—	—	—
NF400-SW	NF630-SW	NF800-SEW	NF1000-SEW	NF1250-SEW	NF1600-SEW

Order information for moulded-case circuit breakers 3–125 A

Type	Rated current (I_n)	Art. no. 3 pole type	Art. no. 4 pole type
S series with thermal-magnetic tripping device, fixed, AC			
NF32-SV	3 A	254680	—
	4 A	254681	—
	5 A	254682	—
	6 A	254683	—
	10 A	254684	—
	15 A	254685	—
	16 A	254686	—
	20 A	254687	—
	25 A	254688	—
	30 A	254689	—
	32 A	254690	—
NF63-SV	3 A	254739	254752
	4 A	254740	254753
	5 A	254741	254754
	6 A	254742	254755
	10 A	254743	254756
	15 A	254744	254757
	16 A	254745	254758
	20 A	254746	254759
	25 A	254747	254760
	30 A	269402	254761
	32 A	254748	254762
	40 A	254749	254763
	50 A	253073	254764
	60 A	254750	254765
	63 A	254751	254766
NF125-SV	75 A	254840	254853
	80 A	254841	254854
	100 A	254842	254855
	125 A	254843	254856
NF250-SV	150 A	255077	255085
	160 A	255078	255086
	175 A	255079	255087
	200 A	255080	255088
	225 A	255081	255089
	250 A	255082	255090
H series with thermal-magnetic tripping device, fixed, AC			
NF63-HV	10 A	254778	254789
	15 A	254779	254790
	16 A	254780	254791
	20 A	254781	254792
	25 A	254782	254793
	30 A	254783	254794
	32 A	254784	254795
	40 A	254785	254796
	50 A	254786	254797
	60 A	254787	254798
	63 A	254788	254799

Type	Rated current (I_n)	Art. no. 3 pole type	Art. no. 4 pole type
S series with thermal-magnetic tripping device, AC, DC			
NF125-SGV	16–20 A	254908	254917
	20–25 A	254909	254918
	25–32 A	254910	254919
	32–40 A	254911	254920
	35–50 A	254912	254921
	45–63 A	254913	254922
	56–80 A	254914	254923
	70–100 A	254915	254924
	90–125 A	254916	254925
NF125-LGV	16–20 A	254935	254943
	20–25 A	254936	254944
	25–32 A	254937	254945
	32–40 A	254938	254946
	35–50 A	254939	254947
	45–63 A	254940	254948
	56–80 A	254941	254949
	70–100 A	254942	254950
	90–125 A	255195	254951
H series with thermal-magnetic tripping device, AC, DC			
NF125-HGV	16–20 A	254961	254970
	20–25 A	254962	254971
	25–32 A	254963	254972
	32–40 A	254964	254973
	35–50 A	254965	254974
	45–63 A	254966	254975
	56–80 A	254967	254976
	70–100 A	254968	254977
	90–125 A	254969	254978
H series with electronic tripping device, adjustable, AC			
NF125-HEV	16–32 A	255030	255033
	32–63 A	255031	255034
	63–125 A	255032	255035
R series with thermal-magnetic tripping device, AC, DC			
NF125–RGV	16–20 A	254988	—
	20–25 A	254989	—
	25–32 A	254990	—
	32–40 A	254991	—
	40–50 A	254992	—
	50–63 A	254993	—
	63–80 A	254994	—
	80–100 A	254995	—
	100–125 A	254996	—
U series with thermal-magnetic tripping device, fixed, AC, DC			
NF125-UV	15 A	255006	255015
	20 A	255007	255016
	30 A	255008	255017
	40 A	255009	255018
	50 A	255010	255019
	60 A	255011	255020
	75 A	255012	255021
	100 A	255013	255022
	125 A	255014	255023

Order information for moulded-case circuit breakers 160–250 A

Type	Rated current (I_n)	Art. no. 3 pole type	Art. no. 4 pole type
S series with thermal-magnetic tripping device, adjustable, AC, DC			
NF160-SGV	125–160 A	255040	255041
L series with thermal-magnetic tripping device, adjustable, AC, DC			
NF160-LGV	125–160 A	255043	255044
H series with thermal-magnetic tripping device, adjustable, AC, DC			
NF160-HGV	125–160 A	255046	255047
S series with thermal-magnetic tripping device, adjustable, AC, DC			
NF250-SGV	125–160 A	255118	255121
	140–200 A	255119	255122
	175–250 A	255120	255123
S series with electronic tripping device, adjustable, AC			
NF250-SEV	80–160 A	255166	255168
	125–250 A	255167	255169
L series with thermal-magnetic tripping device, adjustable, AC, DC			
NF250-LGV	125–160 A	255127	255130
	140–200 A	255128	255131
	175–250 A	255129	255132

Type	Rated current (I_n)	Art. no. 3 pole type	Art. no. 4 pole type
H series with thermal-magnetic tripping device, adjustable, AC, DC			
NF250-HGV	125–160 A	255136	255139
	140–200 A	255137	255140
	175–250 A	255138	255141
H series with electronic tripping device, adjustable, AC			
NF250-HEV	80–160 A	255170	255172
	125–250 A	255171	255173
R series with thermal-magnetic tripping device, adjustable, AC, DC			
NF250-RGV	125–160 A	255145	—
	160–200 A	255146	—
	175–250 A	255147	—
U series with thermal-magnetic tripping device, fixed, AC, DC			
NF250-UV	125 A	255154	255160
	150 A	255155	255161
	175 A	255156	255162
	200 A	255157	255163
	225 A	255158	255164
	250 A	255159	255165

Order information for moulded-case circuit breakers 400–1600 A

Type	Rated current (I_n)	Art. no. 3 pole type	Art. no. 4 pole type
S series with electronic tripping device, adjustable, AC			
NF400–SEW	200–400 A	204780	204781
NF630–SEW	300–630 A	204789	204790
NF800–SEW	400–800 A	204797	204798
H series with electronic tripping device, adjustable, AC			
NF400–HEW	200–400 A	204782	204783
NF630–HEW	300–630 A	204791	204792
NF800–HEW	400–800 A	204799	204800

Type	Rated current (I_n)	Art. no. 3 pole type	Art. no. 4 pole type
R series with electronic tripping device, adjustable, AC			
NF400–REW	200–400 A	204784	—
NF630–REW	300–630 A	204793	—
NF800–REW	400–800 A	204801	—
U series with electronic tripping device, adjustable, AC			
NF400–UEW	200–400 A	204785	204786
NF800–UEW	400–800 A	204802	204803

Order information for moulded-case circuit breakers 1000–1600 A

Type	Rated current (I_n)	Art. no. 3 pole type	Art. no. 4 pole type
SS/UR series with electronic tripping device, adjustable, AC			
NF1000–SEW	500–1000 A	204810	204811
NF1250–SEW	600–1250 A	204812	204813
NF1600–SEW	800–1600 A	204814	204815

Order information for disconnectors DSN series 32–1600 A

Type	Rated current (I_n)	Art. no. 3 pole type	Art. no. 4 pole type
Disconnectors (no tripping device)			
DSN32–SV	32 A	254669	—
DSN63–SV	63 A	254722	254723
DSN125–SGV	125 A	254897	254898
DSN160–SGV	160 A	255037	255038
DSN250–SGV	250 A	255113	255114
DSN400–SW	400 A	204778	204779
DSN630–SW	630 A	204787	204788
DSN800–SW	800 A	204794	204795
DSN1000–SW	1000 A	204804	204805
DSN1250–SW	1250 A	204806	204807
DSN1600–SW	1600 A	204808	204809

Internal accessories

Modular cassette type accessories

The new arrangement and design of pluggable accessories such as indicator and auxiliary contacts allows you to modify the circuit in a way that saves time and space – at any time, even when built in and ready for operation.

The presence of separate circuit chambers makes the system even safer.

Thus cassette type accessories ensure flexibility when upgrading circuits.

The cassette type accessories are available in several versions and fit for breaker series from 32 A up to 800 A:

- alarm switch (AL)
- auxiliary switch (AX)
- alarm and auxiliary switch (AL+AX)
- shunt trip device (SHT)
- undervoltage trip device (UVT)

with lead-wire terminal block as standard.

In addition you can choose the lead-wire version or the internal terminal type as an option.

Alarm switch (AL)

Provides for indication that the MCCB has tripped.

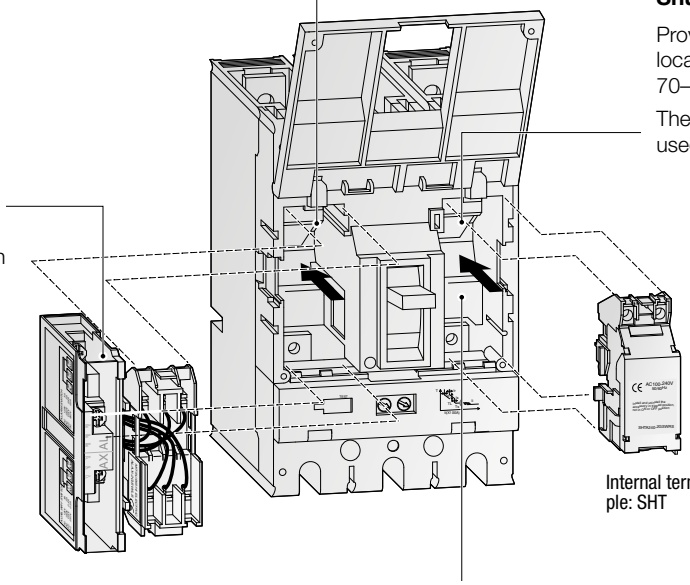
Auxilliary switch (AX)

Provides for indication of whether the breaker is ON or OFF.

Lead-wire terminal block (SLT)

The terminal block is used for bringing out the connections of the internal accessories.

The cassette type accessories are also available as internal terminal type without terminal block. The connection cables are lead out of the breaker housing in line-side direction. So it is possible to mount several breakers easy side-by-side in a row.



Lead-wire terminal block
Example: ALAX

Internal terminal type Example: SHT

Shunt trip (SHT)

Provides for tripping from a remote location. The control voltage range is 70–100 % of rated voltage.

The shunt trip enables an MCCB to be used in combination with an ELR.

Undervoltage trip (UVT)

The tripping voltage is 35–70 % of the rated voltage. When the voltage recovers to at least 85 %, the breaker can be closed or reset.

Provides for electrical interlock, and is used where electrical machines need to be protected against voltage drop.

For the breakers of the super series, 1000 A up to 1600 A, please contact your distributor.

Overview of internal accessories

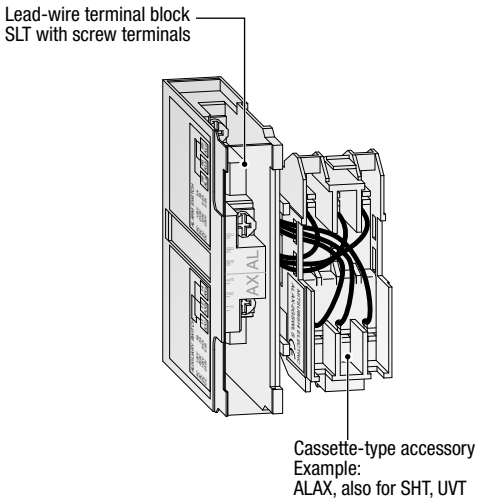
Cassette-type internal accessory	Function	Catalogue reference
AL (Alarm switch)	The alarm switch AL indicates that the breaker has tripped.	Page 68
AX (Auxiliary switch)	The auxiliary switch AX indicates whether the breaker is ON or OFF.	Page 68
SHT (Shunt trip)	The shunt trip SHT trips the breaker automatically by remote. A cut-off switch is integrated. The allowable tripping voltage is 70 % to 110 % of the rated voltage for both AC and DC.	Page 70
UVT (Undervoltage trip)	The undervoltage trip UVT trips the breaker automatically when the voltage drops. The tripping voltage is 35 % to 70 % of the rated voltage. When the voltage recovers to 85 % of the rated voltage or above, the UVT can be reset and the breaker closed.	Page 72

Connection of the control wires

For the connection of the control wires Mitsubishi Electric offers you two ways:

- Lead-wire terminal block (SLT)
- Internal terminal type for direct connection.

■ Lead-wire terminal block (SLT)



Application

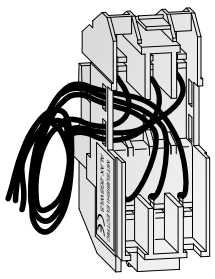
All cassette-type accessories are equipped with the Lead-wire terminal block SLT as standard.

The terminal cover for the lead-wire terminals is available for the safety of live parts.

It is available for front connection type, rear connection type and plug-In type.

- Correspondent terminals are not necessary.
- Uneven arrangement of terminal screws is adopted for easier wiring.
- Tightening check of a terminal screw is easy.
- Terminal cover of a terminal block is standard equipment (co-packed).

■ Internal terminal type for direct connection



Example:
ALAX, also for SHT, UVT

Application

Optional the cassette-type accessories are available as internal terminal type without terminal block.

The internal connected control wires can be lead out of the breaker housing in line-side direction to external terminals.

- Quick install and de-install of the internal accessories is possible without demounting the breaker.
- Mounting of several breakers side-by-side in a row is possible.
- Thus the control wires are fixed inside of the breaker housing, no special terminal cover for the screw terminals is necessary.

■ Alarm switch and auxiliary switch

(Mounted on left side)

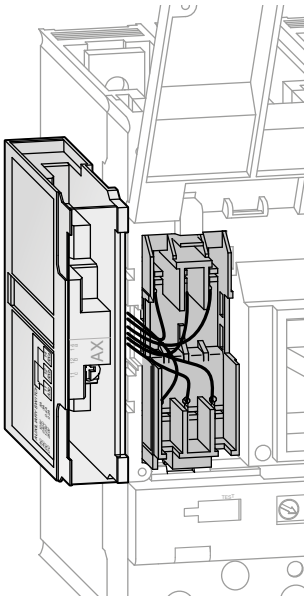


Figure shows Lead-wire terminal block type (SLT).

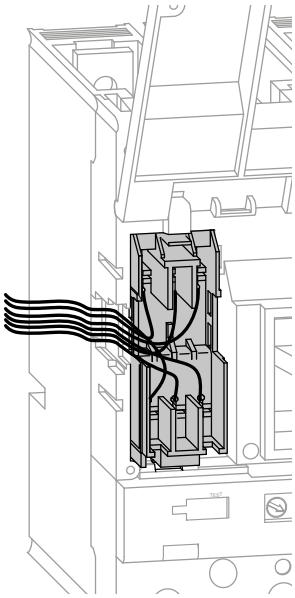


Figure shows Internal terminal type.

Application

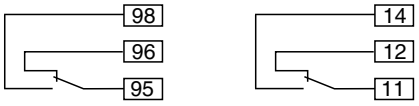
The alarm switch AL indicates that the breaker has tripped.

The auxiliary switch AX indicates whether the breaker is ON or OFF.

The alarm and auxiliary switch ALAX is a combination of the alarm switch AL and the auxiliary switch AX in one housing.

- AL, AX and ALAX standard types are for left-side mounting and equipped with lead-wire terminal block SLT.
- Internal terminal type is also available.
- Please specify, if right-side mounted type or type with flying leads is needed.

Contact plans

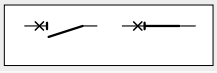
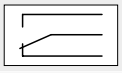
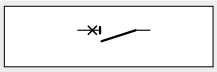
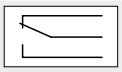


(1 W) Alarm switch AL

(1 W) Auxiliary switch AX

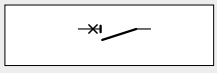
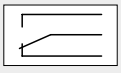
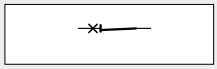
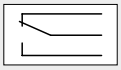
Switching operation

Alarm switch (AL) operation

Main MCCB conditions		Alarm contacts	
OFF or ON			ALa 98 (open) ALc 95 (DC+) ① ALb 96 (closed)
Trip			ALa 98 (closed) ALc 95 (DC+) ① ALb 96 (open)

① When DC use, polarity must be considered.

Auxiliary switch (AX) operation

Main MCCB conditions		Auxiliary contacts	
OFF or Trip			AXa 14 (open) AXc 11 (DC+) ① AXb 12 (closed)
ON			AXa 14 (closed) AXc 11 (DC+) ① AXb 12 (open)

AL, AX switching capacities

Type of Micro-switch for	Voltage (V AC)	Resistive loads (A)	Inductive load (A)	Voltage (V DC) ①	Resistive loads (A)	Inductive load (A)
AL/AX/ALAX-05–8	460	—	—	250	0.2	0.2
	250	3	2	125	0.4	0.4
	125	5	3	30	4	3
AL/AX/ALAX-10	460	5	2	250	0.3	0.3
	250	10	10	125	0.6	0.6
	125	10	10	30	10	6

① When DC use, polarity must be considered.

Order information for alarm switch and auxiliary switch

Type	Contacts	Breaker type	Mounted on	Art. no.
Alarm switch AL with lead-wire terminal block SLT				
AL-05SVLS	1 W	NF/DSN32–63 NF/DSN125–250	Left side	267212
AL-4SWLS	1 W	NF/DSN400–800		205763
AL2-4SWLS	2 W	NF/DSN400–800		205764
AL3-8SWLS	3 W	NF/DSN800		205765
AL-10SWL	1 W	NF/DSN1000–1600		205766
Alarm switch AL for direct connection				
AL-05SV	1 W	NF/DSN32–63 NF/DSN125–250	Left or right side	267210
Auxiliary switch AX with lead-wire terminal block SLT				
AX-05SVLS	1 W	NF/DSN32–63 NF/DSN125–250	Left side	267238
AX2-05SVLS	2 W	NF/DSN32–63 NF/DSN125–250		267246
AX-4SWLS	1 W	NF/DSN400–800		205767
AX2-4SWLS	2 W	NF/DSN400–800		205768
AX3-8SWLS	3 W	NF/DSN800 NF400-UEW 4P		205769
AX4-8SWLS	4 W	NF/DSN800 NF400-UEW 4P		205770
AX-10SWLS	1 W	NF/DSN1000–1600		205771
AX2-10SWLS	2 W	NF/DSN1000–1600		205772
AX3-10SWLS	3 W	NF/DSN1000–1600		205773
Auxiliary switch AX for direct connection				
AX-05SV	1 W	NF/DSN32–63 NF/DSN125–250	Left or right side	267236
AX2-05SV	2 W	NF/DSN32–63 NF/DSN125–250		267244

Type	Contacts AL AX	Breaker type	Mounted on	Art. no.
Alarm switch and auxiliary switch ALAX with lead-wire terminal block SLT				
ALAX-05SVLS	1 W + 1 W	NF/DSN32–63 NF/DSN125–250	Left side	267230
ALAX-4SWLS	1 W + 1 W	NF/DSN400–800 NF400-UEW 4P		205774
AL2AX2-4SWLS	2 W + 2 W	NF/DSN400–800 NF400-UEW 4P		205775
ALAX-10SWL	1 W + 1 W	NF/DSN1000–1600		205776
AL1AX2-10SWL	1 W + 2 W	NF/DSN1000–1600		205777
Alarm switch and auxiliary switch ALAX for direct connection				
ALAX-05SV	1 W + 1 W	NF/DSN32–63 NF/DSN125–250	Left or right side	267228

■ Shunt trip device SHT

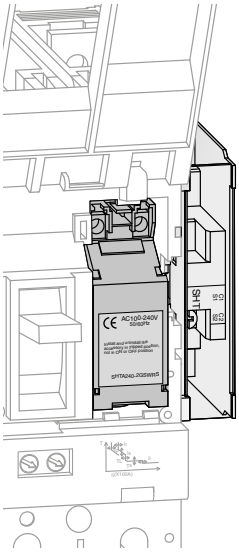


Figure shows lead-wire terminal block type (SLT).

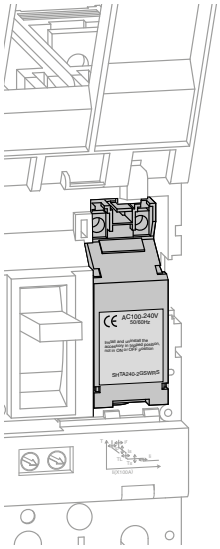


Figure shows internal terminal type.

Application

The shunt trip device SHT trips the breaker automatically by remote. A cut-off switch is integrated.

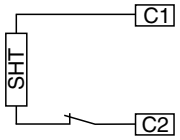
The allowable tripping voltage range is 70 % to 110 % of the rated voltage for both AC and DC.

The SHT is mounted on the right side of the breaker and equipped with lead-wire terminal block SLT as standard.

Please specify, if left-side mounted type or type with flying leads is needed (optional available).

Please consider, the shunt trip device SHT for 3-pole and 4-pole breakers is different in the length of wires based on the outline dimension of the breaker.

Contact plans



With cut-off switch

Coil ratings

MCCB type ①	Cut-off switch	Voltage (V) ②	Input ③ AC (VA)	DC (W)	Operating time (msec) ④
NF32-SV NF63-SV NF63-HV	Equipped	AC 24–48 AC 100–240 AC 380–550 (50/60 Hz) DC 100–125	120	50	≤15
NF125-SGV/SEV NF125-HGV/HEV NF125-RGV/UGV NF160-SGV/SEV NF160-HGV/HEV NF250-SGV/SEV NF250-HGV/HEV NF250-RGV/UGV	Equipped			60	
NF400-SEW/HEW/REW/UEW NF630-SEW/HEW/REW NF800-CEW/SEW/HEW/REW/UEW	Equipped	AC 24–48/DC 24–48 AC 100–450/DC 100–200 AC 380–550 (50/60 Hz)	100 V: 20 200 V: 50 330 V: 120 450 V: 170	100 V: 10 200 V: 35	5–15
NF1000-SEW NF1250-SEW NF1600-SEW	Equipped	AC 100–120 AC 200–240 AC 380–450 (50/60Hz) DC 100	200	70	7–15

① Also for DSN types.
② Other voltages on request
③ For the SHT operating power capacity, any voltage drop in the input electric power must not be below the allowable operating voltage range.
④ The operating time includes all the time up to the moment the main contact of the breaker disconnects after a voltage has been applied to the shunt trip devices.

Order information for shunt trip device SHT

With lead-wire terminal block SLT, mounted on right-side

For 3-pole breaker			For 4-pole breaker			
Type	Breaker type	Art. no.	Type	Breaker type	Art. no.	Rated voltage
SHTA048-05SVRS	NF/DSN32–63 NF/DSN125–250	267479	**SHTA048-05SVRFS**	NF/DSN32–63 NF/DSN125–250	267480	AC 24–48 V
SHTA240-05SVRS		267484	**SHTA240-05SVRFS**		267485	AC 100–240 V
SHTA550-05SVRS		267489	**SHTA550-05SVRFS**		267490	AC 380–550 V
SHTD012-05SVRS		267494	**SHTD012-05SVRFS**		267495	DC 12 V
SHTD036-05SVRS		267499	**SHTD036-05SVRFS**		267500	DC 24–36 V
SHTD048-05SVRS		267504	**SHTD048-05SVRFS**		267505	DC 36–48 V
SHTD125-05SVRS		267509	**SHTD125-05SVRFS**		267510	DC100–125 V
SHTD250-05SVRS		267514	**SHTD250-05SVRFS**		267515	DC220–250 V
SHT-4SWRS	NF/DSN400–800	205778	**SHT-4SWRFS**	NF/DSN400–630	205779	AC 100–450 V/DC 100–200 V
SHT48-4SWRS		205780	**SHT48-4SWRFS**		205781	AC 24–48 V/DC 24–48 V
SHTA550-4SWRS		205782	**SHTA550-4SWRFS**		205783	AC 380–550 V
—	—	—	**SHT-8SWRFS**	NF/DSN800 NF400-UEW 4P	205784	AC 100–450 V/DC100–200 V
			SHT48-8SWRFS		205785	AC 24–48 V/DC 24–48 V
			SHTA550-8SWRFS		205786	AC 380–550 V
SHTA120-10SWRS	NF/DSN1000–1600	205787	**SHTA120-10SWRFS**	NF/DSN1000–1600	205788	AC 100–120 V
SHTA240-10SWRS		205789	**SHTA240-10SWRFS**		205790	AC 200–240 V
SHTA450-10SWRS		205791	**SHTA450-10SWRFS**		205792	AC 380–450 V
SHTD024-10SWRS		205793	**SHTD024-10SWRFS**		205794	DC 24 V
SHTD110-10SWRS		205795	**SHTD110-10SWRFS**		205796	DC 110 V

For direct connection, mounted on right-side

For 3-/4-pole breaker			
Type	Breaker type	Rated voltage	Art. no.
SHTA048-05SVR	NF/DSN125–250	AC 24–48 V	267478
SHTA240-05SVR	NF/DSN-125/160/250xx	AC 100–240 V	267483
SHTA550-05SVR	NF/DSN-125/160/250xx	AC 380–550 V	267488
SHTD012-05SVR	NF/DSN-125/160/250xx	DC 12 V	267493
SHTD036-05SVR	NF/DSN-125/160/250xx	DC 24–36 V	267498
SHTD048-05SVR	NF/DSN-125/160/250xx	DC 36–48 V	267503
SHTD125-05SVR	NF/DSN-125/160/250xx	DC 100–125 V	267508
SHTD250-05SVR	NF/DSN-125/160/250xx	DC 220–250 V	267513

■ Undervoltage tripping device UVT

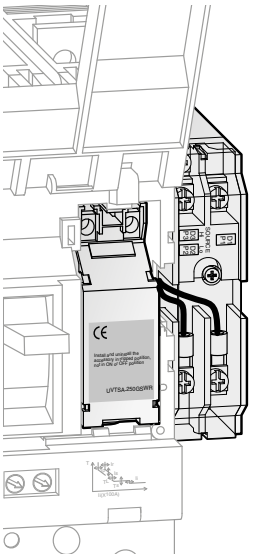


Figure shows lead-wire terminal block type (SLT).

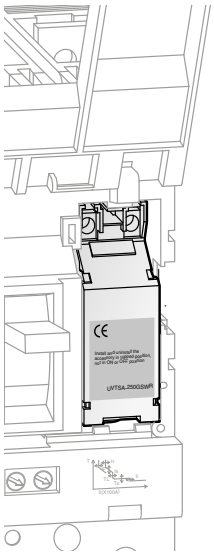


Figure shows internal terminal type.

Application

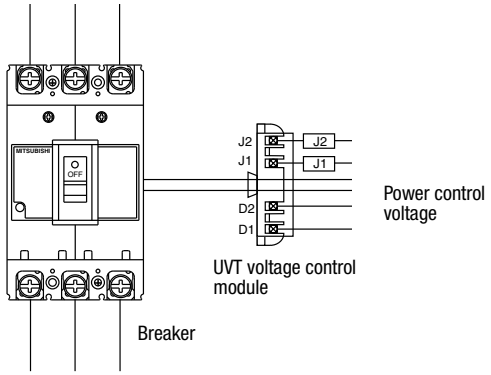
The undervoltage tripping device UVT trips the breaker automatically when the voltage drops. The tripping voltage is 35 % to 70 % of the rated voltage. When the voltage recovers to 85 % of the rated voltage or above, the UVT can be reset and the breaker closed.

The UVT is mounted on the right side of the breaker and equipped with lead-wire terminal block SLT as standard.

Please specify, if left-side mounted type or type with flying leads is needed.

Please consider, the undervoltage trip UVT for 3-pole and 4-pole breaker is different in the length of wires based on the outline dimension of the breaker.

Contact plans



Coil ratings

Breaker type ①	For synchronous closing	Voltage (V) ② Standard	Input (VA)	Operating time ③ (msec)	Making/breaking data	
					Breaker OFF	Breaker ON
NF32-SV **NF63-SV** **NF125-SGV/REV** **NF125-HGV/HEV** **NF125-RGV/UV** **NF160-SGV/REV** **NF160-HGV/HEV** **NF250-SGV/REV** **NF250-HGV/REV** **NF250-RGV/UV**	●	AC 100–120 AC 200–240 AC 220–240 AC 380–450 AC 400–440 (50/60 Hz) DC 24, DC 110	5	≤30	35–70 % U_N	min. 85 % U_N
NF400-SEW/HEW/REW/UEW **NF630-SEW/HEW/REW** **NF800-CEW/SEW/HEW/REW/UEW**	●	AC 100–110/120–130 AC 200–220/230–250 AC 380–415/440–480 (50/60 Hz) DC100/110	5	5–30 (Instantaneous type)		
NF1000-SEW **NF1250-SEW** **NF1600-SEW**	● ④	AC 100–120/200–240/380–450 AC 200–250/380–450/460–550 (50/60 Hz)	5	5–35 (Time delay type with 3 voltage inputs)		

① Also for DSN types.
② Other voltages on request.
③ The operating time is the time from the start of operating the breaker since the undervoltage trip went from voltage to no-voltage condition.
④ DC version on request.
UVTs with time delay on request.

Types of UVTs

Breaker type	No. of poles	Rated voltages AC 24 V DC 24 V	AC 48 V DC 48 V	AC 100–130 V DC 100–130 V	AC 200–220 V/ AC 230–250 V	AC 380–415 V/ AC 440–480 V	AC 500–550 V/ AC 600 V
Instantaneous trip type, with lead-wire terminal block SLT							
NF/DSN32–63 NF/DSN125–250	3	UVTSAD024-05SVRS	UVTSAD048-05SVRS	UVTSAD130-05SVRS	UVTSA250-05SVRS	UVTSA480-05SVRS	UVTSA600-05SVRS
	4	UVTSAD024-05SVRFS	UVTSAD048-05SVRFS	UVTSAD130-05SVRFS	UVTSA250-05SVRFS	UVTSA480-05SVRFS	UVTSA600-05SVRFS

Breaker type	No. of poles	Rated voltages AC 100–110 V/ AC 120–130 V	AC 200–220 V/ AC 230–250 V	AC 380–415 V/ AC 440–480 V	DC 24/48 V	DC 100/110 V
Instantaneous trip type, with lead-wire terminal block SLT						
NF/DSN400–800	3	UVTSA130-4SWS	UVTSA250-4SWS	UVTSA480-4SWS	UVTSD048-4SWS	UVTSD110-4SWS
NF/DSN400–630	4	UVTSA130-4SWRFS	UVTSA250-4SWRFS	UVTSA480-4SWRFS	UVTSD048-4SWRFS	UVTSD110-4SWRFS
NF/DSN800	4	UVTSA130-8SWRFS	UVTSA250-8SWRFS	UVTSA480-8SWRFS	UVTSD048-8SWRFS	UVTSD110-8SWRFS
NF/DSN1000–1600	3	UVTSA130-10SWRS	UVTSA250-10SWRS	UVTSA480-10SWRS	UVTND048-10SWRS	UVTND110-10SWRS
	4	UVTSA130-10SWRFS	UVTSA250-10SWRFS	UVTSA480-10SWRFS	UVTND048-10SWRFS	UVTND110-10SWRFS

Breaker type	No. of poles	Rated voltages AC 24/48 V	AC 120/240/450 V	AC 250/450/550 V	AC 450/550/690 V	DC 24/48 V	DC 100 –110 V
Short-time delay type, with lead-wire terminal block SLT, short-time delay adjustable in steps 0.1–0.3–0.5 sec							
NF/DSN32–63 NF/DSN125–250	3	UVTSA048-05SVRSU05	UVTSA450-05SVRSU05	UVTSA550-05SVRSU05	UVTSA690-05SVRSU05	UVTSD048-05SVRSU05	UVTSD110-05SVRSU05
	4	UVTSA048-05SVRFSU05	UVTSA450-05SVRFSU05	UVTSA550-05SVRFSU05	UVTSA690-05SVRFSU05	UVTSD048-05SVRFSU05	UVTSD110-05SVRFSU05

Breaker type	No. of poles	Rated voltages AC 24/48 V	AC 120/240/450 V	AC 250/450/550 V	AC 450/550/690 V	DC 24/48 V	DC 100 –110 V
Long-time delay type, with lead-wire terminal block SLT, long-time delay adjustable in steps 0.5–1.0–3.0 sec							
NF/DSN32–63 NF/DSN125–250	3	UVTSA048-05SVRSU30	UVTSA450-05SVRSU30	UVTSA550-05SVRSU30	UVTSA690-05SVRSU30	UVTSD048-05SVRSU30	UVTSD110-05SVRSU30
	4	UVTSA048-05SVRFSU30	UVTSA450-05SVRFSU30	UVTSA550-05SVRFSU30	UVTSA690-05SVRFSU30	UVTSD048-05SVRFSU30	UVTSD110-05SVRFSU30

UVTN...: non-synchronous closing type
UVTS...: synchronous closing type
Types for direct connection on request.

Order information for undervoltage tripping devices UVT

Undervoltage tripping device UVT, instantaneous trip type, synchronous and non-synchronous closing, mounted on right-side

with lead-wire terminal block SLT, for 3-pole breakers

Type	Breaker type	Rated voltage	Art. no.
UVTSAD024-05SVRS	NF/DSN32–250	AC 24 V DC 24 V	267615
UVTSAD048-05SVRS	NF/DSN32–250	AC 48 V DC 48 V	267620
UVTSAD130-05SVRS	NF/DSN32–250	AC 100–130 V DC 100–130 V	267625
UVTSA250-05SVRS	NF/DSN32–250	AC 200–220 V/ AC 230–250 V	267600
UVTSA480-05SVRS	NF/DSN32–250	AC 380–415 V/ AC 440–480 V	267605
UVTSA600-05SVRS	NF/DSN32–250	AC 500–550 V/ AC 600 V	267610
UVTSA130-4SWS	NF/DSN400–800	AC 100–110/120–130 V	205951
UVTSA250-4SWS	NF/DSN400–800	AC 200–220/230–250 V	205953
UVTSA480-4SWS	NF/DSN400–800	AC 380–415/440–480 V	205828
UVTSD048-4SWS	NF/DSN400–800	DC 24/48 V	205932
UVTSD110-4SWS	NF/DSN400–800	DC 100/110 V	205934
UVTSA130-10SWRS	NF/DSN1000–1600	AC 100–110/120–130 V	205941
UVTSA250-10SWRS	NF/DSN1000–1600	AC 200–220/230–250 V	205943
UVTSA480-10SWRS	NF/DSN1000–1600	AC 380–415/440–480 V	205945
UVTND048-10SWRS	NF/DSN1000–1600	DC 24/48 V	205947
UVTND110-10SWRS	NF/DSN1000–1600	DC 100/110 V	205949

with lead-wire terminal block SLT, for 4-pole breakers

Type	Breaker type	Rated voltage	Art. no.
UVTSAD024-05SVRFS	NF/DSN63–250	AC 24 V DC 24 V	267616
UVTSAD048-05SVRFS	NF/DSN63–250	AC 48 V DC 48 V	267621
UVTSAD130-05SVRFS	NF/DSN63–250	AC 100–130 V DC 100–130 V	267626
UVTSA250-05SVRFS	NF/DSN63–250	AC 200–220 V/ AC 230–250 V	267601
UVTSA480-05SVRFS	NF/DSN63–250	AC 380–415 V/ AC 440–480 V	267606
UVTSA600-05SVRFS	NF/DSN63–250	AC 500–550 V/ AC 600 V	267611
UVTSA130-4SWRFS	NF/DSN400–630	AC 100–110/120–130 V	205952
UVTSA250-4SWRFS	NF/DSN400–630	AC 200–220/230–250 V	205954
UVTSA480-4SWRFS	NF/DSN400–630	AC 380–415/440–480 V	205955
UVTSD048-4SWRFS	NF/DSN400–630	DC 24/48 V	205933
UVTSD110-4SWRFS	NF/DSN400–630	DC 100/110 V	205935
UVTSA130-8SWRFS	NF/DSN800	AC 100–110/120–130 V	205936
UVTSA250-8SWRFS	NF/DSN800	AC 200–220/230–250 V	205937
UVTSA480-8SWRFS	NF/DSN800	AC 380–415/440–480 V	205938
UVTSD048-8SWRFS	NF/DSN800	DC 24/48 V	205939
UVTSD110-8SWRFS	NF/DSN800	DC 100/110 V	205940
UVTSA130-10SWRFS	NF/DSN1000–1600	AC 100–110/120–130 V	205942
UVTSA240-10SWRFS	NF/DSN1000–1600	AC 200–220/230–250 V	205944
UVTSA480-10SWRFS	NF/DSN1000–1600	AC 380–415/440–480 V	205946
UVTND048-10SWRFS	NF/DSN1000–1600	DC 24/48 V	205948
UVTND110-10SWRFS	NF/DSN1000–1600	DC 100/110 V	205950

Undervoltage tripping device UVT, short-time delay type, synchronous closing, mounted on right-side

with lead-wire terminal block SLT, for 3-pole breakers

Type	Breaker type	Rated voltage	Art. no.
UVTSA048-05SVRSU05	NF/DSN32–250	AC 24/48 V	267690
UVTSA450-05SVRSU05	NF/DSN32–250	AC 120/240/450 V	267695
UVTSA550-05SVRSU05	NF/DSN32–250	AC 250/450/550 V	267700
UVTSA690-05SVRSU05	NF/DSN32–250	AC 450/550/690 V	267705
UVTSD048-05SVRSU05	NF/DSN32–250	DC 24/48 V	267710
UVTSD110-05SVRSU05	NF/DSN32–250	DC 100–110 V	267715

with lead-wire terminal block SLT, for 4-pole breakers

Type	Breaker type	Rated voltage	Art. no.
UVTSA048-05SVRFSU05	NF/DSN63–250	AC 24/48 V	267691
UVTSA450-05SVRFSU05	NF/DSN63–250	AC 120/240/450 V	267696
UVTSA550-05SVRFSU05	NF/DSN63–250	AC 250/450/550 V	267701
UVTSA690-05SVRFSU05	NF/DSN63–250	AC 450/550/690 V	267706
UVTSD048-05SVRFSU05	NF/DSN63–250	DC 24/48 V	267711
UVTSD110-05SVRFSU05	NF/DSN63–250	DC 100–110 V	267716

Undervoltage tripping device UVT, long-time delay type, synchronous closing, mounted on right-side

with lead-wire terminal block SLT, for 3-pole breakers

Type	Breaker type	Rated voltage	Art. no.
UVTSA048-05SVRSU30	NF/DSN32–250	AC 24/48 V	267720
UVTSA450-05SVRSU30	NF/DSN32–250	AC 120/240/450 V	267725
UVTSA550-05SVRSU30	NF/DSN32–250	AC 250/450/550 V	267730
UVTSA690-05SVRSU30	NF/DSN32–250	AC 450/550/690 V	267735
UVTSD048-05SVRSU30	NF/DSN32–250	DC 24/48 V	267740
UVTSD110-05SVRSU30	NF/DSN32–250	DC 100–110 V	267745

with lead-wire terminal block SLT, for 4-pole breakers

Type	Breaker type	Rated voltage	Art. no.
UVTSA048-05SVRFSU30	NF/DSN63–250	AC 24/48 V	267721
UVTSA450-05SVRFSU30	NF/DSN63–250	AC 120/240/450 V	267726
UVTSA550-05SVRFSU30	NF/DSN63–250	AC 250/450/550 V	267731
UVTSA690-05SVRFSU30	NF/DSN63–250	AC 450/550/690 V	267736
UVTSD048-05SVRFSU30	NF/DSN63–250	DC 24/48 V	267741
UVTSD110-05SVRFSU30	NF/DSN63–250	DC 100–110 V	267746

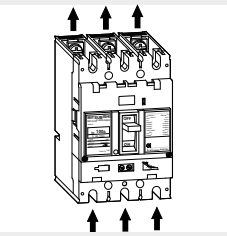
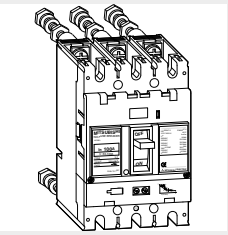
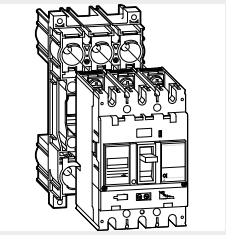
Models for direct connection on request.

Accessories for connection and installation

If no connection method is specified with the order, we deliver the standard fixed-installation type with front connection.

The front-connection model can be modified to other types (excluding plug-in) with special purchase options.

More details on request.

Connection types			
Installation	Fixed		Plug-in
Connection	Front (F)	Rear (B)	Rear (PM)
Appearance			
	Standard	Option	Option

Available terminal connections

Frame size	Front (Standard)	Rear	Solderless terminals	Plug-in
32–250 A	●	●	● ①	●
400–800 A	●	●	—	●
1000–1600 A	●	— ②	—	— ②

① Only for frame sizes 125/160/250 A ② On request, modified at factory.

■ Connection accessories

Rear studs ST

Type	No. of poles	Breaker type		Art. no.
ST-05SV3	3	NF/DSN32–250	For W75 models	267533
ST-05SV4	4			267534
ST-1SV3	3		For W90 models	267537
ST-1SV4	4			267538
ST-2SV3	3		For W105 models	267540
ST-2SV4	4			267541
ST-4SW3	3	NF/DSN400		205956
ST-4SW4	4			205957
ST-6SW3	3	NF/DSN630		205958
ST-6SW4	4			205959
ST-8SW3	3	NF/DSN800		205960
ST-8SW4	4			205961

Solderless terminals SL

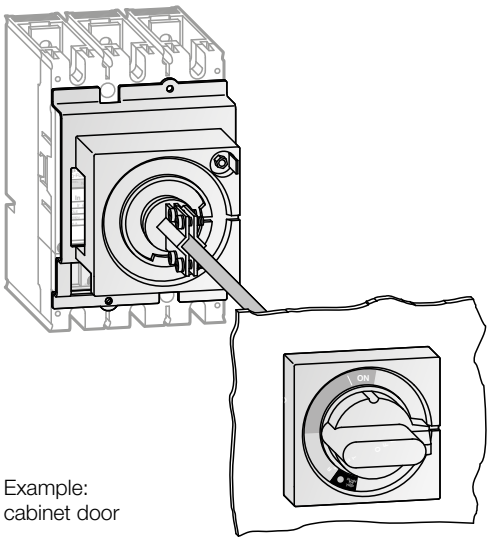
Type	No. of poles	Breaker type	Connected wire size	Art. no.
SL-1SV3L	3	For W90 models	2.5–25 mm²	267516
SL-1SV3G	3		25–70 mm²	267517
SL-1SV4L	4		2.5–25 mm²	267518
SL-1SV4G	4		25–70 mm²	267519
SL-2SV3B	3	For W105 models	2.5–16 mm²	267520
SL-2SV3L	3		14–95 mm²	267521
SL-2SV3G	3		70–125 mm²	267522
SL-2SV4B	4		2.5–16 mm²	267523
SL-2SV4L	4		14–95 mm²	267524
SL-2SV4G	4		70–125 mm²	267525
SL-2UV3B	3	NF-UV	2.5–16 mm²	267526
SL-2UV3L	3		14–95 mm²	267527
SL-2UV3G	3		70–125 mm²	267528
SL-2UV4B	4		2.5–16 mm²	267529
SL-2UV4L	4		14–95 mm²	267530
SL-2UV4G	4		70–125 mm²	267531

Plug-in sets PM

Type	No. of poles	Breaker type		Art. no.
PLT-05SV		NF/DSN32–250	For W75 models	267426
PLT-2RV		NF/DSN32–250	For W105 models	267427
PMD-05SV3	3	NF/DSN32–250	For W75 models	267429
PMD-05SV4	4	NF/DSN32–250	For W75 models	267430
PMDN-05SV3H	3	NF/DSN32–250	For W75 models	267441
PMDN-1SV3	3	NF/DSN32–250	For W90 models	267447
PMDN-1SV4	4	NF/DSN32–250	For W105 models	267448
PMDN-2SV3	3	NF/DSN32–250	For W105 models	267450
PMDN-2SV4	4	NF/DSN32–250	For W105 models	267451
PMN-05SV3H	3	NF/DSN32–250	For W75 models	267456
PMN-05SV3L	3	NF/DSN32–250	For W75 models	267457
PMN-05SV4H	4	NF/DSN32–250	For W75 models	267458
PMN-05SV4L	4	NF/DSN32–250	For W75 models	267459
PMN-1SV3	3	NF/DSN32–250	For W90 models	267461
PMN-1SV4	4	NF/DSN32–250	For W90 models	267462
PMN-2SV3	3	NF/DSN32–250	For W105 models	267464
PMN-2SV4	4	NF/DSN32–250	For W105 models	267465
PMN-2UV3	3	NF-UV	For W105 models	267467
PMDN-4SW3	3	NF/DSN400		266582
PMDN-4SW4	4			266583
PMDN-6SW3	3	NF/DSN630		277944
PMDN-6SW4	4			On request
PMDN-8SW3	3	NF/DSN800		266584
PMDN-8SW4	4			266585

W75 = Breaker width 75 mm
W90 = Breaker width 90 mm
W105 = Breaker width 105 mm
More types available on request.

■ V-type operating handles



Example:
cabinet door

Application

The V-type operating handle is used to operate the breaker which is installed in a cabinet. With the installed V-type operating handle the breaker can be locked (with up to 3 padlocks, Ø 8 mm max., padlocks are not included) in OFF position only.

The door is locked when the breaker is ON and can only be opened when the breaker is in OFF position.

The V-type operating handle is available in the following colour combinations:

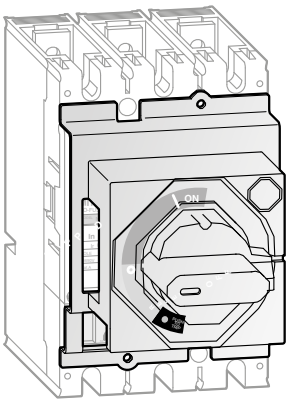
Handle and front in black/black and handle and front in red/yellow, or red/black, see also the following table.

- Protection degree IP65.
- Variable axle length.

Specifications		V-type operating handle											
		V-05SV	V-05SVE	V-1SV	V-1SVE	V-2SV	V-2SVE	V-2UV	V-2UVE	V-4S	V-4SE	V-8S	V-8SE
Breaker type		NF/DSN32-63		NF125-SV		NF/DSN125-250-SGV/SEV		NF/DSN125-250-UV		NF/DSN400-630		NF/DSN800	
Colour: handle/front		black	red/yellow	black	red/yellow	black	red/yellow	black	red/yellow	black	red/yellow	black	red/yellow
Order information	Art. no.	267747	267749	267751	267753	267755	267756	267757	267758	225420	225421	225424	225425

Specifications		Adjustment unit			
		V-AD3S	V-AD5S	V-AD3L	V-AD5L
Breaker type		NF/DSN32-250		NF/DSN400-800	
Approx. length	(mm)	300	500	300	500
Order information	Art. no.	225426	235194	225427	235235

■ F-type operating handles



Application

The F-type operating handles are to be mounted directly on the breaker.

With the installed operating handle the breaker can be locked (with up to 3 padlocks, Ø 8 mm max., padlocks are not included) in OFF position only.

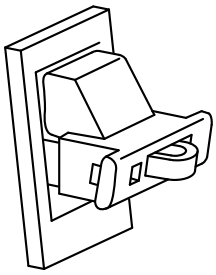
The operating handle is available in the following colour combinations:

Handle and front in black/black and handle and front in red/yellow, or red/black, see also the following table.

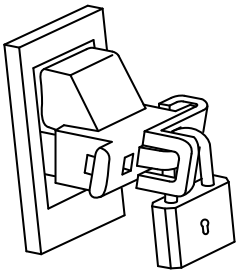
F-type operating handles

Name	Specifications	Breaker type	Art. No.
F-05SV LF DF	Operating handle Type F. OFF position lock, OFF position open, ON side of breaker is upper	NF/DSN32-63 3P / 4P	267263
F-05SV LF DF Y	Operating handle Type F. OFF position lock, OFF position open, ON side of breaker is left		267264
F-05SV LF DF Z	Operating handle Type F. OFF position lock, OFF position open, ON side of breaker is right		267265
F-05SV LF DR	Operating handle Type F. OFF position lock, RESET position open, ON side of breaker is upper		267266
F-05SV LF DR Y	Operating handle Type F. OFF position lock, RESET position open, ON side of breaker is left		267267
F-05SV LF DR Z	Operating handle Type F. OFF position lock, RESET position open, ON side of breaker is right		267268
F-05SVE LF DF	Operating handle Type F Emergency. OFF position lock, OFF position open, ON side of breaker is upper	NF/DSN32-63 3P / 4P	267287
F-05SVE LF DF Y	Operating handle Type F Emergency. OFF position lock, OFF position open, ON side of breaker is left		267288
F-05SVE LF DF Z	Operating handle Type F Emergency. OFF position lock, OFF position open, ON side of breaker is right		267289
F-05SVE LF DR	Operating handle Type F Emergency. OFF position lock, RESET position open, ON side of breaker is upper		267290
F-05SVE LF DR Y	Operating handle Type F Emergency. OFF position lock, RESET position open, ON side of breaker is left		267291
F-05SVE LF DR Z	Operating handle Type F Emergency. OFF position lock, RESET position open, ON side of breaker is right		267292
F-1SV LF DF	Operating handle Type F. OFF position lock, OFF position open, ON side of breaker is upper	NF125-SV 3P / 4P	267311
F-1SV LF DF Y	Operating handle Type F. OFF position lock, OFF position open, ON side of breaker is left		267312
F-1SV LF DF Z	Operating handle Type F. OFF position lock, OFF position open, ON side of breaker is right		267313
F-1SV LF DR	Operating handle Type F. OFF position lock, RESET position open, ON side of breaker is upper		267314
F-1SV LF DR Y	Operating handle Type F. OFF position lock, RESET position open, ON side of breaker is left		267315
F-1SV LF DR Z	Operating handle Type F. OFF position lock, RESET position open, ON side of breaker is right		267316
F-1SVE LF DF	Operating handle Type F Emergency. OFF position lock, OFF position open, ON side of breaker is upper	NF125-SV 3P / 4P	267335
F-1SVE LF DF Y	Operating handle Type F Emergency. OFF position lock, OFF position open, ON side of breaker is left		267336
F-1SVE LF DF Z	Operating handle Type F Emergency. OFF position lock, OFF position open, ON side of breaker is right		267337
F-1SVE LF DR	Operating handle Type F Emergency. OFF position lock, RESET position open, ON side of breaker is upper		267338
F-1SVE LF DR Y	Operating handle Type F Emergency. OFF position lock, RESET position open, ON side of breaker is left		267339
F-1SVE LF DR Z	Operating handle Type F Emergency. OFF position lock, RESET position open, ON side of breaker is right		267340
F-2SV LF DF	Operating handle Type F. OFF position lock, OFF position open, ON side of breaker is upper	NF/DSN125-250 3P / 4P	267359
F-2SV LF DF Y	Operating handle Type F. OFF position lock, OFF position open, ON side of breaker is left		267360
F-2SV LF DF Z	Operating handle Type F. OFF position lock, OFF position open, ON side of breaker is right		267361
F-2SV LF DR	Operating handle Type F. OFF position lock, RESET position open, ON side of breaker is upper		267362
F-2SV LF DR Y	Operating handle Type F. OFF position lock, RESET position open, ON side of breaker is left		267363
F-2SV LF DR Z	Operating handle Type F. OFF position lock, RESET position open, ON side of breaker is right		267364
F-2SVE LF DF	Operating handle Type F Emergency. OFF position lock, OFF position open, ON side of breaker is upper	NF/DSN125-250 3P / 4P All types less NF125-SV	267371
F-2SVE LF DF Y	Operating handle Type F Emergency. OFF position lock, OFF position open, ON side of breaker is left		267372
F-2SVE LF DF Z	Operating handle Type F Emergency. OFF position lock, OFF position open, ON side of breaker is right		267373
F-2SVE LF DR	Operating handle Type F Emergency. OFF position lock, RESET position open, ON side of breaker is upper		267374
F-2SVE LF DR Y	Operating handle Type F Emergency. OFF position lock, RESET position open, ON side of breaker is left		267375
F-2SVE LF DR Z	Operating handle Type F Emergency. OFF position lock, RESET position open, ON side of breaker is right		267376
F-4S LF DF	Operating handle Type F. OFF position lock, OFF position open, ON side of breaker is upper	NF/DSN400-630 3P / 4P	225402
F-4SE LF DF	Operating handle Type F Emergency. OFF position lock, OFF position open, ON side of breaker is upper		225403
F-8S LF DF	Operating handle Type F. OFF position lock, OFF position open, ON side of breaker is upper	NF/DSN800 3P / 4P	225404
F-8SE LF DF	Operating handle Type F Emergency. OFF position lock, OFF position open, ON side of breaker is upper		225405
F-RCS	Release protection for operating handle Type F	All F-types handles	267385
F10SW	Black operating handle set type F	NF/DSN1000-1600, 2P / 3P	225406
F10SW4P	Black operating handle set type F	NF/DSN1000-1600, 4P	225607

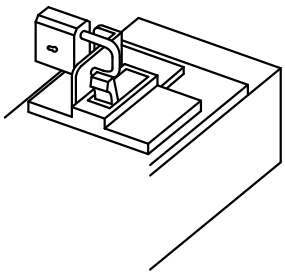
■ Handle lock devices



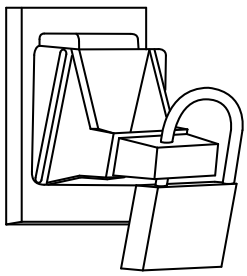
LC-05SV



HLF-05SV



HLS-2SV



HL-4SW

Application

The handle lock device HL is used to lock the handle of the breaker against switching by not-allowed persons. The function of protection is given every time.

Different types are available.

- All handle lock devices can be mounted regardless of the number of poles.
- Padlocks are not included.
- More details on request.

Handle lock device LC type

- The handle lock can be used without padlock as a lock cover.

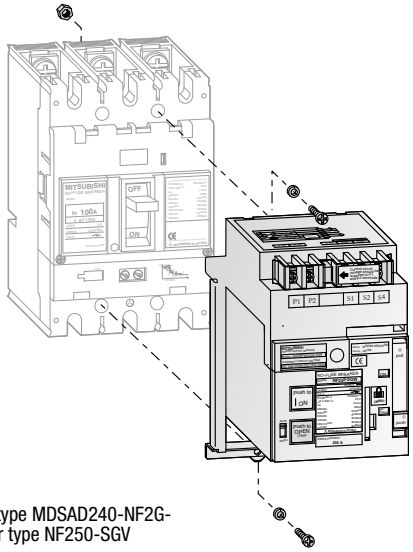
Handle lock device HL type

- The handle lock HL type can be used for 3- and 4-pole breaker types.
- The handle locks can be used without padlock as lock covers.
- The HLF types are used for OFF-lock and the HLN types are used for ON-lock.
- The handle lock HLF3 type enables the user to lock the handle with up to three padlocks against switching.
- The HLS types are used for OFF-lock only.

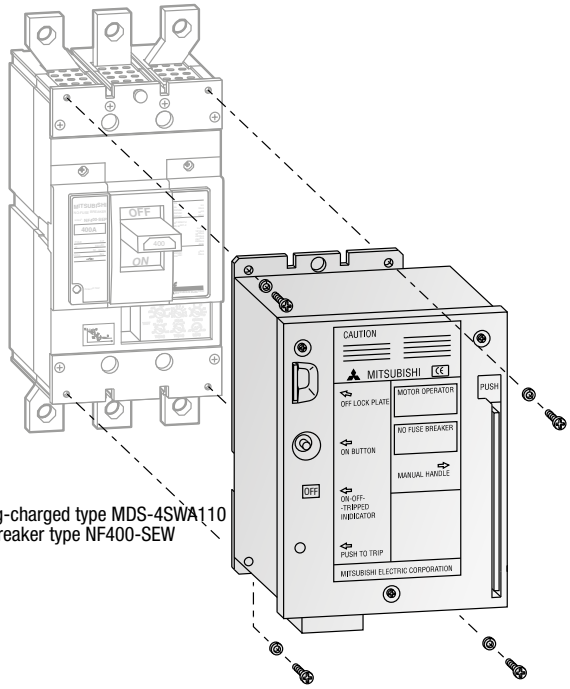
Type	Breaker type	Art. no.
LC-05SV	NF/DSN32–250	267761
HLF-05SV	NF/DSN32–250	267396
HLN-05SV	NF/DSN32–250	267397
HLS-05SW	NF/DSN32–250, W75, W90, 3P, 4P	267398
HLS-05SV2	NF/DSN32–250, W75, W90, 2P	267399
HL-4SW	NF/DSN400–800	205975
HL-10SW	NF/DSN100–1600	205976

Electrically operated breakers – Overview

Spring-charged types MDS



Spring-charged type MDSAD240-NF2G-SWE and breaker type NF250-SGV



Spring-charged type MDS-4SWA110 and breaker type NF400-SEW

Specifications			MDSD.../MDSA...	MDS-4.../8...	MDS-16...
Breaker type ①	NF-S/H series		NF125-SGV/LGV/HGV NF125-SEV/LEV/HEV	NF400-SEW/HEW/REW NF630-SEW/HEW/REW NF800-SEW/HEW/REW	NF1000-SEW NF1250-SEW NF1600-SEW
	NF-R/U series		NF125-RGV/REV/UV NF250-RGV/REV/UV	NF400-UEW, NF800-UEW	—
Rated operating voltage (V) (allowable voltage range 85–110 %) ②			DC 24 V Compatible with 100–240 V AC/ 100–250 V DC	AC 100/110 V, 200/220 V (AC 240 V) DC 100/110 V (DC 125 V)	AC 100/110 V, 200/220 V (AC 240 V) DC 100/110 V (DC125 V)
Operating current (A, eff.) ③	DC	100/110 V		OFF: 1.0 (3.0) ON: 8.0	OFF: 1.0 (3.0) ON: 9.0
	AC	100/110 V		OFF: 1.0 (3.0) ON: 10.0	OFF: 1.0 (3.0) ON: 10.0
		200/200 V		OFF: 0.5 (1.5) ON: 8.0	OFF: 0.5 (1.5) ON: 8.0
Operating time (sec.)	ON operating		0.05–0.1 (self holding)	0.05	0.07
	OFF operating		0.6 and less (self holding)	3 and less (self holding)	3 and less (self holding)
	Spring charging		1.2 and less	—	—
Transformer capacity required (VA)			150	700	700
Endurance voltage (V)				1500	1500

① Also usable for disconnectors DSN with 3 and 4 poles.
② The voltages in parentheses ( ) are special options and might require an external resistor. For details, consult your distributor.
③ The values in parentheses ( ) show starting current.

General precautions for motor-operated electrical MCCBs

The motor operated types should not be operated 10 times consecutively (one on/off counts as an operation).

The operating voltage should be between 85–110 % of the rated control voltage.

The current breaker position ON, OFF or TRIPPED will be shown with a special display on the motor.

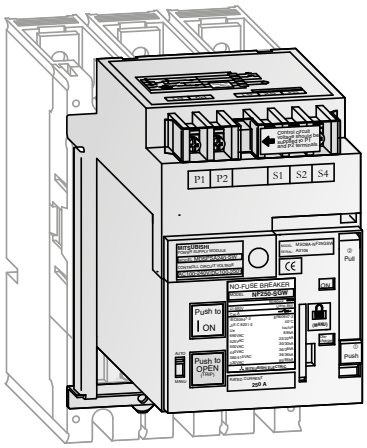
The dielectric strength of the electrical operating circuits is 1500 V. When performing a dielectric strength test simultaneously with another device at a voltage over 1500 V, the operating circuit terminal should be disconnected.

Automatic reset

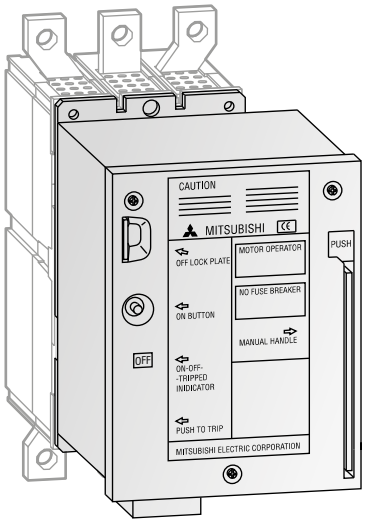
If the breaker is an auto reset type, it contains a built-in alarm switch and the off-control circuit close when the breaker is tripped. Since the breaker automatically resets itself after tripping, the power is easily restored by switching on the breaker again. With a UVT mounted, however, auto reset may not be possible. In this case, please consult your distributor.

- More details on request.

■ Spring-charged type MDS

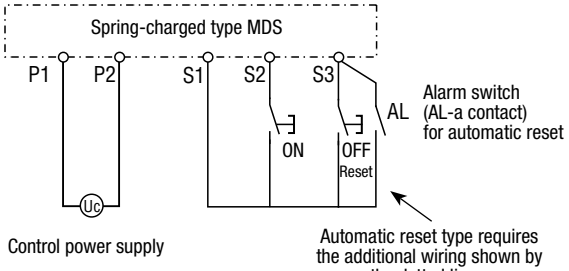


Spring-charged type
MDS.....-NF2VE
and breaker type NF250-SGV

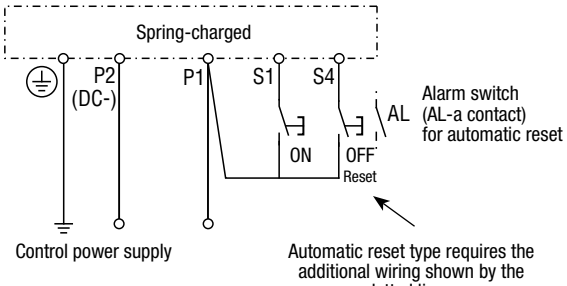


Spring-charged type
MDS-4SW.... and
breaker type NF400-SEW

Control circuit for MDS....-NF2VE



Control circuit for MDS-4/8/16S...



Spring-charged type

Electrical operation

When the ON switch is closed, the coil is releasing the latch mechanism, and the breaker is turned to ON.

When the OFF switch is closed. a relay operates to start a motor which turns the breaker OFF (RESET) and charges the spring at the same time.

Manual operation

When the ON button (on the front of the spring-charged type) is pressed, the latch mechanism is cancelled and the circuit breaker set momentarily to ON by the force of spring.

OFF operation (RESET operation)

The circuit breaker can be set to OFF (RESET) by pressing the leaf spring, pulling out the manual handle and moving it back and forth more than ten times. This charges the spring at the same time.

Cautions during electrical operation

When an electrical-operation device is mounted in a breaker or removed from an breaker, this device must be returned to the discharged state after tripping of the breaker.

A MCCB with an electrical-operation device will not trip in the OFF state “PUSH TO TRIP” is used. This does not indicate that the breaker is faulty.

Since it takes 3 sec to switch off a breaker provided with this device, if the breaker needs to be opened urgently by remote control, a breaker fitted with an SHT or UVT should be used.

The breaker is equipped with a relay for the prevention of pumping.

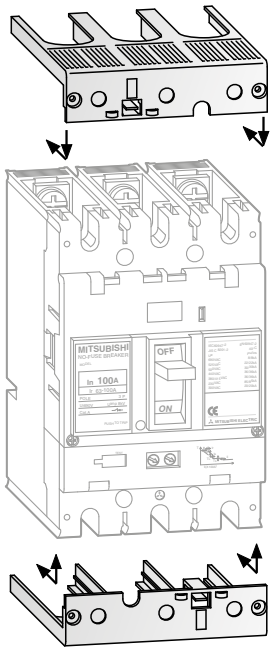
Control circuit

For breakers with automatic resetting capability, add the connection indicated by the dotted line in the diagrams.

- More details on request.
- Control power supply modules on request.

Type	Breaker type	Rated voltage	Art. no.
MDSAD240-NF1SVE	NF/DSN125–250 W90	AC 100–240 V/DC 100–250 V	267401
MDSAD240-NF2SVE	NF/DSN125–250 W105	AC 100–240 V/DC 100–250 V	267402
MDSAD240-NF2UVE	NF250-UV W105	AC 100–240 V/DC 100–250 V	267403
MDSD024-NF1SVE	NF/DSN125–250 W90	DC 24 V	267406
MDSD024-NF2SVE	NF/DSN125–250 W105	DC 24 V	267407
MDSD060-NF1SVE	NF/DSN125–250 W90	DC 48–60 V	267410
MDSD060-NF2SVE	NF/DSN125–250 W105	DC 48–60 V	267411
MDSD060-NF2UVE	NF250-UV W105	DC 48–60 V	267412
MDS-4SWA110	NF/DSN400–630	AC 100–110 V	205968
MDS-4SWA240	NF/DSN400–630	AC 230 V	205969
MDS-4SWD110	NF/DSN400–630	DC 100–110 V	205970
MDS-8SWA110	NF/DSN800	AC 100–110 V	205971
MDS-8SWA240	NF/DSN800	AC 230 V	205972
MDS-8SWD110	NF/DSN800	DC 100–110 V	205973
MDS-10SWA110	NF/DSN1000–1600	AC 100–110 V	213185
MDS-10SWA240	NF/DSN1000–1600	AC 230 V	213186
MDS-10SWD110	NF/DSN1000–1600	DC 100–110 V	213187

■ Terminal covers



TCS type terminal covers

Circuit breaker NF250-SGW

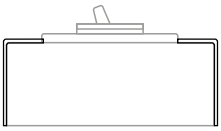
Application

The terminal covers are used to avoid exposure of charged parts.

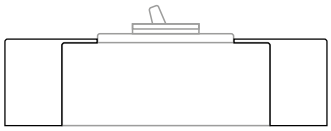
Different types are available:

- for front connection as small terminal covers TCS or large terminal covers TCL, TTC (see figures below)
- for rear connection as closed type BTC
- for plug-in as PTC
- One set includes two pieces of terminal covers.
- Colour: black, white or transparent
- More types/details on request.

Small terminal covers TCS



Large terminal covers TCL, TTC



Small terminal covers TCS (1 set = 2 pieces)

Type	No. of poles	Breaker type	Colour	Protection degree	Art. no.
TCS-05SV3	3	NF/DSN32–63			267552
TCS-05SV4	4				267553
TCS-1SV3	3	NF/DSN125-CV/SV			267555
TCS-1SV4	4				267556
TCS-2SV3	3	NF/DSN125–250 (All types less NF/DSN125-CV/SV)			267557
TCS-2SV4	4				267558

Large terminal covers TCL (1 set = 2 pieces)

Type	No. of poles	Breaker type	Colour	Protection degree	Art. no.
TCL-05SV3	3	NF/DSN32–63			267543
TCL-05SV4	4				267544
TCL-1SV3	3	NF/DSN125-CV/SV			267546
TCL-1SV4	4				267547
TCL-2SV3	3	NF/DSN125–250 Up to 200 A (All types less NF/DSN125-CV/SV)			267548
TCL-2SV3L	3	NF/DSN125–250 Up to 250 A (All types less NF/DSN125-CV/SV)			267549
TCL-2SV4	4	NF/DSN125–250 (All types less NF/DSN125-CV/SV)			267550
TCL-4SW3	3	NF/DSN400–630	black	IP20	205977
TCL-4SW4	4		transparent		205978
TCL-8SW3	3	NF/DSN800	transparent	IP20	205979
TCL-8SW4	4				205980
TCL-8UW3	3	NF/DSN800	transparent	IP20	205981
TCL-8UW4	4				205982
TCL-10SW3	3	NF/DSN1000–1250 (fixed with screws)	transparent	IP20	205983
TCL-10SW4	4				205984

Transparent terminal covers TTC (1 set = 2 pieces)

Type	No. of poles	Breaker type	Colour	Protection degree	Art. no.
TTC-05SV3	3	NF/DSN32–63	transparent		267560
TTC-05SV4	4				267561
TTC-1SV3	3	NF/DSN125-CV/SV			267563
TTC-1SV4	4				267564
TTC-2SV3	3	NF/DSN125–250 All types less NF/DSN125-CV/SV			267565
TTC-2SV4	4				267566

Terminal covers rear for connection studs BTC (1 set = 2 pieces)

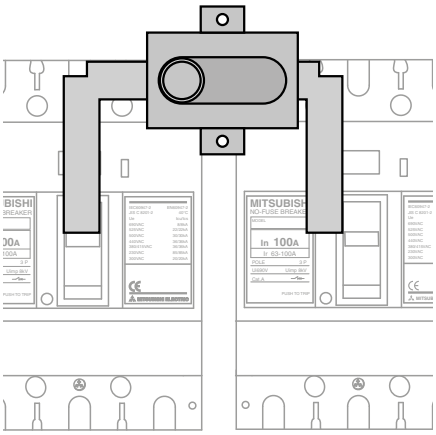
Type	No. of poles	Breaker type	Colour	Protection degree	Art. no.
BTC-05SV3	3	NF/DSN32–63			267254
BTC-05SV4	4				267255
BTC-1SV3	3	NF/DSN125-CV/SV			267257
BTC-1SV4	4				267258
BTC-2SV3	3	NF/DSN125–250 (All types less NF/DSN125-CV/SV)			267259
BTC-2SV4	4				267260
BTC-4SW3	3	NF/DSN400–630	transparent	IP20	205985
BTC-4SW4	4				205986
BTC-8SW3	3	NF/DSN800	transparent	IP20	205987
BTC-8SW4	4				205988

Terminal covers for plug-in type PTC (1 set = 2 pieces)

Type	No. of poles	Breaker type	Colour	Protection degree	Art. no.
PTC-05SV3	3	NF/DSN32–63			267469
PTC-05SV4	4				267470
PTC-1SV3	3	NF/DSN125-CV/SV			267472
PTC-1SV4	4				267473
PTC-2SV3	3	NF/DSN125–250 (All types less NF/DSN125-CV/SV)			267474
PTC-2SV4	4				267475

■ Mechanical interlock MI

(Front side installation)



Application

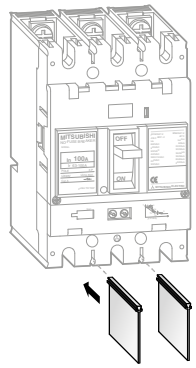
With two breakers, use a panel-mounted mechanical interlock for one-way only input. It is usable for front, rear, and plug-in types.

A breaker-mounting mechanical to mount on the breaker main unit can be made to order.

- More details on request.

Type	No. of poles	For use between two breakers of		Art. no.
MI-05SV3	3	NF/DSN32–250	For W75, W90 and W105; 3 poles. Panel mounting.	267418
MI-05SV4	4		For W75; 4 poles. Panel mounting.	267419
MI-05SVFB3	3		For W75; 3 poles. Breaker mounting.	267421
MI-1SV4	4		For W90; 4 poles. Panel mounting.	267422
MI-1SVFB3	3		For W90; 3 poles. Breaker mounting.	267423
MI-2SV4	4		For W105; 4 poles. Panel mounting.	267424
MI-2SVFB3	3		For W105; 3 poles. Breaker mounting.	267425
MI-4SW3	3	400-630AF		205989
MI-4SW4	4			205990
MI-8SW3	3	800AF		205991
MI-8SW4	4			205992
MI-10SW3	3	1000–1250 AF		205993
MI-10SW4	4			205994
MI-16SW3	3	1600 AF		205995
MI-16SW4	4			205996

■ Isolation barriers (standard) BAF



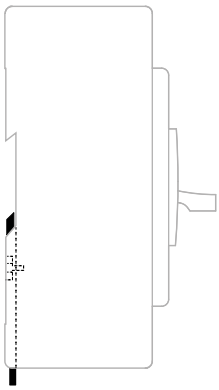
Application

The isolation barriers are used to avoid short-circuits between the terminals of the breaker due to dust or leakage current.

Every breaker is equipped with isolation barriers as standard.

Specifications		BAF-05SV	BAF-2SV
For breaker type		V series W75 type	V series W90/105 type
Connection type		For front connection	For front connection
Order information	Art. no.	267248	267249

■ IEC 35 mm rail mounting adapter



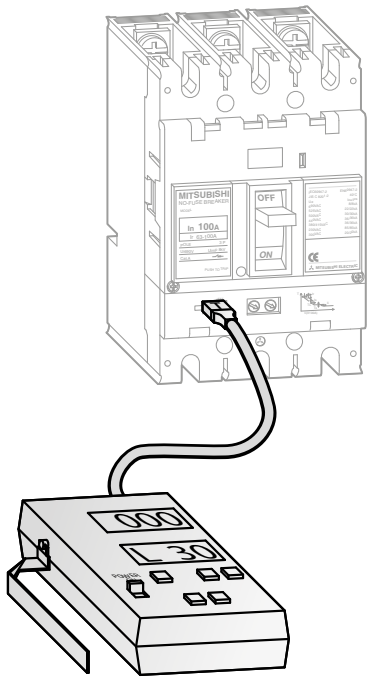
Application

The IEC 35 mm rail mounting adapter is used to mount the breaker on a IEC 35 mm mounting rail.

It is available for 3-pole breakers NF/DSN32–63.

Specifications		DIN-05SV
For 3-pole breakers		NF/DSN32–63
Order information	Art. no.	267262 (packing unit: 1 pc)

■ Tester for electronic breakers



Application

The portable tester unit can be used to check the tripping characteristics of the electronic breakers from 125 A up to 1600 A.

- More details on request.

Specifications		Y-360VW
for MCCB with cable for		W/V-Series
Order information	Art. no.	589126

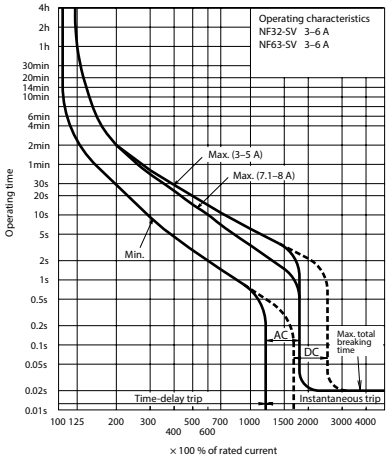
NF32-SV, NF63-SV, NF63-HV

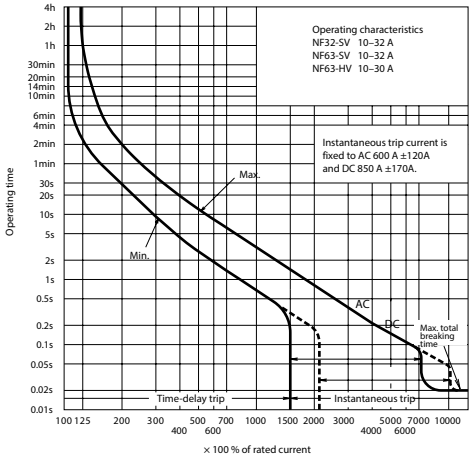
NF63-SV

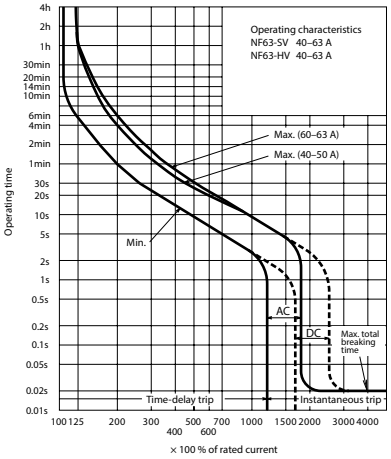
Type name			NF32-SV	NF63-SV	NF63-HV
Rated current In [A]			3, 4, (5), 6, 10, (15), 16, 20, 25, (30), 32	3, 4, (5), 6, 10, (15), 16, 20, 25, (30), 32, 40, 50, (60), 63	10, (15), 16, 20, 25, (30), 32, 40, 50, (60), 63
Number of poles			3	3	3 4
Rated insulation voltage U_i [V]			600	600	600
Rated short-cuircit breaking capacity [kA] IEC/EN 60947-2	AC	690 V	–	–	2.5/2.5
		500 V	2.5/2.5	2.5/2.5	7.5/7.5
		440 V	2.5/2.5	2.5/2.5	10/8
		415 V	2.5/2.5	2.5/2.5	10/8
		400 V	5/5	5/5	10/8
		380 V	5/5	5/5	10/8
		230 V	7.5/7.5	7.5/7.5	25/19
	DC	250 V *1	2.5/2.5	2.5/2.5	7.5/7.5
Standard attached parts (front connection)			Mounting screw: M4×0.7×55 (2 and 3P: 2pcs, 4P: 4pcs) Insulation barrier: (2P: 1pc, 3P: 2pcs, 4P: 3pcs) (*2)		

Notes: *1 Use two poles for three- and four-pole products. Not available for use with connection as shown at the bottom of page 55.
*2 Supplied with NF63-SV and NF63-HV.

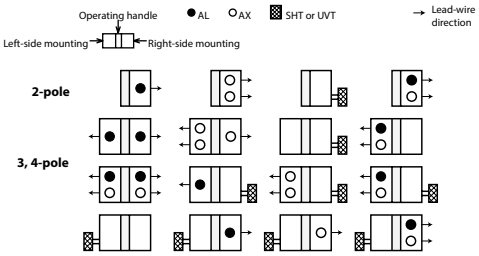
Operating characteristics



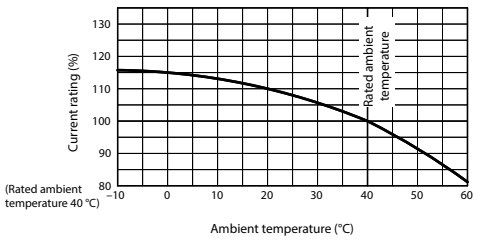




Internal accessories



Ambient compensating curve



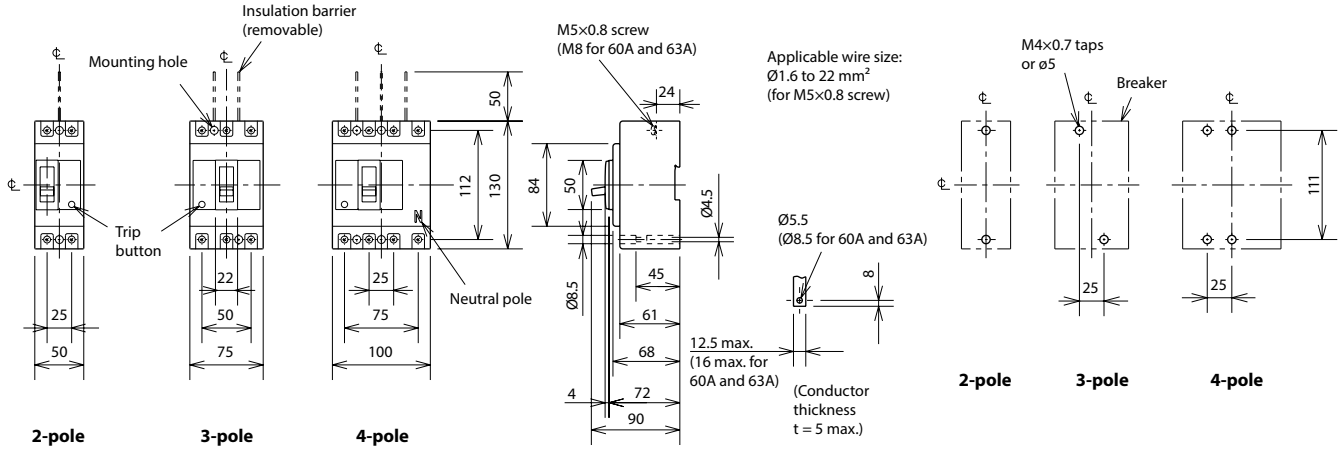
External accessories

Accessories			Type name	Reference page
Operating handle	F	3, 4P	F-05SV	77
	V	3, 4P	V-05SV	76
Handle lock device	LC		LC-05SV	78
	HL (*1)		HLF-05SV	
			HLN-05SV	
	HL-S		HLS-05SV	

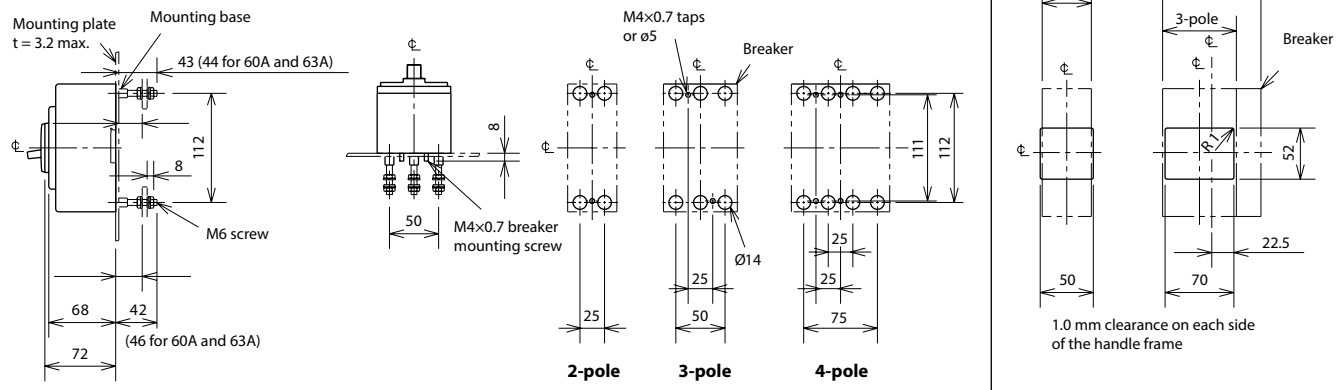
Notes *1 HLF types are used for OFF-lock and HLN types for ON-lock.
*2 Specify the working voltage. Refer to the reference page for type name.

Accessories				Type name	Reference page
Mechanical nterlock		MI	3P	MI-05SV3	82
			4P	MI-05SV4	
Termi-nal cover	Small	TC-S	3P	TCS-05SV3	81
	Large	TC-L	3P	TCL-05SV3	
			4P	TCL-05SV4	
	Skele-ton	TTC	3P	TTC-05SV3	
	Rear	BTC	3P	BTC-05SV3	
	Plug-in	PTC	3P	PTC-05SV3	
Electrical operation device				MDS (2*)	79

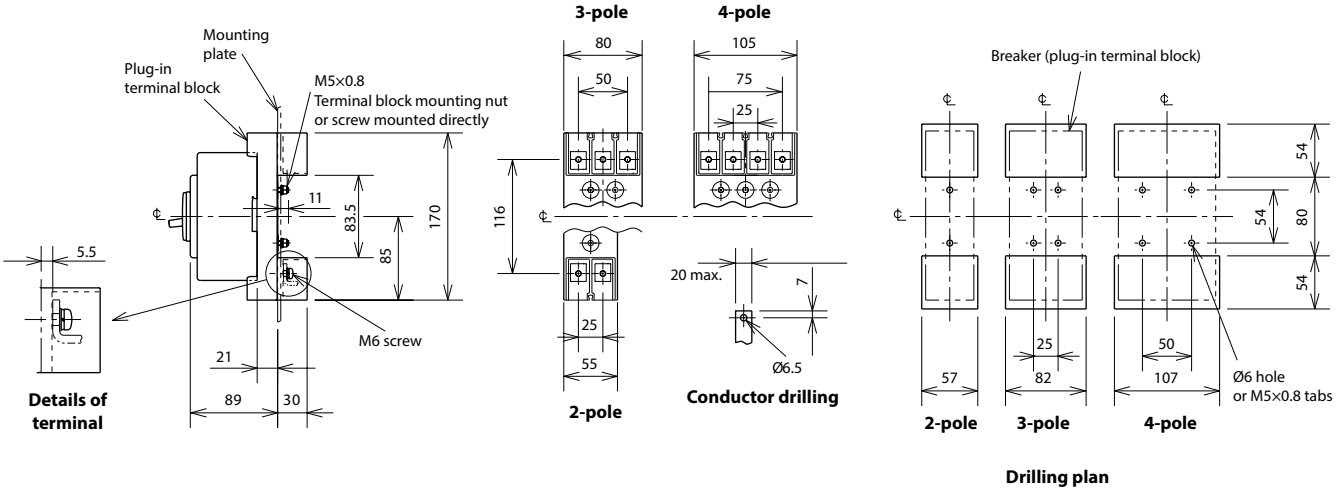
Front connection



Rear connection



Plug-in



Remark: Only two- and three-pole models are available for NF32-SV.

[mm]

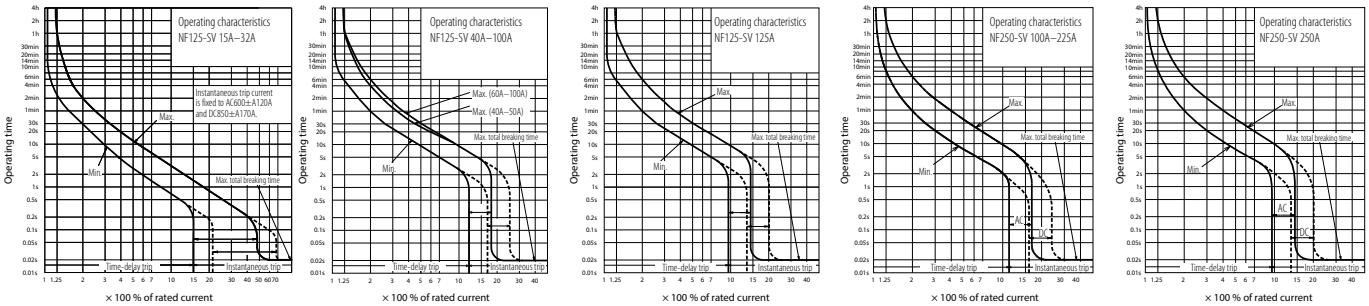
NF125-SV, NF250-SV

NF125-SV

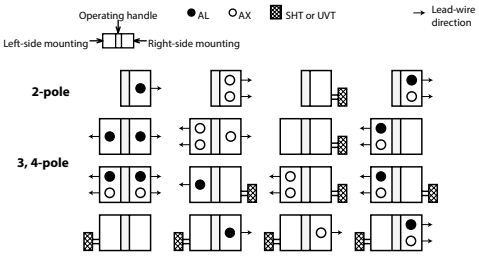
Type name			NF125-SV	NF250SV
Rated current I_n [A]			(15), 16, 20, (30), 32, 40, 50, (60), 63, (75), 80, 100, 125	(100), 125, 150, 160, 175, 200, 225, 250
Number of poles			3 4	3 4
Rated insulation voltage U_i [V]			690	690
Rated short-circuit breaking capacity [kA]	IEC/EN 60947-2	AC 690 V	8/8	8/8
		AC 500 V	18/18	30/30
		AC 440 V	25/25	36/36
		AC 415 V	30/30	36/36
		AC 400 V	30/30	36/36
		AC 380 V	30/30	36/36
		AC 230 V	50/50	85/85
		DC 250 V *1	20/20	20/20 (300 V)
Standard attached parts (front connection)			Mounting screw: M4×0.7×55 (2 and 3P: 2pcs, 4P: 4pcs) Insulation barrier: (2P: 1pc, 3P: 2pcs, 4P: 4pcs)	

Note: *1 When wired as shown at the bottom of page 55, three-pole models can be used for up to 500 V DC, and 4-pole models for up to 600 V DC.

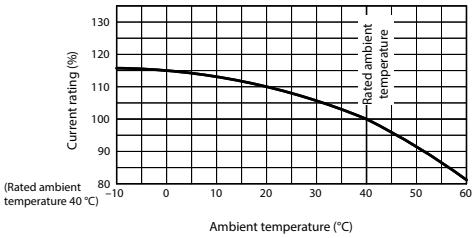
Operating characteristics



Internal accessories



Ambient compensating curve



External accessories

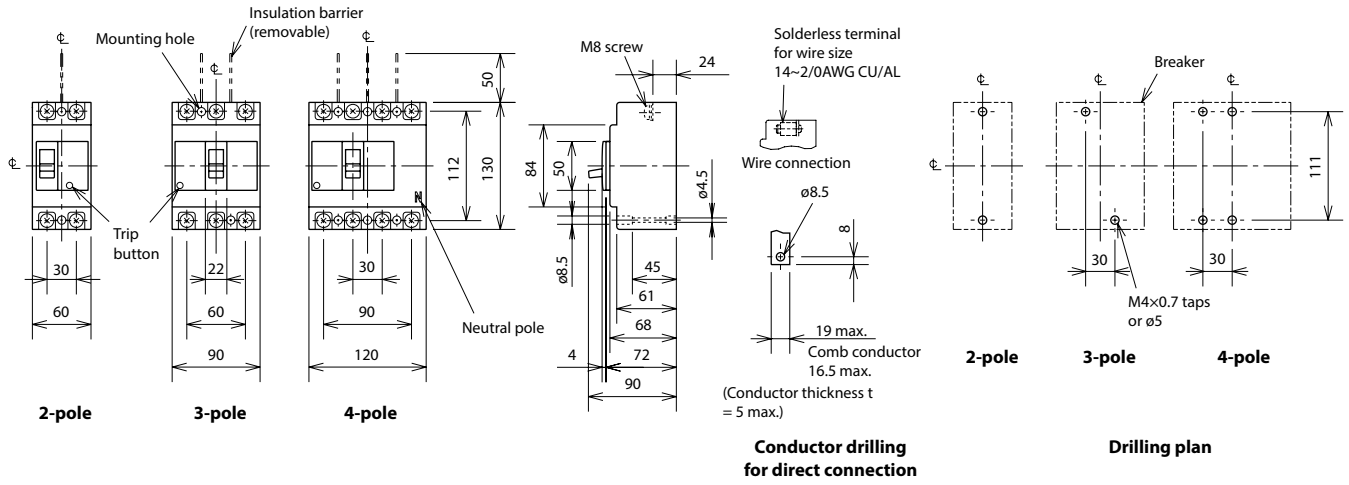
Accessories			Type name		Reference page
Suitable breaker			NF125-SV	NF250-SV	
Operating handle	F	3, 4P	F-1SV	F-2SV	77
	V	3, 4P	V-1SV	V-2SV	76
Handle lock device	LC		LC-05SV	LC-05SV	78
	HL (*1)		HLF-05SV	HLF-05SV	
			HLN-05SV	HLN-05SV	
	HL-S		HLS-05SV	HLS-2SV	

Notes *1 HLF types are used for OFF-lock and HLN types for ON-lock.
*2 Specify the working voltage. Refer to the reference page for type name.

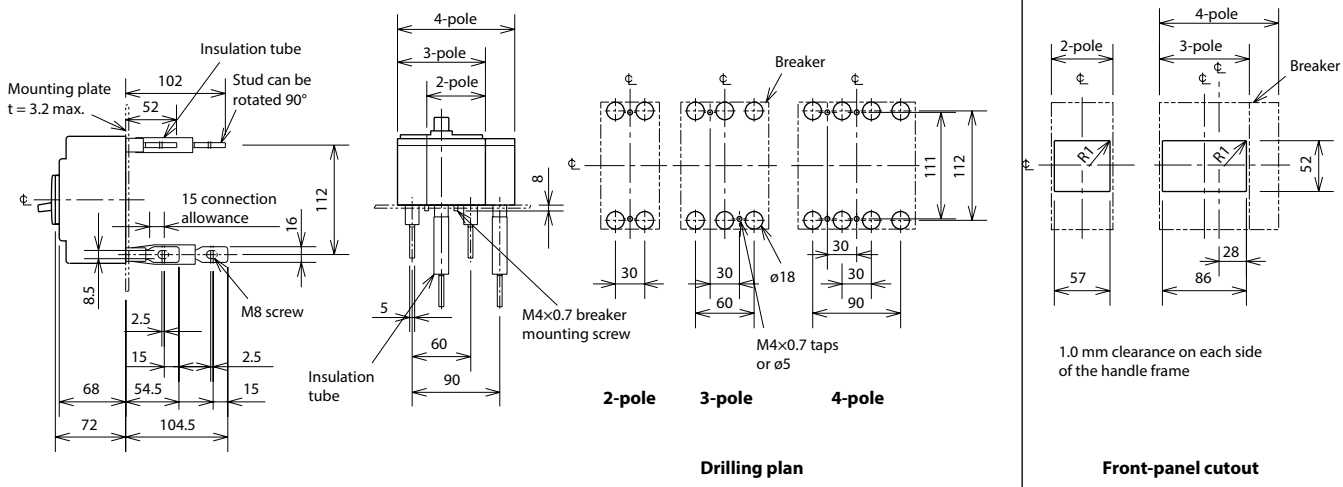
Accessories				Type name		Reference page
Suitable breaker				NF125-SV	NF250-SV	
Mechanical interlock		MI	3P	MI-05SV3	MI-05SV3	82
			4P	MI-05SV4	MI-2SV4	
Terminal cover	Small	TC-S	3P	TCS-1SV3	TCS-2SV3	81
	Large	TC-L	3P	TCL-1SV3	TCL-2SV3	
			4P	TCL-1SV4	TCL-2SV4	
	Skele-ton	TTC	3P	TTC-1SV3	TTC-2SV3	
	Rear	BTC	3P	BTC-1SV3	BTC-2SV3	
	Plug-in	PTC	3P	PTC-1SV3	PTC-2SV3	
Electrical operation device				MDS (2*)	MDS (2*)	79

NF125-SV (for NF250-SV refer to p. 89)

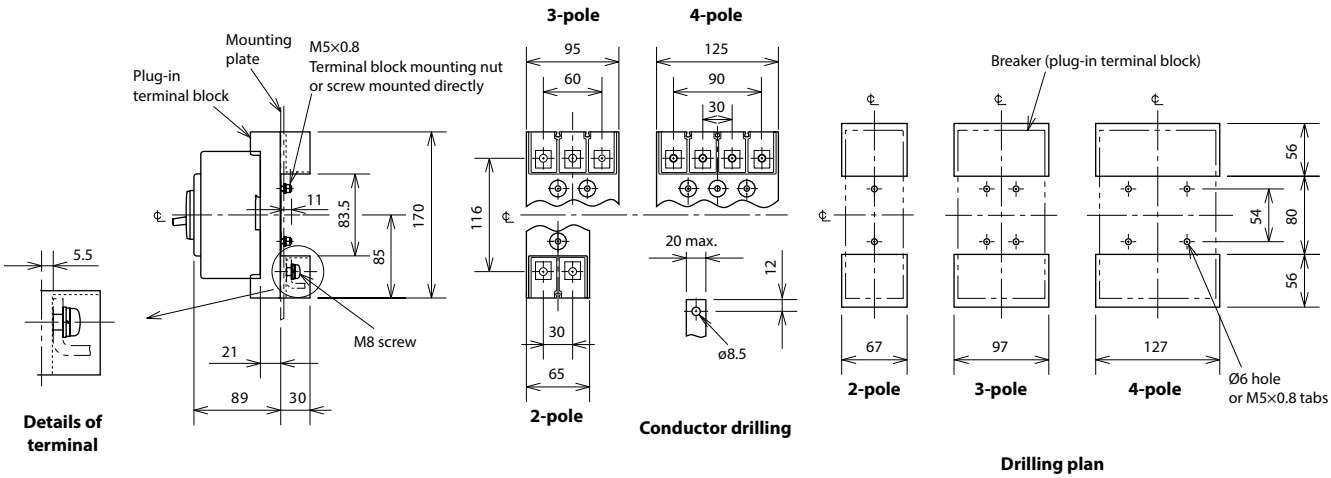
Front connection



Rear connection



Plug-in



[mm]

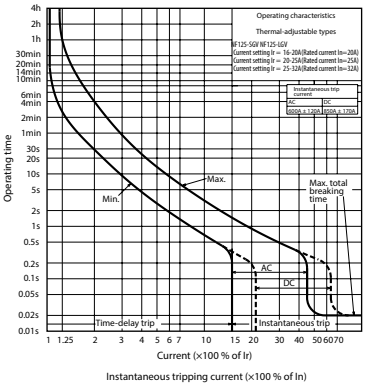
NF125-SGV, NF160-SGV, NF250-SGV, NF125-LGV, NF160-LGV, NF250-LGV

NF250-SGV

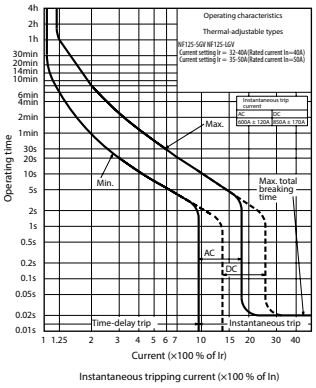
Type name			NF125-SGV	NF160-SGV	NF250-SGV	NF125-LGV	NF160-LGV	NF250-LGV
Rated current I_n [A]			16–20, 20–25, 25–32 32–40, 35–50, 45–63 56–80, 70–100, 90–125	125–160	125–160 140–200 175–250	16–20, 20–25, 25–32 32–40, 35–50, 45–63 56–80, 70–100, 90–125	125–160	125–160 140–200 175–250
Number of poles			3 4	3 4	3 4	3 4	3 4	3 4
Rated insulation voltage U_i [V]			690	690	690	690	690	690
Rated short-cuircit breaking capacity [kA] IEC/EN 60947-2 (I_{cu}/I_{cs})	AC	690 V	8/8	8/8	8/8	8/8	8/8	8/8
		500 V	30/30	30/30	30/30	36/36	36/36	36/36
		440 V	36/36	36/36	36/36	50/50	50/50	50/50
		415 V	36/36	36/36	36/36	50/50	50/50	50/50
		400 V	36/36	36/36	36/36	50/50	50/50	50/50
		380 V	36/36	36/36	36/36	50/50	50/50	50/50
		230 V	85/85	85/85	85/85	90/90	90/90	90/90
		200 V	85/85	85/85	85/85	90/90	90/90	90/90
	DC *1	300 V	20/20	20/20	20/20	20/20	20/20	20/20
Standard attached parts (front connection)			Mounting screw: M4×0.7×55 (3P: 2pcs, 4P: 4pcs) Insulation barrier: (3P: 4pcs, 4P: 6pcs)					

Note: *1 When wired as shown at the bottom of page 55, three-pole models can be used for up to 500 V DC, and 4-pole models for up to 600 V DC.

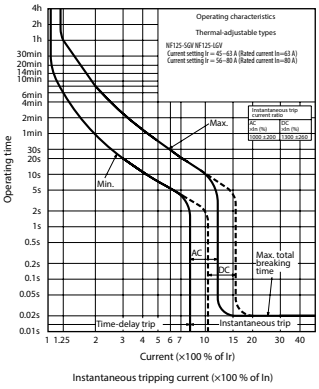
Operating characteristics



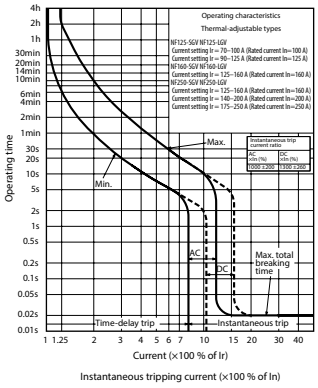
Instantaneous tripping current (×100 % of In)



Instantaneous tripping current (×100 % of In)

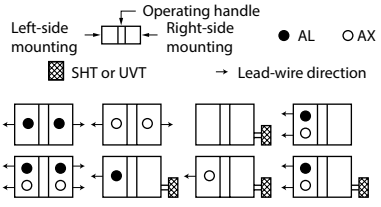


Instantaneous tripping current (×100 % of In)

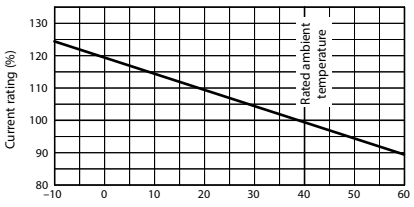


Instantaneous tripping current (×100 % of In)

Internal accessories



Ambient compensating curve



External accessories

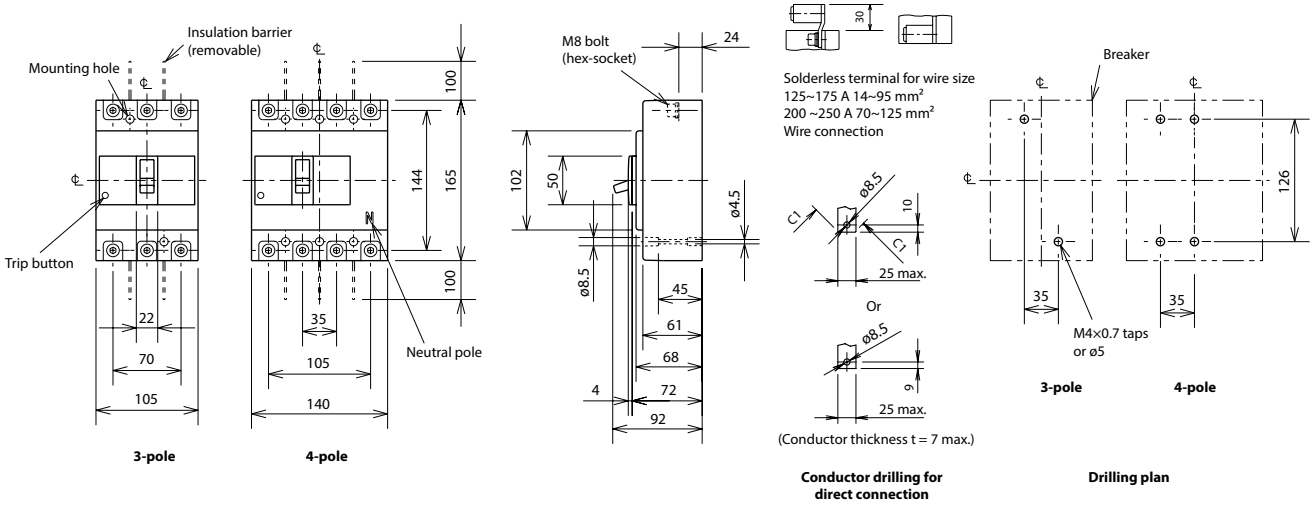
Accessories		Type name	Reference page
Operating handle	F	F-2SV	77
	V	V-2SV	76
Handle lock device	LC	LC-05SV	78
	HL (*1)	HLF-05SV	
		HLN-05SV	
	HL-S	HLS-2SV	

Notes *1 HLF types are used for OFF-lock and HLN types for ON-lock.
*2 Specify the working voltage. Refer to the reference page for type name.

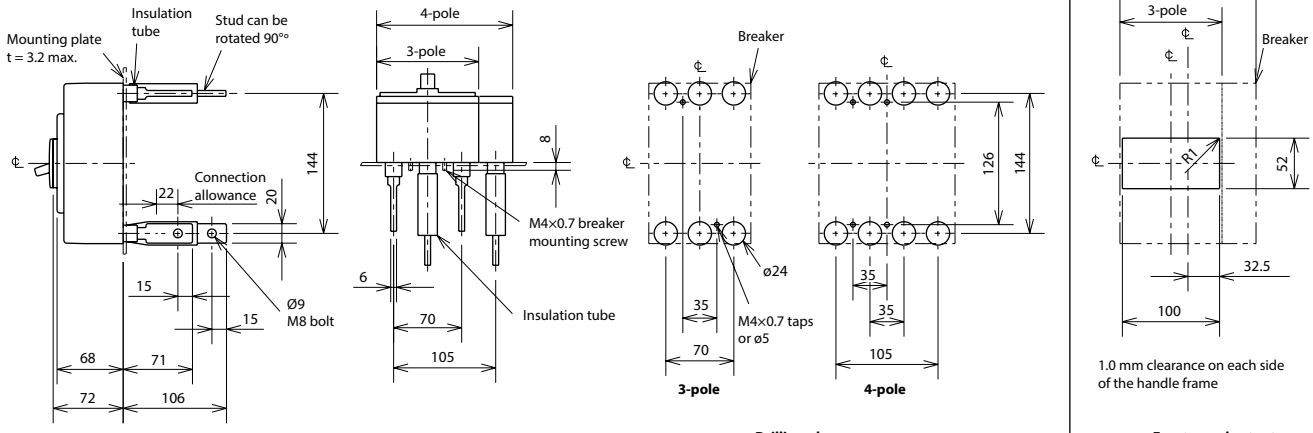
Accessories				Type name	Reference page
Mechanical interlock		MI	3P	MI-05SV3	82
			4P	MI-2SV4	
Terminal cover	Small	TC-S	3P	TCS-2SV3	81
	Large	TC-L	3P	TCL-2SV3	
				TCL-2SV3L	
			4P	TCL-2SV4	
	Skeleton	TTC	3P	TTC-2SV3	
	Rear	BTC	3P	BTC-2SV3	
	Plug-in	PTC	3P	PTC-2SV3	
Electrical operation device				MDS (*2)	79

NF125-SGV, NF160-SGV, NF250-SGV, NF125-LGV, NF160-LGV, NF250-LGV, NF250-SV

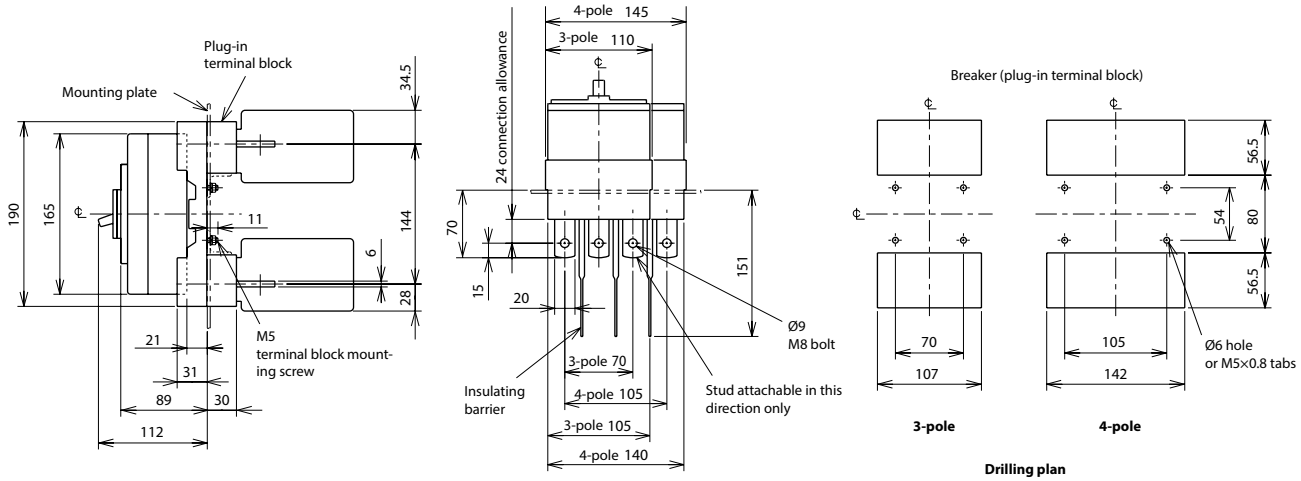
Front connection



Rear connection



Plug-in



[mm]

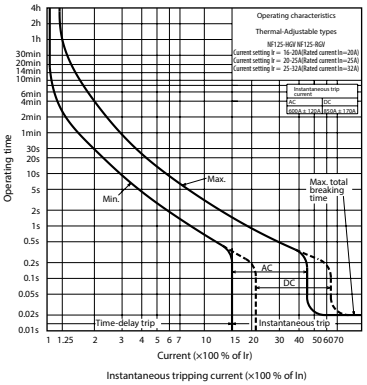
NF125-HGV, NF160-HGV, NF250-HGV, NF125-RGV, NF250-RGV

NF250-HGV

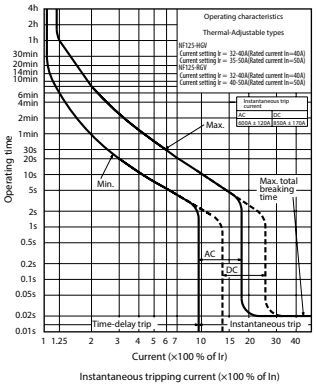
Type name			NF125-HGV	NF160-HGV	NF250-HGV	NF125-RGV	NF250-RGV
Rated current I_n [A]			16–20, 20–25, 25–32 32–40, 35–50, 45–63 56–80, 70–100, 90–125	125–160	125–160 140–200 175–250	16–20, 20–25, 25–32 32–40, 35–50, 45–63 56–80, 70–100, 90–125	125–160
Number of poles			3 4	3 4	3 4	3	3
Rated insulation voltage U_i [V]			690	690	690	690	690
Rated short-cuircit breaking capacity [kA] IEC/EN 60947-2 (I_{cu}/I_{cs})	AC	690 V	10/8	10/8	10/8	—	—
		500 V	50/38	50/38	50/38	—	—
		440 V	65/65	65/65	65/65	125/125	125/125
		415 V	70/70	70/70	70/70	150/150	150/150
		400 V	75/75	75/75	75/75	150/150	150/150
		380 V	75/75	75/75	75/75	150/150	150/150
		230 V	100/100	100/100	100/100	150/150	150/150
		200 V	100/100	100/100	100/100	150/150	150/150
	DC *1	300 V	40/40	40/40	40/40	—	—
Standard attached parts (front connection)			Mounting screw: M4×0.7×55 (3P: 2pcs, 4P: 4pcs) Insulation barrier: (3P: 4pcs, 4P: 6pcs)				

Note: *1 When wired as shown at the bottom of page 43, three-pole models can be used for up to 500 V DC, and 4-pole models for up to 600 V DC.

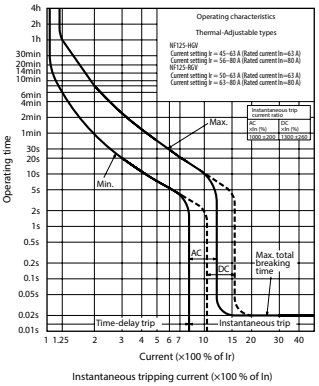
Operating characteristics



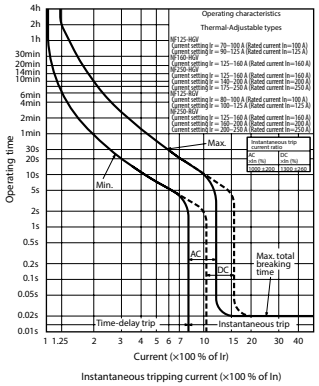
Instantaneous tripping current (×100 % of In)



Instantaneous tripping current (×100 % of In)

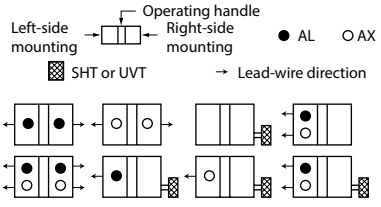


Instantaneous tripping current (×100 % of In)

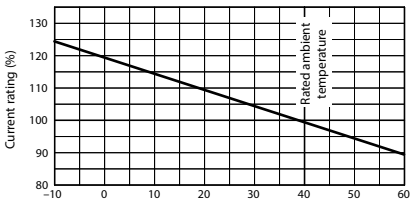


Instantaneous tripping current (×100 % of In)

Internal accessories



Ambient compensating curve



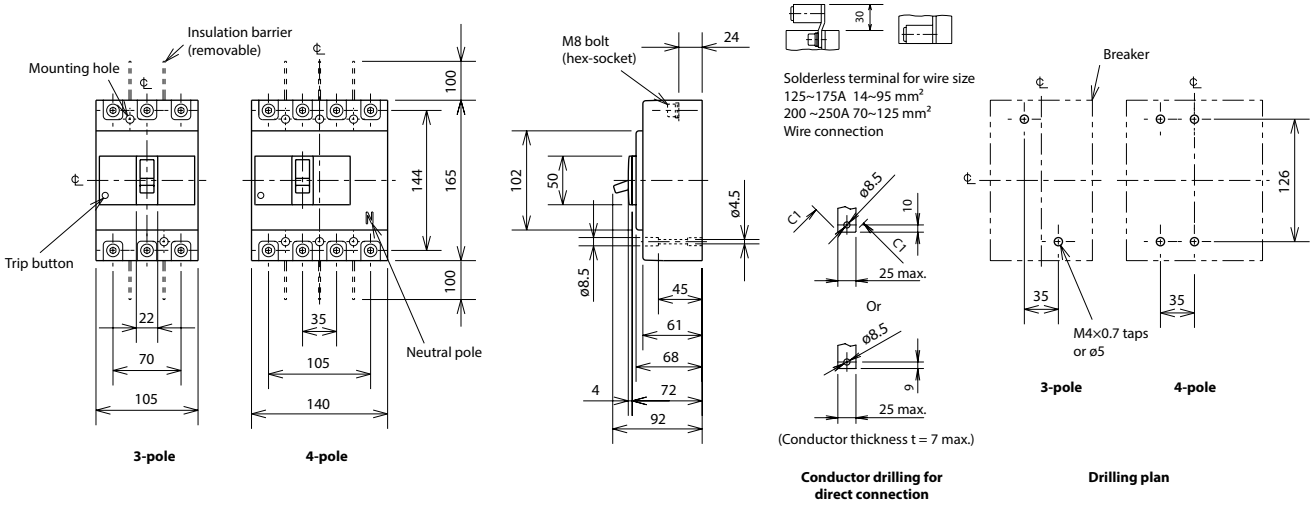
External accessories

Accessories		Type name	Reference page
Operating handle	F	F-2SV	77
	V	V-2SV	76
Handle lock device	LC	LC-05SV	78
	HL (*1)	HLF-05SV	
		HLN-05SV	
	HL-S	HLS-2SV	

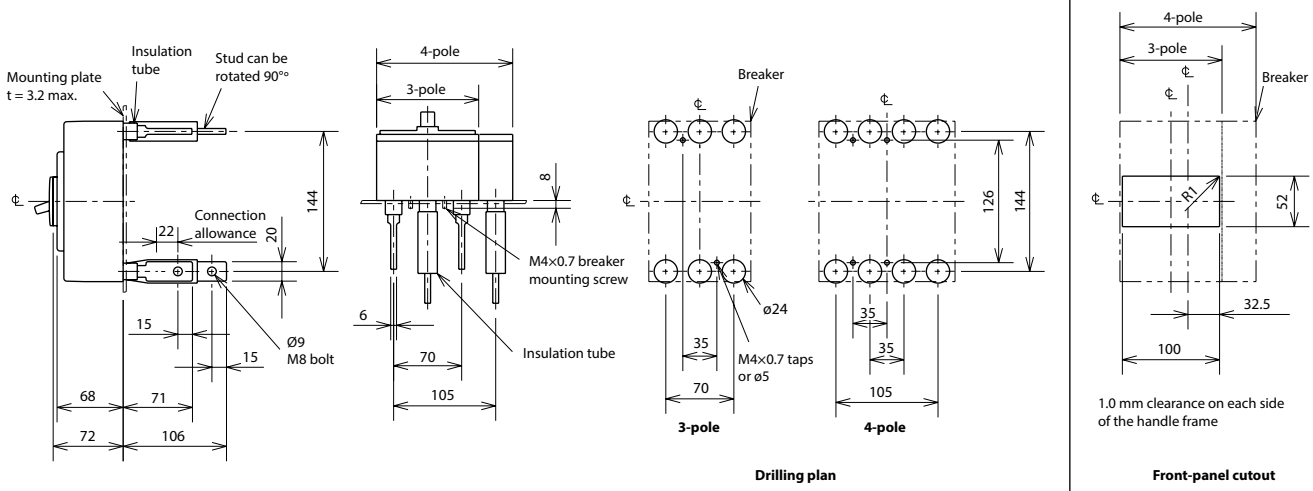
Accessories				Type name	Reference page
Mechanical interlock	MI		3P	MI-05SV3	82
			4P	MI-2SV4	
Terminal cover	Small	TC-S	3P	TCS-2SV3	81
	Large	TC-L	3P	TCL-2SV3	
				TCL-2SV3L	
			4P	TCL-2SV4	
	Skele-ton	TTC	3P	TTC-2SV3	
	Rear	BTC	3P	BTC-2SV3	
	Plug-in	PTC	3P	PTC-2SV3	
Electrical operation device				MDS (*2)	79

Notes *1 HLF types are used for OFF-lock and HLN types for ON-lock.
*2 Specify the working voltage. Refer to the reference page for type name.

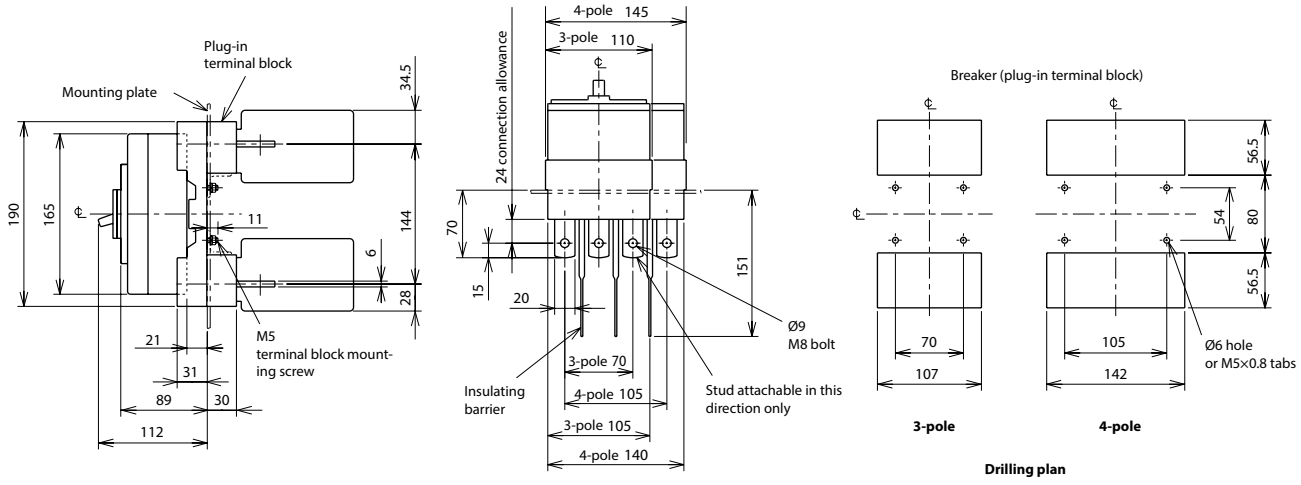
Front connection



Rear connection



Plug-in



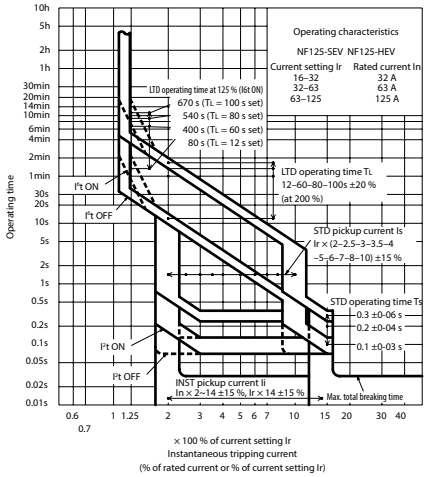
[mm]

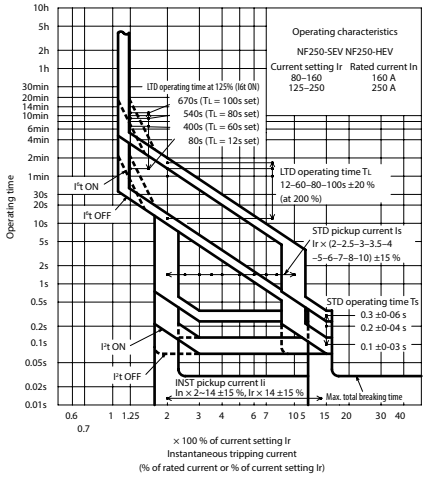
NF125-SEV, NF250-SEV, NF125-HEV, NF250-HEV

NF125-SEV

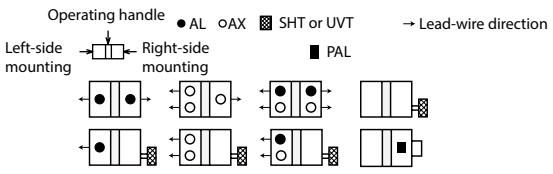
Type name			NF125-SEV	NF250-SEV	NF125-HEV	NF250-HE
Rated current I_n [A]			16–32, 32–63, 63–125	80–160, 125–250	16–32, 32–63, 63–125	80–160, 125–250
Number of poles			3 4	3 4	3 4	3 4
Rated insulation voltage U_i [V]			690	690	690	690
Rated short-cuircit breaking capacity [kA]	IEC/EN 60947-2 (I_{cu}/I_{cs})	AC 690 V	8/8	10/8	8/8	10/8
		AC 500 V	30/30	50/38	30/30	50/38
		AC 440 V	36/36	65/65	36/36	65/65
		AC 415 V	36/36	70/70	36/36	70/70
		AC 400 V	36/36	75/75	36/36	75/75
		AC 380 V	36/36	75/75	36/36	75/75
		AC 230 V	85/85	100/100	85/85	100/100
		DC *1 300 V	—	—	—	—
Standard attached parts (front connection)			Mounting screw: M4×0.7×55 (3P: 2pcs, 4P: 4pcs) Insulation barrier: (3P: 4pcs, 4P: 6pcs)			

Operating characteristics

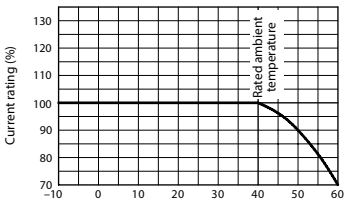




Internal accessories



Ambient compensating curve



The rated current does not have thermal characteristics. Reduce the current as shown in the curve on the left chart if the ambient temperature exceeds 40 °C

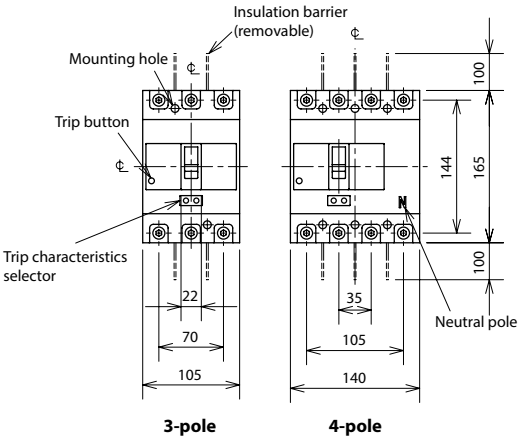
External accessories

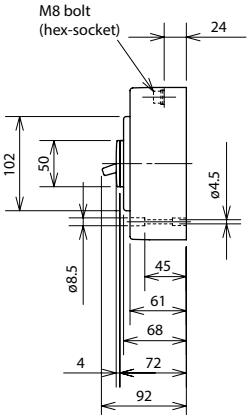
Accessories		Type name	Reference page
Operating handle	F	F-2SV	77
	V	V-2SV	76
Handle lock device	LC	LC-05SV	78
	HL (*1)	HLF-05SV	
		HLN-05SV	
	HL-S	HLS-2SV	

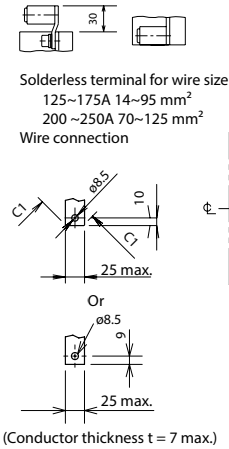
Notes *1 HLF types are used for OFF-lock and HLN types for ON-lock.
*2 Specify the working voltage. Refer to the reference page for type name.

Accessories				Type name	Reference page
Mechanical interlock		MI	3P	MI-05SV3	82
			4P	MI-2SV4	
Terminal cover	Small	TC-S	3P	TCS-2SV3	81
	Large	TC-L	3P	TCL-2SV3	
				TCL-2SV3L	
			4P	TCL-2SV4	
	Skele-ton	TTC	3P	TTC-2SV3	
	Rear	BTC	3P	BTC-2SV3	
	Plug-in	PTC	3P	PTC-2SV3	
Electrical operation device				MDS (*2)	79

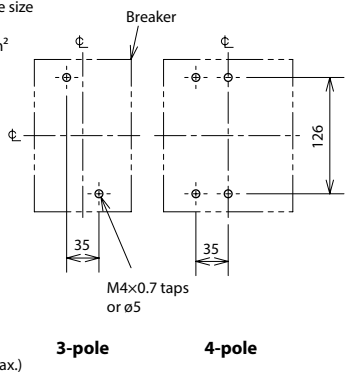
Front connection





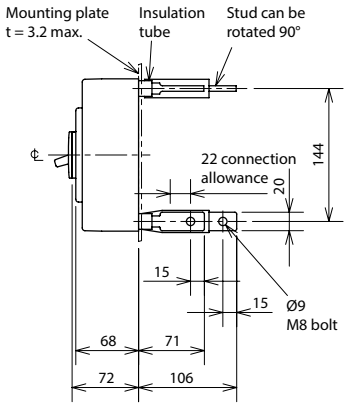


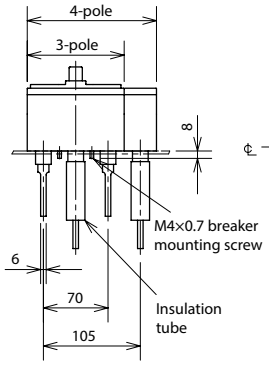
Conductor drilling for direct connection

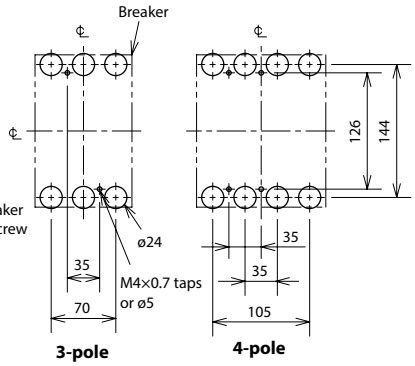


Drilling plan

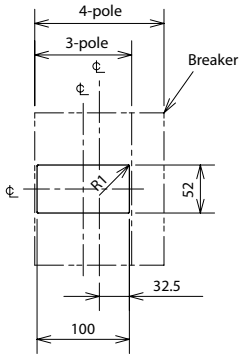
Rear connection







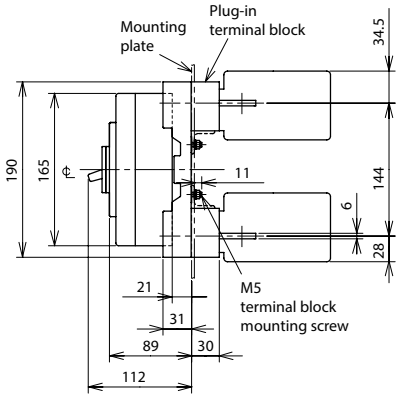
Drilling plan

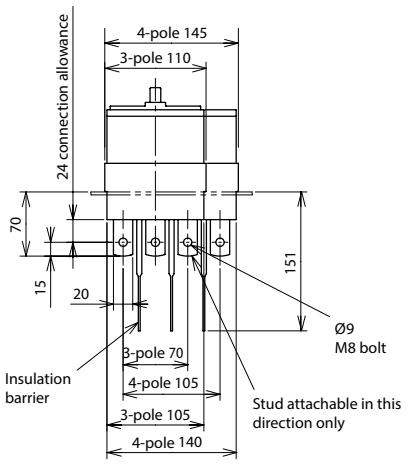


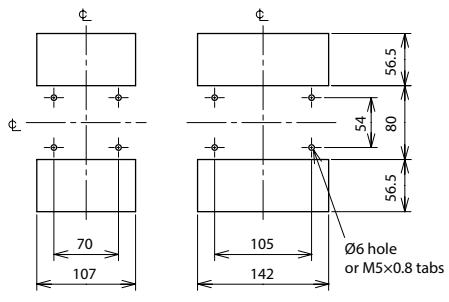
1.0 mm clearance on each side
of the handle frame

Front-panel cutout

Plug-in







Drilling plan

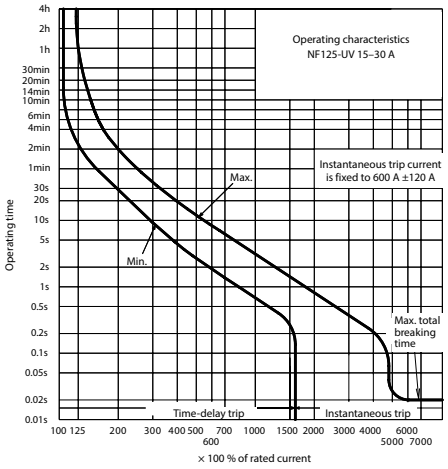
[mm]

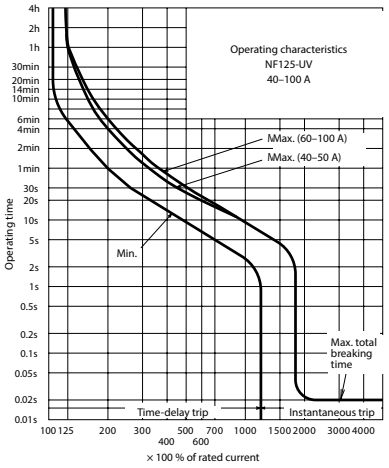
NF125-UV

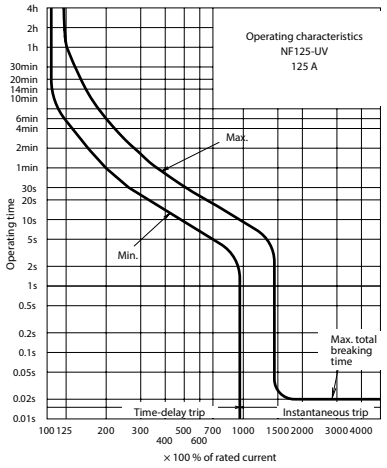
NF125-UV

Type name			NF125-UV
Rated current I_n [A]			15, 20, 30, 40, 50, 60, 75, 100, 125
Number of poles			3 4
Rated insulation voltage U_i [V]			690
Rated short-cuircit breaking capacity [kA] IEC/EN 60947-2 (I_{cu}/I_{cs})	AC	690 V	10/10
		500 V	200/200
		440 V	200/200
		415 V	200/200
		400 V	200/200
		380 V	200/200
		230 V	200/200
		200 V	200/200
	DC *1	300 V	—
Standard attached parts (front connection)			Mounting screw: M4×0.7×55 (3P: 2pcs, 4P: 4pcs) M4×0.7×73 (3P: 2pcs) Insulation barrier: (3P: 4pcs, 4P: 6pcs)

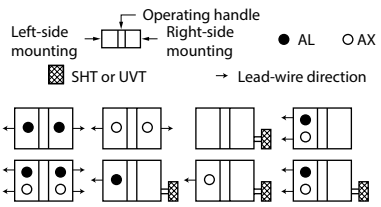
Operating characteristics



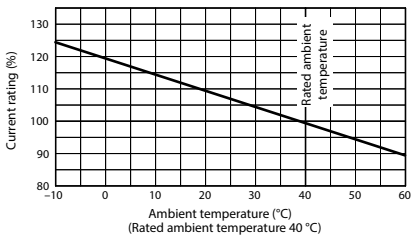




Internal accessories



Ambient compensating curve



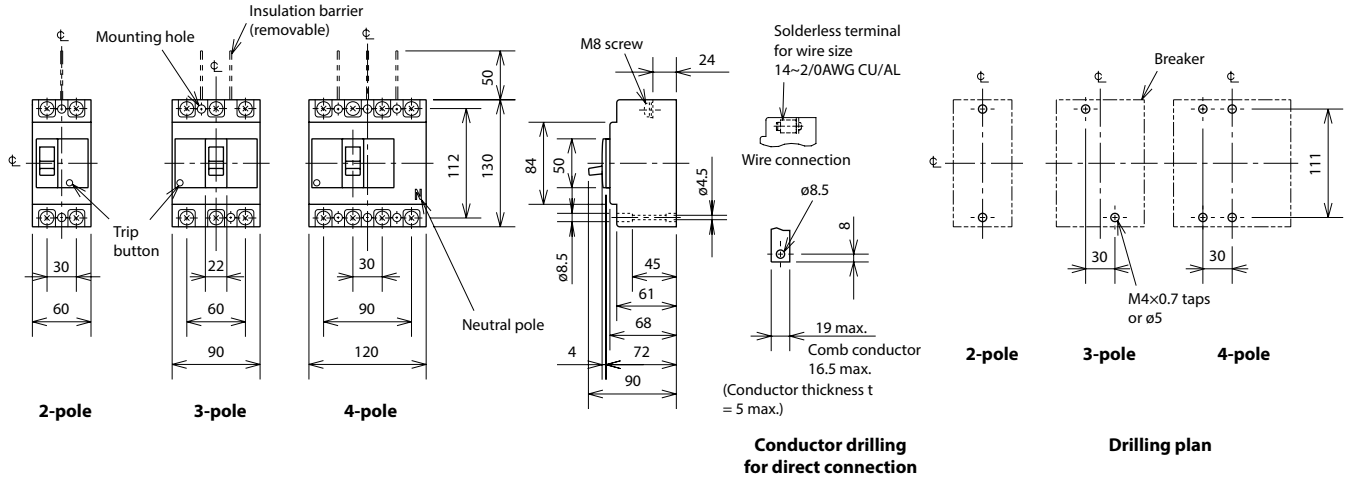
External accessories

Accessories		Type name	Reference page
Operating handle	F	F-1UV	77
	V	V-1UV	76
Handle lock device	LC	LC-05SV	78
	HL (*1)	HLF-05SV	
		HLN-05SV	
	HL-S	HLS-05SV	

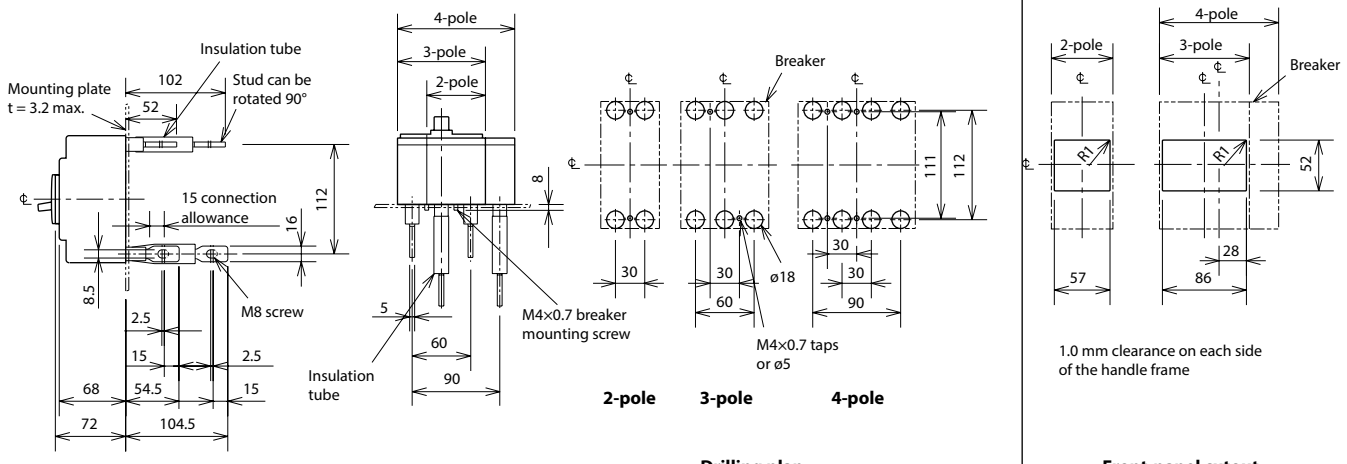
Accessories				Type name	Reference page
Mechanical interlock		MI	3P	MI-05SV3	82
			4P	MI-05SV4	
Terminal cover	Small	TC-S	3P	TCS-1SV3	81
	Large	TC-L	3P	TCL-1SV3	
			4P	TCL-1SV4	
	Skeleton	TTC	3P	TTC-1SV3	
	Rear	BTC	3P	BTC-1SV3	
	Plug-in	PTC	3P	PTC-1SV3	
Electrical operation device				MDS (*2)	79

Notes *1 HLF types are used for OFF-lock and HLN types for ON-lock.
*2 Specify the working voltage. Refer to the reference page for type name.

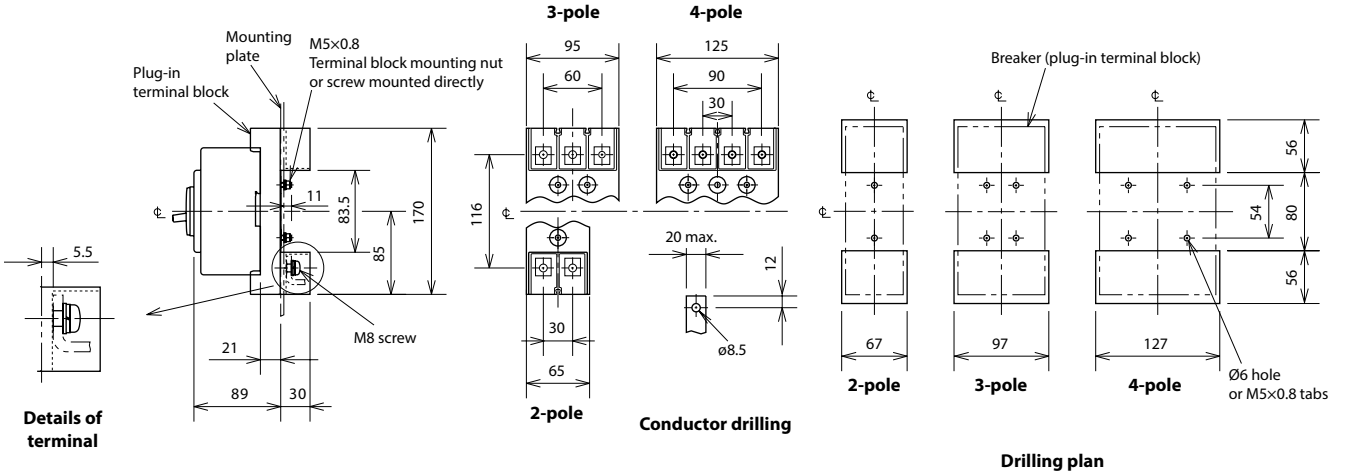
Front connection



Rear connection



Plug-in



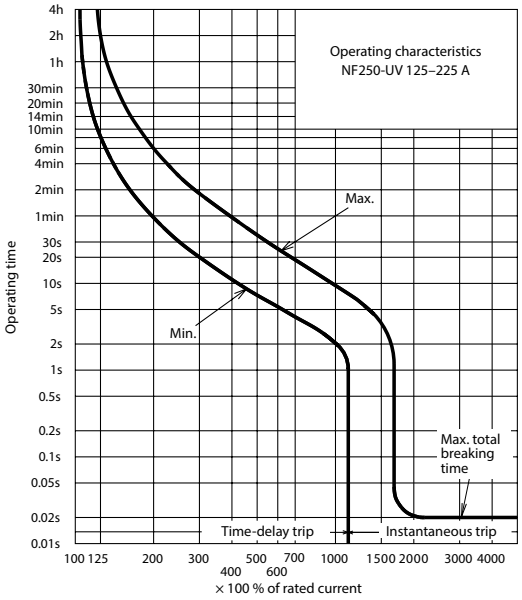
[mm]

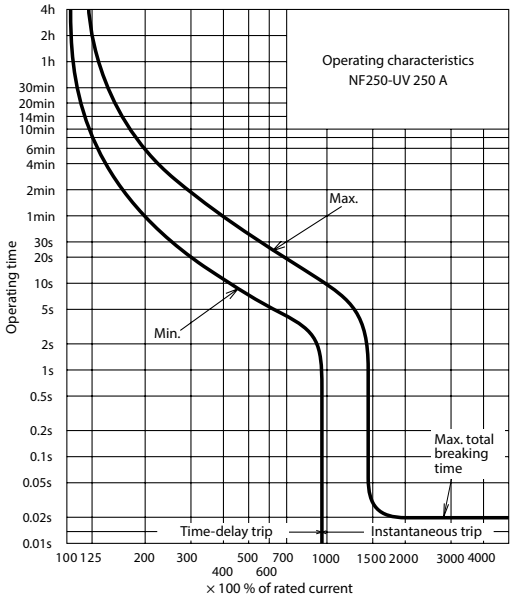
NF250-UV

NF250-UV

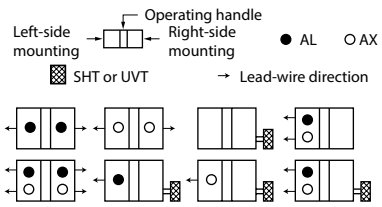
Type name			NF250-UV
Rated current I_n [A]			125, 150, 175, 200, 225, 250
Number of poles			3 4
Rated insulation voltage U_i [V]			690
Rated short-cuircit breaking capacity [kA] IEC/EN 60947-2 (I_{cu}/I_{cs})	AC	690 V	15/15
		500 V	200/200
		440 V	200/200
		415 V	200/200
		400 V	200/200
		380 V	200/200
		230 V	200/200
		200 V	200/200
	DC *1	300 V	—
Standard attached parts (front connection)			Mounting screw: M4×0.7×55 (3P: 2pcs, 4P: 4pcs) M4×0.7×73 (3P: 2pcs) Insulation barrier: (3P: 4pcs, 4P: 6pcs)

Operating characteristics

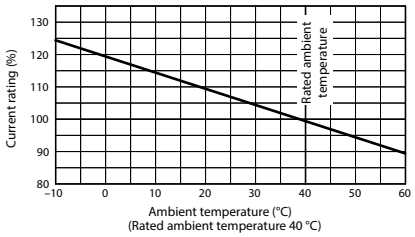




Internal accessories



Ambient compensating curve



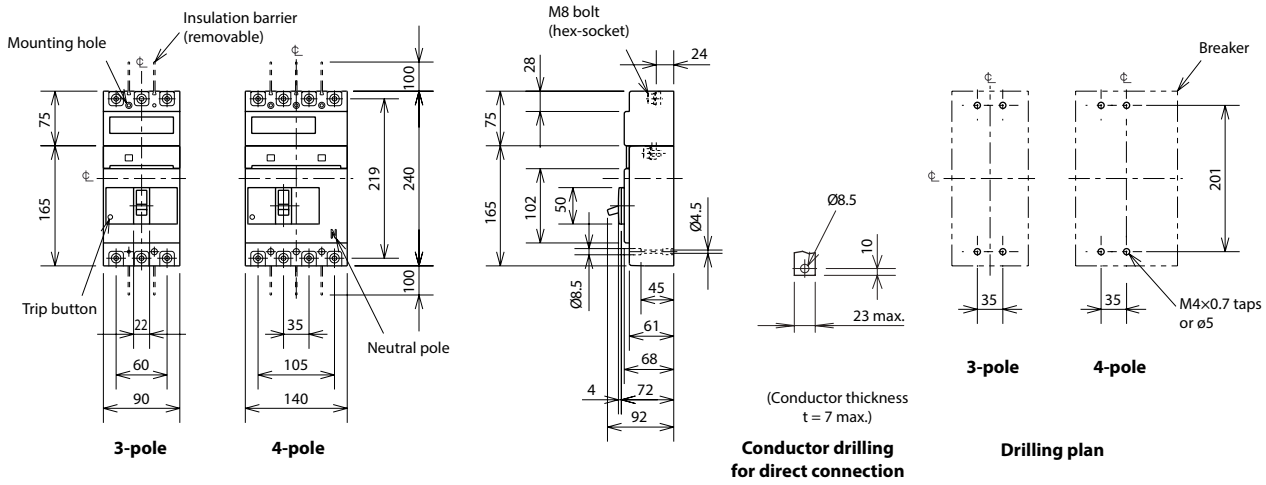
External accessories

Accessories		Type name	Reference page
Operating handle	F	F-2UV	77
	V	V-2UV	76
Handle lock device	LC	LC-05SV	78
	HL (*1)	HLF-05SV	
		HLN-05SV	
	HL-S	HLS-2SV	

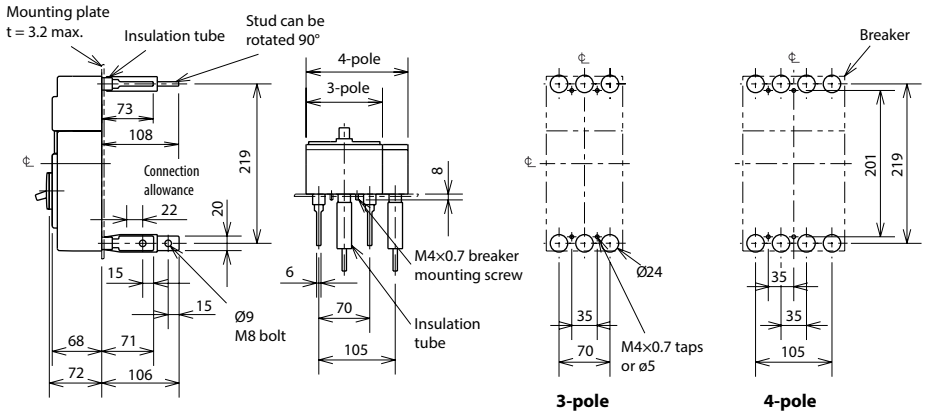
Accessories				Type name	Reference page
Mechanical interlock	MI		3P	MI-05SV3	82
			4P	MI-05SV4	
Terminal cover	Small	TC-S	3P	TCS-2SV3	81
	Large	TC-L	3P	TCL-2SV3	
			4P	TCL-2SV4	
	Skele-ton	TTC	3P	TTC-2SV3	
	Rear	BTC	3P	BTC-2SV3	
	Plug-in	PTC	3P	PTC-2SV3	
Electrical operation device				MDS (*2)	79

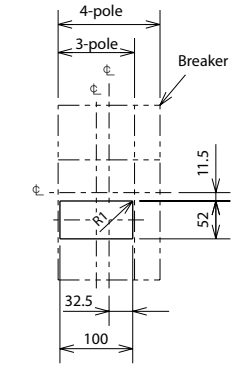
Notes *1 HLF types are used for OFF-lock and HLN types for ON-lock.
*2 Specify the working voltage. Refer to the reference page for type name.

Front connection

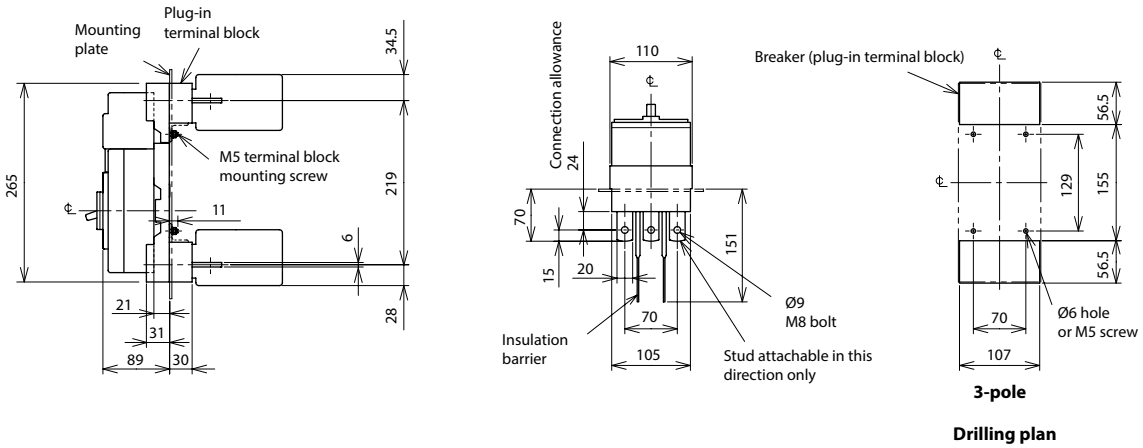


Rear connection





Plug-in



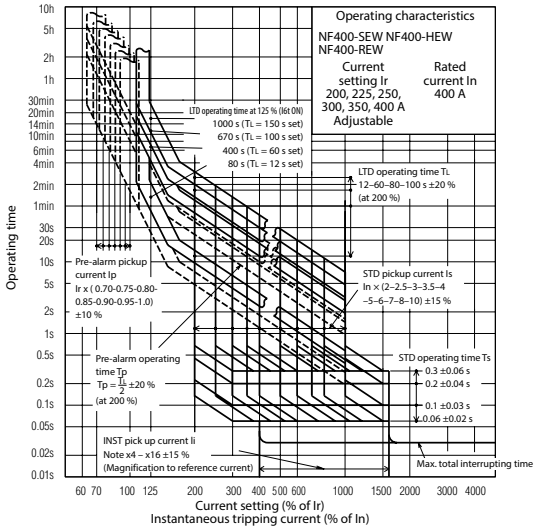
[mm]

NF400-SEW, NF400-HEW, NF400-REW

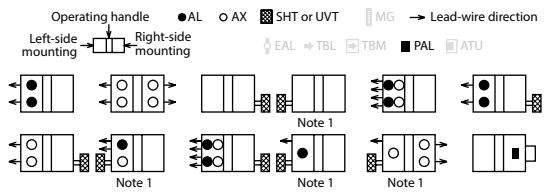
NF400-SEW

Type name			NF400-SEW	NF400-HEW	NF400-REW
Rated current I_n [A]			200, 225, 250, 300, 350, 400	200, 225, 250, 300, 350, 400	200, 225, 250, 300, 350, 400
Number of poles			3 4	3 4	3
Rated insulation voltage U_i [V]			690	690	690
Rated short-cuircit breaking capacity [kA] IEC/EN 60947-2 (I_{cu}/I_{cs})	AC	690 V	10/10	35/18	—
		500 V	30/30	50/50	70/35
		440 V	42/42	65/65	125/63
		415 V	50/50	70/70	125/63
		400 V	50/50	70/70	125/63
		380 V	50/50	70/70	125/63
		230 V	85/85	100/100	150/75
		200 V	85/85	100/100	150/75
	DC	250 V	—	—	—
Standard attached parts (front connection)			Mounting screw: M6×72 (4pcs) Insulation barrier: (3P: 4pcs, 4P: 6pcs)		

Operating characteristics

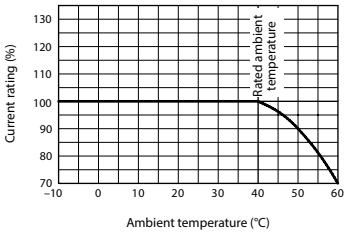


Internal accessories



Note 1: Right-side mounting is standard of SHT and UVT.
Specify separately for left-sidenting.

Ambient compensating curve



The rated current does not have thermal characteristics. Reduce the current as shown in the curve on the left chart if the ambient temperature exceeds 40°C

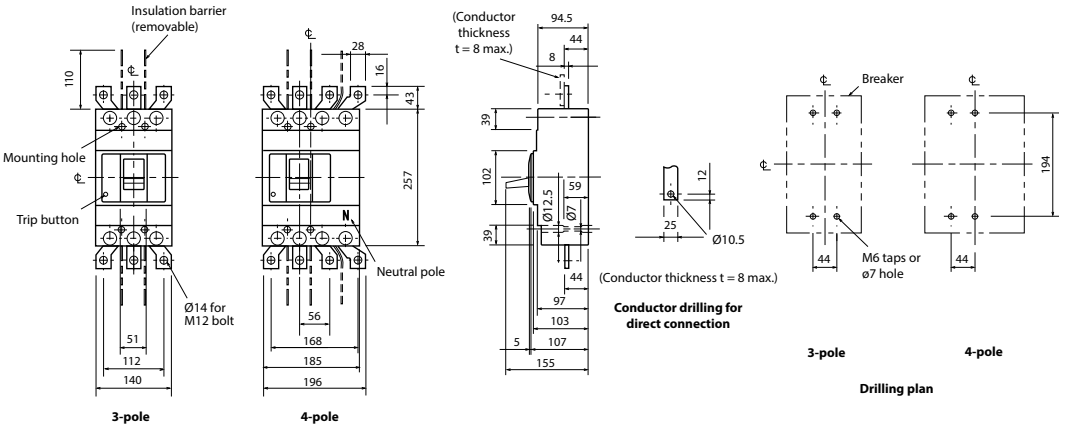
External accessories

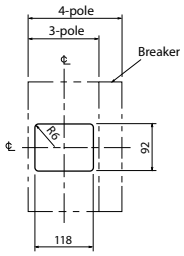
Accessories		Type name	Reference page
Operating handle	F	F-4S	77
	V	V-4S	76
Handle lock device	HL (*1)	HLF-4SW	78
	HL-S	HLN-4SW	
		HLS-4SW	

Accessories				Type name	Reference page
Mechanical interlock		MI	3P	MI-4SW3	82
			4P	MI-4SW4	
Terminal cover	Large	TC-L	3P	TCL-4SW3	81
			4P	TCL-4SW4	
	Skeleton	TTC	3P	TTC-4SW3	
			4P	TTC-4SW4	
	Rear	BTC	3P	BTC-4SW3	
			4P	BTC-4SW4	
Electrical operation device				MDS (*2)	79

Notes *1 HLF types are used for OFF-lock and HLN types for ON-lock.
*2 Specify the working voltage. Refer to the reference page for type name.

Front connection

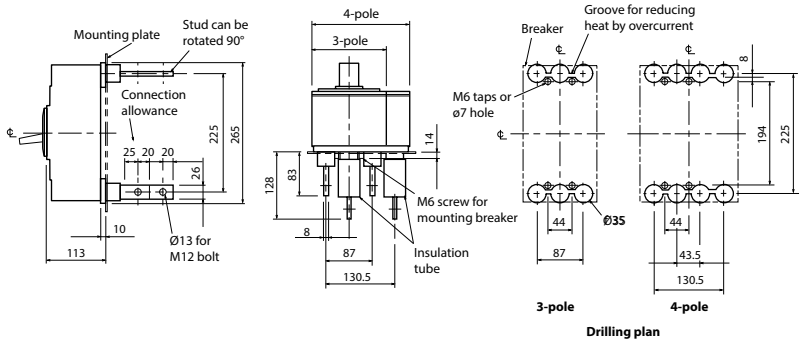




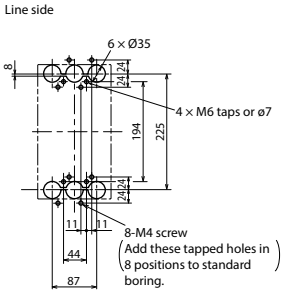
1.0 mm clearance on each side of the handle frame

Front-panel cutout

Rear connection

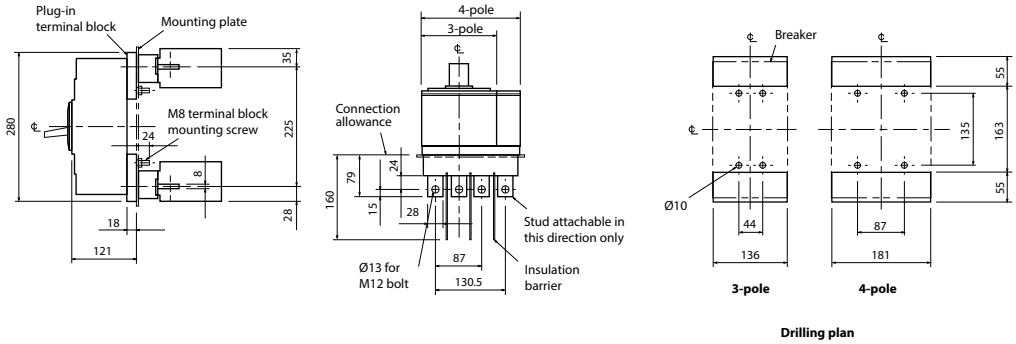


Boring dimensions for rear connection type barriers (3-pole)



Note The bore dimensional drawing shows the breaker viewed from the rear.

Plug-in



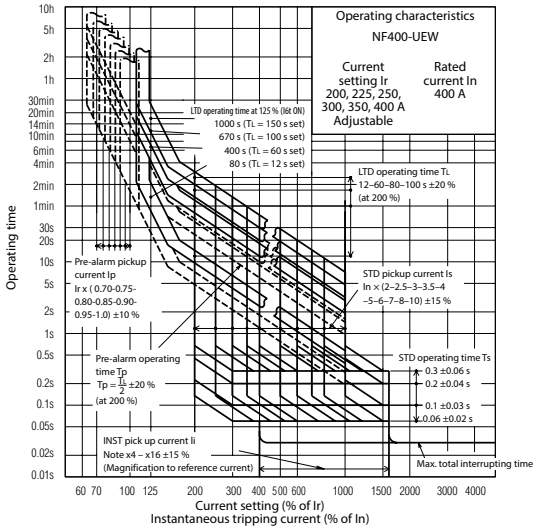
[mm]

NF400-UEW

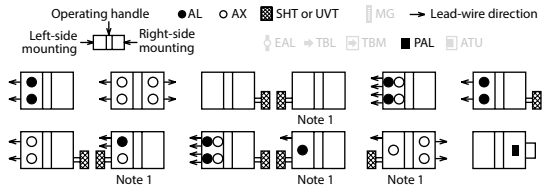
NF400-UEW

Type name			NF400-UEW
Rated current I_n [A]			200, 225, 250, 300, 350, 400
Number of poles			3
Rated insulation voltage U_i [V]			690
Rated short-cuircit breaking capacity [kA] IEC/EN 60947-2 (I_{cu}/I_{cs})	AC	690 V	—
		500 V	170/170
		440 V	200/200
		415 V	200/200
		400 V	200/200
		380 V	200/200
		230 V	200/200
		200 V	200/200
	DC	250 V	—
Standard attached parts (front connection)			Mounting screw: M6×65 (2pcs), M6×174 (2pcs) Insulation barrier: (3P: 4pcs)

Operating characteristics

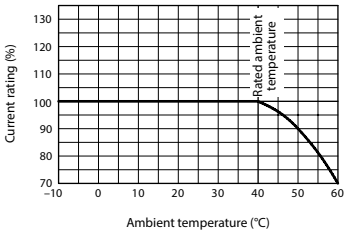


Internal accessories



Note 1: Right-side mounting is standard of SHT and UVT.
Specify separately for left-sidenting.

Ambient compensating curve



The rated current does not have thermal characteristics. Reduce the current as shown in the curve on the left chart if the ambient temperature exceeds 40°C

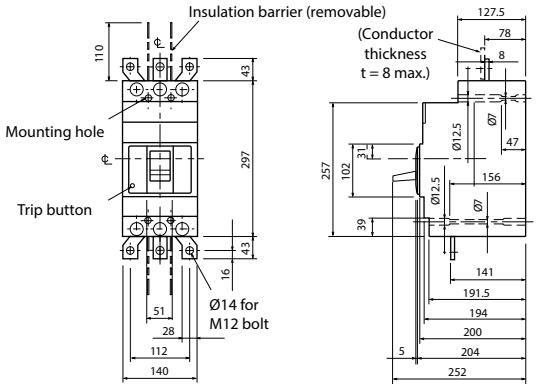
External accessories

Accessories		Type name	Reference page
Operating handle	F	F-4U	77
	V	V-4U	76
Handle lock device	HL (*1)	HLF-4SW	78
		HLN-4SW	
	HL-S	HLS-4SW	

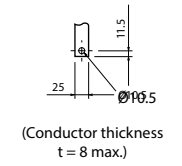
Accessories				Type name	Reference page
Mechanical interlock		MI	3P	MI-4SW3	82
Terminal cover	Large	TC-L	3P	TCL-4SW3	81
	Skeleton	TTC	3P	TTC-4SW3	
	Rear	BTC	3P	BTC-4SW3	
Electrical operation device				MDS (*2)	79

Notes *1 HLF types are used for OFF-lock and HLN types for ON-lock.
*2 Specify the working voltage. Refer to the reference page for type name.

Front connection

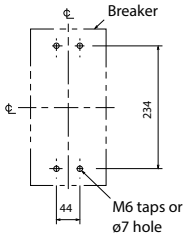


3-pole



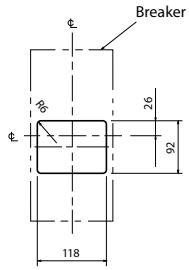
(Conductor thickness t = 8 max.)

Conductor drilling for direct connection



3-pole

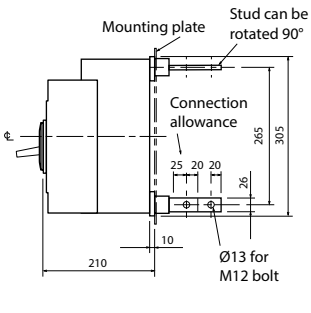
Drilling plan

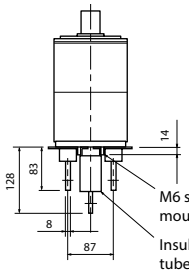


1.0 mm clearance on each side of the handle frame

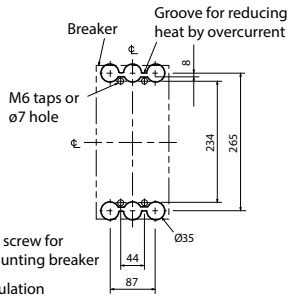
Front-panel cutout

Rear connection



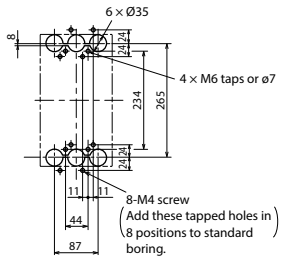


3-pole



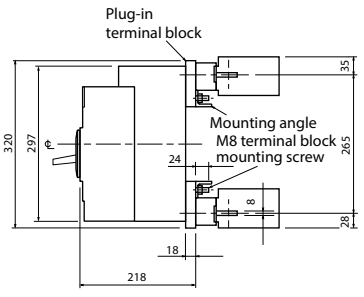
Drilling plan

Boring dimensions for rear connection type barriers (3-pole)

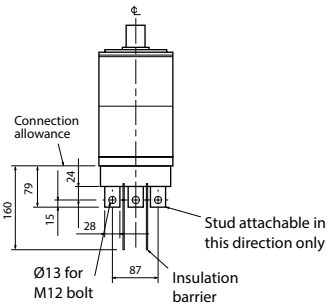


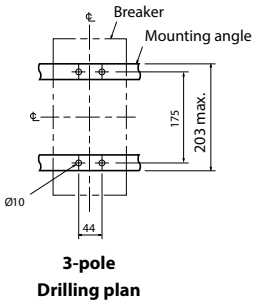
Note The bore dimensional drawing shows the breaker viewed from the rear.

Plug-in



3-pole





3-pole

Drilling plan

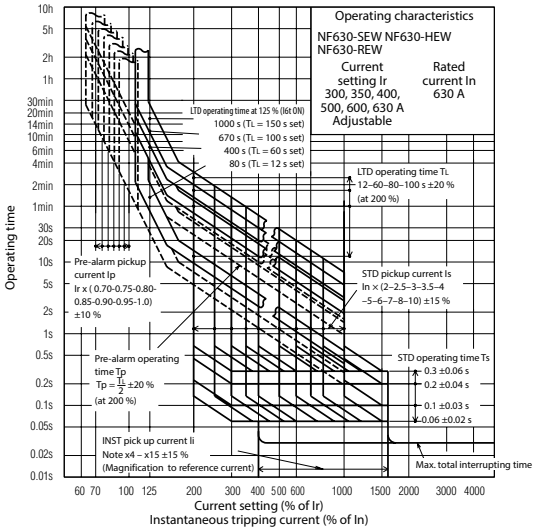
[mm]

NF630-SEW, NF630-HEW, NF630-REW

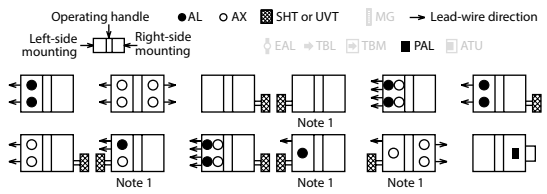
NF630-SEW

Type name			NF630-SEW	NF630-HEW	NF630-REW
Rated current I_n [A]			300, 350, 400, 500, 600, 630	300, 350, 400, 500, 600, 630	300, 350, 400 500, 600, 630
Number of poles			3 4	3 4	3
Rated insulation voltage U_i [V]			690	690	690
Rated short-cuircit breaking capacity [kA] IEC/EN 60947-2 (I_{cu}/I_{cs})	AC	690 V	10/10	35/18	—
		500 V	30/30	50/50	70/35
		440 V	42/42	65/65	125/63
		415 V	50/50	70/70	125/63
		400 V	50/50	70/70	125/63
		380 V	50/50	70/70	125/63
		230 V	85/85	100/100	150/75
		200 V	85/85	100/100	150/75
	DC	250 V	—	—	—
Standard attached parts (front connection)			Mounting screw: M6×72 (4pcs) Insulation barrier: (3P: 4pcs, 4P: 6pcs)		

Operating characteristics

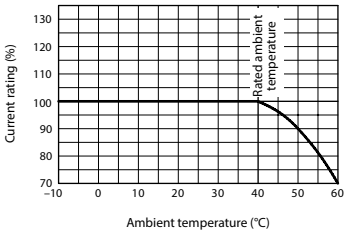


Internal accessories



Note 1: Right-side mounting is standard of SHT and UVT.
Specify separately for left-sidenting.

Ambient compensating curve



The rated current does not have thermal characteristics. Reduce the current as shown in the curve on the left chart if the ambient temperature exceeds 40 °C

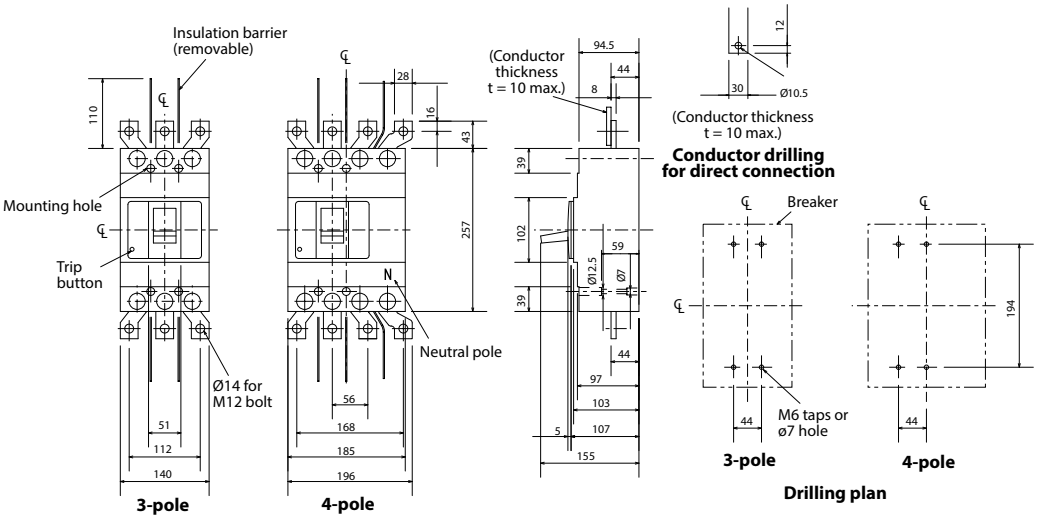
External accessories

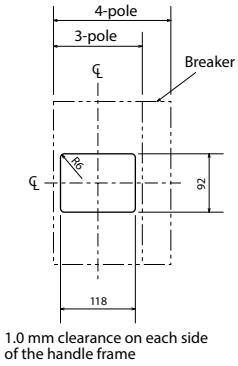
Accessories		Type name	Reference page
Operating handle	F	F-4S	77
	V	V-4S	76
Handle lock device	HL (*1)	HLF-4SW	78
	HL-S	HLS-4SW	

Accessories				Type name	Reference page
Mechanical interlock		MI	3P	MI-4SW3	82
			4P	MI-4SW4	
Terminal cover	Large	TC-L	3P	TCL-4SW3	81
	Skele-ton	TTC	3P	TTC-4SW3	
			4P	TTC-4SW4	
	Rear	BTC	3P	BTC-4SW3	
			4P	BTC-4SW4	
Electrical operation device				MDS (*2)	79

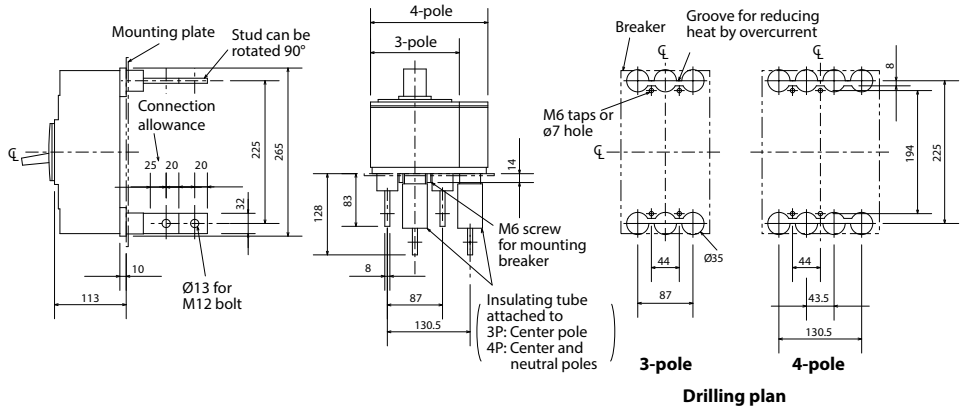
Notes *1 HLF types are used for OFF-lock and HLN types for ON-lock.
*2 Specify the working voltage. Refer to the reference page for type name.

Front connection

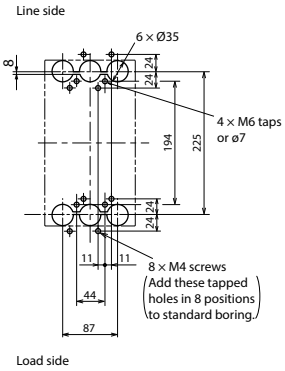




Rear connection

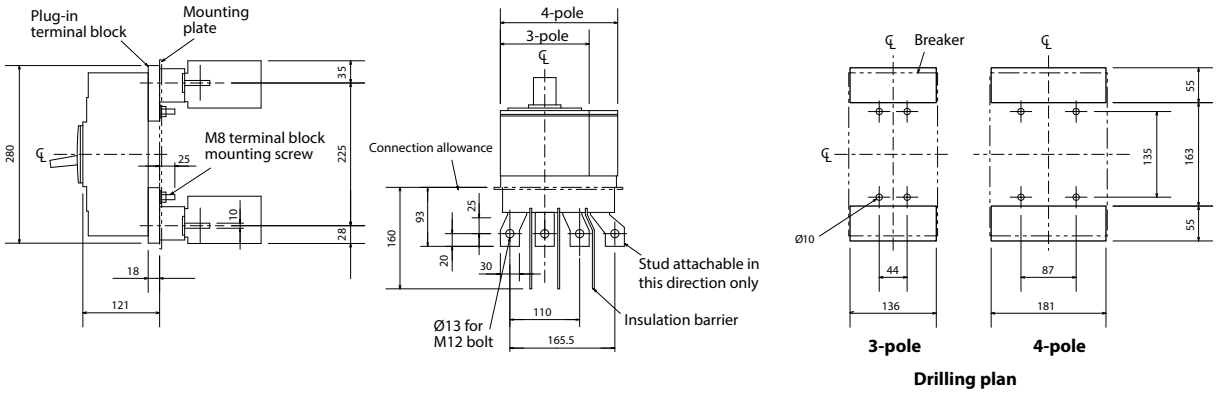


Boring dimensions for rear connection type barriers (3-pole)



Note The bore dimensional drawing shows the breaker viewed from the rear.

Plug-in



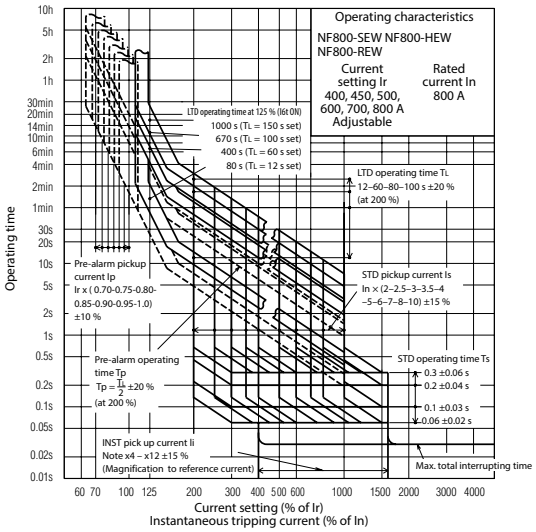
[mm]

NF800-SEW, NF800-HEW, NF800-REW

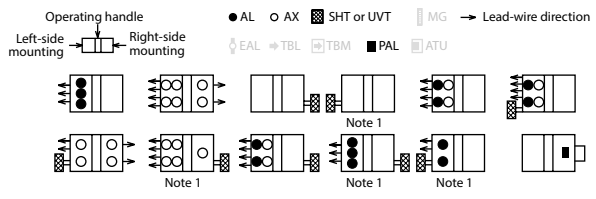
NF800-SEV

Type name			NF800-SEW	NF800-HEW	NF800-REW
Rated current I_n [A]			400, 450, 500, 600, 700, 800	400, 450, 500, 600, 700, 800	400, 450, 500, 600, 700, 800
Number of poles			3 4	3 4	3
Rated insulation voltage U_i [V]			690	690	690
Rated short-cuircit breaking capacity [kA] IEC/EN 60947-2 (I_{cu}/I_{cs})	AC	690 V	10/10	15/15	—
		500 V	30/30	50/50	70/35
		440 V	42/42	65/65	125/63
		415 V	50/50	70/70	125/63
		400 V	50/50	70/70	125/63
		380 V	50/50	70/70	125/63
		230 V	85/85	100/100	150/75
		200 V	85/85	100/100	150/75
	DC	250 V	—	—	—
Standard attached parts (front connection)			Mounting screw: M6×35 (4pcs) Insulation barrier: (3P: 2pcs, 4P: 3pcs)		

Operating characteristics

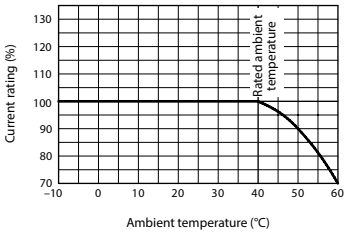


Internal accessories



Note 1: Right-side mounting is standard of SHT and UVT.
Specify separately for left-sidenting.

Ambient compensating curve



The rated current does not have thermal characteristics. Reduce the current as shown in the curve on the left chart if the ambient temperature exceeds 40 °C

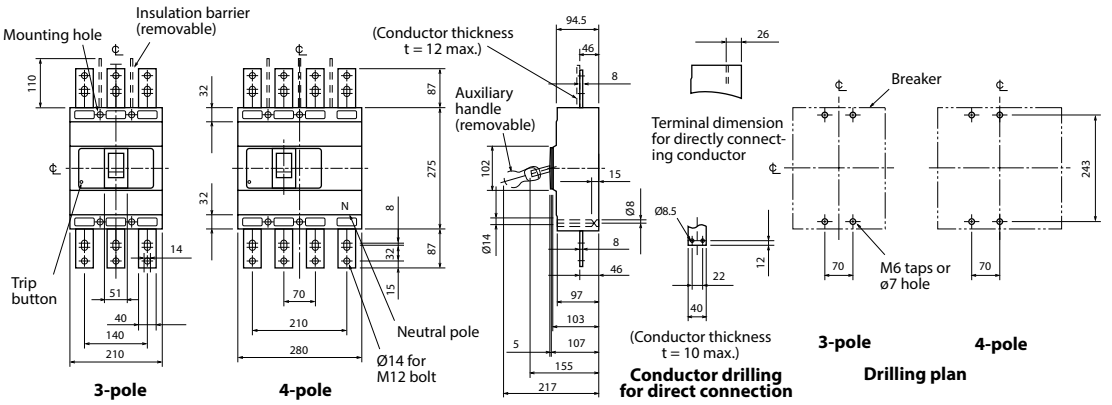
External accessories

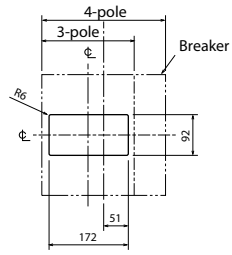
Accessories		Type name	Reference page
Operating handle	F	F-8S	77
	V	V-8S	76
Handle lock device	HL (*1)	HLF-4SW	78
		HLN-4SW	
	HL-S	HLS-8SW	

Accessories				Type name	Reference page
Mechanical interlock		MI	3P	MI-8SW3	82
			4P	MI-8SW4	
Terminal cover	Large	TC-L	3P	TCL-8SW3	81
			4P	TCL-8SW4	
	Skele-ton	TTC	3P	TTC-8SW3	
			4P	TTC-8SW4	
	Rear	BTC	3P	BTC-8SW3	
			4P	BTC-8SW4	
Electrical operation device				MDS (*2)	79

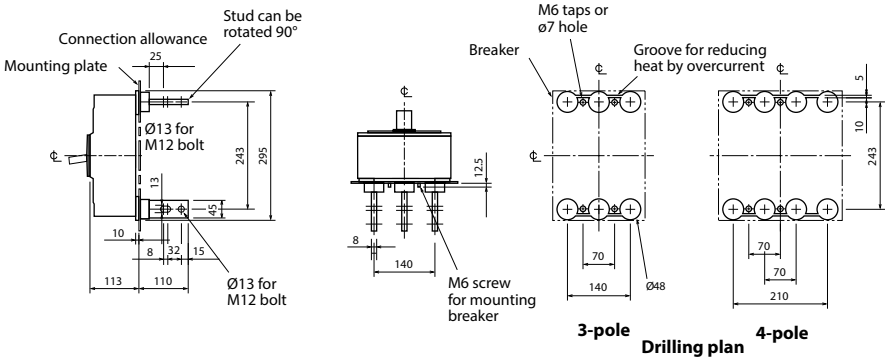
Notes *1 HLF types are used for OFF-lock and HLN types for ON-lock.
*2 Specify the working voltage. Refer to the reference page for type name.

Front connection

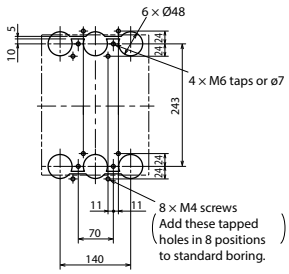




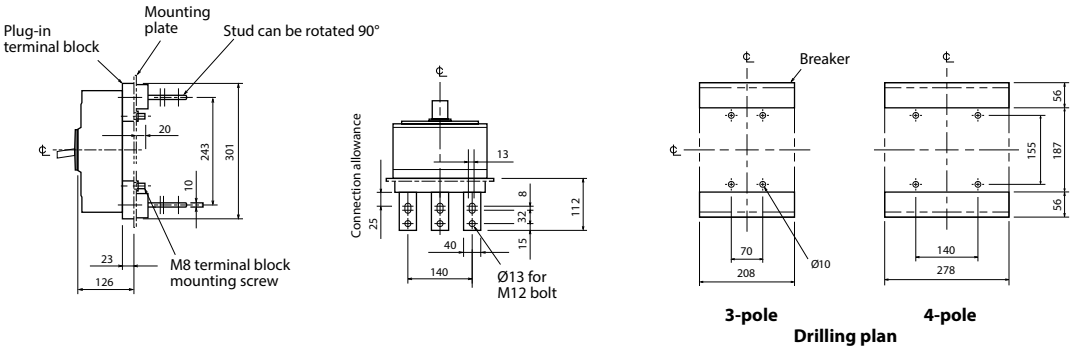
Rear connection



Boring dimensions for rear connection type barriers (3-pole)



Plug-in



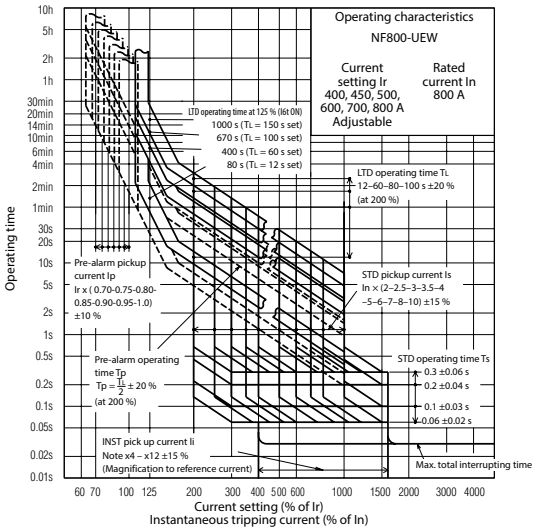
[mm]

NF800-UEW

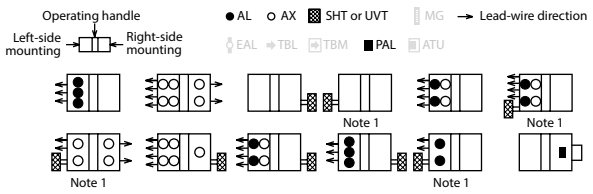
NF800-UEW

Type name			NF800-UEW
Rated current I_n [A]			400, 450, 500, 600, 700, 800
Number of poles			3 4
Rated insulation voltage U_i [V]			690
Rated short-cuircit breaking capacity [kA] IEC/EN 60947-2 (I_{cu}/I_{cs})	AC	690 V	35/35
		500 V	170/170
		440 V	200/200
		415 V	200/200
		400 V	200/200
		380 V	200/200
		230 V	200/200
		200 V	200/200
	DC	300 V	—
Standard attached parts (front connection)			Mounting screw: 3P: M6×35, M6×132 (2pcs each) 4P: M6×35 (3pcs), M6×132 (2pcs) Insulation barrier: (3P: 2pcs, 4P: 3pcs)

Operating characteristics

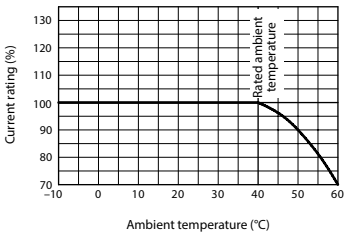


Internal accessories



Note 1: Right-side mounting is standard of SHT and UVT.
Specify separately for left-sidenting.

Ambient compensating curve



The rated current does not have thermal characteristics. Reduce the current as shown in the curve on the left chart if the ambient temperature exceeds 40 °C

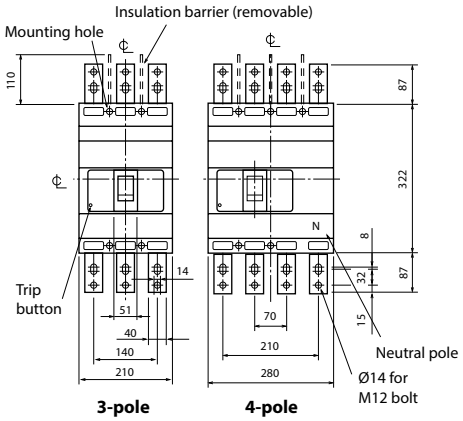
External accessories

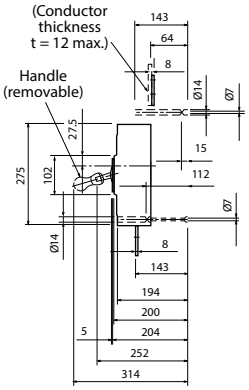
Accessories			Type name	Reference page
Operating handle	F		F-8U	77
Handle lock device	HL		HL-4SW	78
	HL-S		HLS-8UW	
Mechanical interlock	MI	3P	MI-8SW3	82
		4P	MI-8SW4	

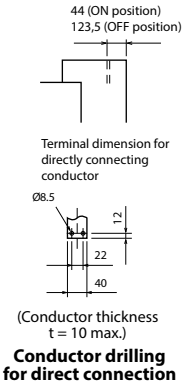
Accessories				Type name	Reference page
Terminal cover	Large	TC-L	3P	TCL-8UW3	81
			4P	TCL-8UW4	
	Rear	BTC	3P	BTC-8SW3	
			4P	BTC-8SW4	
Electrical operation device				MDS (*1)	79

Notes *1 Specify the working voltage. Refer to the reference page for type name.

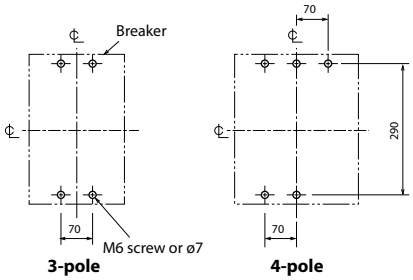
Front connection



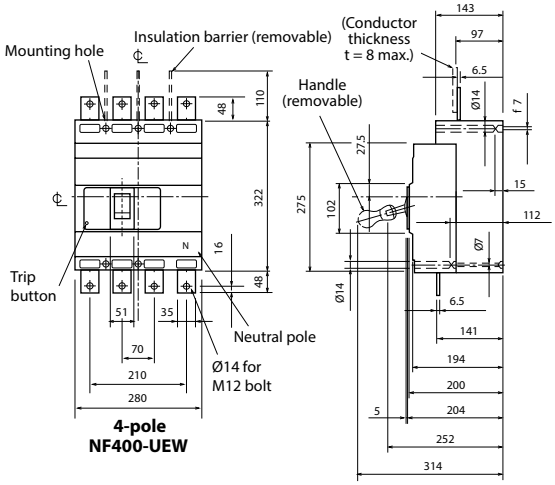




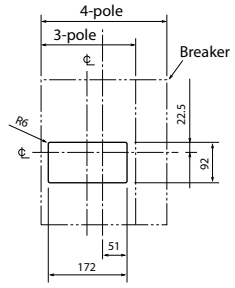
Conductor drilling for direct connection



Drilling plan

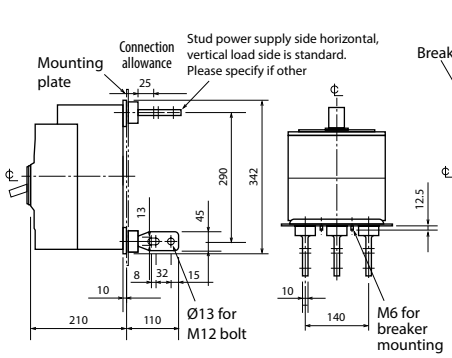


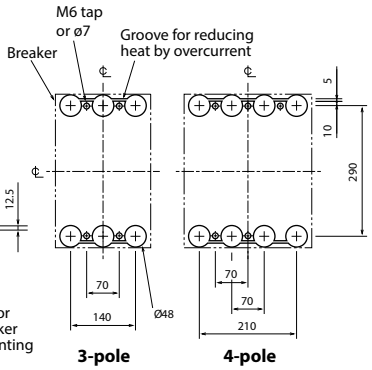
4-pole NF400-UEW



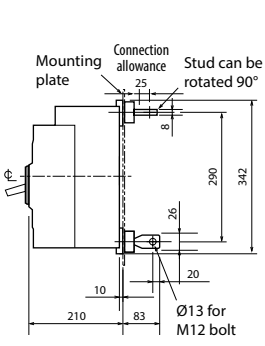
Front-panel cutout

Rear connection



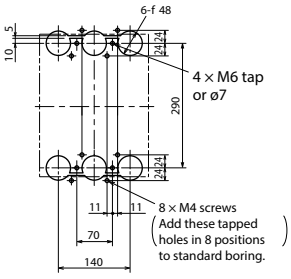


Drilling plan



4-pole NF400-UEW

Boring dimensions for rear connection type barriers (3-pole)



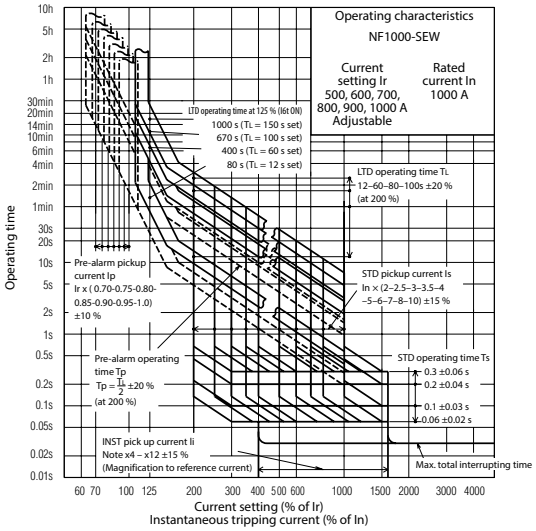
[mm]

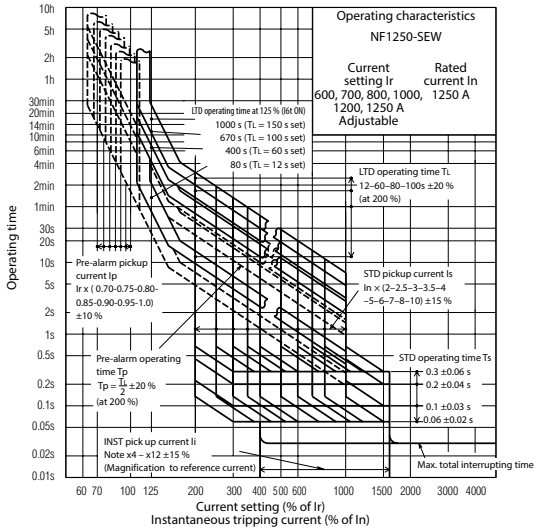
NF1000-SEW, NF1250-SEW

NF1000-SEW

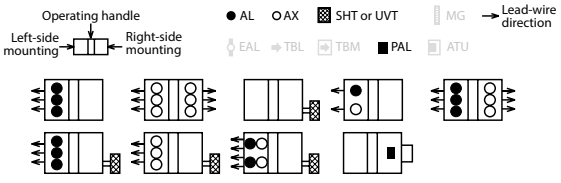
Type name			NF1000-SEW	NF1250-SEW
Rated current I_n [A]			500, 600, 700, 800, 900, 1000	600, 700, 800, 1000, 1200, 1250
Number of poles			3 4	3 4
Rated insulation voltage U_i [V]			690	690
Rated short-cuircit breaking capacity [kA] IEC/EN 60947-2 (I_{cu}/I_{cs})	AC	690 V	25/13	25/13
		500 V	65/33	65/33
		440 V	85/43	85/43
		415 V	85/43	85/43
		400 V	85/43	85/43
		380 V	85/43	85/43
		230 V	125/63	125/63
		200 V	125/63	125/63
	DC	250 V	—	—
Standard attached parts (front connection)			Mounting screw: Insulation barrier:	M8×40 (4pcs each) (3P: 2pcs, 4P: 3pcs)

Operating characteristics

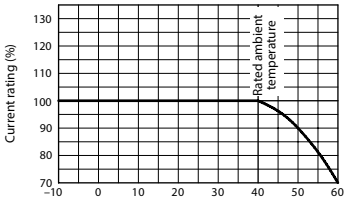




Internal accessories



Ambient compensating curve



The rated current does not have thermal characteristics. Reduce the current as shown in the curve on the left chart if the ambient temperature exceeds 40 °C

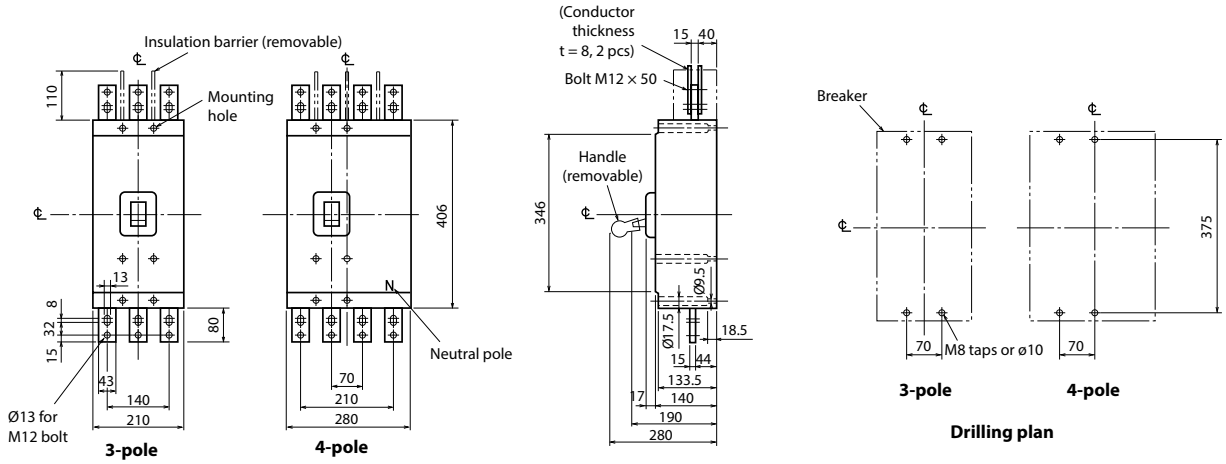
External accessories

Accessories			Type name	Reference page
Handle lock device	HL		HL (on request)	78
Mechanical interlock	MI	3P	MI-10SW3	82
		4P	MI-10SW4	

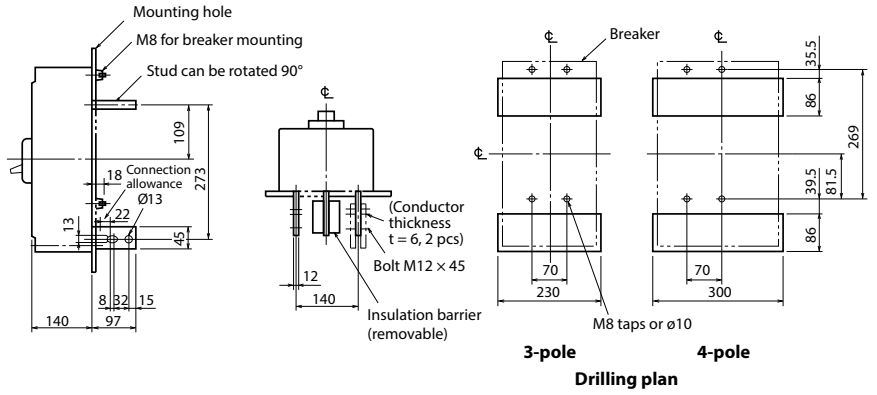
Accessories				Type name	Reference page
Terminal cover	Large	TC-L	3P	TCL-10SW3	81
			4P	TCL-10SW4	
Electrical operation device				MDS (*1)	79

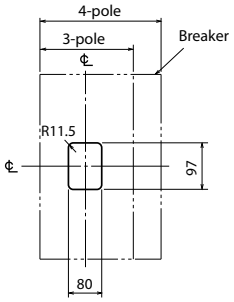
Notes *1 Specify the working voltage. Refer to the reference page for type name.

Front connection

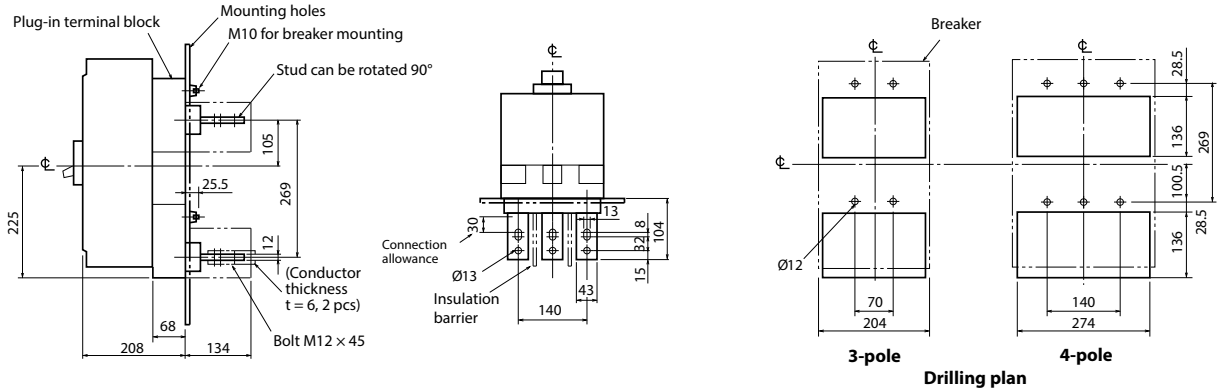


Rear connection





Plug-in



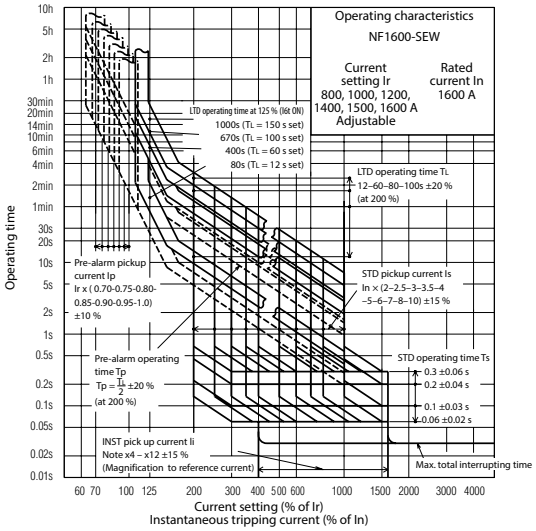
[mm]

NF1600-SEW

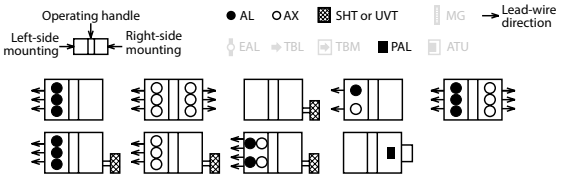
NF1600-SEW

Type name			NF1600-SEW
Rated current I_n [A]			800, 1000, 1200, 1400, 1500, 1600
Number of poles			3 4
Rated insulation voltage U_i [V]			690
Rated short-cuircit breaking capacity [kA] IEC/EN 60947-2 (I_{cu}/I_{cs})	AC	690 V	25/13
		500 V	65/33
		440 V	85/43
		415 V	85/43
		400 V	85/43
		380 V	85/43
		230 V	125/63
		200 V	125/63
	DC	250 V	—
Standard attached parts (front connection)			Mounting screw: M8×40 (4pcs each) Insulation barrier: (3P: 2pcs, 4P: 3pcs)

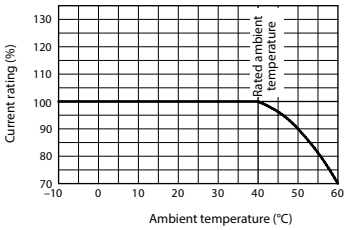
Operating characteristics



Internal accessories



Ambient compensating curve



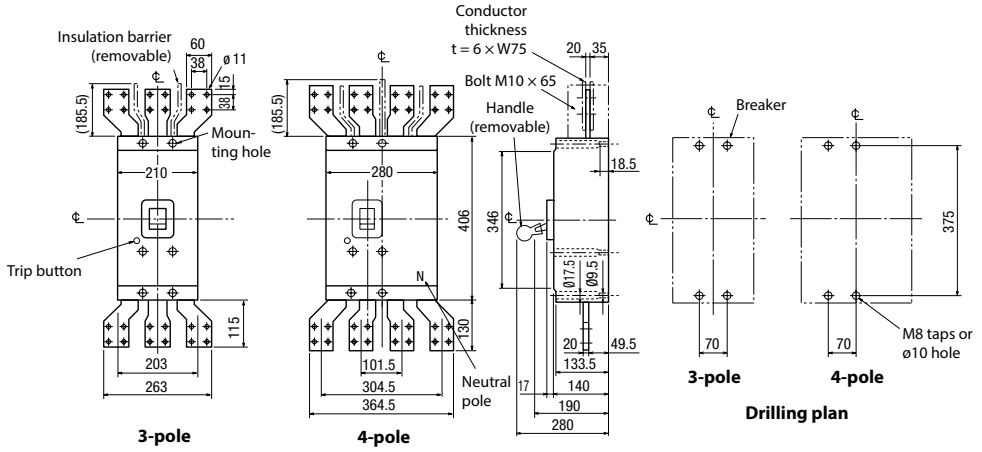
The rated current does not have thermal characteristics. Reduce the current as shown in the curve on the left chart if the ambient temperature exceeds 40 °C

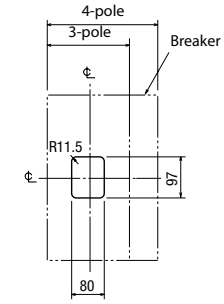
External accessories

Accessories			Type name	Reference page
Handle lock device	HL		HL (on request)	78
Mechanical interlock	MI	3P	MI-16SW3	82
		4P	MI-16SW4	
Electrical operation device			MDS (*1)	79

Notes *1 Specify the working voltage. Refer to the reference page for type name.

Front connection

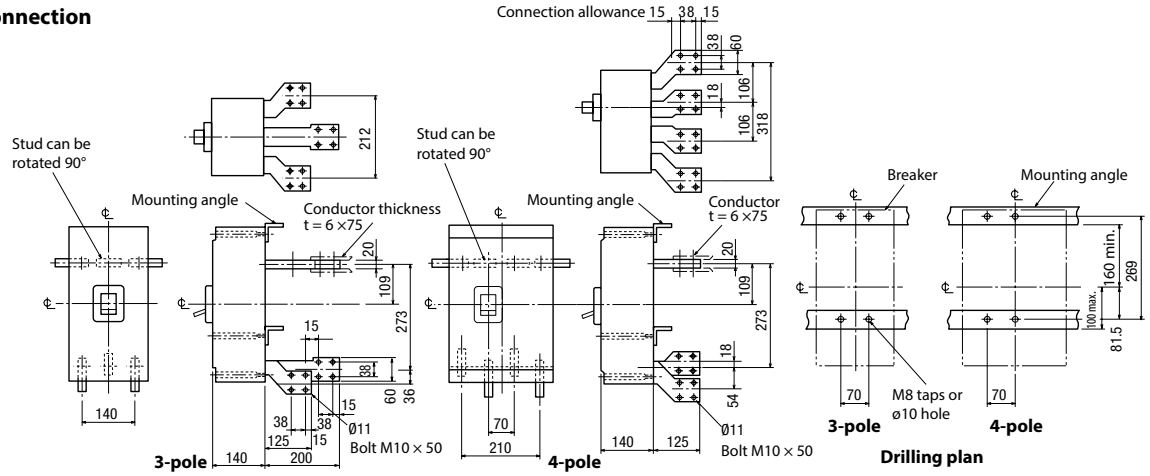




1.0 mm clearance on each side of the handle frame

Front-panel cutout

Rear connection

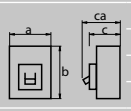


[mm]

Magnetothermic and earth leakage protection

Earth leakage circuit breakers ELCB and residual current circuit breakers with overcurrent protection RCBO

Specifications

Type			BV-DN	NV125-CV	NV125-SV	NV250-CV	NV250-SV
Rated current I_n [A]			10, 16, 20, 25, 32, 40	80, 100, 125	125	150, 175, 200, 225, 250	Adjustable 125-250 (12.5A step)
Number of poles			2 (1+N)	3	3, 4	3	3, 4
Rated voltage [V AC]			230	100–440	200-440	100–440	100-440, 200-440
Rated current sensitivity [mA]			30	100/200/500 selecta-ble	30,100/200/500 selectable	100/200/500 selectable	(30), 100/200/500 selectable
Max. operating time [s]			0.04	0.45/1.0/2.0 selectable	0.45/1.0/2.0 selectable	0.45/1.0/2.0 selectable	0.45/1.0/2.0 selectable
Pulsating current sensitivity			AC	A (Harmonic Surge Ready)	A (Harmonic Surge Ready)	A (Harmonic Surge Ready)	A (Harmonic Surge Ready)
Rated breaking capacity [kA]		230 V AC	4.5	30	50	36	85
		440 V AC	—	10	25	15	36
Number of operating cycles	Without current		20000	10000	25000	8000	25000
	With current		20000 (In 10, 16,20 A) 15000 (In 25 A) 10000 (In 32, 40 A)	6000	10000	4000	10000
Dimensions [mm]		a	36	90	90/120	105	105/140
		b	88	130	130	165	165
		c	44	68	68	68	68
		ca	70	90	90	92	92
Mass [kg]			0.19	1	1.4	1.7	1.9/2.5
Automatic tripping device			Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic	Thermal-magnetic
Based on standard			IEC61009-1	IEC60947-2	IEC60947-2	IEC60947-2	IEC60947-2
Breaker type			MCB	MCCB	MCCB	MCCB	MCCB
CE marking			Self-declaration	Self-declaration	Self-declaration	TÜV approval	TÜV approval

* All the accessories and dimensions of the NF125-SV are compatible with the NV125-CV. All the accessories and dimensions of the NF250-SGV are compatible with the NV250-CV. For internal accessories only is possible to fit it on the left side.
For the available accessories please see page 66.

Order information

Type	2P (1P+N)	3P	4P
RCBO (Residual current circuit breakers with overcurrent protection)			
BV-DN 1PN 10A 30MA N	248280	—	
BV-DN 1PN 16A 30MA N	248283	—	
BV-DN 1PN 20A 30MA N	248286	—	
BV-DN 1PN 25A 30MA N	248289	—	
BV-DN 1PN 32A 30MA N	248292	—	
BV-DN 1PN 10A 40MA N	248295	—	
ELCB (Earth leakage circuit breakers)			
NV125-CV 63A 2-440V 1.2.500MA JIEN CE	—	265622	—
NV125-CV 80A 2-440V 1.2.500MA JIEN CE	—	265624	—
NV125-CV 100A 2-440V 1.2.500MA JIEN C	—	265625	—
NV125-CV 125A 2-440V 1.2.500MA JIEN C	—	265626	—
NV250-CV 150A 2-440V 1.2.500MA JIEN C	—	265792	—
NV250-CV 175A 2-440V 1.2.500MA JIEN C	—	265793	—
NV250-CV 200A 2-440V 1.2.500MA JIEN C	—	265794	—
NV250-CV 225A 2-440V 1.2.500MA JIEN C	—	265795	—
NV250-CV 250A 2-440V 1.2.500MA JIEN C	—	265796	—
NV125-SV 20A 2-440V 1.2.500MA JIEN CE	—	265653	265690
NV125-SV 30A 2-440V 1.2.500MA JIEN CE	—	265654	265691
NV125-SV 32A 2-440V 1.2.500MA JIEN CE	—	265655	265692
NV125-SV 40A 2-440V 1.2.500MA JIEN CE	—	265656	265693
NV125-SV 50A 2-440V 1.2.500MA JIEN CE	—	265657	265694
NV125-SV 60A 2-440V 1.2.500MA JIEN CE	—	265658	265695
NV125-SV 63A 2-440V 1.2.500MA JIEN CE	—	265659	265696
NV125-SV 75A 2-440V 1.2.500MA JIEN CE	—	265660	265697
NV125-SV 80A 2-440V 1.2.500MA JIEN CE	—	265661	265698
NV125-SV 100A 2-440V 1.2.500MA JIEN C	—	265662	265699
NV125-SV 125A 2-440V 1.2.500MA JIEN C	—	265663	265700
NV250-SV 125A 2-440V 1.2.500MA JIEN C	—	265809	—
NV250-SV 150A 2-440V 1.2.500MA JIEN C	—	265810	600479
NV250-SV 175A 2-440V 1.2.500MA JIEN C	—	265811	337379
NV250-SV 200A 2-440V 1.2.500MA JIEN C	—	265812	505701
NV250-SV 225A 2-440V 1.2.500MA JIEN C	—	265813	612518
NV250-SV 250A 2-440V 1.2.500MA JIEN C	—	265814	612519

"Both CV and SV series are non standard stock - can be stocked by consumption agreement"

Miniature Circuit Breakers

■ Description

- High-quality miniature circuit breakers for industrial applications and residential applications
- Contact position indicator red - green
- Guide for secure terminal connection
- 3-position DIN rail clip, permits removal from existing busbar system
- Comprehensive range of accessories suitable for subsequent installation
- Rated currents up to 63 A
- Tripping characteristics B, C, D
- Rated breaking capacity up to 15 kA according to IEC/EN 60947-2
- Classified for the use in rail rolling stock

Characteristic B

1-pole

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to UL1077 (V)	Breaking capacity acc. to UL1077 (kA)	Type Designation	Article No.	Units per package
1	254	10	230	15	277	10	MCB-B1/1	719594	12/120
2	254	10	230	15	277	10	MCB-B2/1	719595	12/120
3	254	10	230	15	277	10	MCB-B3/1	719596	12/120
4	254	10	230	15	277	10	MCB-B4/1	719597	12/120
5	254	10	230	15	277	10	MCB-B5/1	719598	12/120
6	254	10	230	15	277	10	MCB-B6/1	719599	12/120
10	254	10	230	15	277	10	MCB-B10/1	719600	12/120
12	254	10	230	15	277	10	MCB-B12/1	719601	12/120
16	254	10	230	15	277	10	MCB-B16/1	719602	12/120
20	254	10	230	15	277	10	MCB-B20/1	719603	12/120
25	254	10	230	15	277	10	MCB-B25/1	719604	12/120
32	254	10	230	15	277	10	MCB-B32/1	719605	12/120
40	254	10	230	15	277	5	MCB-B40/1	719606	12/120
50	230	15	230	15	277	5	MCB-B50/1	719607	12/120
63	230	15	230	15	277	5	MCB-B63/1	719608	12/120

1+N-poles

1	254	10	230	15	277	10	MCB-B1/1N	719609	1/60
2	254	10	230	15	277	10	MCB-B2/1N	719610	1/60
3	254	10	230	15	277	10	MCB-B3/1N	719611	1/60
4	254	10	230	15	277	10	MCB-B4/1N	719612	1/60
5	254	10	230	15	277	10	MCB-B5/1N	719613	1/60
6	254	10	230	15	277	10	MCB-B6/1N	719614	1/60
10	254	10	230	15	277	10	MCB-B10/1N	719615	1/60
12	254	10	230	15	277	10	MCB-B12/1N	719616	1/60
16	254	10	230	15	277	10	MCB-B16/1N	719617	1/60
20	254	10	230	15	277	10	MCB-B20/1N	719618	1/60
25	254	10	230	15	277	10	MCB-B25/1N	719619	1/60
32	254	10	230	15	277	10	MCB-B32/1N	719620	1/60
40	254	10	230	15	277	5	MCB-B40/1N	719621	1/60
50	230	15	230	15	277	5	MCB-B50/1N	719622	1/60
63	230	15	230	15	277	5	MCB-B63/1N	719623	1/60

2-poles

1	440	10	400	15	480Y/277	10	MCB-B1/2	719624	1/60
2	440	10	400	15	480Y/277	10	MCB-B2/2	719625	1/60
3	440	10	400	15	480Y/277	10	MCB-B3/2	719626	1/60
4	440	10	400	15	480Y/277	10	MCB-B4/2	719627	1/60
5	440	10	400	15	480Y/277	10	MCB-B5/2	719628	1/60
6	440	10	400	15	480Y/277	10	MCB-B6/2	719629	1/60
10	440	10	400	15	480Y/277	10	MCB-B10/2	719630	1/60
12	440	10	400	15	480Y/277	10	MCB-B12/2	719631	1/60
16	440	10	400	15	480Y/277	10	MCB-B16/2	719632	1/60
20	440	10	400	15	480Y/277	10	MCB-B20/2	719633	1/60
25	440	10	400	15	480Y/277	10	MCB-B25/2	719634	1/60
32	440	10	400	15	480Y/277	10	MCB-B32/2	719635	1/60
40	440	10	400	15	480Y/277	5	MCB-B40/2	719636	1/60
50	400	15	400	15	480Y/277	5	MCB-B50/2	719637	1/60
63	400	15	400	15	480Y/277	5	MCB-B63/2	719638	1/60

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to UL1077 (V)	Breaking capacity acc. to UL1077 (kA)	Type Designation	Article No.	Units per package
3-poles									
1	440	10	400	15	480Y/277	10	MCB-B1/3	719639	1/40
2	440	10	400	15	480Y/277	10	MCB-B2/3	719640	1/40
3	440	10	400	15	480Y/277	10	MCB-B3/3	719641	1/40
4	440	10	400	15	480Y/277	10	MCB-B4/3	719642	1/40
5	440	10	400	15	480Y/277	10	MCB-B5/3	719643	1/40
6	440	10	400	15	480Y/277	10	MCB-B6/3	719644	1/40
10	440	10	400	15	480Y/277	10	MCB-B10/3	719645	1/40
12	440	10	400	15	480Y/277	10	MCB-B12/3	719646	1/40
16	440	10	400	15	480Y/277	10	MCB-B16/3	719647	1/40
20	440	10	400	15	480Y/277	10	MCB-B20/3	719648	1/40
25	440	10	400	15	480Y/277	10	MCB-B25/3	719649	1/40
32	440	10	400	15	480Y/277	10	MCB-B32/3	719650	1/40
40	440	10	400	15	480Y/277	5	MCB-B40/3	719651	1/40
50	400	15	400	15	480Y/277	5	MCB-B50/3	719652	1/40
63	400	15	400	15	480Y/277	5	MCB-B63/3	719653	1/40
3+N-poles									
1	440	10	400	15	480Y/277	10	MCB-B1/3N	719654	1/30
2	440	10	400	15	480Y/277	10	MCB-B2/3N	719655	1/30
3	440	10	400	15	480Y/277	10	MCB-B3/3N	719656	1/30
4	440	10	400	15	480Y/277	10	MCB-B4/3N	719657	1/30
5	440	10	400	15	480Y/277	10	MCB-B5/3N	719658	1/30
6	440	10	400	15	480Y/277	10	MCB-B6/3N	719659	1/30
10	440	10	400	15	480Y/277	10	MCB-B10/3N	719660	1/30
12	440	10	400	15	480Y/277	10	MCB-B12/3N	719661	1/30
16	440	10	400	15	480Y/277	10	MCB-B16/3N	719662	1/30
20	440	10	400	15	480Y/277	10	MCB-B20/3N	719663	1/30
25	440	10	400	15	480Y/277	10	MCB-B25/3N	719664	1/30
32	440	10	400	15	480Y/277	10	MCB-B32/3N	719665	1/30
40	440	10	400	15	480Y/277	5	MCB-B40/3N	719666	1/30
50	400	15	400	15	480Y/277	5	MCB-B50/3N	719667	1/30
63	400	15	400	15	480Y/277	5	MCB-B63/3N	719668	1/30
4-poles									
1	440	10	400	15	480Y/277	10	MCB-B1/4	719669	1/30
2	440	10	400	15	480Y/277	10	MCB-B2/4	719670	1/30
3	440	10	400	15	480Y/277	10	MCB-B3/4	719671	1/30
4	440	10	400	15	480Y/277	10	MCB-B4/4	719672	1/30
5	440	10	400	15	480Y/277	10	MCB-B5/4	719673	1/30
6	440	10	400	15	480Y/277	10	MCB-B6/4	719674	1/30
10	440	10	400	15	480Y/277	10	MCB-B10/4	719675	1/30
12	440	10	400	15	480Y/277	10	MCB-B12/4	719676	1/30
16	440	10	400	15	480Y/277	10	MCB-B16/4	719677	1/30
20	440	10	400	15	480Y/277	10	MCB-B20/4	719678	1/30
25	440	10	400	15	480Y/277	10	MCB-B25/4	719679	1/30
32	440	10	400	15	480Y/277	10	MCB-B32/4	719680	1/30
40	440	10	400	15	480Y/277	5	MCB-B40/4	719681	1/30
50	400	15	400	15	480Y/277	5	MCB-B50/4	719682	1/30
63	400	15	400	15	480Y/277	5	MCB-B63/4	719683	1/30

Characteristic C

1-pole

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to UL1077 (V)	Breaking capacity acc. to UL1077 (kA)	Type Designation	Article No.	Units per package
0.5	254	10	230	15	277	10	MCB-C0,5/1	719686	12/120
1	254	10	230	15	277	10	MCB-C1/1	719687	12/120
1.5	254	10	230	15	277	10	MCB-C1,5/1	719688	12/120
1.6	254	10	230	15	277	10	MCB-C1,6/1	719689	12/120
2	254	10	230	15	277	10	MCB-C2/1	719690	12/120
2.5	254	10	230	15	277	10	MCB-C2,5/1	719691	12/120
3	254	10	230	15	277	10	MCB-C3/1	719692	12/120
3.5	254	10	230	15	277	10	MCB-C3,5/1	719693	12/120
4	254	10	230	15	277	10	MCB-C4/1	719694	12/120
5	254	10	230	15	277	10	MCB-C5/1	719695	12/120
6	254	10	230	15	277	10	MCB-C6/1	719696	12/120
10	254	10	230	15	277	10	MCB-C10/1	719697	12/120
12	254	10	230	15	277	10	MCB-C12/1	719698	12/120
16	254	10	230	15	277	10	MCB-C16/1	719699	12/120
20	254	10	230	15	277	10	MCB-C20/1	719700	12/120
25	254	10	230	15	277	10	MCB-C25/1	719701	12/120
32	254	10	230	15	277	10	MCB-C32/1	719702	12/120
40	254	10	230	15	277	5	MCB-C40/1	719703	12/120
50	230	15	230	15	277	5	MCB-C50/1	719704	12/120
63	230	15	230	15	277	5	MCB-C63/1	719705	12/120

1+N-poles

0.5	254	10	230	15	277	10	MCB-C0,5/1N	719706	1/60
1	254	10	230	15	277	10	MCB-C1/1N	719707	1/60
1.5	254	10	230	15	277	10	MCB-C1,5/1N	719708	1/60
1.6	254	10	230	15	277	10	MCB-C1,6/1N	719709	1/60
2	254	10	230	15	277	10	MCB-C2/1N	719710	1/60
2.5	254	10	230	15	277	10	MCB-C2,5/1N	719711	1/60
3	254	10	230	15	277	10	MCB-C3/1N	719712	1/60
3.5	254	10	230	15	277	10	MCB-C3,5/1N	719713	1/60
4	254	10	230	15	277	10	MCB-C4/1N	719714	1/60
5	254	10	230	15	277	10	MCB-C5/1N	719715	1/60
6	254	10	230	15	277	10	MCB-C6/1N	719716	1/60
10	254	10	230	15	277	10	MCB-C10/1N	719717	1/60
12	254	10	230	15	277	10	MCB-C12/1N	719718	1/60
16	254	10	230	15	277	10	MCB-C16/1N	719719	1/60
20	254	10	230	15	277	10	MCB-C20/1N	719720	1/60
25	254	10	230	15	277	10	MCB-C25/1N	719721	1/60
32	254	10	230	15	277	10	MCB-C32/1N	719722	1/60
40	254	10	230	15	277	5	MCB-C40/1N	719723	1/60
50	230	15	230	15	277	5	MCB-C50/1N	719724	1/60
63	230	15	230	15	277	5	MCB-C63/1N	719725	1/60

2-poles

0.5	440	10	400	15	480Y/277	10	MCB-C0,5/2	719726	1/60
1	440	10	400	15	480Y/277	10	MCB-C1/2	719727	1/60
1.5	440	10	400	15	480Y/277	10	MCB-C1,5/2	719728	1/60
1.6	440	10	400	15	480Y/277	10	MCB-C1,6/2	719729	1/60
2	440	10	400	15	480Y/277	10	MCB-C2/2	719730	1/60
2.5	440	10	400	15	480Y/277	10	MCB-C2,5/2	719731	1/60
3	440	10	400	15	480Y/277	10	MCB-C3/2	719732	1/60
3.5	440	10	400	15	480Y/277	10	MCB-C3,5/2	719733	1/60
4	440	10	400	15	480Y/277	10	MCB-C4/2	719734	1/60
5	440	10	400	15	480Y/277	10	MCB-C5/2	719735	1/60
6	440	10	400	15	480Y/277	10	MCB-C6/2	719736	1/60
10	440	10	400	15	480Y/277	10	MCB-C10/2	719737	1/60
12	440	10	400	15	480Y/277	10	MCB-C12/2	719738	1/60
16	440	10	400	15	480Y/277	10	MCB-C16/2	719739	1/60
20	440	10	400	15	480Y/277	10	MCB-C20/2	719740	1/60
25	440	10	400	15	480Y/277	10	MCB-C25/2	719741	1/60
32	440	10	400	15	480Y/277	10	MCB-C32/2	719742	1/60
40	440	10	400	15	480Y/277	5	MCB-C40/2	719743	1/60
50	400	15	400	15	480Y/277	5	MCB-C50/2	719744	1/60
63	400	15	400	15	480Y/277	5	MCB-C63/2	719745	1/60

3-poles

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to UL1077 (V)	Breaking capacity acc. to UL1077 (kA)	Type Designation	Article No.	Units per package
0.5	440	10	400	15	480Y/277	10	MCB-C0,5/3	719746	1/40
1	440	10	400	15	480Y/277	10	MCB-C1/3	719747	1/40
1.5	440	10	400	15	480Y/277	10	MCB-C1,5/3	719748	1/40
1.6	440	10	400	15	480Y/277	10	MCB-C1,6/3	719749	1/40
2	440	10	400	15	480Y/277	10	MCB-C2/3	719750	1/40
2.5	440	10	400	15	480Y/277	10	MCB-C2,5/3	719751	1/40
3	440	10	400	15	480Y/277	10	MCB-C3/3	719752	1/40
3.5	440	10	400	15	480Y/277	10	MCB-C3,5/3	719753	1/40
4	440	10	400	15	480Y/277	10	MCB-C4/3	719754	1/40
5	440	10	400	15	480Y/277	10	MCB-C5/3	719755	1/40
6	440	10	400	15	480Y/277	10	MCB-C6/3	719756	1/40
10	440	10	400	15	480Y/277	10	MCB-C10/3	719757	1/40
12	440	10	400	15	480Y/277	10	MCB-C12/3	719758	1/40
16	440	10	400	15	480Y/277	10	MCB-C16/3	719759	1/40
20	440	10	400	15	480Y/277	10	MCB-C20/3	719760	1/40
25	440	10	400	15	480Y/277	10	MCB-C25/3	719761	1/40
32	440	10	400	15	480Y/277	10	MCB-C32/3	719762	1/40
40	440	10	400	15	480Y/277	5	MCB-C40/3	719763	1/40
50	400	15	400	15	480Y/277	5	MCB-C50/3	719764	1/40
63	400	15	400	15	480Y/277	5	MCB-C63/3	719765	1/40

3+N-poles

1	440	10	400	15	480Y/277	10	MCB-C1/3N	719766	1/30
1.5	440	10	400	15	480Y/277	10	MCB-C1,5/3N	719767	1/30
1.6	440	10	400	15	480Y/277	10	MCB-C1,6/3N	719768	1/30
2	440	10	400	15	480Y/277	10	MCB-C2/3N	719769	1/30
2.5	440	10	400	15	480Y/277	10	MCB-C2,5/3N	719770	1/30
3	440	10	400	15	480Y/277	10	MCB-C3/3N	719771	1/30
3.5	440	10	400	15	480Y/277	10	MCB-C3,5/3N	719772	1/30
4	440	10	400	15	480Y/277	10	MCB-C4/3N	719773	1/30
5	440	10	400	15	480Y/277	10	MCB-C5/3N	719774	1/30
6	440	10	400	15	480Y/277	10	MCB-C6/3N	719775	1/30
10	440	10	400	15	480Y/277	10	MCB-C10/3N	719776	1/30
12	440	10	400	15	480Y/277	10	MCB-C12/3N	719777	1/30
16	440	10	400	15	480Y/277	10	MCB-C16/3N	719778	1/30
20	440	10	400	15	480Y/277	10	MCB-C20/3N	719779	1/30
25	440	10	400	15	480Y/277	10	MCB-C25/3N	719780	1/30
32	440	10	400	15	480Y/277	10	MCB-C32/3N	719781	1/30
40	440	10	400	15	480Y/277	5	MCB-C40/3N	719782	1/30
50	400	15	400	15	480Y/277	5	MCB-C50/3N	719783	1/30
63	400	15	400	15	480Y/277	5	MCB-C63/3N	719784	1/30

4-poles

1	440	10	400	15	480Y/277	10	MCB-C1/4	719785	1/30
1.5	440	10	400	15	480Y/277	10	MCB-C1,5/4	719786	1/30
1.6	440	10	400	15	480Y/277	10	MCB-C1,6/4	719787	1/30
2	440	10	400	15	480Y/277	10	MCB-C2/4	719788	1/30
2.5	440	10	400	15	480Y/277	10	MCB-C2,5/4	719789	1/30
3	440	10	400	15	480Y/277	10	MCB-C3/4	719790	1/30
3.5	440	10	400	15	480Y/277	10	MCB-C3,5/4	719791	1/30
4	440	10	400	15	480Y/277	10	MCB-C4/4	719792	1/30
5	440	10	400	15	480Y/277	10	MCB-C5/4	719793	1/30
6	440	10	400	15	480Y/277	10	MCB-C6/4	719794	1/30
10	440	10	400	15	480Y/277	10	MCB-C10/4	719795	1/30
12	440	10	400	15	480Y/277	10	MCB-C12/4	719796	1/30
16	440	10	400	15	480Y/277	10	MCB-C16/4	719797	1/30
20	440	10	400	15	480Y/277	10	MCB-C20/4	719798	1/30
25	440	10	400	15	480Y/277	10	MCB-C25/4	719799	1/30
32	440	10	400	15	480Y/277	10	MCB-C32/4	719800	1/30
40	440	10	400	15	480Y/277	5	MCB-C40/4	719801	1/30
50	400	15	400	15	480Y/277	5	MCB-C50/4	719802	1/30
63	400	15	400	15	480Y/277	5	MCB-C63/4	719803	1/30

Characteristic D

1-pole

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to UL1077 (V)	Breaking capacity acc. to UL1077 (kA)	Type Designation	Article No.	Units per package
0.5	230	15	277	5	MCB-D0,5/1	719804	12/120
1	230	15	277	5	MCB-D1/1	719805	12/120
1.5	230	15	277	5	MCB-D1,5/1	719806	12/120
1.6	230	15	277	5	MCB-D1,6/1	719807	12/120
2	230	15	277	5	MCB-D2/1	719808	12/120
2.5	230	15	277	5	MCB-D2,5/1	719809	12/120
3	230	15	277	5	MCB-D3/1	719810	12/120
3.5	230	15	277	5	MCB-D3,5/1	719811	12/120
4	230	15	277	5	MCB-D4/1	719812	12/120
5	230	15	277	5	MCB-D5/1	719813	12/120
6	230	15	277	5	MCB-D6/1	719814	12/120
10	230	15	277	5	MCB-D10/1	719815	12/120
12	230	15	277	5	MCB-D12/1	719816	12/120
16	230	15	277	5	MCB-D16/1	719817	12/120
20	230	15	277	5	MCB-D20/1	719818	12/120
25	230	15	277	5	MCB-D25/1	719819	12/120
32	230	15	277	5	MCB-D32/1	719820	12/120
40	230	15	277	5	MCB-D40/1	719821	12/120
50	230	10	-	-	MCB-D50/1	719822	12/120
63	230	10	-	-	MCB-D63/1	719823	12/120

1+N-poles

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to UL1077 (V)	Breaking capacity acc. to UL1077 (kA)	Type Designation	Article No.	Units per package
0.5	230	15	277	5	MCB-D0,5/1N	719824	1/60
1	230	15	277	5	MCB-D1/1N	719825	1/60
2	230	15	277	5	MCB-D2/1N	719826	1/60
3	230	15	277	5	MCB-D3/1N	719827	1/60
4	230	15	277	5	MCB-D4/1N	719828	1/60
5	230	15	277	5	MCB-D5/1N	719829	1/60
6	230	15	277	5	MCB-D6/1N	719830	1/60
10	230	15	277	5	MCB-D10/1N	719831	1/60
12	230	15	277	5	MCB-D12/1N	719832	1/60
16	230	15	277	5	MCB-D16/1N	719833	1/60
20	230	15	277	5	MCB-D20/1N	719834	1/60
25	230	15	277	5	MCB-D25/1N	719835	1/60
32	230	15	277	5	MCB-D32/1N	719836	1/60
40	230	15	277	5	MCB-D40/1N	719837	1/60
50	230	10	-	-	MCB-D50/1N	719838	1/60
63	230	10	-	-	MCB-D63/1N	719839	1/60

2-poles

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to UL1077 (V)	Breaking capacity acc. to UL1077 (kA)	Type Designation	Article No.	Units per package
0.5	400	15	480Y/277	5	MCB-D0,5/2	719840	1/60
1	400	15	480Y/277	5	MCB-D1/2	719841	1/60
2	400	15	480Y/277	5	MCB-D2/2	719842	1/60
3	400	15	480Y/277	5	MCB-D3/2	719843	1/60
4	400	15	480Y/277	5	MCB-D4/2	719844	1/60
5	400	15	480Y/277	5	MCB-D5/2	719845	1/60
6	400	15	480Y/277	5	MCB-D6/2	719846	1/60
10	400	15	480Y/277	5	MCB-D10/2	719847	1/60
12	400	15	480Y/277	5	MCB-D12/2	719848	1/60
16	400	15	480Y/277	5	MCB-D16/2	719849	1/60
20	400	15	480Y/277	5	MCB-D20/2	719850	1/60
25	400	15	480Y/277	5	MCB-D25/2	719851	1/60
32	400	15	480Y/277	5	MCB-D32/2	719852	1/60
40	400	15	480Y/277	5	MCB-D40/2	719853	1/60
50	400	10	-	-	MCB-D50/2	719854	1/60
63	400	10	-	-	MCB-D63/2	719855	1/60

3-poles

0.5	400	15	480Y/277	5	MCB-D0,5/3	719856	1/40
1	400	15	480Y/277	5	MCB-D1/3	719857	1/40
2	400	15	480Y/277	5	MCB-D2/3	719858	1/40
3	400	15	480Y/277	5	MCB-D3/3	719859	1/40
4	400	15	480Y/277	5	MCB-D4/3	719860	1/40
5	400	15	480Y/277	5	MCB-D5/3	719861	1/40
6	400	15	480Y/277	5	MCB-D6/3	719862	1/40
10	400	15	480Y/277	5	MCB-D10/3	719863	1/40
12	400	15	480Y/277	5	MCB-D12/3	719864	1/40
16	400	15	480Y/277	5	MCB-D16/3	719865	1/40
20	400	15	480Y/277	5	MCB-D20/3	719866	1/40
25	400	15	480Y/277	5	MCB-D25/3	719867	1/40
32	400	15	480Y/277	5	MCB-D32/3	719868	1/40
40	400	15	480Y/277	5	MCB-D40/3	719869	1/40
50	400	10	-	-	MCB-D50/3	719870	1/40
63	400	10	-	-	MCB-D63/3	719871	1/40

3+N-poles

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to UL1077 (V)	Breaking capacity acc. to UL1077 (kA)	Type Designation	Article No.	Units per package
0.5	400	15	480Y/277	5	MCB-D0,5/3N	719872	1/30
1	400	15	480Y/277	5	MCB-D1/3N	719873	1/30
2	400	15	480Y/277	5	MCB-D2/3N	719874	1/30
3	400	15	480Y/277	5	MCB-D3/3N	719875	1/30
4	400	15	480Y/277	5	MCB-D4/3N	719876	1/30
5	400	15	480Y/277	5	MCB-D5/3N	719877	1/30
6	400	15	480Y/277	5	MCB-D6/3N	719878	1/30
10	400	15	480Y/277	5	MCB-D10/3N	719879	1/30
12	400	15	480Y/277	5	MCB-D12/3N	719880	1/30
16	400	15	480Y/277	5	MCB-D16/3N	719881	1/30
20	400	15	480Y/277	5	MCB-D20/3N	719882	1/30
25	400	15	480Y/277	5	MCB-D25/3N	719883	1/30
32	400	15	480Y/277	5	MCB-D32/3N	719884	1/30
40	400	15	480Y/277	5	MCB-D40/3N	719885	1/30
50	400	10	-	-	MCB-D50/3N	719886	1/30
63	400	10	-	-	MCB-D63/3N	719887	1/30

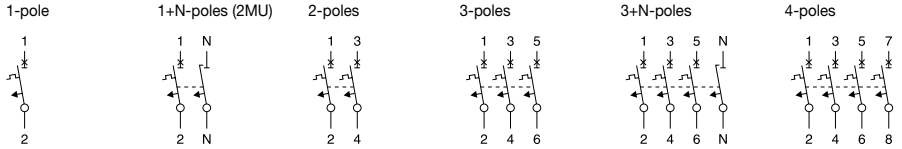
4-poles

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to UL1077 (V)	Breaking capacity acc. to UL1077 (kA)	Type Designation	Article No.	Units per package
0.5	400	15	480Y/277	5	MCB-D0,5/4	719888	1/30
1	400	15	480Y/277	5	MCB-D1/4	719889	1/30
2	400	15	480Y/277	5	MCB-D2/4	719890	1/30
3	400	15	480Y/277	5	MCB-D3/4	719891	1/30
4	400	15	480Y/277	5	MCB-D4/4	719892	1/30
5	400	15	480Y/277	5	MCB-D5/4	719893	1/30
6	400	15	480Y/277	5	MCB-D6/4	719894	1/30
10	400	15	480Y/277	5	MCB-D10/4	719895	1/30
12	400	15	480Y/277	5	MCB-D12/4	719896	1/30
16	400	15	480Y/277	5	MCB-D16/4	719897	1/30
20	400	15	480Y/277	5	MCB-D20/4	719898	1/30
25	400	15	480Y/277	5	MCB-D25/4	719899	1/30
32	400	15	480Y/277	5	MCB-D32/4	719900	1/30
40	400	15	480Y/277	5	MCB-D40/4	719901	1/30
50	400	10	-	-	MCB-D50/4	719902	1/30
63	400	10	-	-	MCB-D63/4	719903	1/30

■ Technical Data

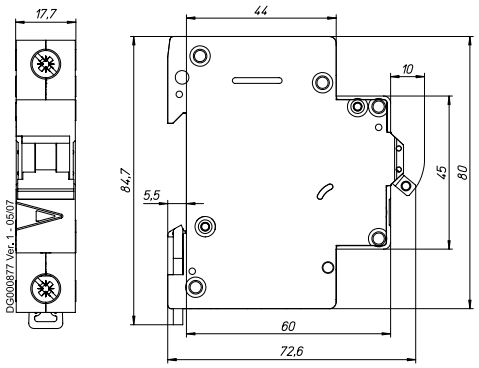
Electrical	B Characteristic		C Characteristic		D Characteristic
Approvals Classified according to Current test marks as printed onto the device	CE, VDE IEC 61373, EN 45545-2				
Standards	IEC/EN 60947-2				
Short-circuit trip response	3–5 I_n		5–10 I_n		10–20 I_n
Supplementary Protectors - UL/CSA					
Current range	1–63 A		0.16–63 A		0.5–40 A
Maximum voltage ratings - UL/CSA					
Single-pole, single-pole + neutral	277 V AC 48 V DC		277 V AC 48 V DC		277 V AC 48 V DC
Two-, three-, four-pole and three-pole + neutral	480Y/277 V AC		480Y/277 V AC		480Y/277 V AC
Two poles in series	96 V DC		96 V DC		96 V DC
Thermal tripping characteristics					
Single-pole	< 1 hour @ 1.35 x In @ 40°C		< 1 hour @ 1.35 x In @ 40°C		< 1 hour @ 1.35 x In @ 40°C
Multi-pole	< 1 hour @ 1.45 x In @ 40°C		< 1 hour @ 1.45 x In @ 40°C		< 1 hour @ 1.45 x In @ 40°C
Short-circuit ratings (at max. voltage)					
Single-pole	10 kA (5 kA for 40–63A device)		10 kA (5 kA for 40–63A device)		5 kA
Two-, three-pole	10 kA (5 kA for 40–63A device)		10 kA (5 kA for 40–63A device)		5 kA
Single-pole	10 kA @ 48 V DC		10 kA @ 48 V DC		10 kA @ 48 V DC
Two poles in series	10 kA @ 96 V DC		10 kA @ 96 V DC		10 kA @ 96 V DC
Miniature Circuit Breaker - IEC					
Current range	1–40 A	50–63 A	0.16–40 A	50–63 A	0.5–63 A
Maximum voltage ratings - IEC 60947-2					
Single-pole, single-pole + neutral	254 V AC 60 V DC	230 V AC 60 V DC	254 V AC 60 V DC	230 V AC 60 V DC	230 V AC 60 V DC
Two-, three-, four-pole and three-pole + neutral	440 V AC	400 V AC	440 V AC	400 V AC	400 V AC
Maximum voltage ratings - IEC 60898					
Single-pole, single-pole + neutral	240 V AC	240 V AC	240 V AC	240 V AC	240 V AC
Two-, three-, four-pole and three-pole + neutral	415 V AC	415 V AC	415 V AC	415 V AC	415 V AC
Thermal tripping characteristics - IEC 60947-2					
	> 1 hour @ 1.05 x In @ 40°C		> 1 hour @ 1.05 x In @ 40°C		> 1 hour @ 1.05 x In @ 40°C
	< 1 hour @ 1.3 x In @ 40°C		< 1 hour @ 1.3 x In @ 40°C		< 1 hour @ 1.3 x In @ 40°C
Interrupt ratings (at max. voltage)					
IEC 60947-2	10 kA	15 kA	10 kA	15 kA	15 kA (type D50 and D63: 10k A)
IEC 60898	10 kA	10 kA	10 kA	10 kA	10 kA (type D50 and D63: not testet)
Operational switching capacity	7.5 kA	7.5 kA	7.5 kA	7.5 kA	7.5 kA (type D50 and D63: 6 kA)
Max. back-up fuse [gL/gG]	125 A	125 A	125 A	125 A	125 A
Rated impulse withstand voltage - U_{imp}	4000 V AC	4000 V AC	4000 V AC	4000 V AC	4000 V AC
Rated insulation voltage - U_i	440 V AC	440 V AC	440 V AC	440 V AC	440 V AC
Environmental / General					
Selectivity class	3		3		3
Endurance (operations)	>10000 (1 operation = ON/OFF)		>10000 (1 operation = ON/OFF)		>10000 (1 operation = ON/OFF)
Shock (IEC 68-2-22)	10 g / 120 ms		10 g / 120 ms		10 g / 120 ms
Operating temperature range	-40°C up to +75°C		-40°C up to +75°C		-40°C up to +75°C
Storage- and transport temperature	-40°C up to +75°C		-40°C up to +75°C		-40°C up to +75°C
Mechanical					
Device height	80 mm		80 mm		80 mm
Terminal protection	Finger and back-of-hand proof		Finger and back-of-hand proof		Finger and back-of-hand proof
Mounting width per pole	17.5 mm		17.5 mm		17.5 mm
Mounting	IEC/EN 60715 top-hat rail		IEC/EN 60715 top-hat rail		IEC/EN 60715 top-hat rail
Degree of protection	IP20		IP20		IP20
Terminals top and bottom	Twin-purpose terminals		Twin-purpose terminals		Twin-purpose terminals
Supply connection	Line or load side		Line or load side		Line or load side
Terminal capacity [mm²]	1 x 25 / 2 x 10		1 x 25 / 2 x 10		1 x 25 / 2 x 10
Torque of terminals	2.4 Nm		2.4 Nm		2.4 Nm
Thickness of busbar material	0.8 - 2 mm		0.8 - 2 mm		0.8 - 2 mm
Mounting position	As required		As required		As required

■ Connection diagram

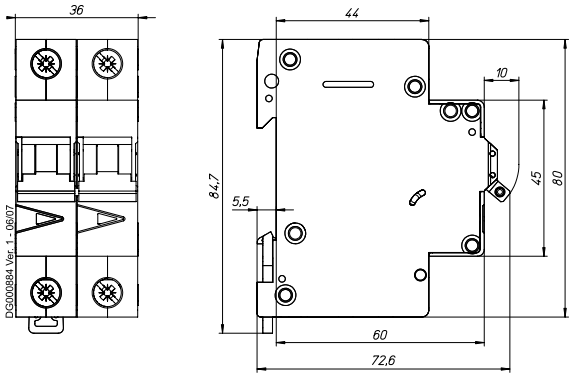


■ Dimensions (mm) MCB

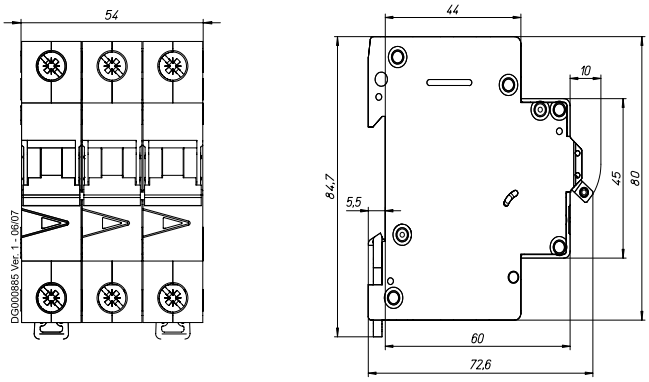
1-pole



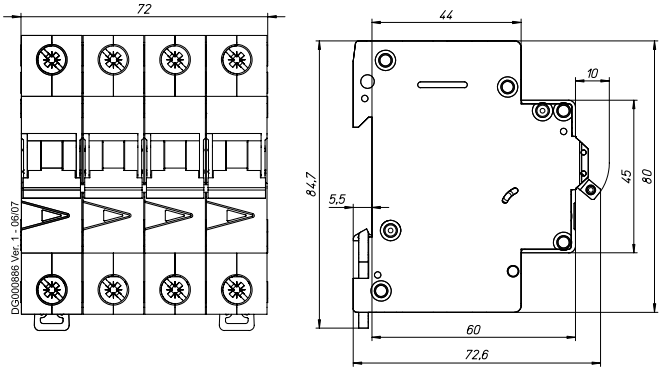
1+N-poles, 2-poles



3-poles



3+N-poles, 4-poles



■ Internal Resistance MCB

Type B At room temperature (single pole)		
I_n [A]	Z* [mΩ]	R* [mΩ]
1	1120	1102
1.5	922	912
1.6	922	912
2	335	333
2.5	234	230
3	211	208
3.5	184	180
4	87.7	87.2
5	73.5	72.8
6	46.8	46.3
8	30.5	30.4
10	17.5	17.4
12	16.9	16.8
13	13.4	13.3
15	8.0	7.9
16	8.0	7.9
20	7.2	7.1
25	5.0	4.9
32	3.7	3.7
40	2.6	2.5
50	2.1	2.1
63	2.0	2.0

* 50 Hz

Type C At room temperature (single pole)		
I_n [A]	Z* [mΩ]	R* [mΩ]
0.16	68500	68300
0.25	27500	27400
0.5	4680	4670
0.75	2280	2250
1	1120	1100
1.5	589	587
1.6	589	587
2	335	333
2.5	234	230
3	131	130
3.5	143	141
4	87.7	87.2
5	73.5	72.8
6	39.3	39.1
8	30.5	30.4
10	14.1	14.0
12	13.5	13.4
13	13.4	13.3
15	8.0	7.9
16	8.0	7.9
20	7.2	7.1
25	5.0	4.9
32	3.7	3.7
40	2.6	2.5
50	2.1	2.1
63	2.0	2.0

* 50 Hz

Type D At room temperature (single pole)		
I_n [A]	Z* [mΩ]	R* [mΩ]
0.5	4680	4670
1	772	770
1.5	512	508
1.6	512	508
2	250	249
2.5	153	153
3	131	130
3.5	143	141
4	87.7	87.2
5	65.4	65.1
6	39.3	39.1
8	19.5	19.5
10	14.1	14.0
12	11.3	11.2
13	10.1	10.1
15	8.0	7.9
16	8.0	7.9
20	4.9	4.9
25	3.9	3.8
32	3.5	3.4
40	2.7	2.6

* 50 Hz

■ Fault Loop Impedance MCB

Max. allowed value for the Fault Loop Impedance ZS
(acc. to DIN VDE 0100. Teil 410)
U_0 = 230 V

	Type B 0.4s		Type C		Type D	
I_n [A]	Zs* [mΩ]	R* [mΩ]	Zs* [mΩ]	R* [mΩ]	Zs* [mΩ]	R* [mΩ]
1	40.4	40.4	24.3	40.4	12.4	40.4
1.5	26.9	26.9	16.2	26.9	8.3	26.9
2	20.2	20.2	12.2	20.2	6.2	20.2
2.5	16.1	16.1	9.7	16.1	5.0	16.1
3	13.5	13.5	8.1	13.5	4.1	13.5
3.5	11.5	11.5	7.0	11.5	3.6	11.5
4	10.1	10.1	6.1	10.1	3.1	10.1
5	8.1	8.1	4.9	8.1	2.5	8.1
6	6.7	6.7	4.1	6.7	2.1	6.7
8	5.0	5.0	3.0	5.0	1.6	5.0
10	4.0	4.0	2.4	4.0	1.2	4.0
12	3.4	3.4	2.0	3.4	1.0	3.4
13	3.1	3.1	1.9	3.1	1.0	3.1
15	2.7	2.7	1.6	2.7	0.8	2.7
16	2.5	2.5	1.5	2.5	0.8	2.5
20	2.0	2.0	1.2	2.0	0.6	2.0
25	1.6	1.6	1.0	1.6	0.5	1.6
32	1.3	1.3	0.8	1.3	0.4	1.3
40	1.0	1.0	0.6	1.0	0.3	1.0
50	0.8	0.8	0.5	0.8	0.2	0.8
63	0.6	0.6	0.4	0.6	0.2	0.6

$Z_s=R_{M.C.B.}+R_{Loop}$
Data/factors taken from the time-current characteristic MCB

For other rated voltages U0 :
U_0 = 240 V: Z_s * 1.04
U_0 = 127 V: Z_s * 0.55

■ Power Loss at I_n MCB (50/60 Hz)

Type B					
I_n [A]	P [W]	P [W]	P [W]	P [W]	P [W]
1	1.6	1.7	3.1	4.7	4.8
1.5	2.3	2.5	4.6	6.9	7.2
1.6	2.5	2.7	4.9	7.4	7.6
2	1.4	1.5	2.8	4.1	4.3
2.5	1.5	1.7	3.1	4.6	4.7
3	2.5	2.7	5.0	7.6	7.8
3.5	2.5	2.8	5.1	7.8	8.0
4	1.4	1.6	2.9	4.4	4.5
5	1.9	2.1	3.8	5.8	6.0
6	1.8	2.0	3.6	5.5	5.6
8	2.1	2.3	4.1	6.3	6.5
10	1.9	2.1	3.9	5.9	6.1
12	2.8	3.2	5.9	8.7	9.0
13	2.5	2.9	5.3	7.8	8.1
15	2.1	2.4	4.4	6.5	6.7
16	2.2	2.6	4.7	6.9	7.2
20	3.2	3.6	6.6	9.8	10.1
25	3.0	3.5	6.4	9.4	9.7
32	3.7	4.4	8.1	12.1	12.5
40	3.4	4.1	7.5	11.2	11.5
50	4.5	5.4	9.9	14.9	15.3
63	5.2	6.3	11.5	17.2	17.7

* symmetrical load

Type C					
I_n [A]	P [W]	P [W]	P [W]	P [W]	P [W]
0.16	2.2	2.4	4.4	6.7	6.9
0.25	2.0	2.2	4.0	6.1	6.3
0.5	1.2	1.3	2.4	3.5	3.7
0.75	1.3	1.4	2.6	3.9	4.1
1	1.6	1.7	3.1	4.7	4.8
1.5	1.5	1.6	2.9	4.4	4.6
1.6	1.6	1.7	3.1	4.7	4.9
2	1.4	1.5	2.8	4.1	4.3
2.5	1.5	1.7	3.1	4.6	4.7
3	1.2	1.3	2.4	3.6	3.7
3.5	1.3	1.4	2.6	3.9	4.0
4	1.4	1.6	2.9	4.4	4.5
5	1.9	2.1	3.8	5.8	6.0
6	1.5	1.6	2.9	4.4	4.6
8	2.1	2.3	4.1	6.3	6.5
10	1.5	1.7	3.0	4.6	4.7
12	2.1	2.4	4.4	6.5	6.8
13	2.5	2.9	5.3	7.8	8.1
15	2.1	2.4	4.4	6.5	6.7
16	2.2	2.6	4.7	6.9	7.2
20	3.2	3.6	6.6	9.8	10.1
25	3.0	3.5	6.4	9.4	9.7
32	3.7	4.4	8.1	12.1	12.5
40	3.4	4.1	7.5	11.2	11.5
50	4.5	5.4	9.9	14.9	15.3
63	5.2	6.3	11.5	17.2	17.7

* symmetrical load

Type D					
I_n [A]	P [W]	P [W]	P [W]	P [W]	P [W]
0.5	1.2	1.3	2.4	3.5	3.7
1	0.8	0.9	1.6	2.4	2.5
1.5	1.2	1.3	2.3	3.5	3.6
1.6	1.3	1.4	2.5	3.8	3.9
2	1.0	1.1	2.0	3.0	3.1
2.5	1.0	1.1	1.9	2.9	3.0
3	1.2	1.3	2.4	3.6	3.7
3.5	1.3	1.4	2.6	3.9	4.0
4	1.4	1.6	2.9	4.4	4.5
5	1.7	1.8	3.3	5.1	5.3
6	1.5	1.6	2.9	4.4	4.6
8	1.3	1.5	2.6	4.0	4.2
10	1.5	1.7	3.0	4.6	4.7
12	1.7	2.0	3.6	5.3	5.4
13	1.9	2.2	4.0	5.9	6.1
15	2.1	2.4	4.4	6.5	6.7
16	2.2	2.6	4.7	6.9	7.2
20	2.0	2.2	4.1	6.1	6.2
25	2.5	2.9	5.2	7.7	7.9
32	3.4	4.0	7.4	11.1	11.4
40	3.2	3.8	7.0	10.4	10.7

* symmetrical load

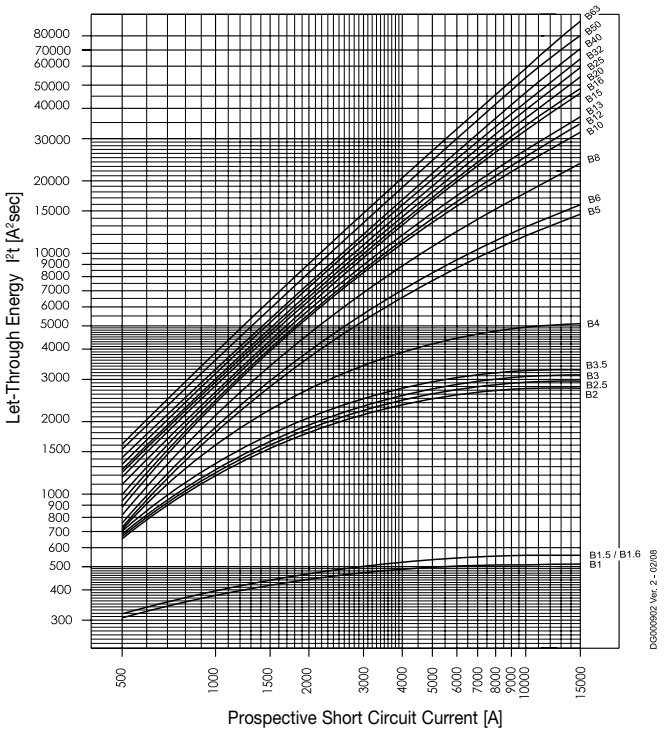
■ Influence of Ambient Temperature MCB

On Load Carrying Capacity (temperature derating)

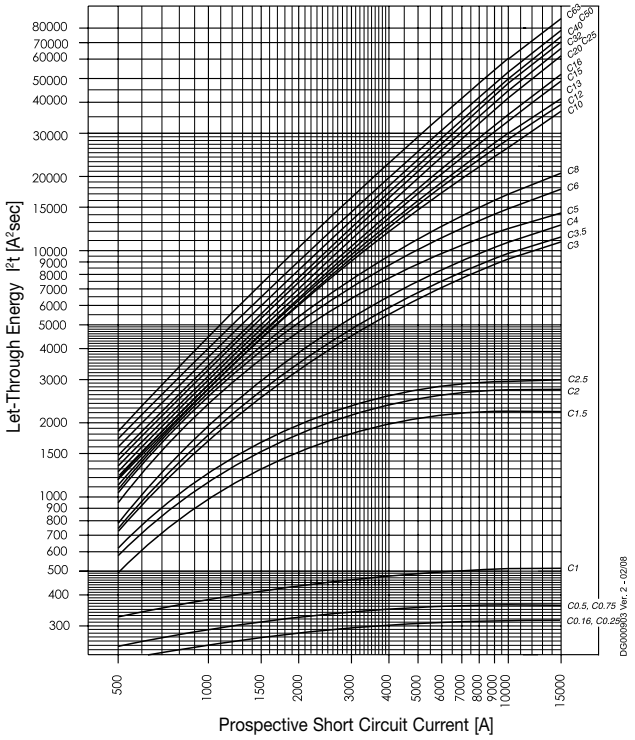
	Ambient temperature T [°C]																
	-40	-30	-20	-10	0	10	20	30	35	40	45	50	55	60	65	70	75
I_n [A]																	
0.16	0.2	0.2	0.19	0.19	0.18	0.17	0.17	0.16	0.16	0.15	0.15	0.15	0.14	0.14	0.14	0.14	0.13
0.25	0.32	0.31	0.3	0.29	0.28	0.27	0.26	0.25	0.25	0.24	0.24	0.23	0.23	0.22	0.22	0.21	0.21
0.5	0.64	0.62	0.6	0.58	0.56	0.54	0.52	0.5	0.49	0.48	0.47	0.46	0.45	0.44	0.43	0.42	0.41
0.75	0.96	0.93	0.9	0.87	0.84	0.81	0.78	0.75	0.74	0.73	0.71	0.69	0.68	0.66	0.65	0.64	0.62
1	1.3	1.2	1.2	1.2	1.1	1.1	1	1	0.99	0.97	0.95	0.93	0.9	0.89	0.87	0.85	0.83
1.5	1.9	1.9	1.8	1.7	1.7	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3	1.2
1.6	2	2	1.9	1.9	1.8	1.7	1.7	1.6	1.6	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.3
2	2.6	2.5	2.4	2.3	2.2	2.2	2.1	2	2	1.9	1.9	1.9	1.8	1.8	1.7	1.7	1.7
2.5	3.2	3.1	3	2.9	2.8	2.7	2.6	2.5	2.5	2.4	2.4	2.3	2.3	2.2	2.2	2.1	2.1
3	3.8	3.7	3.6	3.5	3.4	3.3	3.1	3	3	2.9	2.8	2.8	2.7	2.7	2.6	2.5	2.5
3.5	4.5	4.4	4.2	4.1	3.9	3.8	3.7	3.5	3.4	3.4	3.3	3.2	3.2	3.1	3	3	2.9
4	5.1	5	4.8	4.7	4.5	4.3	4.2	4	3.9	3.9	3.8	3.7	3.6	3.5	3.5	3.4	3.3
5	6.4	6.2	6	5.8	5.6	5.4	5.2	5	4.9	4.8	4.7	4.6	4.5	4.4	4.3	4.2	4.1
6	7.7	7.5	7.2	7	6.7	6.5	6.3	6	5.9	5.8	5.7	5.6	5.4	5.3	5.2	5.1	5
8	10.2	9.9	9.6	9.3	9	8.7	8.4	8	7.9	7.7	7.6	7.4	7.2	7.1	6.9	6.8	6.6
10	13	12	12	12	11	11	10	10	9.9	9.7	9.5	9.3	9	8.9	8.7	8.5	8.3
12	15	15	14	14	13	13	13	12	12	12	11	11	11	11	10	10	10
13	17	16	16	15	15	14	14	13	13	13	12	12	12	12	11	11	11
15	19	19	18	17	17	16	16	15	15	15	14	14	14	13	13	13	12
16	20	20	19	19	18	17	17	16	16	15	15	15	14	14	14	14	13
20	26	25	24	23	22	22	21	20	20	19	19	19	18	18	17	17	17
25	32	31	30	29	28	27	26	25	25	24	24	23	23	22	22	21	21
32	41	40	38	37	36	35	33	32	32	31	30	30	29	28	28	27	26
40	51	50	48	47	45	43	42	40	39	39	38	37	36	35	35	34	33
50	64	62	60	58	56	54	52	50	49	48	47	46	45	44	43	42	41
63	81	78	76	73	71	68	66	63	62	61	60	58	57	56	55	53	52

■ Maximum Let-Through Energy MCB

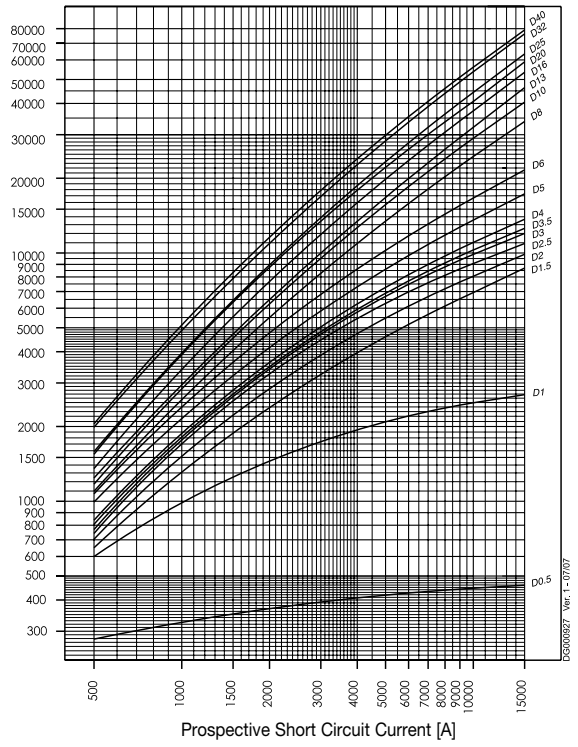
Type B (IEC/EN60947-2)



Type C (IEC/EN60947-2)

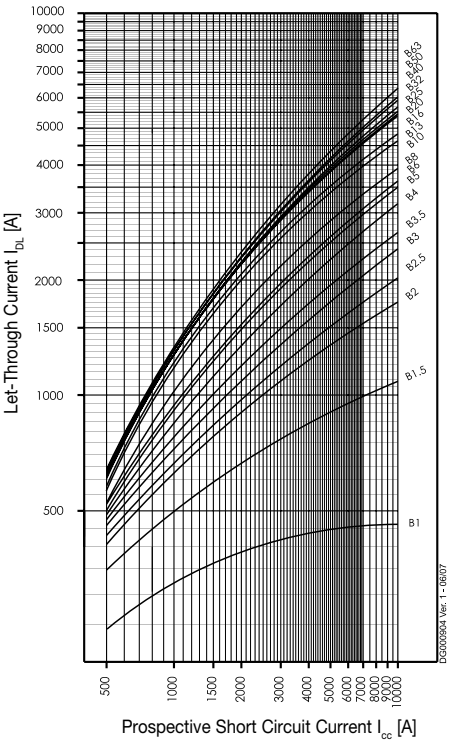


Type D (IEC/EN60947-2)

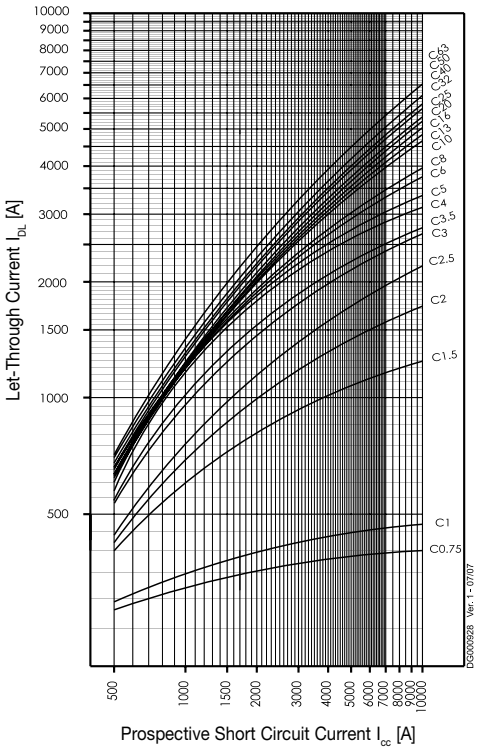


■ Maximum Let-Through Current MCB

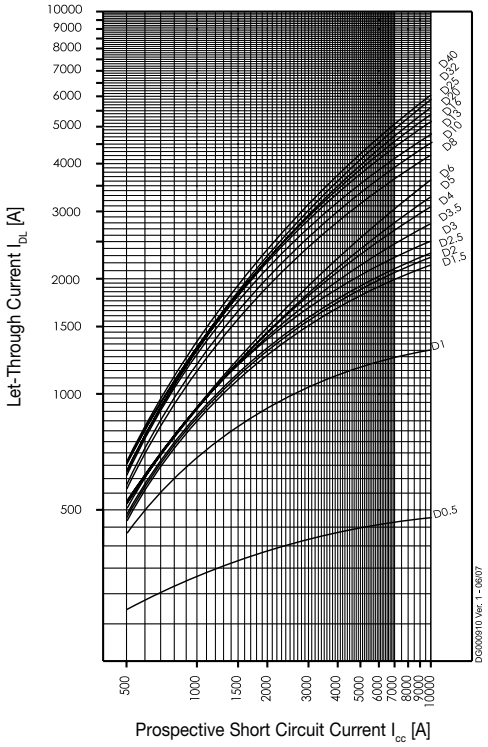
Type B (IEC/EN60898)



Type C (IEC/EN60898)

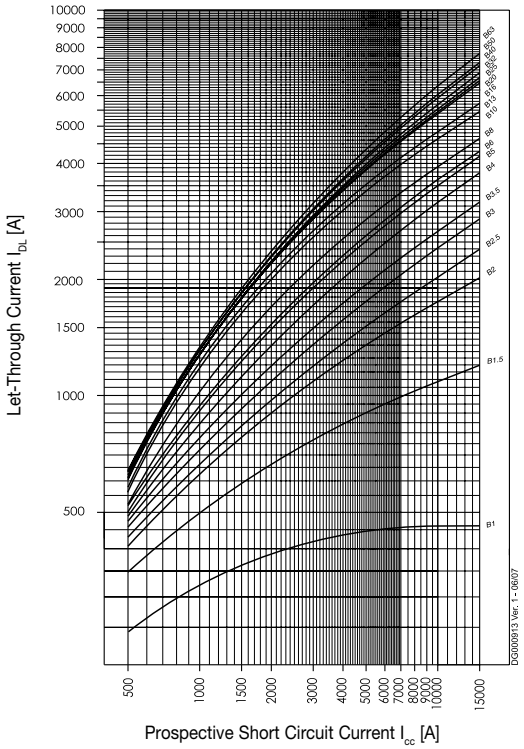


Type D (IEC/EN60898)

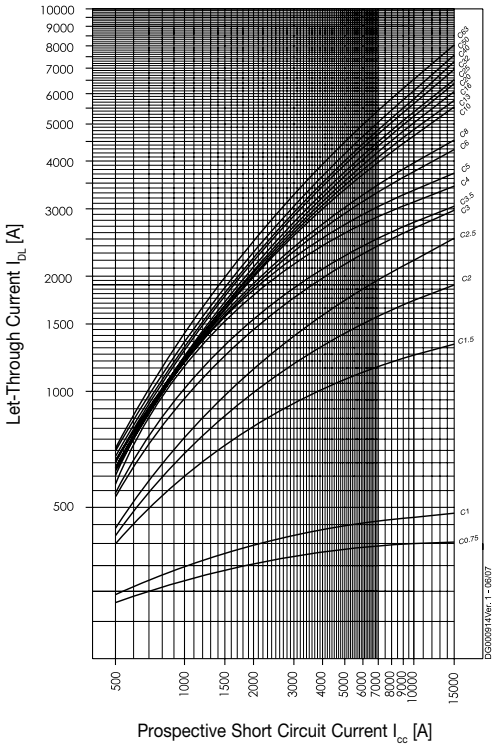


■ Maximum Let-Through Current MCB

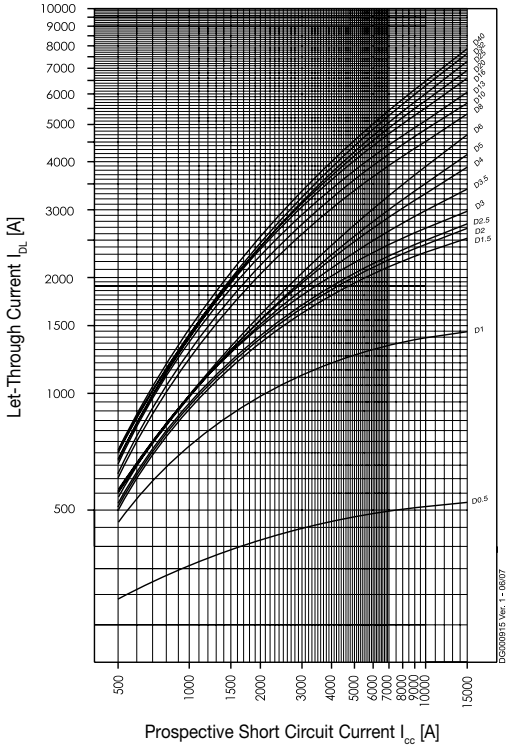
Type B (IEC/EN60947-2)



Type C (IEC/EN60947-2)



Type D (IEC/EN60947-2)



Miniature Circuit Breakers MCB-T

■ Description

- High-quality miniature circuit breakers for industrial and commercial applications
- Contact position indicator red - green
- Accessories suitable for subsequent installation
- Rated currents up to 40 A
- Tripping characteristics B, C, D
- Rated breaking capacity up to 25 kA according to EN 60947-2
- Classified for the use in rail rolling stock

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60898-1 (V)	Breaking capacity acc. to IEC/EN 60898-1 (kA)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Type Designation	Article No.	Units per package

Characteristic B

1-pole

1	240	15	240	25	254	15	MCBT-B1/1	721371	12/120
2	240	15	240	25	254	15	MCBT-B2/1	721372	12/120
3	240	15	240	25	254	15	MCBT-B3/1	721373	12/120
4	240	15	240	25	254	15	MCBT-B4/1	721374	12/120
6	240	15	240	25	254	15	MCBT-B6/1	721375	12/120
10	240	15	240	25	254	15	MCBT-B10/1	721376	12/120
12	240	15	240	25	254	15	MCBT-B12/1	721377	12/120
13	240	15	240	25	254	15	MCBT-B13/1	721378	12/120
15	240	15	240	25	254	15	MCBT-B15/1	721379	12/120
16	240	15	240	25	254	15	MCBT-B16/1	721380	12/120
20	240	15	240	25	254	15	MCBT-B20/1	721381	12/120
25	240	15	240	25	254	15	MCBT-B25/1	721382	12/120
32	240	10	240	20	254	15	MCBT-B32/1	721383	12/120
40	240	10	240	20	254	15	MCBT-B40/1	721384	12/120

1+N-poles

1	240	15	240	25	254	15	MCBT-B1/1N	721385	1/60
2	240	15	240	25	254	15	MCBT-B2/1N	721386	1/60
3	240	15	240	25	254	15	MCBT-B3/1N	721387	1/60
4	240	15	240	25	254	15	MCBT-B4/1N	721388	1/60
6	240	15	240	25	254	15	MCBT-B6/1N	721389	1/60
10	240	15	240	25	254	15	MCBT-B10/1N	721390	1/60
12	240	15	240	25	254	15	MCBT-B12/1N	721391	1/60
13	240	15	240	25	254	15	MCBT-B13/1N	721392	1/60
15	240	15	240	25	254	15	MCBT-B15/1N	721393	1/60
16	240	15	240	25	254	15	MCBT-B16/1N	721394	1/60
20	240	15	240	25	254	15	MCBT-B20/1N	721395	1/60
25	240	15	240	25	254	15	MCBT-B25/1N	721396	1/60
32	240	10	240	20	254	15	MCBT-B32/1N	721397	1/60
40	240	10	240	20	254	15	MCBT-B40/1N	721398	1/60

2-poles

1	415	15	240/415	25	254/440	15	MCBT-B1/2	721399	1/60
2	415	15	240/415	25	254/440	15	MCBT-B2/2	721400	1/60
3	415	15	240/415	25	254/440	15	MCBT-B3/2	721401	1/60
4	415	15	240/415	25	254/440	15	MCBT-B4/2	721402	1/60
6	415	15	240/415	25	254/440	15	MCBT-B6/2	721403	1/60
10	415	15	240/415	25	254/440	15	MCBT-B10/2	721404	1/60
12	415	15	240/415	25	254/440	15	MCBT-B12/2	721405	1/60
13	415	15	240/415	25	254/440	15	MCBT-B13/2	721406	1/60
15	415	15	240/415	25	254/440	15	MCBT-B15/2	721407	1/60
16	415	15	240/415	25	254/440	15	MCBT-B16/2	721408	1/60
20	415	15	240/415	25	254/440	15	MCBT-B20/2	721409	1/60
25	415	15	240/415	25	254/440	15	MCBT-B25/2	721410	1/60
32	415	10	240/415	20	254/440	15	MCBT-B32/2	721411	1/60
40	415	10	240/415	20	254/440	15	MCBT-B40/2	721412	1/60

3-poles

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60898-1 (V)	Breaking capacity acc. to IEC/EN 60898-1 (kA)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Type Designation	Article No.	Units per package
1	415	15	240/415	25	254/440	15	MCBT-B1/3	721413	1/40
2	415	15	240/415	25	254/440	15	MCBT-B2/3	721414	1/40
3	415	15	240/415	25	254/440	15	MCBT-B3/3	721415	1/40
4	415	15	240/415	25	254/440	15	MCBT-B4/3	721416	1/40
6	415	15	240/415	25	254/440	15	MCBT-B6/3	721417	1/40
10	415	15	240/415	25	254/440	15	MCBT-B10/3	721418	1/40
12	415	15	240/415	25	254/440	15	MCBT-B12/3	721419	1/40
13	415	15	240/415	25	254/440	15	MCBT-B13/3	721420	1/40
15	415	15	240/415	25	254/440	15	MCBT-B15/3	721421	1/40
16	415	15	240/415	25	254/440	15	MCBT-B16/3	721422	1/40
20	415	15	240/415	25	254/440	15	MCBT-B20/3	721423	1/40
25	415	15	240/415	25	254/440	15	MCBT-B25/3	721424	1/40
32	415	10	240/415	20	254/440	15	MCBT-B32/3	721425	1/40
40	415	10	240/415	20	254/440	15	MCBT-B40/3	721426	1/40

3+N-poles

1	415	15	240/415	25	254/440	15	MCBT-B1/3N	721427	1/30
2	415	15	240/415	25	254/440	15	MCBT-B2/3N	721428	1/30
3	415	15	240/415	25	254/440	15	MCBT-B3/3N	721429	1/30
4	415	15	240/415	25	254/440	15	MCBT-B4/3N	721430	1/30
6	415	15	240/415	25	254/440	15	MCBT-B6/3N	721431	1/30
10	415	15	240/415	25	254/440	15	MCBT-B10/3N	721432	1/30
12	415	15	240/415	25	254/440	15	MCBT-B12/3N	721433	1/30
13	415	15	240/415	25	254/440	15	MCBT-B13/3N	721434	1/30
15	415	15	240/415	25	254/440	15	MCBT-B15/3N	721435	1/30
16	415	15	240/415	25	254/440	15	MCBT-B16/3N	721436	1/30
20	415	15	240/415	25	254/440	15	MCBT-B20/3N	721437	1/30
25	415	15	240/415	25	254/440	15	MCBT-B25/3N	721438	1/30
32	415	10	240/415	20	254/440	15	MCBT-B32/3N	721439	1/30
40	415	10	240/415	20	254/440	15	MCBT-B40/3N	721440	1/30

4-poles

1	415	15	240/415	25	254/440	15	MCBT-B1/4	721441	1/30
2	415	15	240/415	25	254/440	15	MCBT-B2/4	721442	1/30
3	415	15	240/415	25	254/440	15	MCBT-B3/4	721443	1/30
4	415	15	240/415	25	254/440	15	MCBT-B4/4	721444	1/30
6	415	15	240/415	25	254/440	15	MCBT-B6/4	721445	1/30
10	415	15	240/415	25	254/440	15	MCBT-B10/4	721446	1/30
12	415	15	240/415	25	254/440	15	MCBT-B12/4	721447	1/30
13	415	15	240/415	25	254/440	15	MCBT-B13/4	721448	1/30
15	415	15	240/415	25	254/440	15	MCBT-B15/4	721449	1/30
16	415	15	240/415	25	254/440	15	MCBT-B16/4	721450	1/30
20	415	15	240/415	25	254/440	15	MCBT-B20/4	721451	1/30
25	415	15	240/415	25	254/440	15	MCBT-B25/4	721452	1/30
32	415	10	240/415	20	254/440	15	MCBT-B32/4	721453	1/30
40	415	10	240/415	20	254/440	15	MCBT-B40/4	721454	1/30

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60898-1 (V)	Breaking capacity acc. to IEC/EN 60898-1 (kA)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Type Designation	Article No.	Units per package

Characteristic C

1-pole

1	240	15	240	25	254	15	MCBT-C1/1	721171	12/120
2	240	15	240	25	254	15	MCBT-C2/1	721172	12/120
3	240	15	240	25	254	15	MCBT-C3/1	721173	12/120
4	240	15	240	25	254	15	MCBT-C4/1	721174	12/120
6	240	15	240	25	254	15	MCBT-C6/1	721175	12/120
10	240	15	240	25	254	15	MCBT-C10/1	721176	12/120
12	240	15	240	25	254	15	MCBT-C12/1	721177	12/120
13	240	15	240	25	254	15	MCBT-C13/1	721178	12/120
15	240	15	240	25	254	15	MCBT-C15/1	721179	12/120
16	240	15	240	25	254	15	MCBT-C16/1	721180	12/120
20	240	15	240	25	254	15	MCBT-C20/1	721181	12/120
25	240	15	240	25	254	15	MCBT-C25/1	721182	12/120
32	240	10	240	20	254	15	MCBT-C32/1	721183	12/120
40	240	10	240	20	254	15	MCBT-C40/1	721184	12/120

1+N-poles

1	240	15	240	25	254	15	MCBT-C1/1N	721185	1/60
2	240	15	240	25	254	15	MCBT-C2/1N	721186	1/60
3	240	15	240	25	254	15	MCBT-C3/1N	721187	1/60
4	240	15	240	25	254	15	MCBT-C4/1N	721188	1/60
6	240	15	240	25	254	15	MCBT-C6/1N	721189	1/60
10	240	15	240	25	254	15	MCBT-C10/1N	721190	1/60
12	240	15	240	25	254	15	MCBT-C12/1N	721191	1/60
13	240	15	240	25	254	15	MCBT-C13/1N	721192	1/60
15	240	15	240	25	254	15	MCBT-C15/1N	721193	1/60
16	240	15	240	25	254	15	MCBT-C16/1N	721194	1/60
20	240	15	240	25	254	15	MCBT-C20/1N	721195	1/60
25	240	15	240	25	254	15	MCBT-C25/1N	721196	1/60
32	240	10	240	20	254	15	MCBT-C32/1N	721197	1/60
40	240	10	240	20	254	15	MCBT-C40/1N	721198	1/60

2-poles

1	415	15	240/415	25	254/440	15	MCBT-C1/2	721199	1/60
2	415	15	240/415	25	254/440	15	MCBT-C2/2	721200	1/60
3	415	15	240/415	25	254/440	15	MCBT-C3/2	721201	1/60
4	415	15	240/415	25	254/440	15	MCBT-C4/2	721202	1/60
6	415	15	240/415	25	254/440	15	MCBT-C6/2	721203	1/60
10	415	15	240/415	25	254/440	15	MCBT-C10/2	721204	1/60
12	415	15	240/415	25	254/440	15	MCBT-C12/2	721205	1/60
13	415	15	240/415	25	254/440	15	MCBT-C13/2	721206	1/60
15	415	15	240/415	25	254/440	15	MCBT-C15/2	721207	1/60
16	415	15	240/415	25	254/440	15	MCBT-C16/2	721208	1/60
20	415	15	240/415	25	254/440	15	MCBT-C20/2	721209	1/60
25	415	15	240/415	25	254/440	15	MCBT-C25/2	721210	1/60
32	415	10	240/415	20	254/440	15	MCBT-C32/2	721211	1/60
40	415	10	240/415	20	254/440	15	MCBT-C40/2	721212	1/60

3-poles

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60898-1 (V)	Breaking capacity acc. to IEC/EN 60898-1 (kA)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Type Designation	Article No.	Units per package
1	415	15	240/415	25	254/440	15	MCBT-C1/3	721213	1/40
2	415	15	240/415	25	254/440	15	MCBT-C2/3	721214	1/40
3	415	15	240/415	25	254/440	15	MCBT-C3/3	721215	1/40
4	415	15	240/415	25	254/440	15	MCBT-C4/3	721216	1/40
6	415	15	240/415	25	254/440	15	MCBT-C6/3	721217	1/40
10	415	15	240/415	25	254/440	15	MCBT-C10/3	721218	1/40
12	415	15	240/415	25	254/440	15	MCBT-C12/3	721219	1/40
13	415	15	240/415	25	254/440	15	MCBT-C13/3	721220	1/40
15	415	15	240/415	25	254/440	15	MCBT-C15/3	721221	1/40
16	415	15	240/415	25	254/440	15	MCBT-C16/3	721222	1/40
20	415	15	240/415	25	254/440	15	MCBT-C20/3	721223	1/40
25	415	15	240/415	25	254/440	15	MCBT-C25/3	721224	1/40
32	415	10	240/415	20	254/440	15	MCBT-C32/3	721225	1/40
40	415	10	240/415	20	254/440	15	MCBT-C40/3	721226	1/40

3+N-poles

1	415	15	240/415	25	254/440	15	MCBT-C1/3N	721227	1/30
2	415	15	240/415	25	254/440	15	MCBT-C2/3N	721228	1/30
3	415	15	240/415	25	254/440	15	MCBT-C3/3N	721229	1/30
4	415	15	240/415	25	254/440	15	MCBT-C4/3N	721230	1/30
6	415	15	240/415	25	254/440	15	MCBT-C6/3N	721231	1/30
10	415	15	240/415	25	254/440	15	MCBT-C10/3N	721232	1/30
12	415	15	240/415	25	254/440	15	MCBT-C12/3N	721233	1/30
13	415	15	240/415	25	254/440	15	MCBT-C13/3N	721234	1/30
15	415	15	240/415	25	254/440	15	MCBT-C15/3N	721235	1/30
16	415	15	240/415	25	254/440	15	MCBT-C16/3N	721236	1/30
20	415	15	240/415	25	254/440	15	MCBT-C20/3N	721237	1/30
25	415	15	240/415	25	254/440	15	MCBT-C25/3N	721238	1/30
32	415	10	240/415	20	254/440	15	MCBT-C32/3N	721239	1/30
40	415	10	240/415	20	254/440	15	MCBT-C40/3N	721240	1/30

4-poles

1	415	15	240/415	25	254/440	15	MCBT-C1/4	721241	1/30
2	415	15	240/415	25	254/440	15	MCBT-C2/4	721242	1/30
3	415	15	240/415	25	254/440	15	MCBT-C3/4	721243	1/30
4	415	15	240/415	25	254/440	15	MCBT-C4/4	721244	1/30
6	415	15	240/415	25	254/440	15	MCBT-C6/4	721245	1/30
10	415	15	240/415	25	254/440	15	MCBT-C10/4	721246	1/30
12	415	15	240/415	25	254/440	15	MCBT-C12/4	721247	1/30
13	415	15	240/415	25	254/440	15	MCBT-C13/4	721248	1/30
15	415	15	240/415	25	254/440	15	MCBT-C15/4	721249	1/30
16	415	15	240/415	25	254/440	15	MCBT-C16/4	721250	1/30
20	415	15	240/415	25	254/440	15	MCBT-C20/4	721251	1/30
25	415	15	240/415	25	254/440	15	MCBT-C25/4	721252	1/30
32	415	10	240/415	20	254/440	15	MCBT-C32/4	721253	1/30
40	415	10	240/415	20	254/440	15	MCBT-C40/4	721254	1/30

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60898-1 (V)	Breaking capacity acc. to IEC/EN 60898-1 (kA)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Type Designation	Article No.	Units per package

Characteristic D

1-pole

1	240	15	240	25	MCBT-D1/1	721058	12/120
2	240	15	240	25	MCBT-D2/1	721059	12/120
3	240	15	240	25	MCBT-D3/1	721060	12/120
4	240	15	240	25	MCBT-D4/1	721061	12/120
6	240	15	240	25	MCBT-D6/1	721062	12/120
10	240	15	240	25	MCBT-D10/1	721063	12/120
12	240	15	240	25	MCBT-D12/1	721064	12/120
13	240	15	240	25	MCBT-D13/1	721065	12/120
15	240	15	240	20	MCBT-D15/1	721066	12/120
16	240	15	240	20	MCBT-D16/1	721067	12/120
20	240	10	240	20	MCBT-D20/1	721068	12/120
25	240	10	240	15	MCBT-D25/1	721069	12/120
32	240	10	240	15	MCBT-D32/1	721070	12/120
40	240	10	240	15	MCBT-D40/1	721071	12/120

1+N-poles

1	240	15	240	25	MCBT-D1/1N	721072	1/60
2	240	15	240	25	MCBT-D2/1N	721073	1/60
3	240	15	240	25	MCBT-D3/1N	721074	1/60
4	240	15	240	25	MCBT-D4/1N	721075	1/60
6	240	15	240	25	MCBT-D6/1N	721076	1/60
10	240	15	240	25	MCBT-D10/1N	721077	1/60
12	240	15	240	25	MCBT-D12/1N	721078	1/60
13	240	15	240	25	MCBT-D13/1N	721079	1/60
15	240	15	240	20	MCBT-D15/1N	721080	1/60
16	240	15	240	20	MCBT-D16/1N	721081	1/60
20	240	10	240	20	MCBT-D20/1N	721082	1/60
25	240	10	240	15	MCBT-D25/1N	721083	1/60
32	240	10	240	15	MCBT-D32/1N	721084	1/60
40	240	10	240	15	MCBT-D40/1N	721085	1/60

2-poles

1	415	15	240/415	25	MCBT-D1/2	721086	1/60
2	415	15	240/415	25	MCBT-D2/2	721087	1/60
3	415	15	240/415	25	MCBT-D3/2	721088	1/60
4	415	15	240/415	25	MCBT-D4/2	721089	1/60
6	415	15	240/415	25	MCBT-D6/2	721090	1/60
10	415	15	240/415	25	MCBT-D10/2	721091	1/60
12	415	15	240/415	25	MCBT-D12/2	721092	1/60
13	415	15	240/415	25	MCBT-D13/2	721093	1/60
15	415	15	240/415	20	MCBT-D15/2	721094	1/60
16	415	15	240/415	20	MCBT-D16/2	721095	1/60
20	415	10	240/415	20	MCBT-D20/2	721096	1/60
25	415	10	240/415	15	MCBT-D25/2	721097	1/60
32	415	10	240/415	15	MCBT-D32/2	721098	1/60
40	415	10	240/415	15	MCBT-D40/2	721099	1/60

3-poles

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60898-1 (V)	Breaking capacity acc. to IEC/EN 60898-1 (kA)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Type Designation	Article No.	Units per package
1	415	15	240/415	25	MCBT-D1/3	721100	1/40
2	415	15	240/415	25	MCBT-D2/3	721101	1/40
3	415	15	240/415	25	MCBT-D3/3	721102	1/40
4	415	15	240/415	25	MCBT-D4/3	721103	1/40
6	415	15	240/415	25	MCBT-D6/3	721104	1/40
10	415	15	240/415	25	MCBT-D10/3	721105	1/40
12	415	15	240/415	25	MCBT-D12/3	721106	1/40
13	415	15	240/415	25	MCBT-D13/3	721107	1/40
15	415	15	240/415	25	MCBT-D15/3	721108	1/40
16	415	15	240/415	25	MCBT-D16/3	721109	1/40
20	415	10	240/415	20	MCBT-D20/3	721110	1/40
25	415	10	240/415	15	MCBT-D25/3	721111	1/40
32	415	10	240/415	15	MCBT-D32/3	721112	1/40
40	415	10	240/415	15	MCBT-D40/3	721113	1/40

3+N-poles

1	415	15	240/415	25	MCBT-D1/3N	721114	1/30
2	415	15	240/415	25	MCBT-D2/3N	721115	1/30
3	415	15	240/415	25	MCBT-D3/3N	721116	1/30
4	415	15	240/415	25	MCBT-D4/3N	721117	1/30
6	415	15	240/415	25	MCBT-D6/3N	721118	1/30
10	415	15	240/415	25	MCBT-D10/3N	721119	1/30
12	415	15	240/415	25	MCBT-D12/3N	721120	1/30
13	415	15	240/415	25	MCBT-D13/3N	721121	1/30
15	415	15	240/415	25	MCBT-D15/3N	721122	1/30
16	415	15	240/415	25	MCBT-D16/3N	721123	1/30
20	415	10	240/415	20	MCBT-D20/3N	721124	1/30
25	415	10	240/415	15	MCBT-D25/3N	721125	1/30
32	415	10	240/415	15	MCBT-D32/3N	721126	1/30
40	415	10	240/415	15	MCBT-D40/3N	721127	1/30

4-poles

1	415	15	240/415	25	MCBT-D1/4	721128	1/30
2	415	15	240/415	25	MCBT-D2/4	721129	1/30
3	415	15	240/415	25	MCBT-D3/4	721130	1/30
4	415	15	240/415	25	MCBT-D4/4	721131	1/30
6	415	15	240/415	25	MCBT-D6/4	721132	1/30
10	415	15	240/415	25	MCBT-D10/4	721133	1/30
12	415	15	240/415	25	MCBT-D12/4	721134	1/30
13	415	15	240/415	25	MCBT-D13/4	721135	1/30
15	415	15	240/415	25	MCBT-D15/4	721136	1/30
16	415	15	240/415	25	MCBT-D16/4	721137	1/30
20	415	10	240/415	20	MCBT-D20/4	721138	1/30
25	415	10	240/415	15	MCBT-D25/4	721139	1/30
32	415	10	240/415	15	MCBT-D32/4	721140	1/30
40	415	10	240/415	15	MCBT-D40/4	721141	1/30

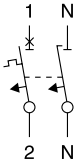
■ Technical Data

		MCB-T
Productstandard Classified according to Current test marks as printed onto the device		IEC/EN 60947-2, IEC/EN 60898-1 IEC 61373, EN 45545-2
Number of poles		1, 1p+N, 2, 3, 3p+N, 4
Mechanical		
Device width		17.7 mm (1p), 27 mm (1p+N), 36 mm (2p), 54 mm (3p), 72 mm (3p+N), 72 mm (4p)
Frame size		45 mm
Device height		80 mm
Device depth		60 mm
Terminals		lift terminal
Terminal capacity rigid solid/stranded wire		1-25 mm^2
Terminal screw		M5 (with slotted screw acc. to EN ISO 4757-Z2, PZ2)
Fastening torque of terminal screws		max. 2.4 Nm
Snap on fixing		tristable (on DIN rail acc. to EN 50022)
Finger proof		acc. to VBG4, ÖVE EN-6
Degree of protection (DIN VDE 0470)		
Surface mounted		IP20
Built-in behind panel		IP40
Contact position indicator		red / green
Electrical		
Rated voltage	U_n	255/440 V AC (Characteristic B, C), 240/415 V AC (Characteristic D) 60 V DC per pole
Rated current	I_n	Type B, C, D: 1, 2, 3, 4, 6, 10, 12, 13, 15, 16, 20, 25, 32, 40 A
Rated insulation voltage	U_i	440 V AC
Rated impulse withstand voltage	U_{imp}	4 kV (1.2/50) µsec
Tripping characteristic		
Conventional non-tripping current		$I_{nt} = 1{,}13\ I_n$
Conventional tripping current		$I_t = 1.45\ I_n$
Reference temperature		40 °C
Temperature factor		0.4%/K
Instantaneous tripping current	I_{mt}	Type B: $3\ I_n < I_{mt} = 5\ I_n$:t (I_{mt}) < 0.1 sec Type C: $5\ I_n < I_{mt} = 10\ I_n$:t ($I_{mt}$) < 0.1 sec Type D: $10\ I_n < I_{mt} = 20\ I_n$:t ($I_{mt}$) < 0.1 sec
Rated ultimate short-circuit breaking capacity I_{cu} (IEC/EN 60947-2)	Type B	1-25 A: 25 kA, 32-40 A: 20 kA
	Type C	1-25 A: 25 kA, 32-40 A: 20 kA
	Type D	1p/1p+N/2p - 1-13 A: 25 kA, 15-20 A: 20 kA, 25-40 A: 15 kA 3p/3p+N/4p - 1-16 A: 25 kA, 20 A: 20 kA, 25-40 A: 15 kA
Rated service short-circuit breaking capacity I_{cs} (IEC/EN 60947-2)		for I_{cu} = 25 kA --> I_{cs} = 12.5 kA: 240/415 V AC; I_{cu} = 15 kA: 255/440 V AC for I_{cu} = 20 kA --> I_{cs} = 10 kA: 240/415 V AC; I_{cu} = 15 kA: 255/440 V AC for I_{cu} = 15 kA --> I_{cs} = 7.5 kA
Rated short-circuit breaking capacity I_{cn} (IEC/EN 60898-1)	Type B	1-25 A: 15 kA, 32-40 A: 10 kA
	Type C	1-25 A: 15 kA, 32-40 A: 10 kA
	Type D	1-16 A: 15 kA, 20-40 A: 10 kA
Selectivity class		3 (acc. to EN 60898)
Number of electrical operations		> 4.000 (IEC/EN 60898)
Number of mechanical operations		> 10,000 (IEC/EN 60947)
Climatic conditions		acc. to IEC 60068-2-30 (25..55°C / 90..95% RH)
Operating temperature range		-40°C up to +75°C
Storage- and transport temperature		-40°C up to +75°C

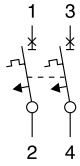
■ Connection diagram

1-pole

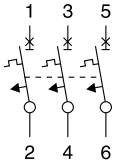
1+N-poles



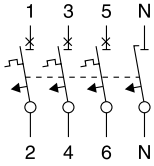
2-poles



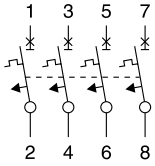
3-poles



3+N-poles

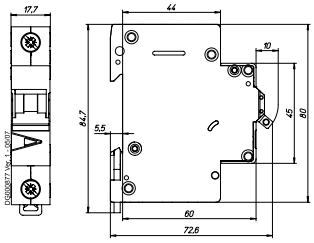


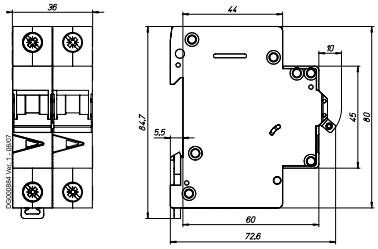
4-poles



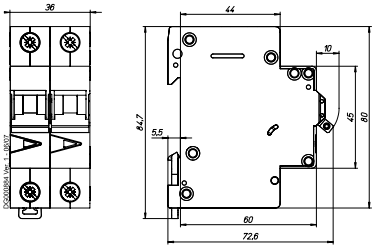
■ Dimensions (mm) MCB-T

1+N-poles

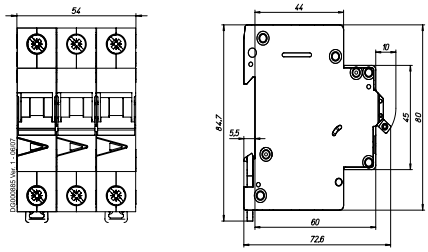




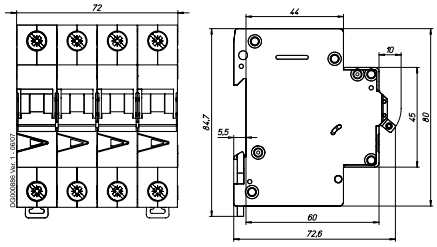
2-poles



3-poles

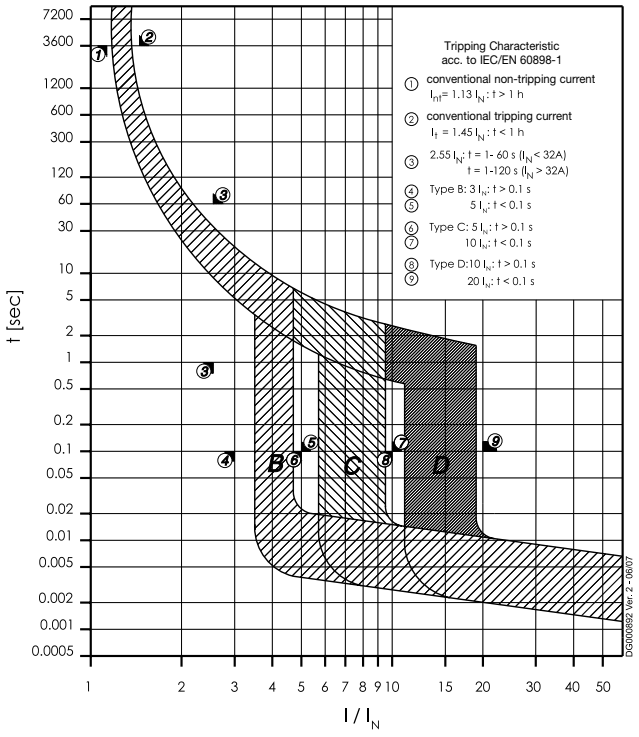


3+N-poles, 4-poles



■ Tripping Characteristics MCB-T

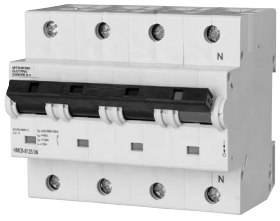
Characteristics B, C and D - EN60898

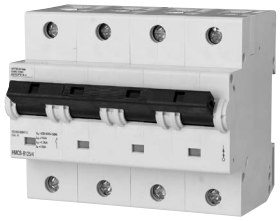


Miniature Circuit Breakers HMCB

■ Description

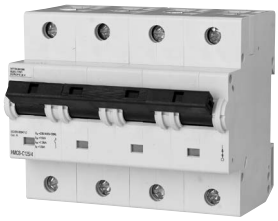
- High-quality miniature circuit breakers for industrial and commercial applications
- Contact position indicator red - green
- Accessories suitable for subsequent installation
- Rated currents up to 125 A
- Tripping characteristics B, C, D
- Rated breaking capacity up to 25 kA according to EN 60947-2
- Classified for the use in rail rolling stock





Characteristic B

Rated current I_n (A)	Type Designation	Article No.	Units per package
1-pole			
20	HMCB-B20/1	720486	12
25	HMCB-B25/1	720487	12
32	HMCB-B32/1	720488	12
40	HMCB-B40/1	720489	12
50	HMCB-B50/1	720490	12
63	HMCB-B63/1	720491	12
80	HMCB-B80/1	720492	12
100	HMCB-B100/1	720493	12
125	HMCB-B125/1	720494	12
2-poles			
20	HMCB-B20/2	720495	6
25	HMCB-B25/2	720496	6
32	HMCB-B32/2	720497	6
40	HMCB-B40/2	720498	6
50	HMCB-B50/2	720499	6
63	HMCB-B63/2	720500	6
80	HMCB-B80/2	720501	6
100	HMCB-B100/2	720502	6
125	HMCB-B125/2	720503	6
3-poles			
20	HMCB-B20/3	720504	4
25	HMCB-B25/3	720505	4
32	HMCB-B32/3	720506	4
40	HMCB-B40/3	720507	4
50	HMCB-B50/3	720508	4
63	HMCB-B63/3	720509	4
80	HMCB-B80/3	720510	4
100	HMCB-B100/3	720511	4
125	HMCB-B125/3	720512	4
3+N-poles			
20	HMCB-B20/3N	720513	3
25	HMCB-B25/3N	720514	3
32	HMCB-B32/3N	720515	3
40	HMCB-B40/3N	720516	3
50	HMCB-B50/3N	720517	3
63	HMCB-B63/3N	720518	3
80	HMCB-B80/3N	720519	3
100	HMCB-B100/3N	720520	3
125	HMCB-B125/3N	720521	3
4-poles			
20	HMCB-B20/4	720522	3
25	HMCB-B25/4	720523	3
32	HMCB-B32/4	720524	3
40	HMCB-B40/4	720525	3
50	HMCB-B50/4	720526	3
63	HMCB-B63/4	720527	3
80	HMCB-B80/4	720528	3
100	HMCB-B100/4	720529	3
125	HMCB-B125/4	720530	3



Rated current I_n (A)	Type Designation	Article No.	Units per package

Characteristic C

1-pole

20	HMCB-C20/1	720441	12
25	HMCB-C25/1	720442	12
32	HMCB-C32/1	720443	12
40	HMCB-C40/1	720444	12
50	HMCB-C50/1	720445	12
63	HMCB-C63/1	720446	12
80	HMCB-C80/1	720447	12
100	HMCB-C100/1	720448	12
125	HMCB-C125/1	720449	12

2-poles

20	HMCB-C20/2	720450	6
25	HMCB-C25/2	720451	6
32	HMCB-C32/2	720452	6
40	HMCB-C40/2	720453	6
50	HMCB-C50/2	720454	6
63	HMCB-C63/2	720455	6
80	HMCB-C80/2	720456	6
100	HMCB-C100/2	720457	6
125	HMCB-C125/2	720458	6

3-poles

20	HMCB-C20/3	720459	4
25	HMCB-C25/3	720460	4
32	HMCB-C32/3	720461	4
40	HMCB-C40/3	720462	4
50	HMCB-C50/3	720463	4
63	HMCB-C63/3	720464	4
80	HMCB-C80/3	720465	4
100	HMCB-C100/3	720466	4
125	HMCB-C125/3	720467	4

3+N-poles

20	HMCB-C20/3N	720468	3
25	HMCB-C25/3N	720469	3
32	HMCB-C32/3N	720470	3
40	HMCB-C40/3N	720471	3
50	HMCB-C50/3N	720472	3
63	HMCB-C63/3N	720473	3
80	HMCB-C80/3N	720474	3
100	HMCB-C100/3N	720475	3
125	HMCB-C125/3N	720476	3

4-poles

20	HMCB-C20/4	720477	3
25	HMCB-C25/4	720478	3
32	HMCB-C32/4	720479	3
40	HMCB-C40/4	720480	3
50	HMCB-C50/4	720481	3
63	HMCB-C63/4	720482	3
80	HMCB-C80/4	720483	3
100	HMCB-C100/4	720484	3
125	HMCB-C125/4	720485	3

Characteristic D

1-pole

Rated current I_n (A)	Type Designation	Article No.	Units per package
20	HMCB-D20/1	720531	12
25	HMCB-D25/1	720532	12
32	HMCB-D32/1	720533	12
40	HMCB-D40/1	720534	12
50	HMCB-D50/1	720535	12
63	HMCB-D63/1	720536	12
80	HMCB-D80/1	720537	12
100	HMCB-D100/1	720538	12

2-poles

Rated current I_n (A)	Type Designation	Article No.	Units per package
20	HMCB-D20/2	720539	6
25	HMCB-D25/2	720540	6
32	HMCB-D32/2	720541	6
40	HMCB-D40/2	720542	6
50	HMCB-D50/2	720543	6
63	HMCB-D63/2	720544	6
80	HMCB-D80/2	720545	6
100	HMCB-D100/2	720546	6

3-poles

Rated current I_n (A)	Type Designation	Article No.	Units per package
20	HMCB-D20/3	720547	4
25	HMCB-D25/3	720548	4
32	HMCB-D32/3	720549	4
40	HMCB-D40/3	720550	4
50	HMCB-D50/3	720551	4
63	HMCB-D63/3	720552	4
80	HMCB-D80/3	720553	4
100	HMCB-D100/3	720554	4

3+N-poles

Rated current I_n (A)	Type Designation	Article No.	Units per package
20	HMCB-D20/3N	720555	4
25	HMCB-D25/3N	720556	4
32	HMCB-D32/3N	720557	4
40	HMCB-D40/3N	720558	4
50	HMCB-D50/3N	720559	4
63	HMCB-D63/3N	720560	4
80	HMCB-D80/3N	720561	4
100	HMCB-D100/3N	720562	4

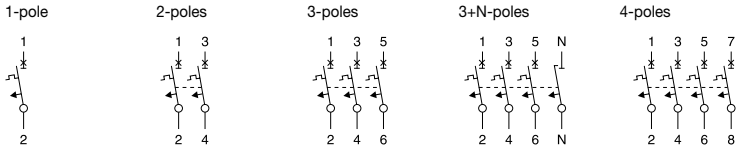
4-poles

Rated current I_n (A)	Type Designation	Article No.	Units per package
20	HMCB-D20/4	720563	3
25	HMCB-D25/4	720564	3
32	HMCB-D32/4	720565	3
40	HMCB-D40/4	720566	3
50	HMCB-D50/4	720567	3
63	HMCB-D63/4	720568	3
80	HMCB-D80/4	720569	3
100	HMCB-D100/4	720570	3

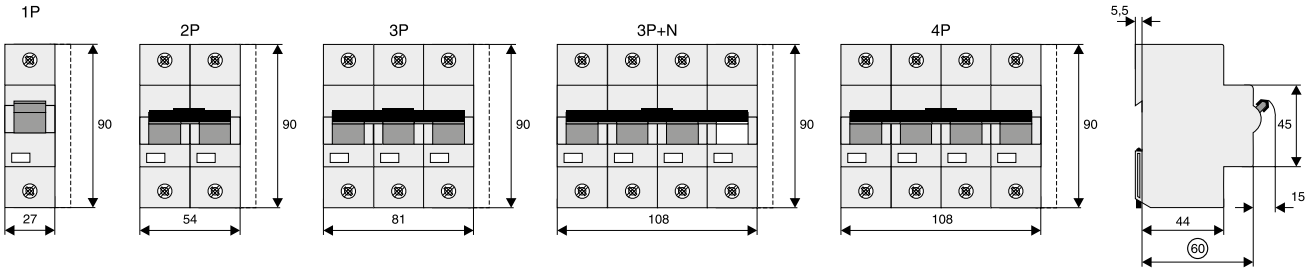
■ Technical Data

	HMCB
Electrical	
Standards Classified according to Current test marks as printed onto the device	IEC/EN 60947-2 IEC 61373, EN 45545-2
Rated operating voltage	230/400 V AC 60 V DC (per pole)
Limiting breaking capacity according to IEC/EN 60947-2	
Characteristic B	I_n = 20-63 A: 25 kA I_n = 80-100 A: 20 kA I_n = 125 A: 15 kA
Characteristic C	I_n = 20-63 A: 25 kA I_n = 80-100 A: 20 kA I_n = 125 A: 15 kA
Characteristic D	I_n = 20-63 A: 25 kA I_n = 80 A: 20 kA I_n = 100 A: 15 kA
Characteristic	Similar: B, C, D
Max. back-up fuse	200 A gL/gG
Selectivity class	Compliant with class 3
Endurance	>10,000 Operations
Direction of incoming supply	Any
Mechanical	
Frame size	45 mm
Device height	90 mm
Mounting width per pole	27 mm
Terminal protection	finger and hand touch safe according to BGV A2
Mounting	Top-hat rail to IEC/EN 60715
Terminals top and bottom	Lift terminals
Terminal capacity	2.5 – 50 mm^2 (solid)
Operation temperature	-25 °C up to +55 °C
Storage- and transport temperature	-40 °C up to +75 °C

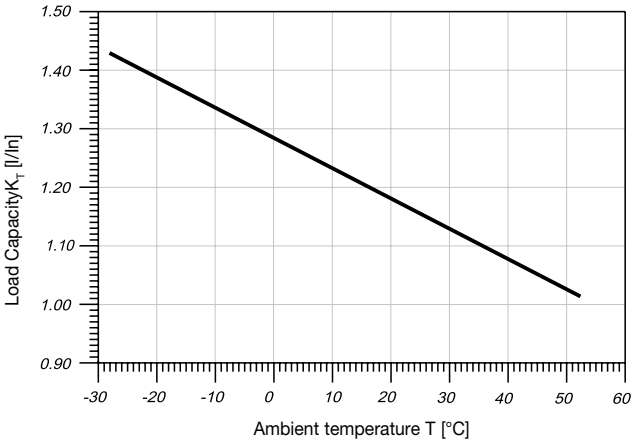
■ Connection diagram



■ Dimensions (mm)



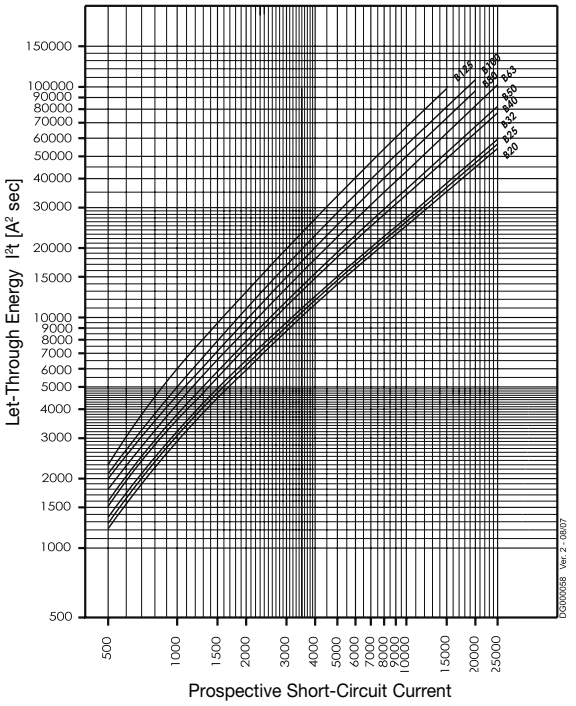
■ Influence of Ambient Temperature HMCB



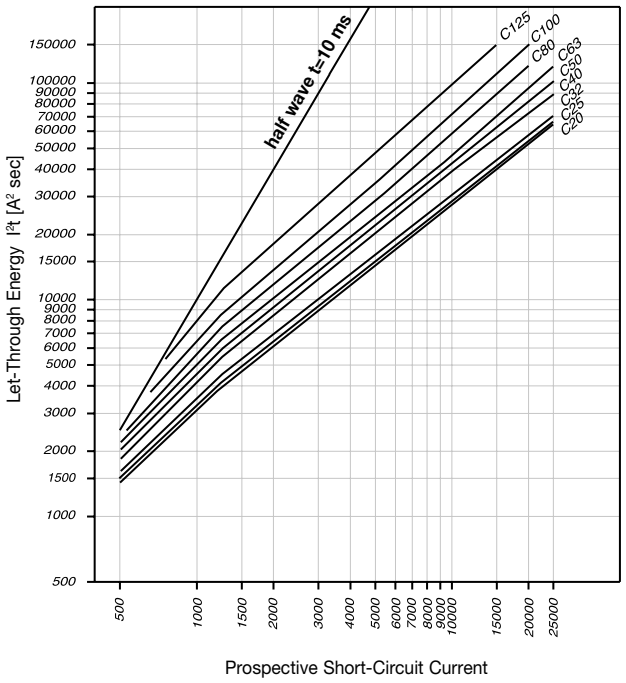
Permitted permanent load at ambient temperature T [°C] and n devices: $I_{DL} = I_n K_T(T) K_N(N)$.

■ Let-Through Energy HMCB

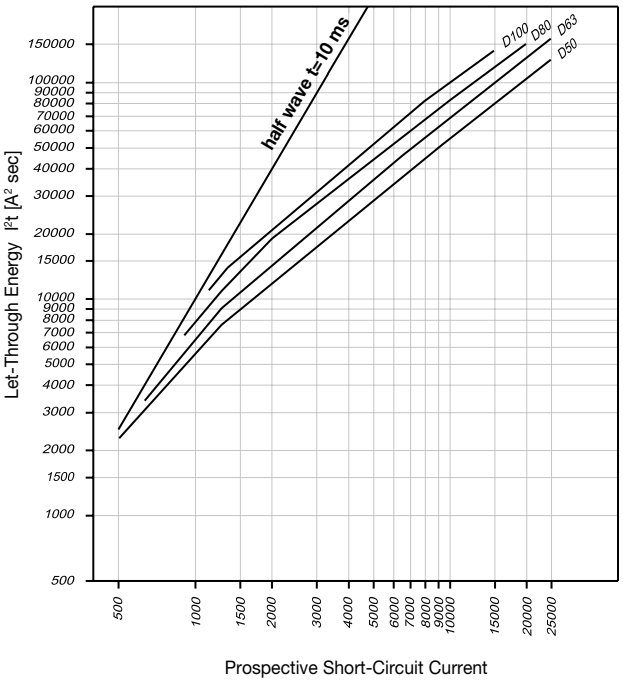
Maximum Let-Through Energy HMCB, Characteristic B, 1poles



Maximum Let-Through Energy HMCB, Characteristic C, 1poles



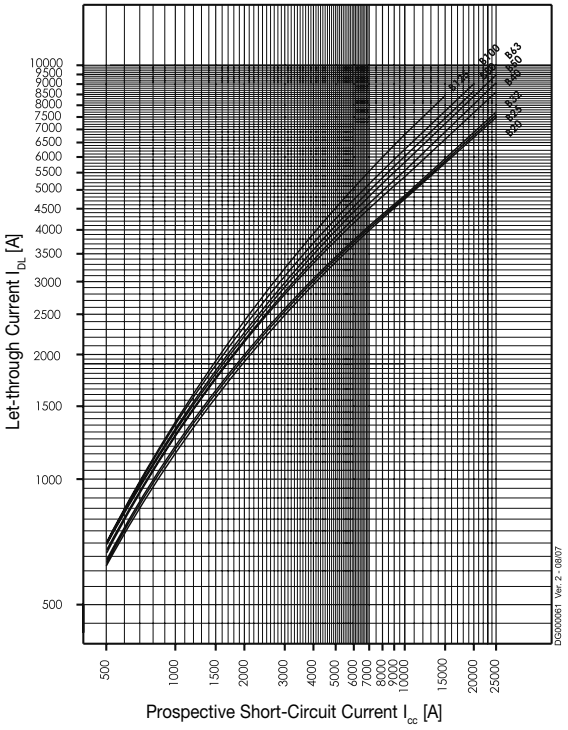
Maximum Let-Through Energy HMCB, Characteristic D, 1poles



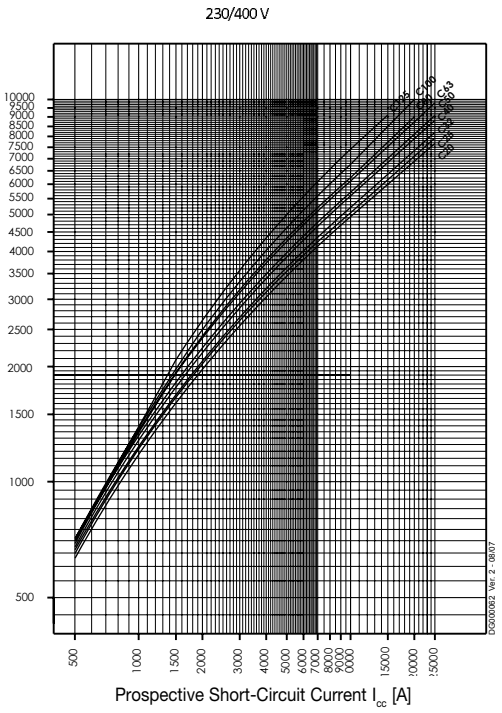
Determined according to EN 60898-1.

■ Maximum Let-Through Current HMCB

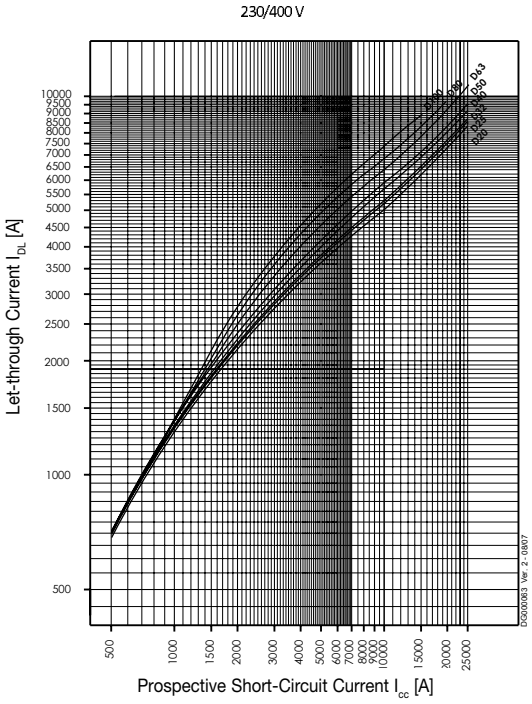
Type B



Type C



Type D



Miniature Circuit Breakers DCMCB for direct current application

■ Description

- High-quality miniature circuit breakers for DC-applications
- Contact position indicator red - green
- Guide for secure terminal connection
- 3-position DIN rail clip, permits removal from existing busbar system
- Comprehensive range of accessories can be mounted subsequently
- Rated currents up to 50 A
- Tripping Characteristic C
- Rated breaking capacity 10 kA according to IEC/EN 60947-2
- Up to 250 V DC per pole

Rated current I_n (A)	Type Designation	Article No.	Units per package
10 kA, Characteristic C			
1-pole			
1	DCMCB-C1	720591	12/120
2	DCMCB-C2	720592	12/120
3	DCMCB-C3	720593	12/120
4	DCMCB-C4	720594	12/120
6	DCMCB-C6	720595	12/120
10	DCMCB-C10	720596	12/120
16	DCMCB-C16	720597	12/120
20	DCMCB-C20	720598	12/120
25	DCMCB-C25	720599	12/120
32	DCMCB-C32	720600	12/120
40	DCMCB-C40	720601	12/120
50	DCMCB-C50	720602	12/120
2-pole			
1	DCMCB-C1/2	720603	1/60
2	DCMCB-C2/2	720604	1/60
3	DCMCB-C3/2	720605	1/60
4	DCMCB-C4/2	720606	1/60
6	DCMCB-C6/2	720607	1/60
10	DCMCB-C10/2	720608	1/60
16	DCMCB-C16/2	720609	1/60
20	DCMCB-C20/2	720610	1/60
25	DCMCB-C25/2	720611	1/60
32	DCMCB-C32/2	720612	1/60
40	DCMCB-C40/2	720613	1/60
50	DCMCB-C50/2	720614	1/60

■ Specifications

- High selectivity between MCB and back-up fuse due to low let-through energy
- Compatible with standard busbar
- Twin-purpose terminal (lift/open-mouthed) above and below
- Busbar positioning optionally above or below
- Meets the requirements of insulation co-ordination, distance between contacts ≥ 4 mm, for secure isolation
- Rated breaking capacity 10 kA according to IEC/EN 60947
- Rated voltage to 250 V (per pole), t = 4 ms
- Take into account polarity!

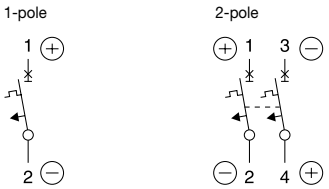
■ Accessories

Auxiliary switch for subsequent installation	AX-MCB	720031
	2AX-MCB	720032
Tripping signal switch for subsequent installation	AXAL-MCB	720033
Shunt trip release	SHT24-MCB, SHT230-MCB	720041, 720042
Undervoltage release	UVT/..	720036-720040

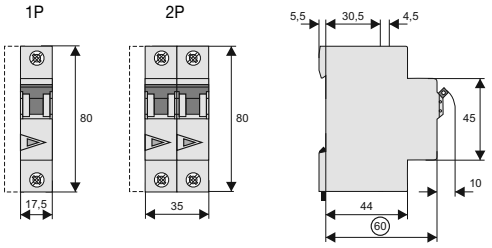
■ Technical Data

	DCMCB
Electrical	
Design according to Current test marks as printed onto the device	IEC/EN 60947-2
Rated voltage DC	1-2 A types: 220 V (per pole) 3-50 A types: 250 V (per pole)
Rated frequency	50/60 Hz
Rated breaking capacity according to IEC/EN 60947-2	10 kA
Characteristic	C
Back-up fuse	max. 100 A gL
Selectivity class	3
Rated impulse withstand voltage U_{imp}	4 kV (1.2/50 µs)
Endurance	
electrical components	≥ 4,000 switching operations
mechanical components	≥ 20,000 switching operations
Line voltage connection	at will (above/below)
Mechanical	
Frame size	45 mm
Device height	80 mm
Device width	17.5 mm per pole (1MU)
Mounting	quick fastening with 3 lock-in positions on DIN rail IEC/EN 60715
Degree of protection	IP20
Upper and lower terminals	open-mouthed/lift terminals
Terminal protection	finger and hand touch safe, DGUV VS3, EN 50274
Terminal capacity	1-25 mm^2
Terminal torque	2-2.4 Nm
Busbar thickness	0.8 - 2 mm
Mounting	independent of position
Operation temperature	-25°C to +55°C
Storage- and transport temperature	-40°C up to +60°C

■ Connection diagrams

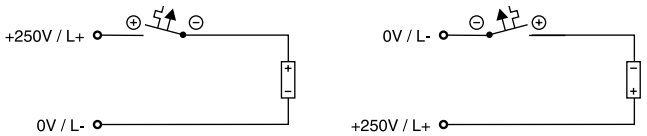


■ Dimensions (mm)

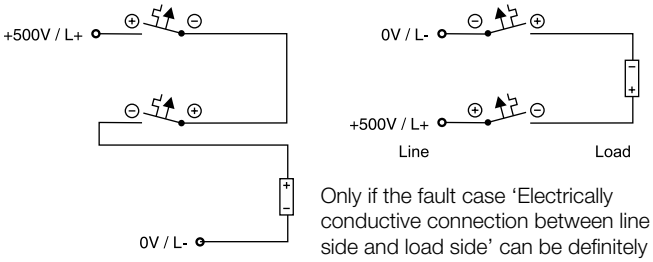


■ Connection examples

Connection example at 250 V=, 1-pole



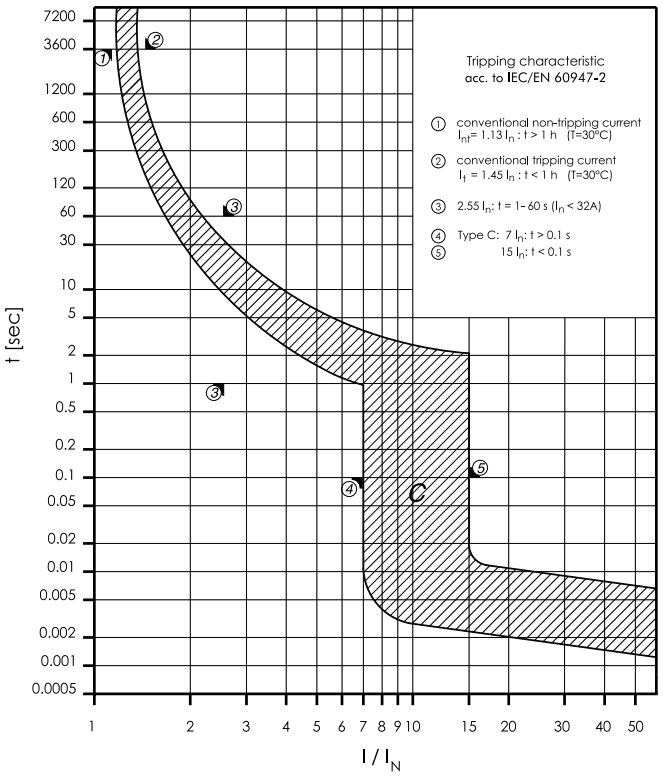
Connection example at 500 V=, 2-pole



Only if the fault case 'Electrically conductive connection between line side and load side' can be definitely excluded.

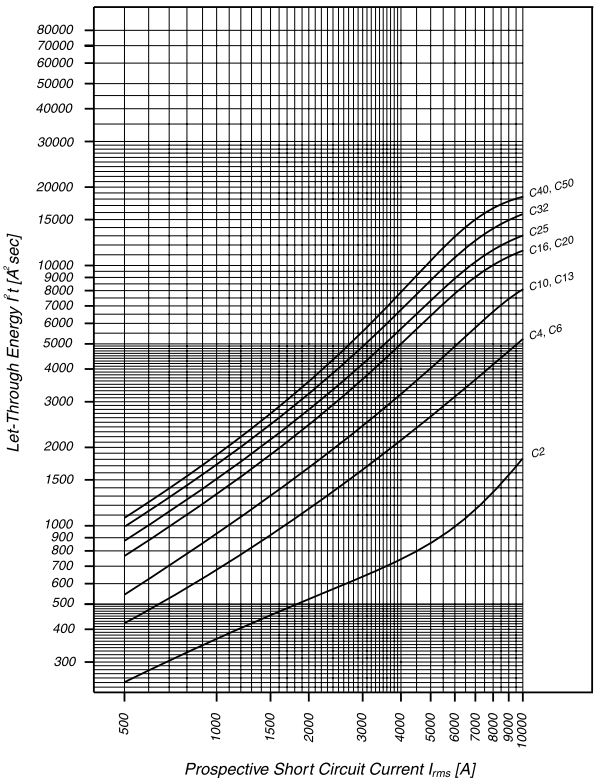
■ Tripping characteristic DCMCB

Type C



■ Let-through Energy DCMCB

Type C, 250 V d.c., t = 5 ms (according to IEC/EN 60947-2)



Miniature Circuit Breakers MCB-NA

■ Description

MCB-NA

- According to UL 489, CSA C22.2 No. 5 and also IEC 60947-2 standard
- For Applications, wich are permitted for UL 1077 or CSA C22.2 No. 235
- Auxiliary switch and voltage trips suitable for subsequent installation
- Contact position indicator red - green
- Easy mounting at DIN-rail
- Classified for the use in rail rolling stock

Characteristic B

1-pole

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to UL489 (V)	Breaking capacity acc. to UL489 (kA)	SWD	NFPA 79	Type Designation	Article No.	Units per package
1	254	15	277	10	SWD	AWG 18	MCB-B1/1-NA	721460	2/80
1.5	254	15	277	10	SWD	AWG 18	MCB-B1,5/1-NA	721461	2/80
2	254	15	277	10	SWD	AWG 18	MCB-B2/1-NA	721462	2/80
3	254	15	277	10	SWD	AWG 18	MCB-B3/1-NA	721463	2/80
4	254	15	277	10	SWD	AWG 18	MCB-B4/1-NA	721464	2/80
5	254	15	277	10	SWD	AWG 18	MCB-B5/1-NA	721465	2/80
6	254	15	277	10	SWD	AWG 18	MCB-B6/1-NA	721466	2/80
7	254	15	277	10	SWD	AWG 18	MCB-B7/1-NA	721467	2/80
8	254	15	277	10	SWD	AWG 16	MCB-B8/1-NA	721468	2/80
10	254	15	277	10	SWD	AWG 16	MCB-B10/1-NA	721469	2/80
13	254	15	277	10	SWD		MCB-B13/1-NA	721470	2/80
15	254	15	277	14	SWD		MCB-B15/1-NA	721471	2/80
16	254	15	277	14	SWD		MCB-B16/1-NA	721472	2/80
20	254	15	277	14	SWD		MCB-B20/1-NA	721473	2/80
25	254	15	277	14			MCB-B25/1-NA	721474	2/80
30	254	15	277	10			MCB-B30/1-NA	721475	2/80
32	254	15	277	10			MCB-B32/1-NA	721476	2/80
35	254	15	240	10			MCB-B35/1-NA	721477	2/80
40	254	15	240	10			MCB-B40/1-NA	721478	2/80
50	240	15	240	10			MCB-B50/1-NA	721479	2/80
63	240	15	240	10			MCB-B63/1-NA	721480	2/80

2-poles

1	440	15	480Y/277	10	SWD	AWG 18	MCB-B1/2-NA	721481	1/40
1.5	440	15	480Y/277	10	SWD	AWG 18	MCB-B1,5/2-NA	721482	1/40
2	440	15	480Y/277	10	SWD	AWG 18	MCB-B2/2-NA	721483	1/40
3	440	15	480Y/277	10	SWD	AWG 18	MCB-B3/2-NA	721484	1/40
4	440	15	480Y/277	10	SWD	AWG 18	MCB-B4/2-NA	721485	1/40
5	440	15	480Y/277	10	SWD	AWG 18	MCB-B5/2-NA	721486	1/40
6	440	15	480Y/277	10	SWD	AWG 18	MCB-B6/2-NA	721487	1/40
7	440	15	480Y/277	10	SWD	AWG 18	MCB-B7/2-NA	721488	1/40
8	440	15	480Y/277	10	SWD	AWG 16	MCB-B8/2-NA	721489	1/40
10	440	15	480Y/277	10	SWD	AWG 16	MCB-B10/2-NA	721490	1/40
13	440	15	480Y/277	10	SWD		MCB-B13/2-NA	721491	1/40
15	440	15	480Y/277	14	SWD		MCB-B15/2-NA	721492	1/40
16	440	15	480Y/277	14	SWD		MCB-B16/2-NA	721493	1/40
20	440	15	480Y/277	14	SWD		MCB-B20/2-NA	721494	1/40
25	440	15	480Y/277	14			MCB-B25/2-NA	721495	1/40
30	440	15	480Y/277	10			MCB-B30/2-NA	721496	1/40
32	440	15	480Y/277	10			MCB-B32/2-NA	721497	1/40
35	440	15	240	10			MCB-B35/2-NA	721498	1/40
40	440	15	240	10			MCB-B40/2-NA	721499	1/40
50	415	15	240	10			MCB-B50/2-NA	721500	1/40
63	415	15	240	10			MCB-B63/2-NA	721501	1/40

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to UL489 (V)	Breaking capacity acc. to UL489 (kA)	SWD	NFPA 79	Type Designation	Article No.	Units per package
3-poles									
1	440	15	480Y/277	10	SWD	AWG 18	MCB-B1/3-NA	721502	1/28
1.5	440	15	480Y/277	10	SWD	AWG 18	MCB-B1,5/3-NA	721503	1/28
2	440	15	480Y/277	10	SWD	AWG 18	MCB-B2/3-NA	721504	1/28
3	440	15	480Y/277	10	SWD	AWG 18	MCB-B3/3-NA	721505	1/28
4	440	15	480Y/277	10	SWD	AWG 18	MCB-B4/3-NA	721506	1/28
5	440	15	480Y/277	10	SWD	AWG 18	MCB-B5/3-NA	721507	1/28
6	440	15	480Y/277	10	SWD	AWG 18	MCB-B6/3-NA	721508	1/28
7	440	15	480Y/277	10	SWD	AWG 18	MCB-B7/3-NA	721509	1/28
8	440	15	480Y/277	10	SWD	AWG 16	MCB-B8/3-NA	721510	1/28
10	440	15	480Y/277	10	SWD	AWG 16	MCB-B10/3-NA	721511	1/28
13	440	15	480Y/277	10	SWD		MCB-B13/3-NA	721512	1/28
15	440	15	480Y/277	14	SWD		MCB-B15/3-NA	721513	1/28
16	440	15	480Y/277	14	SWD		MCB-B16/3-NA	721514	1/28
20	440	15	480Y/277	14	SWD		MCB-B20/3-NA	721515	1/28
25	440	15	480Y/277	14			MCB-B25/3-NA	721516	1/28
30	440	15	480Y/277	10			MCB-B30/3-NA	721517	1/28
32	440	15	480Y/277	10			MCB-B32/3-NA	721518	1/28
35	440	15	240	10			MCB-B35/3-NA	721519	1/28
40	440	15	240	10			MCB-B40/3-NA	721520	1/28
50	415	15	240	10			MCB-B50/3-NA	721521	1/28
63	415	15	240	10			MCB-B63/3-NA	721522	1/28
4-poles									
1	440	15	480Y/277	10		AWG18	MCB-B1/4-NA	721523	1/20
1.5	440	15	480Y/277	10		AWG18	MCB-B1,5/4-NA	721524	1/20
2	440	15	480Y/277	10		AWG18	MCB-B2/4-NA	721525	1/20
3	440	15	480Y/277	10		AWG18	MCB-B3/4-NA	721526	1/20
4	440	15	480Y/277	10		AWG18	MCB-B4/4-NA	721527	1/20
5	440	15	480Y/277	10		AWG18	MCB-B5/4-NA	721528	1/20
6	440	15	480Y/277	10		AWG18	MCB-B6/4-NA	721529	1/20
7	440	15	480Y/277	10		AWG18	MCB-B7/4-NA	721530	1/20
8	440	15	480Y/277	10		AWG16	MCB-B8/4-NA	721531	1/20
10	440	15	480Y/277	10		AWG16	MCB-B10/4-NA	721532	1/20
13	440	15	480Y/277	10			MCB-B13/4-NA	721533	1/20
15	440	15	480Y/277	14			MCB-B15/4-NA	721534	1/20
16	440	15	480Y/277	14			MCB-B16/4-NA	721535	1/20
20	440	15	480Y/277	14			MCB-B20/4-NA	721536	1/20
25	440	15	480Y/277	14			MCB-B25/4-NA	721537	1/20
30	440	15	480Y/277	10			MCB-B30/4-NA	721538	1/20
32	440	15	480Y/277	10			MCB-B32/4-NA	721539	1/20
35	440	15	240	10			MCB-B35/4-NA	721540	1/20
40	440	15	240	10			MCB-B40/4-NA	721541	1/20
50	415	15	240	10			MCB-B50/4-NA	721542	1/20
63	415	15	240	10			MCB-B63/4-NA	721543	1/20

Characteristic C

1-pole

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to UL489 (V)	Breaking capacity acc. to UL489 (kA)	SWD	NFPA 79	Type Designation	Article No.	Units per package
0.5	254	15	277	10	SWD	AWG 18	MCB-C0,5/1-NA	721544	2/80
1	254	15	277	10	SWD	AWG 18	MCB-C1/1-NA	721545	2/80
1.5	254	15	277	10	SWD	AWG 18	MCB-C1,5/1-NA	721546	2/80
2	254	15	277	10	SWD	AWG 18	MCB-C2/1-NA	721547	2/80
3	254	15	277	10	SWD	AWG 18	MCB-C3/1-NA	721548	2/80
4	254	15	277	10	SWD	AWG 18	MCB-C4/1-NA	721549	2/80
5	254	15	277	10	SWD	AWG 18	MCB-C5/1-NA	721550	2/80
6	254	15	277	10	SWD	AWG 18	MCB-C6/1-NA	721551	2/80
7	254	15	277	10	SWD	AWG 18	MCB-C7/1-NA	721552	2/80
8	254	15	277	10	SWD	AWG 16	MCB-C8/1-NA	721553	2/80
10	254	15	277	10	SWD	AWG 16	MCB-C10/1-NA	721554	2/80
13	254	15	277	10	SWD		MCB-C13/1-NA	721555	2/80
15	254	15	277	14	SWD		MCB-C15/1-NA	721556	2/80
16	254	15	277	14	SWD		MCB-C16/1-NA	721557	2/80
20	254	15	277	14	SWD		MCB-C20/1-NA	721558	2/80
25	254	15	277	14			MCB-C25/1-NA	721559	2/80
30	254	15	277	10			MCB-C30/1-NA	721560	2/80
32	254	15	277	10			MCB-C32/1-NA	721561	2/80
35	254	15	240	10			MCB-C35/1-NA	721562	2/80
40	254	15	240	10			MCB-C40/1-NA	721563	2/80
50	240	15	240	10			MCB-C50/1-NA	721564	2/80
63	240	15	240	10			MCB-C63/1-NA	721565	2/80

2-poles

0.5	440	15	480Y/277	10	SWD	AWG 18	MCB-C0,5/2-NA	721566	1/40
1	440	15	480Y/277	10	SWD	AWG 18	MCB-C1/2-NA	721567	1/40
1.5	440	15	480Y/277	10	SWD	AWG 18	MCB-C1,5/2-NA	721568	1/40
2	440	15	480Y/277	10	SWD	AWG 18	MCB-C2/2-NA	721569	1/40
3	440	15	480Y/277	10	SWD	AWG 18	MCB-C3/2-NA	721570	1/40
4	440	15	480Y/277	10	SWD	AWG 18	MCB-C4/2-NA	721571	1/40
5	440	15	480Y/277	10	SWD	AWG 18	MCB-C5/2-NA	721572	1/40
6	440	15	480Y/277	10	SWD	AWG 18	MCB-C6/2-NA	721573	1/40
7	440	15	480Y/277	10	SWD	AWG 18	MCB-C7/2-NA	721574	1/40
8	440	15	480Y/277	10	SWD	AWG 16	MCB-C8/2-NA	721575	1/40
10	440	15	480Y/277	10	SWD	AWG 16	MCB-C10/2-NA	721576	1/40
13	440	15	480Y/277	10	SWD		MCB-C13/2-NA	721577	1/40
15	440	15	480Y/277	14	SWD		MCB-C15/2-NA	721578	1/40
16	440	15	480Y/277	14	SWD		MCB-C16/2-NA	721579	1/40
20	440	15	480Y/277	14	SWD		MCB-C20/2-NA	721580	1/40
25	440	15	480Y/277	14			MCB-C25/2-NA	721581	1/40
30	440	15	480Y/277	10			MCB-C30/2-NA	721582	1/40
32	440	15	480Y/277	10			MCB-C32/2-NA	721583	1/40
35	440	15	240	10			MCB-C35/2-NA	721584	1/40
40	440	15	240	10			MCB-C40/2-NA	721585	1/40
50	415	15	240	10			MCB-C50/2-NA	721586	1/40
63	415	15	240	10			MCB-C63/2-NA	721587	1/40

3-poles

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to UL489 (V)	Breaking capacity acc. to UL489 (kA)	SWD	NFPA 79	Type Designation	Article No.	Units per package
0.5	440	15	480Y/277	10	SWD	AWG 18	MCB-C0,5/3-NA	721588	1/28
1	440	15	480Y/277	10	SWD	AWG 18	MCB-C1/3-NA	721589	1/28
1.5	440	15	480Y/277	10	SWD	AWG 18	MCB-C1,5/3-NA	721590	1/28
2	440	15	480Y/277	10	SWD	AWG 18	MCB-C2/3-NA	721591	1/28
3	440	15	480Y/277	10	SWD	AWG 18	MCB-C3/3-NA	721592	1/28
4	440	15	480Y/277	10	SWD	AWG 18	MCB-C4/3-NA	721593	1/28
5	440	15	480Y/277	10	SWD	AWG 18	MCB-C5/3-NA	721594	1/28
6	440	15	480Y/277	10	SWD	AWG 18	MCB-C6/3-NA	721595	1/28
7	440	15	480Y/277	10	SWD	AWG 18	MCB-C7/3-NA	721596	1/28
8	440	15	480Y/277	10	SWD	AWG 16	MCB-C8/3-NA	721597	1/28
10	440	15	480Y/277	10	SWD	AWG 16	MCB-C10/3-NA	721598	1/28
13	440	15	480Y/277	10	SWD		MCB-C13/3-NA	721599	1/28
15	440	15	480Y/277	14	SWD		MCB-C15/3-NA	721600	1/28
16	440	15	480Y/277	14	SWD		MCB-C16/3-NA	721601	1/28
20	440	15	480Y/277	14	SWD		MCB-C20/3-NA	721602	1/28
25	440	15	480Y/277	14			MCB-C25/3-NA	721603	1/28
30	440	15	480Y/277	10			MCB-C30/3-NA	721604	1/28
32	440	15	480Y/277	10			MCB-C32/3-NA	721605	1/28
35	440	15	240	10			MCB-C35/3-NA	721606	1/28
40	440	15	240	10			MCB-C40/3-NA	721607	1/28
50	415	15	240	10			MCB-C50/3-NA	721608	1/28
63	415	15	240	10			MCB-C63/3-NA	721609	1/28

4-poles

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to UL489 (V)	Breaking capacity acc. to UL489 (kA)	SWD	NFPA 79	Type Designation	Article No.	Units per package
0.5	440	15	480Y/277	10		AWG18	MCB-C0,5/4-NA	721610	1/20
1	440	15	480Y/277	10		AWG18	MCB-C1/4-NA	721611	1/20
1.5	440	15	480Y/277	10		AWG18	MCB-C1,5/4-NA	721612	1/20
2	440	15	480Y/277	10		AWG18	MCB-C2/4-NA	721613	1/20
3	440	15	480Y/277	10		AWG18	MCB-C3/4-NA	721614	1/20
4	440	15	480Y/277	10		AWG18	MCB-C4/4-NA	721615	1/20
5	440	15	480Y/277	10		AWG18	MCB-C5/4-NA	721616	1/20
6	440	15	480Y/277	10		AWG18	MCB-C6/4-NA	721617	1/20
7	440	15	480Y/277	10		AWG18	MCB-C7/4-NA	721618	1/20
8	440	15	480Y/277	10		AWG16	MCB-C8/4-NA	721619	1/20
10	440	15	480Y/277	10		AWG16	MCB-C10/4-NA	721620	1/20
13	440	15	480Y/277	10			MCB-C13/4-NA	721621	1/20
15	440	15	480Y/277	14			MCB-C15/4-NA	721622	1/20
16	440	15	480Y/277	14			MCB-C16/4-NA	721623	1/20
20	440	15	480Y/277	14			MCB-C20/4-NA	721624	1/20
25	440	15	480Y/277	14			MCB-C25/4-NA	721625	1/20
30	440	15	480Y/277	10			MCB-C30/4-NA	721626	1/20
32	440	15	480Y/277	10			MCB-C32/4-NA	721627	1/20
35	440	15	240	10			MCB-C35/4-NA	721628	1/20
40	440	15	240	10			MCB-C40/4-NA	721629	1/20
50	415	15	240	10			MCB-C50/4-NA	721630	1/20
63	415	15	240	10			MCB-C63/4-NA	721631	1/20

Characteristic D

1-pole

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to UL489 (V)	Breaking capacity acc. to UL489 (kA)	SWD	NFPA 79	Type Designation	Article No.	Units per package
0.5	240	15	277	10	SWD	AWG 18	MCB-D0,5/1-NA	721632	2/80
1	240	15	277	10	SWD	AWG 18	MCB-D1/1-NA	721633	2/80
1.5	240	15	277	10	SWD	AWG 18	MCB-D1,5/1-NA	721634	2/80
2	240	15	277	10	SWD	AWG 18	MCB-D2/1-NA	721635	2/80
3	240	15	277	10	SWD	AWG 18	MCB-D3/1-NA	721636	2/80
4	240	15	277	10	SWD	AWG 18	MCB-D4/1-NA	721637	2/80
5	240	15	277	10	SWD	AWG 18	MCB-D5/1-NA	721638	2/80
6	240	15	277	10	SWD	AWG 18	MCB-D6/1-NA	721639	2/80
7	240	15	277	10	SWD	AWG 18	MCB-D7/1-NA	721640	2/80
8	240	15	277	10	SWD	AWG 16	MCB-D8/1-NA	721641	2/80
10	240	15	277	10	SWD	AWG 16	MCB-D10/1-NA	721642	2/80
13	240	15	277	14	SWD		MCB-D13/1-NA	721643	2/80
15	240	15	277	14	SWD		MCB-D15/1-NA	721644	2/80
16	240	15	277	14	SWD		MCB-D16/1-NA	721645	2/80
20	240	15	277	14	SWD		MCB-D20/1-NA	721646	2/80
25	240	15	277	10			MCB-D25/1-NA	721647	2/80
30	240	15	277	10			MCB-D30/1-NA	721648	2/80
32	240	15	277	10			MCB-D32/1-NA	721649	2/80
35	240	15	240	10			MCB-D35/1-NA	721650	2/80
40	240	15	240	10			MCB-D40/1-NA	721651	2/80

2-poles

0.5	415	15	480Y/277	10	SWD	AWG 18	MCB-D0,5/2-NA	721652	1/40
1	415	15	480Y/277	10	SWD	AWG 18	MCB-D1/2-NA	721653	1/40
1.5	415	15	480Y/277	10	SWD	AWG 18	MCB-D1,5/2-NA	721654	1/40
2	415	15	480Y/277	10	SWD	AWG 18	MCB-D2/2-NA	721655	1/40
3	415	15	480Y/277	10	SWD	AWG 18	MCB-D3/2-NA	721656	1/40
4	415	15	480Y/277	10	SWD	AWG 18	MCB-D4/2-NA	721657	1/40
5	415	15	480Y/277	10	SWD	AWG 18	MCB-D5/2-NA	721658	1/40
6	415	15	480Y/277	10	SWD	AWG 18	MCB-D6/2-NA	721659	1/40
7	415	15	480Y/277	10	SWD	AWG 18	MCB-D7/2-NA	721660	1/40
8	415	15	480Y/277	10	SWD	AWG 16	MCB-D8/2-NA	721661	1/40
10	415	15	480Y/277	10	SWD	AWG 16	MCB-D10/2-NA	721662	1/40
13	415	15	480Y/277	14	SWD		MCB-D13/2-NA	721663	1/40
15	415	15	480Y/277	14	SWD		MCB-D15/2-NA	721664	1/40
16	415	15	480Y/277	14	SWD		MCB-D16/2-NA	721665	1/40
20	415	15	480Y/277	14	SWD		MCB-D20/2-NA	721666	1/40
25	415	15	480Y/277	10			MCB-D25/2-NA	721667	1/40
30	415	15	480Y/277	10			MCB-D30/2-NA	721668	1/40
32	415	15	480Y/277	10			MCB-D32/2-NA	721669	1/40
35	415	15	240	10			MCB-D35/2-NA	721670	1/40
40	415	15	240	10			MCB-D40/2-NA	721671	1/40

Rated current I_n (A)	Rated voltage acc. to IEC/EN 60947-2 (V)	Breaking capacity acc. to IEC/EN 60947-2 (kA)	Rated voltage acc. to UL489 (V)	Breaking capacity acc. to UL489 (kA)	SWD	NFPA 79	Type Designation	Article No.	Units per package
3-poles									
0.5	415	15	480Y/277	10	SWD	AWG 18	MCB-D0,5/3-NA	721672	1/28
1	415	15	480Y/277	10	SWD	AWG 18	MCB-D1/3-NA	721673	1/28
1.5	415	15	480Y/277	10	SWD	AWG 18	MCB-D1,5/3-NA	721674	1/28
2	415	15	480Y/277	10	SWD	AWG 18	MCB-D2/3-NA	721675	1/28
3	415	15	480Y/277	10	SWD	AWG 18	MCB-D3/3-NA	721676	1/28
4	415	15	480Y/277	10	SWD	AWG 18	MCB-D4/3-NA	721677	1/28
5	415	15	480Y/277	10	SWD	AWG 18	MCB-D5/3-NA	721678	1/28
6	415	15	480Y/277	10	SWD	AWG 18	MCB-D6/3-NA	721679	1/28
7	415	15	480Y/277	10	SWD	AWG 18	MCB-D7/3-NA	721680	1/28
8	415	15	480Y/277	10	SWD	AWG 16	MCB-D8/3-NA	721681	1/28
10	415	15	480Y/277	10	SWD	AWG 16	MCB-D10/3-NA	721682	1/28
13	415	15	480Y/277	14	SWD		MCB-D13/3-NA	721683	1/28
15	415	15	480Y/277	14	SWD		MCB-D15/3-NA	721684	1/28
16	415	15	480Y/277	14	SWD		MCB-D16/3-NA	721685	1/28
20	415	15	480Y/277	14	SWD		MCB-D20/3-NA	721686	1/28
25	415	15	480Y/277	10			MCB-D25/3-NA	721687	1/28
30	415	15	480Y/277	10			MCB-D30/3-NA	721688	1/28
32	415	15	480Y/277	10			MCB-D32/3-NA	721689	1/28
35	415	15	240	10			MCB-D35/3-NA	721690	1/28
40	415	15	240	10			MCB-D40/3-NA	721691	1/28
4-poles									
0.5	415	15	480Y/277	10		AWG18	MCB-D0,5/4-NA	721692	1/20
1	415	15	480Y/277	10		AWG18	MCB-D1/4-NA	721693	1/20
1.5	415	15	480Y/277	10		AWG18	MCB-D1,5/4-NA	721694	1/20
2	415	15	480Y/277	10		AWG18	MCB-D2/4-NA	721695	1/20
3	415	15	480Y/277	10		AWG18	MCB-D3/4-NA	721696	1/20
4	415	15	480Y/277	10		AWG18	MCB-D4/4-NA	721697	1/20
5	415	15	480Y/277	10		AWG18	MCB-D5/4-NA	721698	1/20
6	415	15	480Y/277	10		AWG18	MCB-D6/4-NA	721699	1/20
7	415	15	480Y/277	10		AWG18	MCB-D7/4-NA	721700	1/20
8	415	15	480Y/277	10		AWG16	MCB-D8/4-NA	721701	1/20
10	415	15	480Y/277	10		AWG16	MCB-D10/4-NA	721702	1/20
13	415	15	480Y/277	10			MCB-D13/4-NA	721703	1/20
15	415	15	480Y/277	14			MCB-D15/4-NA	721704	1/20
16	415	15	480Y/277	14			MCB-D16/4-NA	721705	1/20
20	415	15	480Y/277	14			MCB-D20/4-NA	721706	1/20
25	415	15	480Y/277	14			MCB-D25/4-NA	721707	1/20
30	415	15	480Y/277	10			MCB-D30/4-NA	721708	1/20
32	415	15	480Y/277	10			MCB-D32/4-NA	721709	1/20
35	415	15	240	10			MCB-D35/4-NA	721710	1/20
40	415	15	240	10			MCB-D40/4-NA	721711	1/20

■ Miniature Circuit Breakers MCB-...-NA

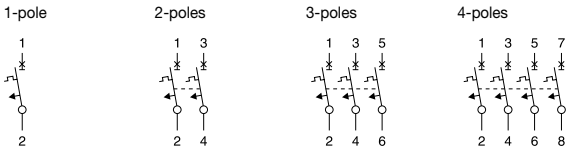
Accessories:

Tripping signal contact for subsequent installation	AXAL-UNI	720030

■ Technical Data IEC/EN

		MCB-NA
Product standard Classified according to Current test marks as printed onto the device		IEC/EN 60947-2 IEC 61373, EN 45545-2
Number of poles		1, 2, 3, 4
Mechanical		
Device width		17.7 mm (1-pole), 35.4 mm (2-poles), 53.1 mm (3-poles), 70.8 mm (4-poles)
Frame size		45 mm
Device height		105 mm
Device depth		60 mm
Terminals		lift terminal / ring-tongue
Terminal capacity rigid solid/stranded wire		1-25 mm^2
Terminal screw		M5 (with slotted screw Pozidriv PZ2)
Fastening torque of terminal screws		max. 2.4 Nm
Degree of protection (DIN VDE 0470)		
Surface mounted		IP20
Built-in behind panel		IP40
Contact position indicator		red / green
Electrical		
Rated voltage	U_n	Only characteristic B, C (up to 40 A): 254/440 V AC For characteristic B, C (50 and 63 A) and characteristic D: 240/415 V AC
Rated current	I_n	0.5, 1, 1.5, 2, 3, 4, 5, 6, 7, 8, 10, 13, 15, 16, 20, 25, 30, 32, 35, 40, 50, 63 A
Rated insulation voltage	U_i	440 V AC
Rated impulse withstand voltage	U_{imp}	4 kV (1.2/50) µsec
Tripping characteristic		
Conventional non-tripping current		$I_{nt} = 1.05\ I_n$
Conventional tripping current		$I_t = 1.30\ I_n$
Reference temperature		30 °C
Temperature factor		0.5%/K
Instantaneous tripping current	I_{mt}	Type B: $3\ I_n < I_{mt} = 5\ I_n$:t (I_{mt}) < 0.1 sec Type C: $5\ I_n < I_{mt} = 10\ I_n$:t ($I_{mt}$) < 0.1 sec Type D: $10\ I_n < I_{mt} = 20\ I_n$:t ($I_{mt}$) < 0.1 sec
Rated short-circuit breaking capacity	I_{cu}	15 kA
Service short circuit capacity	I_{cs}	7.5 kA
Selectivity class		3 (acc. to EN 60898)
Number of electrical operations		> 1,500
Number of mechanical operations		> 10,000
Climatic conditions		acc. to IEC 60068-2-30 (25..55°C / 90..95% RH)
Operating temperature range		-40°C up to +75°C
Storage- and transport temperature		-40°C up to +75°C
Operating utility frequency		50/60 Hz

■ Connection diagram

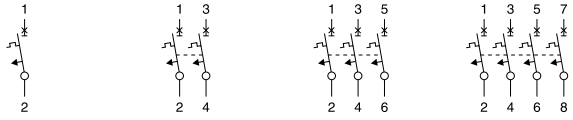


■ Technical Data UL

		MCB-NA
Product standard		UL 489, CSA C22.2 No. 5-02
Number of poles		1, 2, 3, 4
Mechanical		
Device width		0.697 in. (1-pole), 1.394 in. (2-poles), 2.090 in. (3-poles), 2.788 in. (4-poles)
Frame size		1.772 in.
Device height		4.134 in.
Device depth		2.362 in.
Terminals		lift terminal / ring-tongue
Terminal capacity rigid solid/stranded wire		1 Wire: #18-6 AWG (Cu only) 2 Wires: #18-10 AWG (Cu only)
Terminal screw		M5 (with slotted screw Pozidriv PZ2)
Fastening torque of terminal screws		#18-12 AWG: 2.4 Nm (21 lb-in) #10-8 AWG: 2.8 Nm (25 lb-in) #6 AWG: 4 Nm (36 lb-in)
Contact position indicator		red / green
Electrical		
Rated voltage	U_n	0.5-32 A: 480Y/277 V AC, 35-63 A: 240 V AC
Rated current	I_n	0.5, 1, 1.5, 2, 3, 4, 5, 6, 7, 8, 10, 13, 15, 16, 20, 25, 30, 32, 35, 40, 50 (not D), 63 (not D) A
Tripping characteristic		
Conventional non-tripping current		$I_{nt} = 1{,}00\ I_n$
Conventional tripping current		$I_t = 1.35\ I_n$
Reference temperature		25 °C
Temperature factor		0.5%/K
Instantaneous tripping current	I_{mt}	Type B: $3\ I_n < I_{mt} = 5\ I_n$:t (I_{mt}) < 0.1 sec Type C: $5\ I_n < I_{mt} = 10\ I_n$:t ($I_{mt}$) < 0.1 sec Type D: $10\ I_n < I_{mt} = 20\ I_n$:t ($I_{mt}$) < 0.1 sec
Current interrupting rating		
10 kA		B0.5-13A, B30-63A, C0.5-13A, C30-63A, D0.5-10A, D25-40A
14 kA		B15-25A, C15-25A, D13-20A
Current-Limiting		
High interrupt current at 240 V / 10 kA		$I^2t = 42\ kA^2s$ and $I_{peak} = 6.2$ kA
Intermediate interrupt current at 240 V / 5 kA		$I^2t = 24\ kA^2s$ and $I_{peak} = 4.2$ kA
Threshold current at 240 V / 2.6 kA		$I^2t = 18\ kA^2s$ and $I_{peak} = 2.9$ kA
High interrupt current at 480Y/277V / 10 kA		$I^2t = 60\ kA^2s$ and $I_{peak} = 6.2$ kA
High interrupt current at 480Y/277V / 14 kA		$I^2t = 65\ kA^2s$ and $I_{peak} = 7.5$ kA
Intermediate interrupt current at 480Y/277V / 5 kA		$I^2t = 36\ kA^2s$ and $I_{peak} = 4.6$ kA
Threshold current at 480Y/277V / 2.08 kA		$I^2t = 15\ kA^2s$ and $I_{peak} = 2.2$ kA
Selectivity class		3 (acc. to EN 60898)
Number of electrical operations		6,000
Number of mechanical operations		10,000
Climatic conditions		acc. to IEC 60068-2-30 (25..55°C / 90..95% RH)
Operating temperature range		-5°C up to +40 °C
Storage- and transport temperature		-40°C up to +75°C
Operating utility frequency		50/60 Hz (B, C, D up to 40 A)
		60 Hz (50, 63 A)

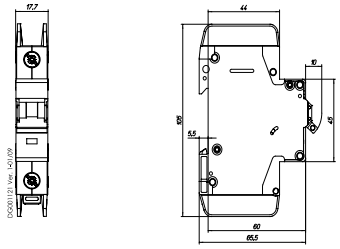
■ Connection diagram

1-pole 2-poles 3-poles 4-poles

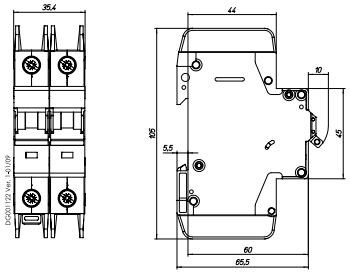


■ Dimensions (mm) MCB-...-NA

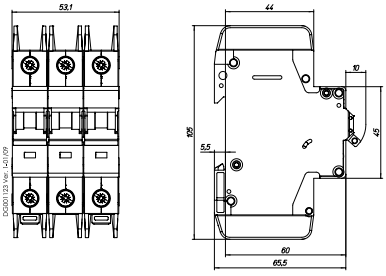
1-pole



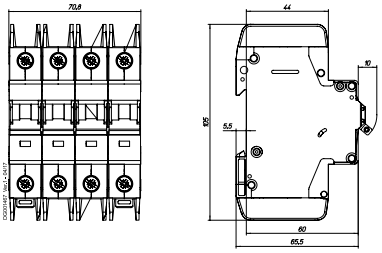
2-poles



3-poles

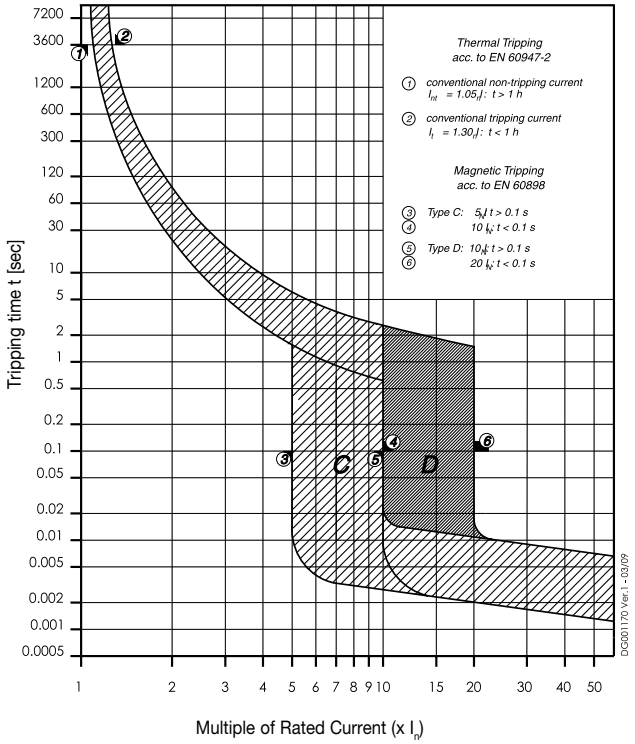


4-poles

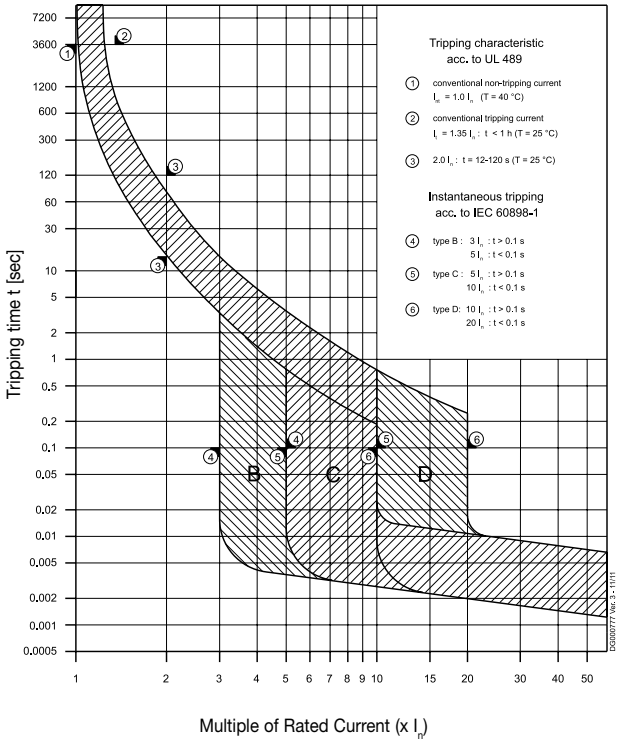


■ Tripping Characteristics MCB-...-NA

Characteristics C and D - EN/IEC 60947-2



Characteristics B, C and D - UL 489



■ Internal Resistance MCB-...-NA (50/60Hz)

Type B At room temperature (single pole)	
I_n [A]	R* [mΩ]
1	1100
1.5	900
2	350
3	220
4	87
5	72
6	47
7	38
8	30
10	17
13	13
15	8.0
16	8.0
20	6.9
25	3.9
30	2.8
32	3.0
35	2.9
40	1.9
50	1.6
63	1.2

* 50 Hz

Type C At room temperature (single pole)	
I_n [A]	R* [mΩ]
1	1100
1.5	580
2	350
3	130
4	87
5	60
6	32
7	28
8	19
10	14
13	13
15	8.0
16	8.0
20	6.9
25	3.9
30	2.8
32	3.0
35	2.5
40	1.9
50	1.6
63	1.2

* 50 Hz

Type D At room temperature (single pole)	
I_n [A]	R* [mΩ]
1	800
1.5	490
2	260
3	130
4	87
5	58
6	32
7	28
8	19
10	14
13	11
15	8.0
16	8.0
20	4.9
25	3.5
30	2.5
32	2.6
35	2.5
40	1.8
50	1.7
63	1.2

* 50 Hz

■ Power Loss at In MCB-...-NA

Type B				
	1p	2p	3p	4p
I_n [A]	P [W]	P [W]	P [W]	P [W]
1	1.2	2.2	3.6	4.8
1.5	2.2	4.4	6.6	8.8
2	1.4	2.8	4.2	5.6
3	2.2	4.4	6.6	8.8
4	1.4	2.8	4.2	5.6
5	1.9	3.8	5.7	7.6
6	1.8	3.6	5.4	7.2
7	2	4	6	8
8	2.1	4.2	6.3	8.4
10	1.8	3.6	5.4	7.2
13	2.5	5	7.5	10
15	2	4	6	8
16	2.3	4.6	6.9	9.2
20	3.3	6.6	9.9	13.2
25	2.8	5.6	8.4	11.2
30	3	6	9	12
32	3.5	7	10.5	14
35	4	8	12	16
40	3.4	6.8	10.2	13.6
50	4.4	8.8	13.2	17.6
63	5.5	11	16.5	22

* 50/60 Hz

Type C				
	1p	2p	3p	4p
I_n [A]	P [W]	P [W]	P [W]	P [W]
1	1.2	2.4	3.6	4.8
1.5	1.3	2.6	3.9	5.2
2	1.4	2.8	4.2	5.6
3	1.2	2.4	3.6	4.8
4	1.5	3	4.5	6
5	1.6	3.2	4.8	6.4
6	1.2	2.4	3.6	4.8
7	1.4	2.8	4.2	5.6
8	1.3	2.6	3.9	5.2
10	1.5	3	4.5	6
13	2.5	5	7.5	10
15	2	4	6	8
16	2.3	4.6	6.9	9.2
20	3.3	6.6	9.9	13.2
25	2.8	5.6	8.4	11.2
30	3	6	9	12
32	3.5	7	10.5	14
35	3.7	7.4	11.1	14.8
40	3.4	6.8	10.2	13.6
50	4.4	8.8	13.2	17.6
63	5.5	11	16.5	22

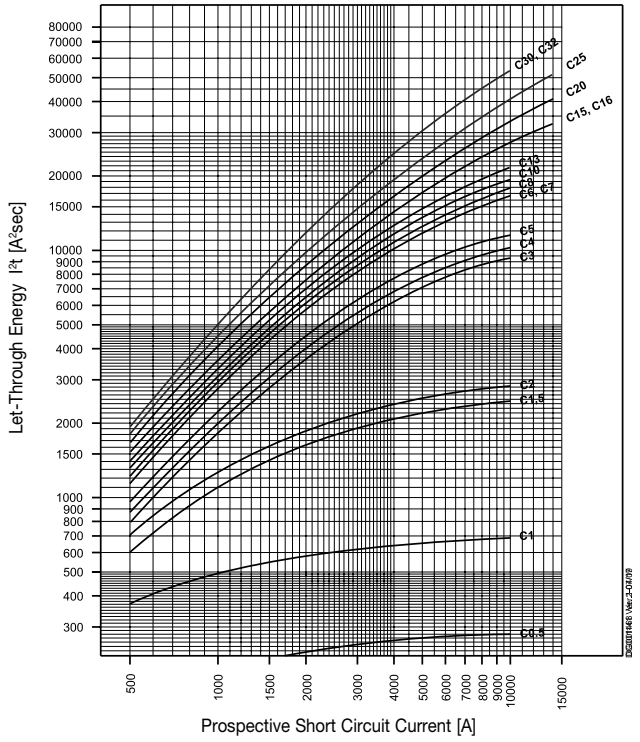
* 50/60 Hz

Type D				
	1p	2p	3p	4p
I_n [A]	P [W]	P [W]	P [W]	P [W]
1	0.8	1.6	2.4	3.2
1.5	1.1	2.2	3.3	4.4
2	1.1	2.2	3.3	4.8
3	1.2	2.4	3.6	4.8
4	1.5	3	4.5	6
5	1.5	3	5.5	6
6	1.2	2.4	3.6	4.8
7	1.4	2.8	4.2	5.6
8	1.3	2.6	3.9	5.2
10	1.5	3	4.5	6
13	2	4	6	8
15	2	4	6	8
16	2.3	4.6	6.9	9.2
20	2.2	4.4	6.6	8.8
25	2.5	5	7.5	10
30	2.7	5.4	8.1	10.8
32	3	6	9	12
35	3.8	7.6	11.4	15.2
40	3.1	6.2	9.3	12.4
50	4.9	9.8	14.7	19.6
63	5.5	11	16.5	22

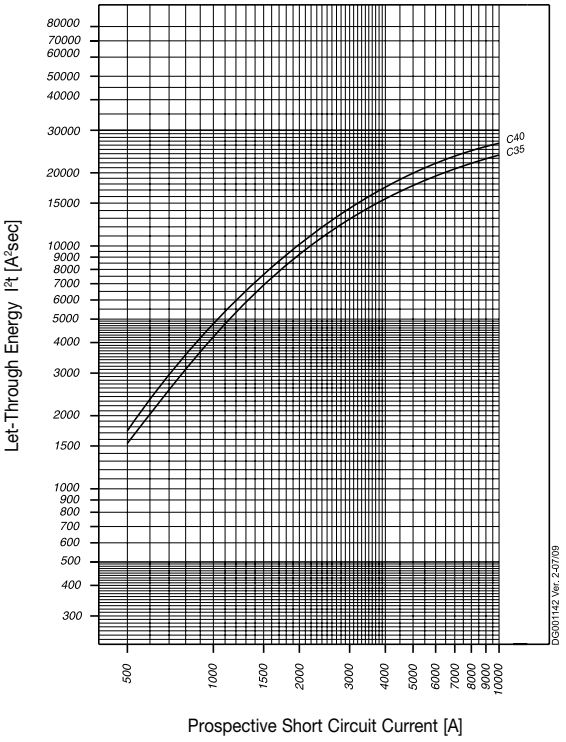
* 50/60 Hz

■ Maximum Let-Through Energy MCB-...-NA

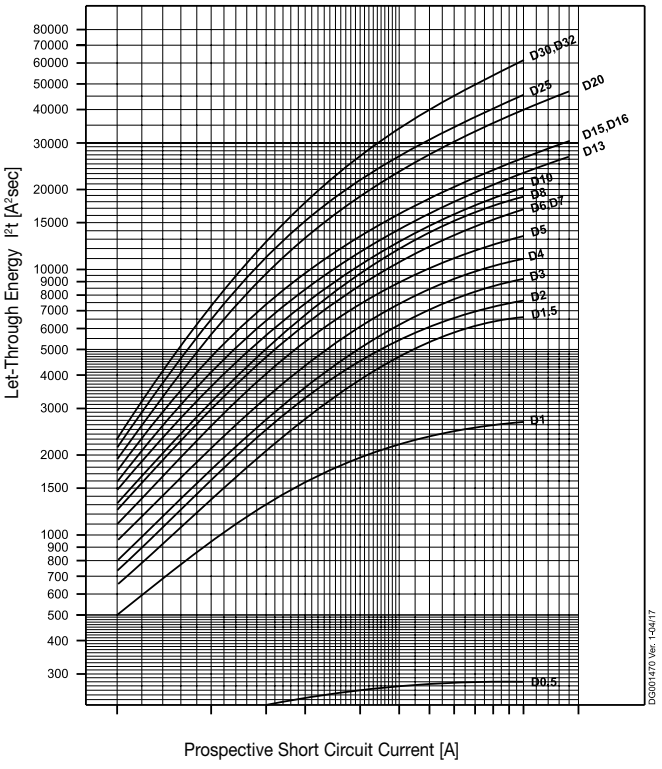
Type C (0.5 - 32 A), 277 V



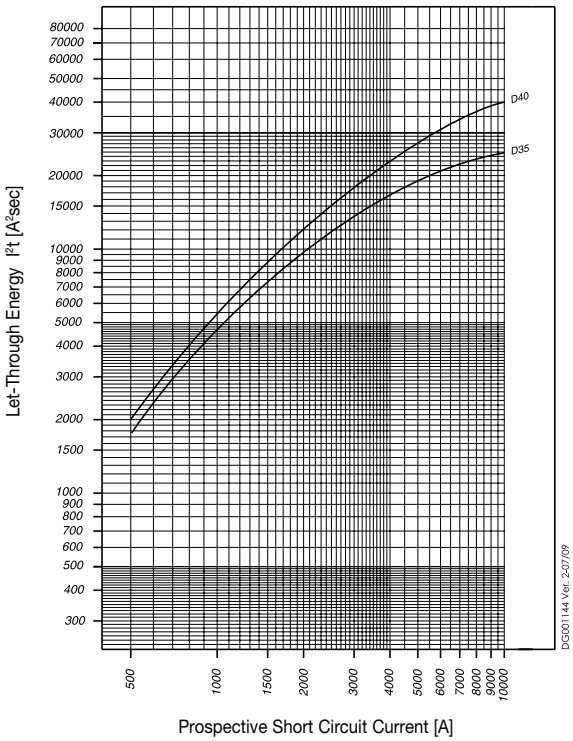
Type C (35 - 40 A), 240 V



Type D (0.5 - 32 A), 277 V

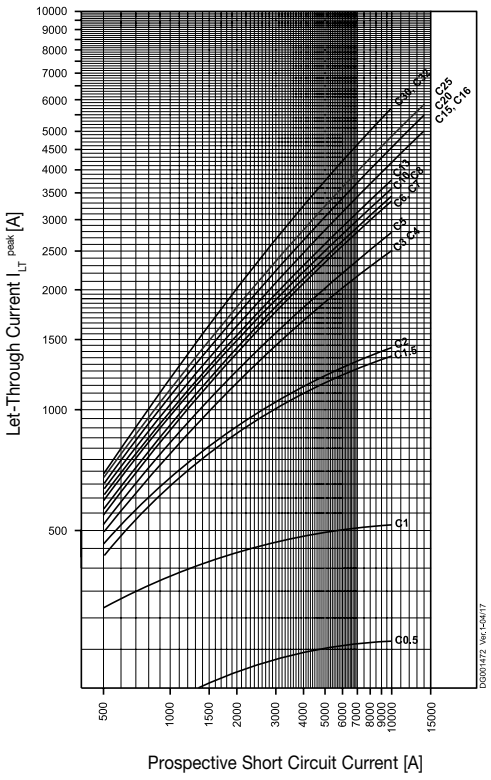


Type D (35 - 40 A), 240 V

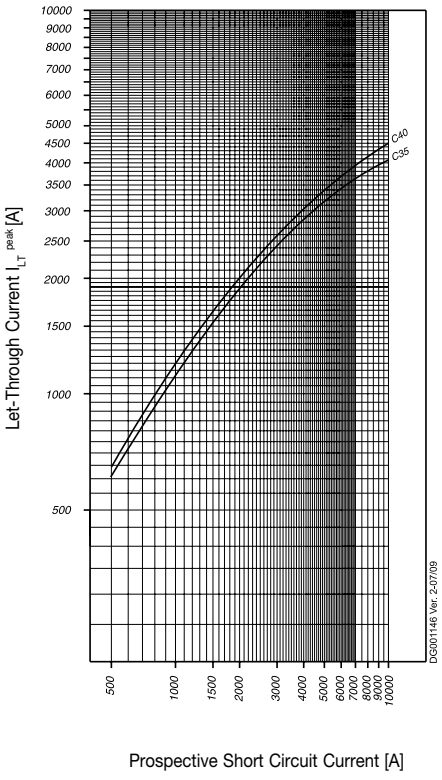


■ Maximum Let-Through Current MCB-...-NA

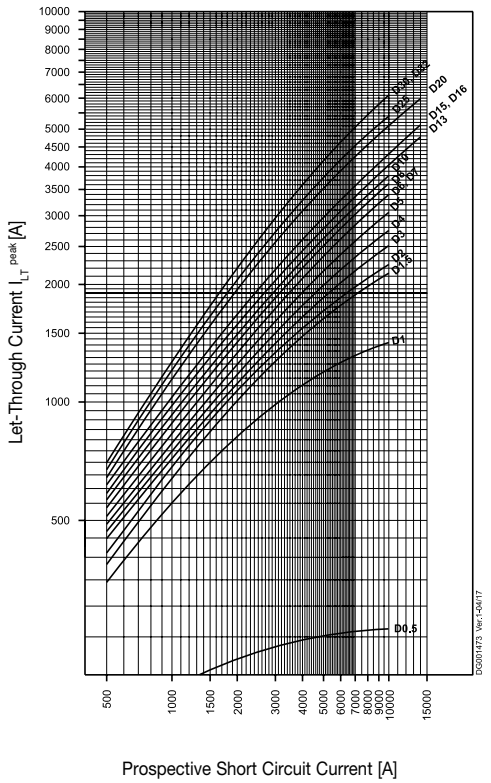
Type C (0.5 - 32 A), 277 V



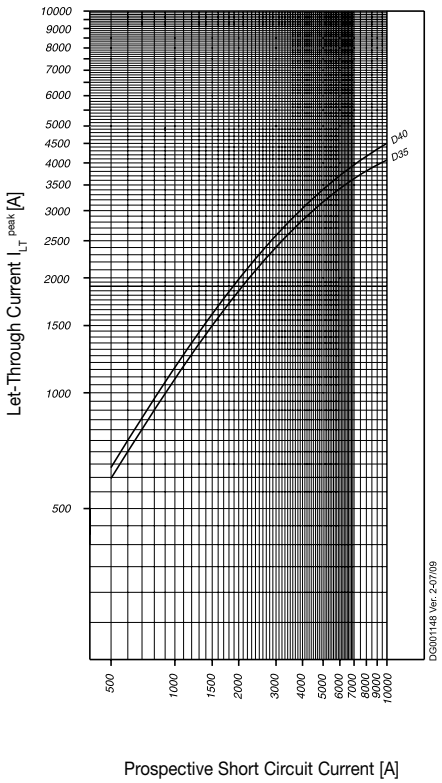
Type C (35 - 40 A), 240 V



Type D (0.5 - 32 A), 277 V



Type D (35 - 40 A), 240 V



■ Influence of Ambient Temperature on Load Carrying Capacity (temperature derating)

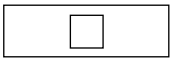
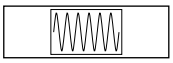
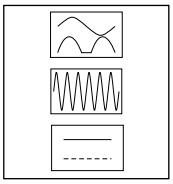
Values in the table display the nominal current In in ampere depending on the ambient temperature

	Ambient Temperature T [°C]										
	-25	-10	5	15	20	25	30	40*	50	55	60
I_n [A]											
0.5	0.6	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5
1	1.3	1.2	1.1	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9
1.5	1.9	1.8	1.7	1.7	1.6	1.6	1.6	1.5	1.4	1.4	1.4
2	2.5	2.4	2.3	2.2	2.2	2.1	2.1	2.0	1.9	1.9	1.8
3	3.8	3.6	3.4	3.3	3.2	3.2	3.1	3.0	2.9	2.8	2.8
4	5.0	4.8	4.6	4.4	4.3	4.2	4.2	4.0	3.8	3.8	3.7
5	6.3	6.0	5.7	5.5	5.4	5.3	5.2	5.0	4.8	4.7	4.6
6	7.6	7.2	6.8	6.6	6.5	6.4	6.2	6.0	5.8	5.6	5.5
7	8.5	804	8.0	7.7	7.6	7.4	7.3	7.0	6.7	6.6	6.4
8	10.1	9.6	9.1	8.8	8.6	8.5	8.3	8.0	7.7	7.5	7.4
10	12.6	12.0	11.4	11.0	10.8	10.6	10.4	10.0	9.6	9.4	9.2
13	16.4	15.6	14.8	14.3	14.0	13.8	13.5	13.0	12.5	12.2	12.0
15	18.9	18.0	17.1	16.5	16.2	15.9	15.6	15.0	14.4	14.1	13.8
16	20.2	19.2	18.2	17.6	17.3	17.0	16.6	16.0	15.4	15.0	14.7
20	25.2	24.0	22.8	22.0	21.6	21.2	20.8	20.0	19.2	18.8	18.4
25	31.5	30.0	28.5	27.5	27.0	26.5	26.0	25.0	24.0	23.5	23.0
30	37.8	36.0	34.2	33.1	32.4	31.8	31.2	30.0	28.8	28.2	27.6
32	40.3	38.4	36.5	35.2	34.6	33.9	33.3	32.0	30.7	30.1	29.4
35	44.1	42.0	39.9	38.5	37.8	37.1	36.4	35.0	33.6	32.9	32.2
40	50.4	48.0	45.6	44.0	43.2	42.4	41.6	40.0	38.4	37.6	36.8
50	63.0	60.0	57.0	55.0	54.0	53.0	52.0	50.0	48.0	47.0	46.0
63	79.4	75.6	71.8	69.3	68.0	66.8	65.5	63.0	60.5	59.2	58.0

*IEC 60947-2, nominal current at reference calibration temperature 40°C

■ Residual Current Devices - General Data

Short description of the most important RCD types

Symbol	Description
	Conditionally surge-current proof (>250 A, 8/20 µs) for general application.
	Type A: AC and pulsating DC current sensitive RCCB, not affected by smooth DC fault currents up to 6 mA
	Frequency range up to 20 kHz
	Trips also at frequency mixtures (10 Hz, 50 Hz, 1000 Hz)
	Type B: All-current sensitive RCD switchgear for applications where DC fault currents may occur. Non-selective, non-delayed. Protection against all kinds of fault currents.

■ Kind of residual current and correct use of RCD Types

Kind of current	Current profile	Correct use / application field of RCCB types				Tripping current
		A	F	B	/B+ kHz	
Sinusoidal AC residual current		●	●	●		0.5 to 1.0 $I_{\Delta n}$
Pulsating DC residual current (positive or negative half-wave)		●	●	●		0.35 to 1.4 $I_{\Delta n}$
Cut half-wave current		●	●	●		Lead angle 90°: 0.25 to 1.4 $I_{\Delta n}$
Lead angle 90° el Lead angle 135° el		●	●	●		Lead angle 135°: 0.11 to 1.4 $I_{\Delta n}$
Half-wave with smooth DC current of 6 mA		●	●	●		max. 1.4 $I_{\Delta n}$ + 6 mA
Half-wave with smooth DC current of 10 mA		-	●	●		max. 1.4 $I_{\Delta n}$+ 10 mA
Smooth DC current		-	-	●		0.5to2.0$I_{\Delta n}$

3

■ Tripping time

Break time and non-actuating time for alternating residual currents (r.m.s. values) for type AC and A RCCB

Classification	$I_{\Delta n}$ mA		$I_{\Delta n}$	$2xI_{\Delta n}$	$5xI_{\Delta n}$	5 x $I_{\Delta n}$ or 0.25A	500A
Standard RCD Conditionally surge current-proof 250 A	≤30	Max. tripping time (s)	0.3	0.15		0.04	0.04
Standard RCD Conditionally surge current-proof 250 A	>30	Max. tripping time (s)	0.3	0.15	0.04		0.04

Break time for half-wave pulsating residual currents (r.m.s. values) for type A RCCB

Classification	$I_{\Delta n}$ mA		$1.4xI_{\Delta n}$	$2xI_{\Delta n}$	$2.8xI_{\Delta n}$	$4xI_{\Delta n}$	7 x $I_{\Delta n}$	0.35 A	0.5 A	350A
Standard RCD Conditionally surge current-proof 250 A	<30	Max. tripping time (s)		0.3		0.15			0.04	0.04
Standard RCD Conditionally surge current-proof 250 A	30	Max. tripping time (s)	0.3		0.15			0.04		0.04
Standard RCD Conditionally surge current-proof 250 A	>30	Max. tripping time (s)	0.3		0.15		0.04			0.04

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package

Type A

10 kA, 1+N-poles
Conditionally Surge Current-Proof 250A, Pulse Current Sensitive, Type A

Characteristic B

6/0.03	RCBO-B6/1N/30mA-A	719934	1/60
10/0.03	RCBO-B10/1N/30mA-A	719935	1/60
13/0.03	RCBO-B13/1N/30mA-A	719936	1/60
16/0.03	RCBO-B16/1N/30mA-A	719937	1/60
20/0.03	RCBO-B20/1N/30mA-A	719938	1/60
25/0.03	RCBO-B25/1N/30mA-A	719939	1/60
32/0.03	RCBO-B32/1N/30mA-A	719940	1/60
40/0.03	RCBO-B40/1N/30mA-A	719941	1/60

Characteristic C

6/0.03	RCBO-C6/1N/30mA-A	719942	1/60
10/0.03	RCBO-C10/1N/30mA-A	719943	1/60
13/0.03	RCBO-C13/1N/30mA-A	719944	1/60
16/0.03	RCBO-C16/1N/30mA-A	719945	1/60
20/0.03	RCBO-C20/1N/30mA-A	719946	1/60
25/0.03	RCBO-C25/1N/30mA-A	719947	1/60
32/0.03	RCBO-C32/1N/30mA-A	719948	1/60
40/0.03	RCBO-C40/1N/30mA-A	719949	1/60

Characteristic D

6/0.03	RCBO-D6/1N/30mA-A	719950	1/60
10/0.03	RCBO-D10/1N/30mA-A	719951	1/60
13/0.03	RCBO-D13/1N/30mA-A	719952	1/60
16/0.03	RCBO-D16/1N/30mA-A	719953	1/60
20/0.03	RCBO-D20/1N/30mA-A	719954	1/60

■ Specifications

Description

- Combined RCD/MCB device
- Line voltage-independent tripping
- Compatible with standard busbar
- Twin-purpose terminal (lift/open-mouthed) above and below
- Busbar positioning optionally above or below
- Free terminal space despite installed busbar
- Guide for secure terminal connection
- Contact position indicator red - green
- Comprehensive range of accessories suitable for subsequent installation
- Nameplate
- The test key “T” must be pressed every 6 months. The system operator must be informed of this obligation and his responsibility in a way that can be proven. Under special conditions (e.g. damply and/or dusty environments, environments with polluting and/or corroding conditions, environments with large temperature fluctuations, installations with a risk of overvoltages due to switching of equipment and/or atmospheric discharges, portable equipment ...), it’s recommended to test in monthly intervals.
- Pressing the test key “T” serves the only purpose of function testing the residual current device (RCD). This test does not make earthing resistance measurement (R_E), or proper checking of the earth conductor condition redundant, which must be performed separately.
- **Type -A**: Protects against special forms of residual pulsating DC which have not been smoothed.

Accessories:

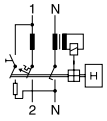
Auxiliary switch for subsequent installation	AX-MCB	720031
	2AX-MCB	720032
Tripping signal switch for subsequent installation	AXAL-MCB	720033
Shunt trip release	SHT..-MCB	720041, 720042
Tripping module	RTU-RCBO	720035

■ Technical Data

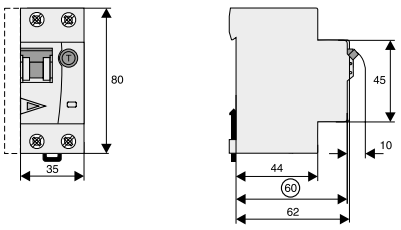
		RCBO, 1+N-poles
Electrical		
Design according to Classified according to Current test marks as printed onto the device		IEC/EN 61009, IEC/EN 60479-2 IEC 61373, EN 45545-2
Tripping line voltage-independent		instantaneous 250A (8/20µs), surge current-proof
Type G, F		10 ms delay 3kA (8/20µs), surge current-proof
Rated voltage	U_n	240 V AC, 50 Hz AC, A types: 50/60 Hz
Rated tripping current	$I_{\Delta n}$	10, 30, 100, 300 mA
Rated non-tripping current	$I_{\Delta no}$	0.5 $I_{\Delta n}$
Sensitivity		AC and pulsating DC
Selectivity class		3
Rated short circuit capacity		
RCBO acc. to IEC/EN 61009	I_{cn}	10 kA
acc. to IEC/EN 60947-2: 2A - 20A:	I_{cu}	15 kA
	I_{cs}	7.5 kA
acc. to IEC/EN 60947-2: 25A-40A:	I_{cn}	10 kA
	I_{cs}	5 kA
	I_{cn}	6 kA
Rated current		2 - 40 A
Rated impulse withstand voltage	U_{imp}	4 kV (1.2/50µs)
Characteristic		B, C, D
Maximum back-up fuse (short circuit protection)		100 A gL (>10 kA)
Endurance		
electrical components		≥ 4,000 operating cycles
mechanical components		≥ 10,000 operating cycles
Mechanical		
Frame size		45 mm
Device height		80 mm
Device width		35 mm (2MU)
Mounting		3-position DIN rail clip, permits removal from existing busbar system
Degree of protection switch		IP20
Degree of protection, built-in		IP40
Upper and lower terminals		open mouthed/lift terminals
Terminal protection		finger and hand touch safe, DGUV VS3, EN 50274
Terminal capacity		1 - 25 mm²
Terminal torque		2 - 2.4 Nm
Busbar thickness		0.8 - 2 mm
Operation temperature		-25°C to +40°C
Storage- and transport temperature		-35°C to +70°C
Resistance to climatic conditions		acc. to IEC 60068-2-30 (25..55°C / 90..95% RH)

■ Connection diagram

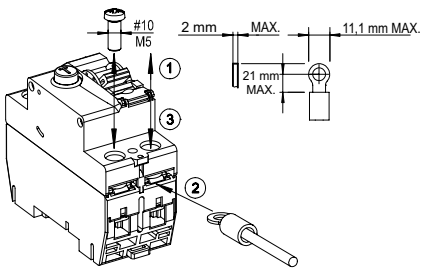
1+N-poles



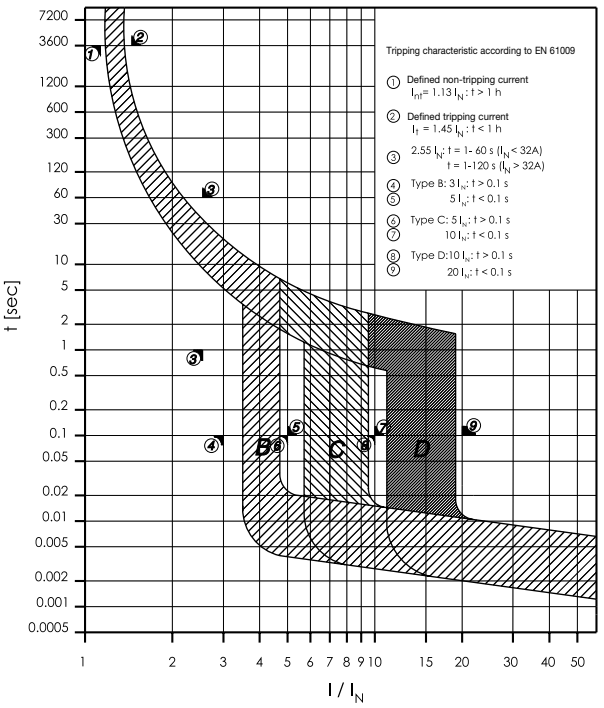
■ Dimensions (mm)



■ Connection of ring cable lugs (only RCBO...RT)



Tripping Characteristic RCBO-../1N/, Characteristics B, C and D



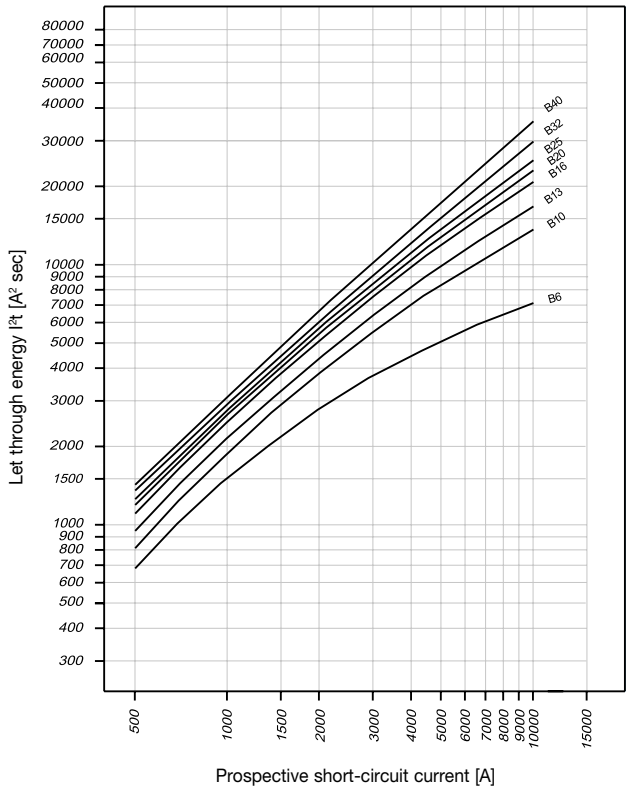
Effect of ambient temperature RCBO-../1N/

Effect of ambient temperature (MCB component)

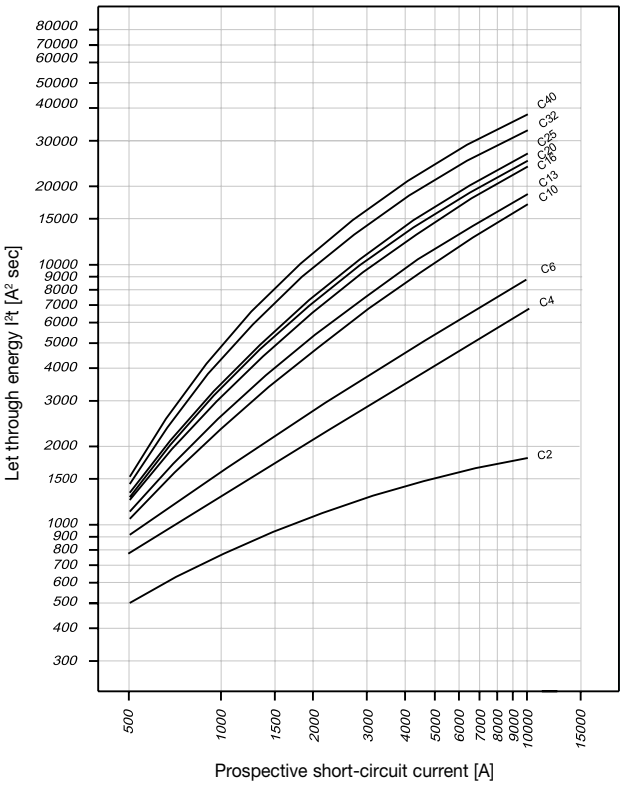
	Ambient Temperature T [°C]										
I_n [A]	-25	-15	-5	10	30	40	45	55	60	65	70
2	2.3	2.3	2.2	2.1	2	1.9	1.9	1.8	1.7	1.7	1.6
4	4.8	4.7	4.5	4.3	4	3.8	3.7	3.6	3.5	3.4	3.3
6	7.0	6.8	6.6	6.4	6	5.7	5.6	5.3	5.2	5.1	4.9
10	12.3	11.9	11.4	10.8	10	9.5	9.3	8.8	8.6	8.4	8.1
13	15.1	14.7	14.3	13.7	13	12.5	12.3	11.8	11.6	11.3	11.1
16	19.1	18.6	18.0	17.1	16	15.2	14.9	14.1	13.8	13.4	13.0
20	24.8	23.9	23.0	21.7	20	19.0	18.5	17.5	17.0	16.5	16.1
25	31.4	30.2	29.1	27.3	25	23.9	23.3	22.1	21.6	21.1	20.4
32	40.1	38.6	37.1	34.9	32	30.4	29.6	28.0	27.3	26.5	25.7
40	51.0	49.0	47.0	44.0	40	38.1	37.1	35.1	34.1	33.1	32.1

Let-through Energy RCBO-../1N/

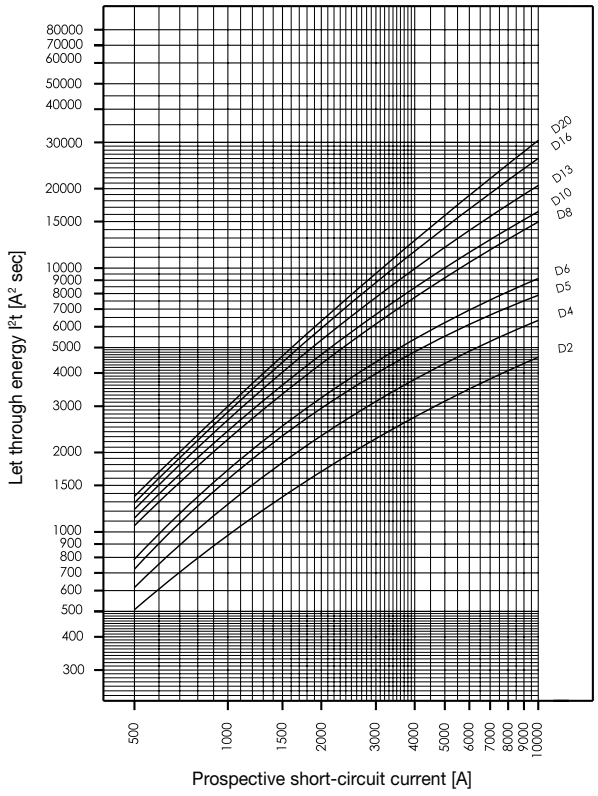
Let-through Energy RCBO, Characteristic B, 1+Npolig



Let-through Energy RCBO, Characteristic C, 1+Npolig



Let-through Energy RCBO, Characteristic D, 1+Npolig



$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
Type A			
10 kA, 1+N-pole **Conditionally surge current-proof 250 A, sensitive to residual pulsating DC, type A**			
Characteristic B			
6/0.03	RCBOE-B6/1/30mA-A	719961	1/30
10/0.03	RCBOE-B10/1/30mA-A	719962	1/30
16/0.03	RCBOE-B16/1/30mA-A	719963	1/30
20/0.03	RCBOE-B20/1/30mA-A	719964	1/30
25/0.03	RCBOE-B25/1/30mA-A	719965	1/30
32/0.03	RCBOE-B32/1/30mA-A	719966	1/30
40/0.03	RCBOE-B40/1/30mA-A	719967	1/30
Characteristic C			
6/0.03	RCBOE-C6/1/30mA-A	719968	1/30
10/0.03	RCBOE-C10/1/30mA-A	719969	1/30
16/0.03	RCBOE-C16/1/30mA-A	719970	1/30
20/0.03	RCBOE-C20/1/30mA-A	719971	1/30
25/0.03	RCBOE-C25/1/30mA-A	719972	1/30
32/0.03	RCBOE-C32/1/30mA-A	719973	1/30
40/0.03	RCBOE-C40/1/30mA-A	719974	1/30

Specifications

- Electronic residual current device / miniature circuit breaker combination in only 1MU
- Tripping line voltage dependent
- Contact position indicator red - green
- Can be sealed with leads in the ON and OFF position
- Colour coded switching toggle (designating the rated current)
- Permanently connected neutral conductor (950 mm long, blue)
- Special application in British-Standard-Distibution Boxes
- Can be connected to standard busbar (at the lower side)
- Comprehensive range of accessories can be mounted subsequently

Accessories:

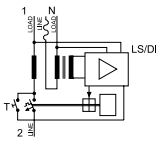
Auxiliary switch for subsequent installation	AX-MCB	720029
Tripping signal switch for subsequent installation	AXAL-UNI	720030
Tripping module	RTU-RCBO	720035

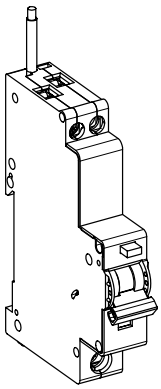
Technical Data

	RCBOE, 1+N-pole, 1MU
Electrical	
Design according to Current test marks as printed onto the device	BS/EN 61009
Number of poles	1+N-pole, pole switched, N led through (solid neutral)
Rated voltage U_n	240 VAC
Rated frequency	50 Hz
Rated current I_n	6 - 45 A
Rated tripping current $I_{\Delta n}$	10, 30, 100, 300 mA
Sensitivity	pulsating DC
Tripping Characteristic RCD component	
Tripping line voltage dependent	instantaneous
Peak withstand current	250 A (8/20 µs)
Rated non-tripping current $I_{\Delta no}$	0.5 $I_{\Delta n}$
Voltage range for protective function	184 - 264 V~
Tripping Characteristic MCB component	
Conventional non-tripping current	1.13 I_n
Conventional tripping current	1.45 I_n
Reference temperature	30°C
Characteristic	B, C
Rated breaking capacity	10 kA
Selectivity class	3
Maximum back-up fuse (short-circuit)	100 A gL (>6 kA)
Endurance	
electrical components	≥ 4,000 switching operations
mechanical components	≥ 20,000 switching operations
Mechanical	
Frame size	45 mm
Device height	102.6 mm
Device width	17.7 mm (1MU)
Mounting	quick fastening with 2 lock-in positions on DIN rail IEC/EN 60715
Degree of protection, switch	IP20
Degree of protection, built-in	IP40
Upper terminals	lift terminals
Lower terminals	open-mouthed/lift terminals
Terminal protection	finger and hand touch safe, DGUV VS3, EN 50274
Terminal capacity	1 - 25 mm^2
Terminal torque	2 - 2.4 Nm
Busbar thickness	0.8 - 2 mm
Operating temperature	-25°C to +40°C
Storage- and transport temperature	-35°C to +60°C
Resistance to climatic conditions	25-55°C/90-95% relative humidity according to IEC 60068-2

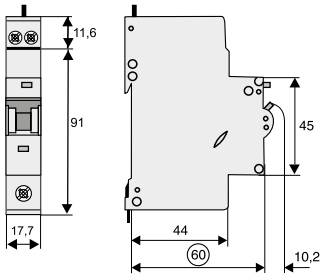
Connection diagram

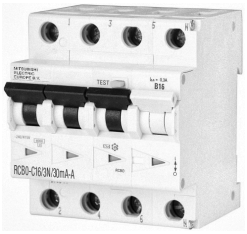
1+N-pole





Dimensions (mm)





$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
Type A			
6 kA, 3+N-poles			
Conditionally surge current-proof 250 A, sensitive to residual pulsating DC, Type A			
Characteristic C			
6/0.03	RCBO-C6/3N/30mA-A	719955	1/30
10/0.03	RCBO-C10/3N/30mA-A	719956	1/30
16/0.03	RCBO-C16/3N/30mA-A	719957	1/30
20/0.03	RCBO-C20/3N/30mA-A	719958	1/30
25/0.03	RCBO-C25/3N/30mA-A	719959	1/30
32/0.03	RCBO-C32/3N/30mA-A	719960	1/30

Specifications

- Combined RCD/MCB device
- Line voltage-independent tripping
- Compatible with standard busbar
- Twin-purpose terminal (lift/open-mouthed) above and below
- Busbar positioning optionally above or below
- Free terminal space despite installed busbar
- Guide for secure terminal connection
- Contact position indicator red - green
- Fault current tripping indicator white - blue
- Comprehensive range of accessories suitable for subsequent installation
- The test key “T” must be pressed every 6 months. The system operator must be informed of this obligation and his responsibility in a way that can be proven. Under special conditions (e.g. damply and/or dusty environments, environments with polluting and/or corroding conditions, environments with large temperature fluctuations, installations with a risk of overvoltages due to switching of equipment and/or atmospheric discharges, portable equipment ...), it’s recommended to test in monthly intervals.
- Pressing the test key “T” serves the only purpose of function testing the residual current device (RCD). This test does not make earthing resistance measurement (RE), or proper checking of the earth conductor condition redundant, which must be performed separately.
- **Type -A:** Protects against special forms of residual pulsating DC which have not been smoothed.

Accessories:

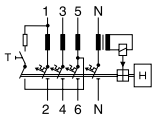
Auxiliary switch for subsequent installation	AX-MCB	720031
	2AX-MCB	720032
Tripping signal switch for subsequent installation	AXAL-MCB	720033
Shunt trip release	SHT24-MCB, SHT230-MCB	720041, 720042

Technical Data

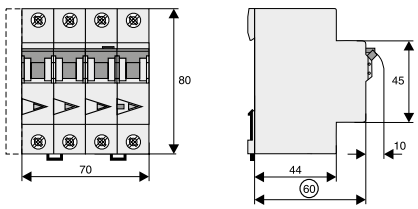
		RCBO, 3+N-poles
Electrical		
Design according to Classified according to Current test marks as printed onto the device		IEC/EN 61009, IEC/EN 60947 IEC 61373, EN 45545-2
Tripping line voltage-independent		instantaneous 250A (8/20µs), surge current-proof, N protected
Rated voltage	U_n	240/415V AC, 50Hz
Rated tripping current	$I_{\Delta n}$	30, 100, 300 mA
Rated non-tripping current	$I_{\Delta no}$	0.5 $I_{\Delta n}$
Sensitivity		AC and pulsating DC
Selectivity class		3
Rated short circuit capacity		
RCBO acc. to IEC/EN61009: 6A…16A	I_{cn}	6 kA
acc. to IEC/EN60947-2: 6A…16A	I_{cu}	6 kA
	I_{cs}	3 kA
RCBO acc. to IEC/EN61009: 6A…32A	I_{cn}	4.5 kA
acc. to IEC/EN60947-2: 6A…32A	I_{cu}	4.5 kA
	I_{cs}	3 kA
Rated current		6 - 32 A
Rated impulse withstand voltage	U_{imp}	4 kV (1.2/50µs)
Characteristic		B, C, D
Maximum back-up fuse (short circuit protection)		100 A gL (>10 kA)
Endurance		
electrical components		≥ 4,000 operating cycles
mechanical components		≥ 10,000 operating cycles
Mechanical		
Frame size		45 mm
Device height		80 mm
Device width		70 mm (4MU)
Mounting		3-position DIN rail clip, permits removal from existing busbar system
Degree of protection switch		IP20
Degree of protection, built-in		IP40
Upper and lower terminals		open mouthed/lift terminals
Terminal protection		finger and hand touch safe, DGUV VS3, EN 50274
Terminal capacity		1 - 25 mm^2
Terminal torque		2 - 2.4 Nm
Busbar thickness		0.8 - 2 mm
Operation temperature		-25°C to +40°C
Storage- and transport temperature		-35°C to +70°C
Resistance to climatic conditions		acc. to IEC 68-2 (25..55°C / 90..95% RH)

Connection diagram

3+N-poles



Dimensions (mm)



Residual Current Devices RCD

■ Device

- A complete spectrum of compact residual current devices for a wide range of applications
- For fault current/residual current protection and additional protection
- Wide variety of nominal currents
- Comprehensive range of accessories
- Real contact position indicator
- Automatic re-setting possible

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
Type A			
Conditionally surge current-proof 250 A, sensitive to residual pulsating DC, type A			
2-pole			
25/0.03	RCD-25/2/30mA - A	719904	1/60
25/0.10	RCD-25/2/100mA - A	719905	1/60
25/0.30	RCD-25/2/300mA - A	719906	1/60
40/0.03	RCD-40/2/30mA - A	719907	1/60
40/0.10	RCD-40/2/100mA - A	719908	1/60
40/0.30	RCD-40/2/300mA - A	719909	1/60
63/0.03	RCD-63/2/30mA - A	719910	1/60
63/0.10	RCD-63/2/100mA - A	719911	1/60
63/0.30	RCD-63/2/300mA - A	719912	1/60
100/0.10	RCD-100/2/100mA - A	719913	1/60
100/0.30	RCD-100/2/300mA - A	719914	1/60

4-pole			
25/0.03	RCD-25/4/30mA - A	719915	1/30
25/0.10	RCD-25/4/100mA - A	719916	1/30
25/0.30	RCD-25/4/300mA - A	719917	1/30
40/0.03	RCD-40/4/30mA - A	719918	1/30
40/0.10	RCD-40/4/100mA - A	719919	1/30
40/0.30	RCD-40/4/300mA - A	719920	1/30
63/0.03	RCD-63/4/30mA - A	719921	1/30
63/0.10	RCD-63/4/100mA - A	719922	1/30
63/0.30	RCD-63/4/300mA - A	719923	1/30
80/0.03	RCD-80/4/30mA - A	719924	1/30
80/0.30	RCD-80/4/300mA - A	719925	1/30
100/0.03	RCD-100/4/30mA - A	719926	1/30
100/0.10	RCD-100/4/100mA - A	719927	1/30
100/0.30	RCD-100/4/300mA - A	719928	1/30

■ Specifications

Description

- Residual Current Devices
- Shape compatible with and suitable for standard busbar connection to other devices of the P-series
- Twin-purpose terminal (lift/open-mouthed) above and below
- Busbar positioning optionally above or below
- Free terminal space despite installed busbar
- Auxiliary switch AX-RCD can be mounted subsequently
- Contact position indicator red - green
- Delayed types suitable for being used with standard fluorescent tubes with or without electronical ballast (30mA-RCD: 30 units per phase conductor, 100mA-RCD: 90 units per phase conductor).
  Notes: Depending of the fluorescent lamp ballast manufacturer partly more possible. Symmetrical allocation of the fluorescent lamp ballasts on all phases favourably. Shifting references of the fluorescent lamp ballast manufacturer consider.
- The device functions irrespective of the position of installation
- Tripping is line voltage-independent. Consequently, the RCD is suitable for “fault current/residual current protection” and “additional protection” within the the meaning of the applicable installation rules
- Mains connection at either side
- The 4-pole device can also be used for 2- or 3-pole connection. See connection possibilities.
- The test key “T” must be pressed every 6 month. The system operator must be informed of this obligation and his responsibility in a way that can be proven (self-adhesive RCD-label enclosed). The test intervall of 6 month is valid for residential and similar applications. Under all other conditions (e.g. damply or dusty environments), it’s recommended to test in shorter intervalls (e.g. monthly).
- Pressing the test key “T” serves the only purpose of function testing the residual current device (RCD). This test does not make earthing resistance measurement (RE), or proper checking of the earth conductor condition redundant, which must be performed separately.
- **Type -A:** Protects against special forms of residual pulsating DC which have not been smoothed.

Accessories:

Auxiliary switch for subsequent installation to the left	AX-RCD	720028
Tripping signal contact for subsequent installation to the right	AXAL-UNI	720030

■ Technical Data

		RCD
Electrical		
Design according to Current test marks as printed onto the device		IEC/EN 61008 Type G according to ÖVE E 8601
Tripping		instantaneous
Rated voltage	U_n	230/400 V AC, 50 Hz
Rated tripping current	I_{Dn}	10, 30, 100, 300, 500 mA
Sensitivity		AC and pulsating DC
Rated insulation voltage	U_i	440 V
Rated impulse withstand voltage	U_{imp}	4 kV (1.2/50 µs)
Rated short-circuit strength	I_{cn}	10 kA
Maximum back-up fuse RCD		

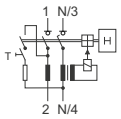
Rating	**Fuses**		**MCB's (Characteristic B/C)**	
In [A]	Short-circuit [A]	Overload [A]	Short-circuit [A]	Overload [A]
16	63 gG/gl	10 gG/gl	–	–
25	63 gG/gl	16 gG/gl	C20	C20
40	63 gG/gl	25 gG/gl	C25	C25
63	63 gG/gl	40 gG/gl	C40	C40
80	80 gG/gl	50 gG/gl	–	–
100	100 gG/gl	63 gG/gl	–	–

Important: In the case that the maximal possible operating current of the electrical installation don´t exceed the rated current of the RCD only short-circuit protection must be implemented. Overload protection must be implemented in the case if the maximal possible operating current of the electrical installation can exceed the rated current of the RCD.

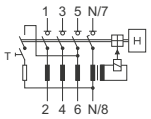
Rated breaking capacity	I_m	
Rated fault breaking capacity	I_{Dm}	
I_n = 16-40 A		500 A
I_n = 63 A		630 A
I_n = 80 A		800 A
I_n = 100 A		1000 A
Voltage range of test button		
2-pole		196 - 264 V~
4-pole 30 mA		196 - 264 V~
4-pole 10, 100, 300, 500 mA		196 - 456 V~
Endurance		
electrical components		≥ 4,000 switching operations
mechanical components		≥ 20,000 switching operations
Mechanical		
Frame size		45 mm
Device height		80 mm
Device width		35 mm (2 MU), 70 mm (4 MU)
Mounting		quick fastening with 2 lock-in positions on DIN rail IEC/EN 60715
Degree of protection, built-in		IP40
Degree of protection in moisture-proof enclosure		IP54
Upper and lower terminals		open-mouthed/lift terminals
Terminal protection		finger and hand touch safe, DGUV VS3, EN 50274
Terminal capacity		1.5 - 35 mm² single wire 2 x 16 mm² multi wire
Terminal screw		M5 (mit geschlitzter Schraube according to EN ISO 4757-Z2, Pozidriv PZ2)
Terminal torque		2 - 2.4 Nm
Busbar thickness		0.8 - 2 mm
Operating temperature		-25°C to +40°C
Storage- and transport temperature		-35°C to +60°C
Resistance to climatic conditions		25-55°C/90-95% relative humidity according to IEC 60068-2

■ Connection diagrams

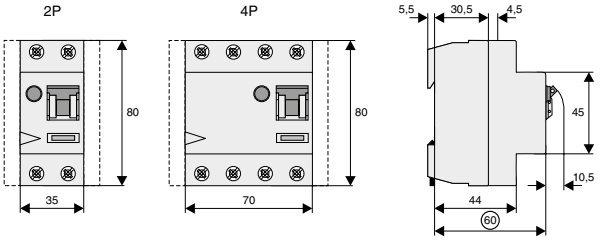
2-pole



4-pole



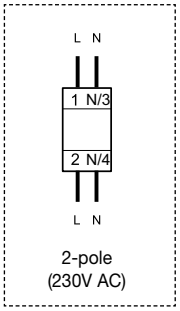
■ Dimensions (mm)



■ Correct connection

2-pole

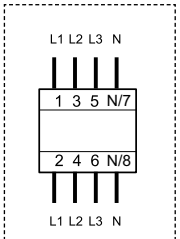
30, 100, 300 types:



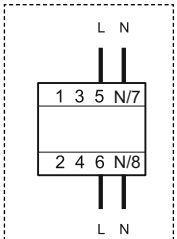
2-pole
(230V AC)

4-pole

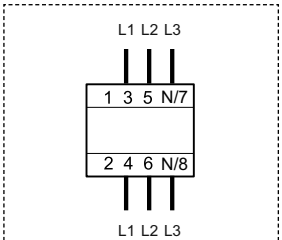
30mA types:



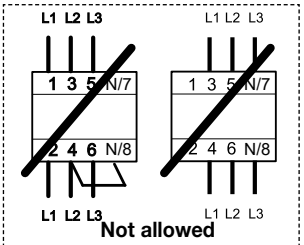
3+N
(230/400V AC)



2-pole
(230V AC)

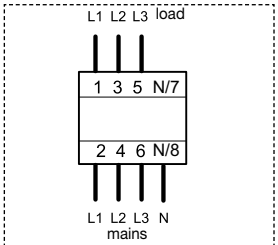


3-phase application without N
(230V AC phase-phase)



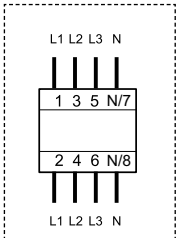
Not allowed

3-phase application without N
(400V AC phase-phase)

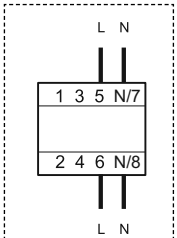


3-phase load without N
(400V AC phase-phase)

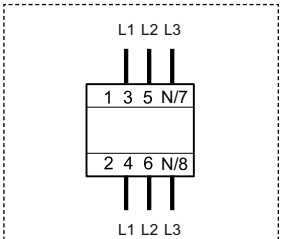
100, 300 types:



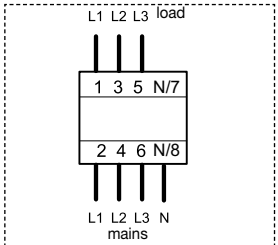
3+N
(230/400V AC)



2-pole
(230V AC)



3-phase application without N
(230/400V AC phase-phase)



3-phase load without N
(400V AC phase-phase)

■ Influence of the ambient temperature to the maximum continuous current (A)

	16A		25A		40A		63A		80A		100A	
Ambient temperature	**2p**	**4p**	**2p**	**4p**	**2p**	**4p**	**2p**	**4p**	**2p**	**4p**	**2p**	**4p**
40°	16	16	25	25	40	40	63	63	80	80	100	100
45°	14	14	21	22	37	37	59	59	76	76	95	95
50°	11	11	18	19	33	34	55	55	72	72	90	90
55°	9	9	14	16	30	31	50	50	68	68	85	85
60°	– *)	–	–	–	26	27	45	45	64	64	80	80

Annotation: It has to be ensured that the values in the table are not exceeded and the back-up fuse/thermal protection works properly.

*) not applicable

Residual Current Devices RCD Type B

■ Description

- All-current sensitive RCCB for fault or additional protection
- 4-pole types can also be used as 2-pole devices for photovoltaic / EV charging applications
- New level of accuracy -> reduced unwanted tripping
  - time delay tripping
  - increased current withstand capability
    > 3 kA
  - handles all DC currents
  - handles mixed frequencies up to 1kHz
- Back up protection with nominal value possible (overload protection)
- Yearly test interval
- Real contact position indicator
- Automatic re-setting possible
- Transparent designation plate

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
Type B			
Surge current-proof 3 kA, AC-DC sensitive, Type B (ÖVE E 8601)			
2-pole (4 MU)			
25/0.03	RCD-25/2/30mA - B	719929	1/30
40/0.03	RCD-40/2/30mA -B	719930	1/30
63/0.03	RCD-63/2/30mA - B	719931	1/30

4-pole			
40/0.03	RCD-40/4/30mA - B	719932	1/30
63/0.03	RCD-63/4/30mA - B	719933	1/30

■ Specifications

Description

- Residual Current Devices
- Shape compatible with and suitable for standard busbar connection to other devices of the P-series
- Twin-purpose terminal (lift/open-mouthed) above and below
- Busbar positioning optionally above or below
- Free terminal space despite installed busbar
- Auxiliary switch AX-RCD can be mounted subsequently
- Contact position indicator red - green
- Delayed types suitable for being used with standard fluorescent tubes with or without electronical ballast (30mA-RCD: 30 units per phase conductor)
  Notes: Depending of the fluorescent lamp ballast manufacturer partly more possible. Symmetrical allocation of the fluorescent lamp ballasts on all phases favourably. Shifting references of the fluorescent lamp ballast manufacturer consider.
- The device functions irrespective of the position of installation
- The RCD is suitable for “fault protection” and “additional protection” within the meaning of the applicable installation rules.
- The 4-pole device can also be used for 2- or 3-pole connection. See connection possibilities.
- The test key “T” must be pressed every year. The system operator must be informed of this obligation and his responsibility in a way that can be proven. Under special conditions (e.g. damply and/or dusty environments, environments with polluting and/or corroding conditions, environments with large temperature fluctuations, installations with a risk of overvoltages due to switching of equipment and/or atmospheric discharges, portable equipment ...), it’s recommended to test in monthly intervals.
- Pressing the test key “T” serves the only purpose of function testing the residual current device (RCD). This test does not make earthing resistance measurement (RE), or proper checking of the earth conductor condition redundant, which must be performed separately.
- **Type B:** High reliability against unwanted tripping. Suitable for any circuit where personal injury or damage to property may occur in case of unwanted tripping. Protection against all types of fault currents.

Accessories:

Auxiliary switch for subsequent installation to the left	AX-RCD	720028
Tripping signal contact for subsequent installation to the right	AXAL-UNI	720030

■ Technical Data

		RCD-B type
Electrical		
Design according to Current test marks as printed onto the device		acc. to IEC/EN 61008, IEC/EN 62423, Type B additional acc. to ÖVE E 8601.
Tripping		
Type G		10 ms delay @ 50 Hz
Type S		40 ms delay @ 50 Hz - with selective disconnecting function
Rated voltage	U_n	230/400 V AC, 50 Hz
Limits operation voltage electronic		50 – 456V AC
Limits operation voltage test circuit		
30 mA		196 - 253V AC
300 mA		196 - 440V AC
Rated tripping current	I_{Dn}	30, 300 mA
Sensitivity		All types of current
Rated insulation voltage	U_i	440 V
Rated impulse withstand voltage	U_{imp}	4 kV (1.2/50 µs)
Rated short-circuit capacity	I_{cn}	10 kA with back-up fuse

Maximum back-up fuse RCD-B

Rating	**Fuses**		**MCB's (Characteristic B/C)**	
In [A]	Short-circuit [A]	Overload [A]	Short-circuit [A]	Overload [A]
25	63 gG/gl	25 gG/gl	MCB-C40	MCB-C25
40	63 gG/gl	40 gG/gl	MCB-C40	MCB-C40
63	63 gG/gl	63 gG/gl	MCB-C40	MCB-C40

Important: In the case that the maximal possible operating current of the electrical installation don´t exceed the rated current of the RCD only short-circuit protection must be implemented. Overload protection must be implemented in the case if the maximal possible operating current of the electrical installation can exceed the rated current of the RCD.

Peak withstand current		
Type B		3 kA (8/20 µs) surge current-proof
Rated breaking capacity	I_m	
Rated fault breaking capacity	I_{Dm}	
I_n = 25-40 A		500 A
I_n = 63 A		630 A
Endurance		
electrical components		≥ 4,000 switching operations
mechanical components		≥ 20,000 switching operations
Mechanical		
Frame size		45 mm
Device height		80 mm
Device width		70 mm (4 MU)
Mounting		quick fastening with 2 lock-in positions on DIN rail IEC/EN 60715
Degree of protection, built-in		IP40
Degree of protection in moisture-proof enclosure		IP54
Upper and lower terminals		open-mouthed/lift terminals
Terminal protection		finger and hand touch safe, DGUV VS3, EN 50274
Terminal capacity		1.5 - 35 mm² single wire 2 x 16 mm² multi wire
Terminal screw		M5 (with slotted screw acc. to EN ISO 4757-Z2, Pozidriv PZ2)
Terminal torque		2 - 2.4 Nm
Busbar thickness		0.8 - 2 mm
Operation temperature		-25°C to +40°C (for higher values see table on ambient temperature)
Storage- and transport temperature		-35°C to +60°C
Resistance to climatic conditions		25-55°C/90-95% relative humidity according to IEC 60068-2
Contact position indicator		red / green

■ Power Loss at In RCD-B type

(entire unit)		
In [A]	**P* [W]**	
	2p	4p
25	3.1	4.6
40	4.1	6.2
63	6.7	10

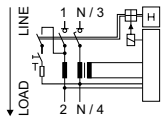
* 50Hz

■ Influence of the ambient temperature to the maximum continuous current (A)

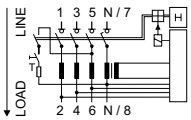
	25A	40A	63A
Ambient temperature	**2 & 4p**	**2 & 4p**	**2 & 4p**
40°	25	40	63
45°	21	37	56
50°	18	34	50

■ Connection diagram

2-pole

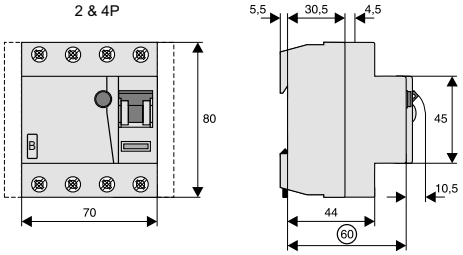


4-pole



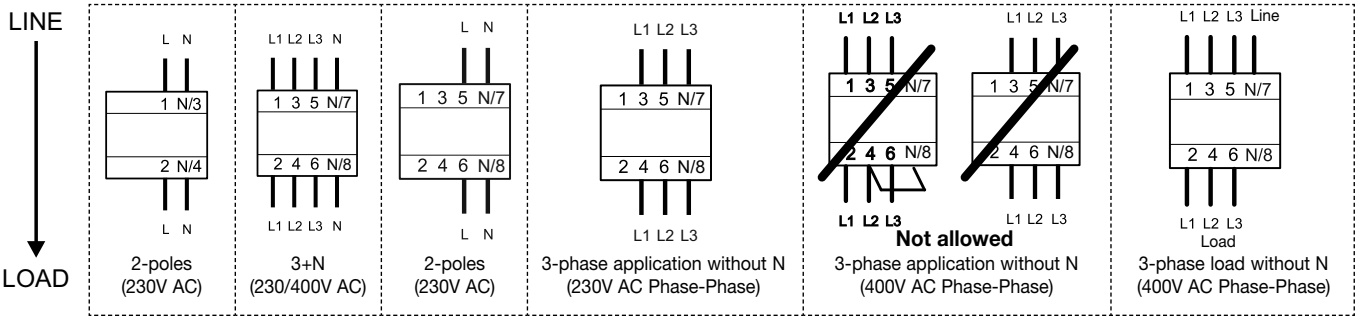
■ Dimensions (mm)

2 & 4P

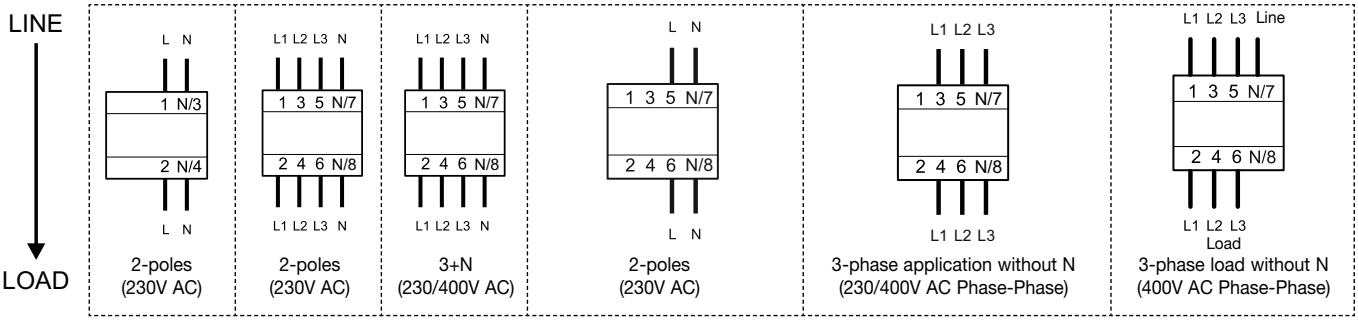


■ Correct connection

30mA Types:



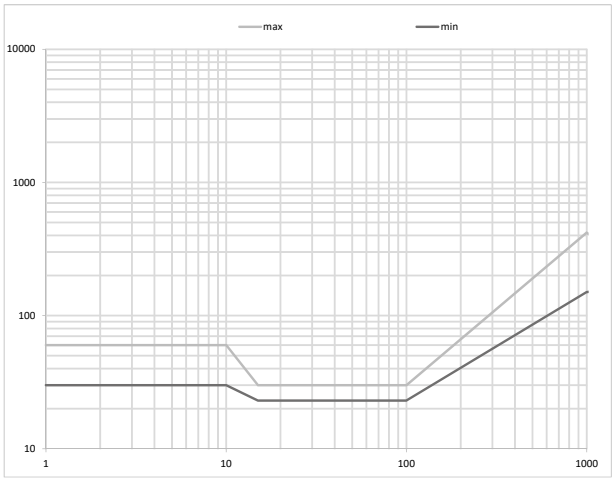
300mA Types:



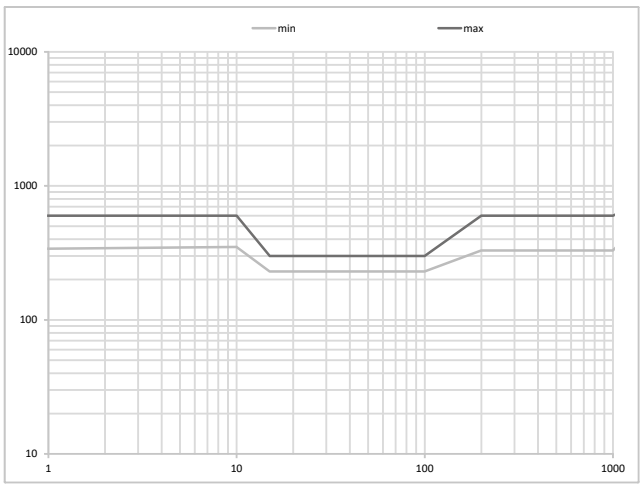
- Disconnect load side of the switch gear, if you make a insulation test of the installation!
- Please take care of supply side and load side!

■ Tripping current frequency response RCD-B type

Type B 30mA



Type B 300mA



Arc Fault Detection Device AFDD, 2-pole

■ Description

- Arc Fault Detection Device acc. to IEC/EN-62606
- Detects and quenches arc faults in final circuits
- Fully combined with residual current circuit breaker (RCCB) and miniature circuit breaker (MCB)
- 2-pole: Both clearances between open contacts are protected
- Variable installation of N either to the left or right
- Rated currents from 6 to 40 A
- Contact position indicator red – green
- Tripped indication: MCB, RCCB or AFDD
- LED indication for arc faults
- Permanent self-monitoring
- Overvoltage and overheat monitoring
- Guide for secure terminal connection
- 3-position DIN rail clip, permits removal from existing busbar system
- Comprehensive range of accessories suitable for subsequent installation
- 10 and 30 mA rated residual currents
- Tripping characteristics B, C
- Rated breaking capacity up to 10 kA
- The -OL types are specifically designed to fullfill the tripping characteristic requirements of I2 ≤ Iz in the Norwegian electrotechnical standard NEK 400-8-823.

$I_n/I_{\Delta n}$ (A)	Type Designation	Article No.	Units per package
Type A, 10 kA, 2-pole			
Non-delayed, sensitive to residual pulsating DC, type A			
Characteristic B			
10/0.03	AFDD-B10/30mA/2-A	720175	1/40
13/0.03	AFDD-B13/30mA/2-A	720176	1/40
16/0.03	AFDD-B16/30mA/2-A	720177	1/40
20/0.03	AFDD-B20/30mA/2-A	720178	1/40
25/0.03	AFDD-B25/30mA/2-A	720179	1/40
Characteristic C			
10/0.03	AFDD-C10/30mA/2-A	720182	1/40
13/0.03	AFDD-C13/30mA/2-A	720183	1/40
16/0.03	AFDD-C16/30mA/2-A	720184	1/40
20/0.03	AFDD-C20/30mA/2-A	720185	1/40
25/0.03	AFDD-C25/30mA/2-A	720186	1/40

Type A, 6 kA, 2-pole			
Non-delayed, sensitive to residual pulsating DC, type A			
Characteristic B			
32/0.03	AFDD-B32/30mA/2-A	720180	1/40
40/0.03	AFDD-B40/30mA/2-A	720181	1/40
Characteristic C			
32/0.03	AFDD-C32/30mA/2-A	720187	1/40
40/0.03	AFDD-C40/30mA/2-A	720188	1/40

■ Specifications

Description

- Arc Fault Detection Device acc. to IEC/EN-62606
- Line-voltage-independent RCBO (combined switch) acc. to IEC/EN 61009
- 2-pole: Both clearances between open contacts are protected
- Variable installation of N either to the left or the right
- Tripped indication: MCB, RCCB or AFDD
- LED indication for arc faults
- Compatible with standard busbar
- Twin-purpose terminal (lift/open-mouthed) above and below
- Busbar positioning optionally above or below
- Free terminal space despite installed busbar
- Guide for secure terminal connection
- Switching toggle (MCB component) in colour designating the rated current
- Contact position indicator red - green
- Comprehensive range of accessories can be mounted subsequently
- The test key “T” must be pressed every 6 months. The system operator must be informed of this obligation and their responsibility in a way that can be proven (self-adhesive RCD-label enclosed). The test interval of 6 months is valid for residential and similar applications. Under all other conditions (e.g. damp or dusty environments), it’s recommended to test in shorter intervals (e.g. monthly).
- Pressing the test key “T” serves the only purpose of function testing the residual current device (RCD). This test does not perform an earthing resistance measurement (RE), nor does it render the check of the earth conductor condition redundant, which means both tests must additionally be performed separately.
- The cable length (one-way) from the AFDD to the socket outlet should not exceed 70 m. This guarantees that arc faults can be detected reliably.
- **Type -A:** Protects against special forms of residual pulsating DC which
  have not been smoothed

Error memory:

The AFDD saves the last tripping reason/cause. If the device is in the open position (turned off), press and hold the test button “T” and simultaneously turn on the device. This causes the in-built LED to flash in a sequence that will reveal the tripping cause.

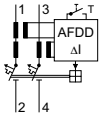
Accessories:		
Auxiliary switch for subsequent installation	AX-MCB	720031
Auxiliary switch	AXAL-MCB	720033
	2AX-MCB	720032
Shunt trip release	SHT24-MCB, SHT230-MCB	720041, 720042

■ Technical Data

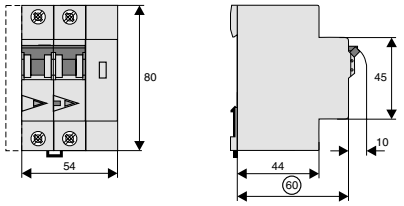
		AFDD
Electrical		
Design according to Relevant effective certification marks as printed onto the device		IEC/EN 62606 IEC/EN 61009 IEC/EN 62423 Type G acc. to ÖVE E 8601
Line voltage-independent tripping		instantaneous surge current proof 250 A (8/20 µs) surge current proof 3 kA (F, -F-OL, -G/A, -G/A-OL) (8/20 µs)
Rated voltage	U_n	240 V AC; 50 Hz
Operational voltage range		180-264 V
Self-consumption		< 0.8 W
Rated residual operating current	$I_{\Delta n}$	10, 30 mA
Rated residual non-operating current	$I_{\Delta no}$	0.5 $I_{\Delta n}$
Sensitivity		AC and pulsating DC, Type F
Selectivity class		3
Rated breaking capacity		
AFDD 6-25 A		10 kA
AFDD 32-40 A		6 kA
Rated current		6 - 40 A
Rated insulation voltage	U_i	440 V
Rated impulse withstand voltage	U_{imp}	4 kV (1.2/50 µs)
Rated residual making and breaking capacity	$I_{\Delta m}$	
EN 61009		3 kA
IEC 61009		6-16 A: 3 kA 20-40 A: 500 A
Arc fault tripping times after load current (acc. to IEC/EN 62606)		
Load current (A)		Tripping time (s)
2,5		<1
5		<0.5
10		<0.25
16		<0.15
32		<0.12
40		<0.12
Characteristic		B, C, B(-OL), C(-OL)
Maximum back-up fuse (short-circuit)		100 A gL (>10 kA)
Endurance		
electrical components		≥ 4,000 switching operations
mechanical components		≥ 20,000 switching operations
Mechanical		
Frame size		45 mm
Device height		80 mm
Device width		54 mm (3 MU)
Mounting		3-position DIN rail clip, permits removal from existing busbar system
Degree of protection, switch		IP20
Degree of protection, built-in		IP40
Upper and lower terminals		open-mouthed/lift terminals
Terminal protection		finger and hand touch safe, EN 50274
Terminal cross section (capacity)		1 - 25 mm^2
Busbar thickness		0.8 - 2 mm
Operating temperature		-25° C to +40° C
Storage and transport temperature		-35° C to +60° C
Resistance to climatic conditions		according to IEC/EN 61009

■ Connection diagram

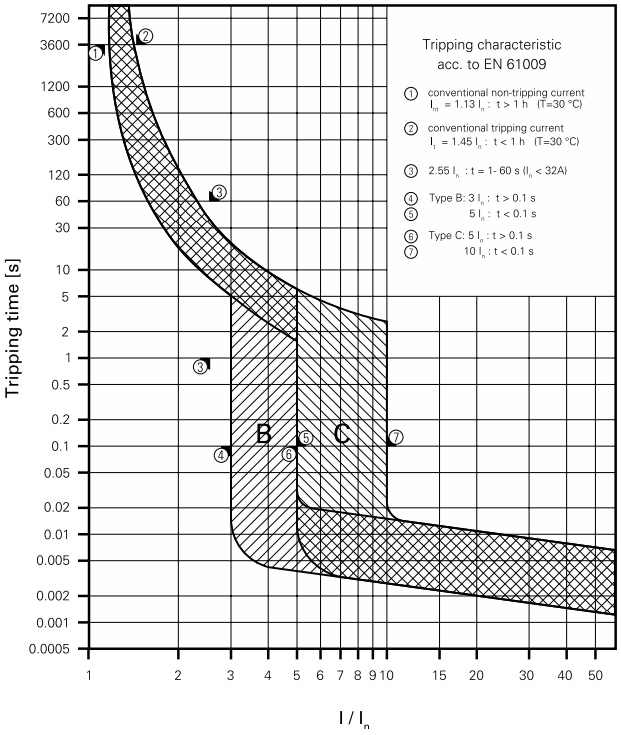
2-pole

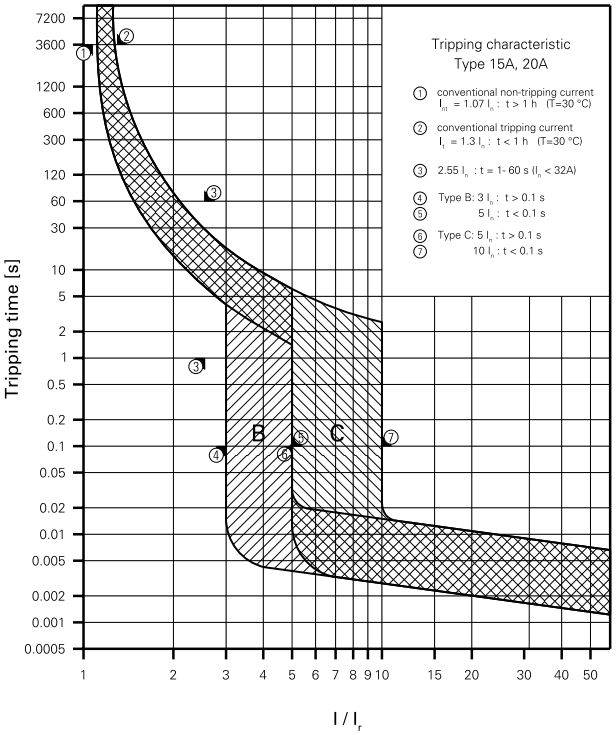


■ Dimensions (mm)



■ Tripping Characteristic AFDD, Characteristics B and C





■ Declaration AFDD reason for tripping

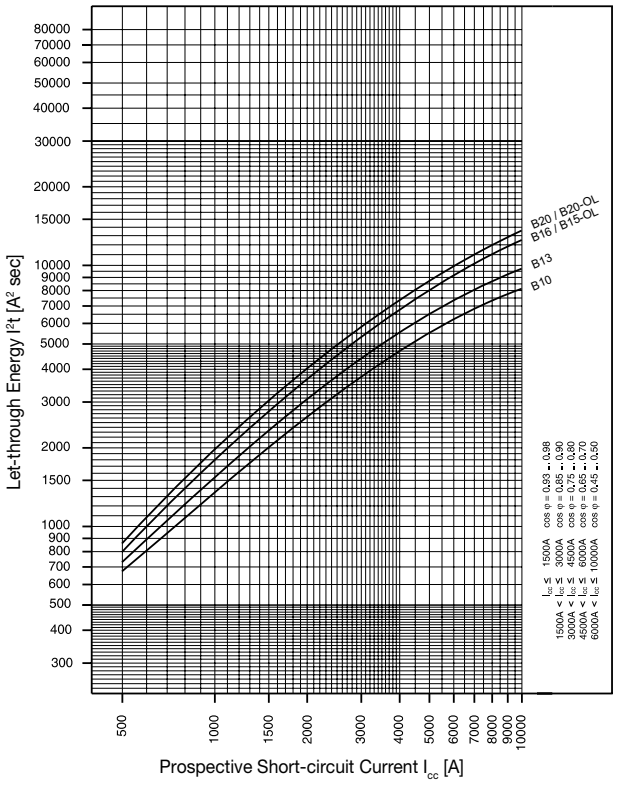
After switching on the AFDD is initially a test LED (LED sequence red-yellow-green -> continuous green).
Any previous arc tripping reasons are shown only one time after switching on again.

I...I...I $I_\Delta > I_{\Delta n}$	Green, no arcing as tripping reason
I...I...I	1x yellow, serial arc
II...II...II	2x yellow, serial arc of a dimmed load
III...III...III	3x yellow, parallel arc
IIII...IIII...IIII U > 270 V	4x yellow, over voltage (about 270V) AFDD tripped for self protection
IIIII...IIIII...IIIII	5x yellow, overtemperature in the device (about >115°C) AFDD tripped for self protection
IIIIII...IIIIII...IIIIII	6x yellow, device error, please check device by an expert

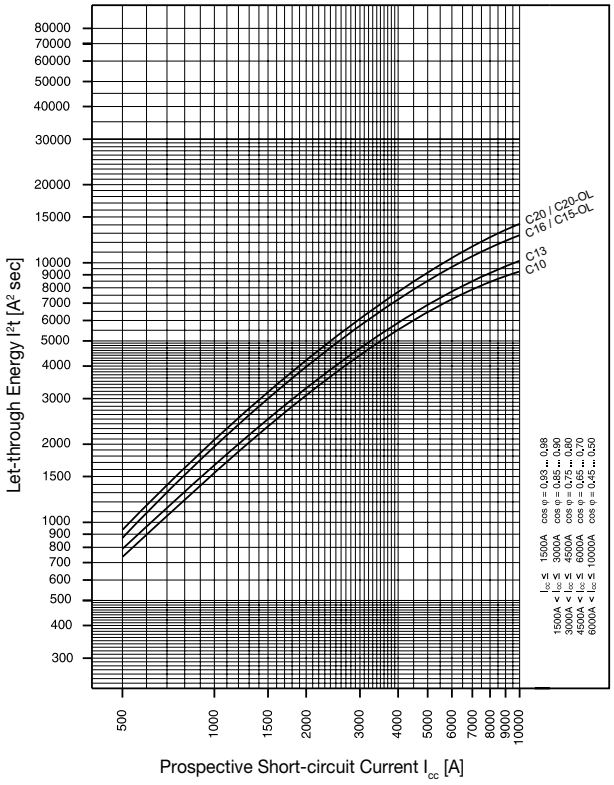
The last AFDD error can be reshown by pressing the test key while the device is switched on.

■ Let-through Energy AFDD

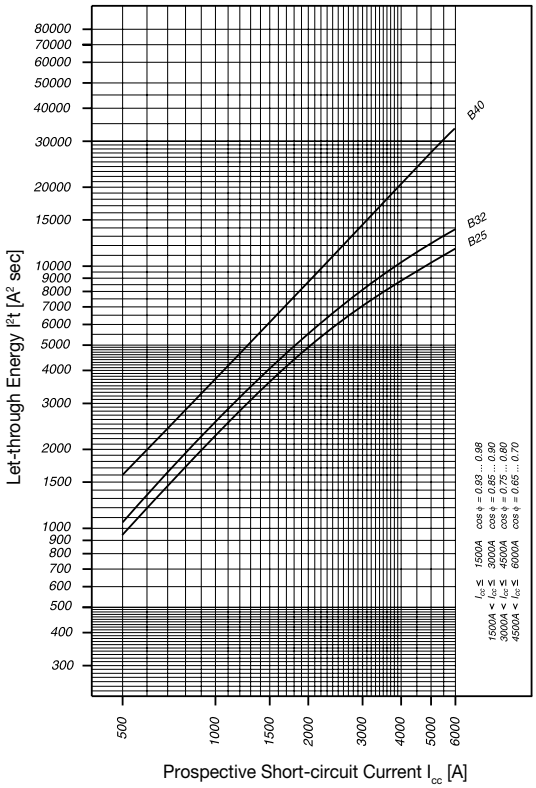
Let-through Energy **AFDD**, Characteristic B, 2-pole, 10-20 A



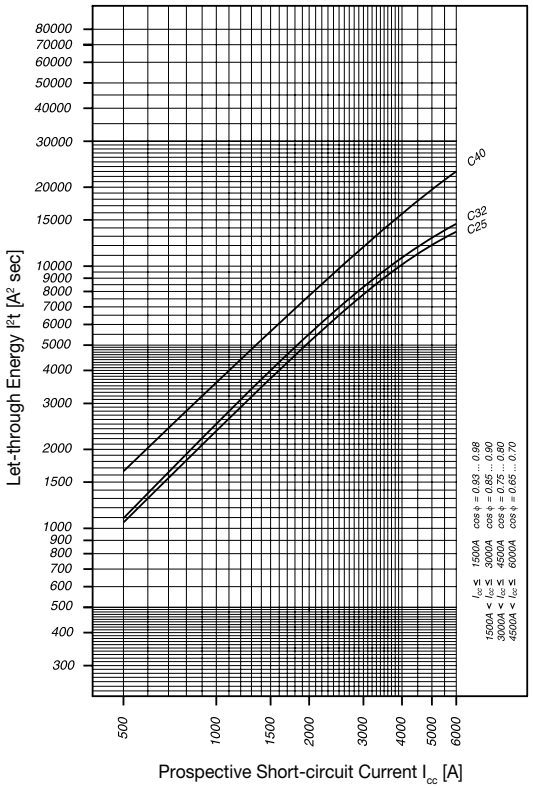
Let-through Energy **AFDD**, Characteristic C, 2-pole, 6-20 A



Let-through Energy **AFDD**, Characteristic B, 2-pole, 25-40 A



Let-through Energy **AFDD**, Characteristic C, 2-pole, 25-40 A



Busbar

Description	Cu-factor	Type Designation	Article No.	Units per package
Busbar Block (Fork) MZ-GV, 1 Meter				
● delivered without end caps				
16 mm² - Rated current 80 A				
1-phase	0.470	MZ-GV-16/1P-1MU	720043	50
1-phase + Auxiliary Switch	0.470	MZ-GV-16/1P+HS	720044	50
2-phases	0.657	MZ-GV-16/1P+N-2MU	720045	20
3-phases	1.042	MZ-GV-16/3P-3MU	720046	20
3-phases + Auxiliary Switch	0.998	MZ-GV-16/3P+HS	720047	20
4-phases	1.465	MZ-GV-16/3P+N-4MU	720048	15
4-phases	1.522	MZ-GV-16/3P+3N-6MU	720049	15
4-phases	1.050	MZ-GV-16/PKPX/4PHAS	720050	10
End cap 1-phase		MZ-V-AK/1P	720051	10 / 600
End cap 2+3 pole		MBB-EC/2+3P	720052	10/600
End cap 4-phases		MZ-V-AK/4P	720053	10 / 600

Accessories

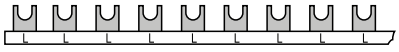
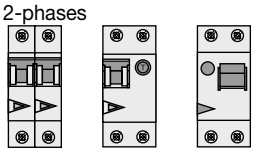
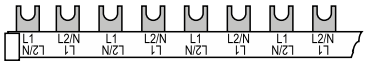
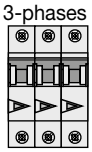
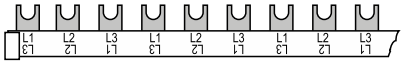
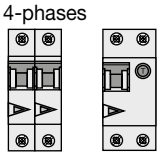
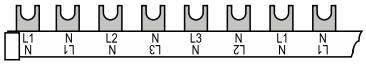
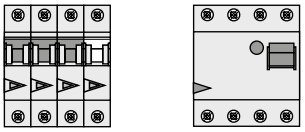
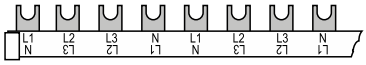
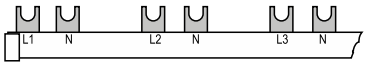
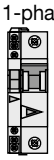
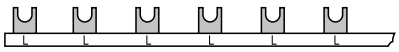
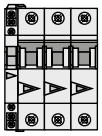
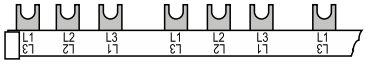
Busbar Tag Shrouds for busbar, yellow MZV-BS-G				
Shrouds for forks		MZV-BS-G	720054	10/600

Description	Cu-factor	Type Designation	Article No.	Units per package
Busbar Block (Pin) MZ-SV-35				
● 1,5 MU for HMCB				
35 mm2 - Rated current 110 A				
1-phase angulated grey	0.83	MZ-SV-35/1P	720055	1
3-phases	2.74	MZ-SV-35/3P	720056	4
3-phases	2.74	MZ-SV-35/PLHT-V	720057	4
4-phases*	1.57	MZ-SV-35/3P+N-6TE	720058	4
* delivered with end caps				

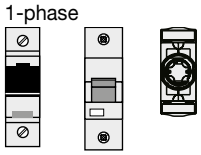
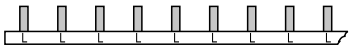
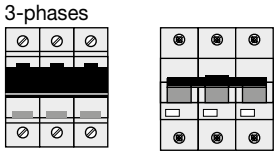
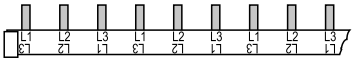
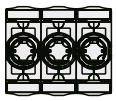
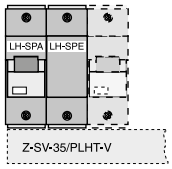
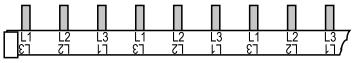
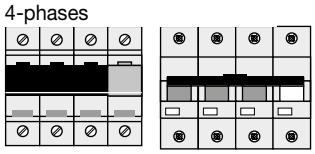
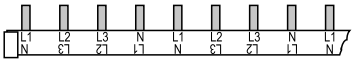
Accessories for Z-SV-35

End cap				
End cap		MZ-V-35/AK/3P	720059	10 / 600

■ Description of the Busbar Block (Fork) MZ-GV

Devices to busbar	Pcs. of the devices	End caps		Type
1-phase	x57	MZ-V--AK/1P		MZ-GV-16/1P-1MU
2-phases 	x28	MBB--EC/2+3P		MZ-GV-16/1P+N-2MU
3-phases 	x19	MBB--EC/2+3P		MZ-GV-16/3P-3MU
4-phases 	x27	MZ-V--AK/4P		MZ-GV-16/3P+3N-6MU
	x14	MZ-V--AK/4P		MZ-GV-16/3P+N-4MU
For 2-pole Combined RCD/MCB Device, 4-phases	x18	MZ-V--AK/4P		MZ-GV-16/PKPX/4PHAS
1-phase + Auxiliary Switch 	x38	MZ-V--AK/1P		MZ-GV-16/1P+HS
3-phases + Auxiliary Switch 	x16	MBB--EC/2+3P		MZ-GV-16/3P+HS

■ Description of the Busbar Block (Pin) Z-SV

Devices to busbar	Pcs. of the devices	End caps	Type
1-phase 	x36		MZ-SV-35/1P
3-phases 	x12	MZ-V-35/AK/3P 	MZ-SV-35/3P
			
	x33	MZ-V-35/AK/3P 	MZ-SV-35/PLHT-V
4-phases 	x4	MZ-V-35/AK/3P 	MZ-SV-35/3P+N-6TE

Main Load Disconnector Switch (Isolator) MIS

Rated Current (A)	Number of Poles	Type Designation	Article No.	Units per package
Main Load Disconnector Switch (Isolator) MIS				
40	1	MIS-40/1	720620	12/120
40	2	MIS-40/2	720623	1/60
40	3	MIS-40/3	720628	1/40
40	4	MIS-40/4	720633	1/30
63	1	MIS-63/1	720621	12/120
63	2	MIS-63/2	720624	1/60
63	3	MIS-63/3	720629	1/40
63	4	MIS-63/4	720634	1/30
80	1	MIS-80/1	720622	12/120
80	2	MIS-80/2	720625	1/60
80	3	MIS-80/3	720630	1/40
80	4	MIS-80/4	720635	1/30
100	2	MIS-100/2	720626	1/60
100	3	MIS-100/3	720631	1/40
100	4	MIS-100/4	720636	1/30
125	2	MIS-125/2	720627	1/60
125	3	MIS-125/3	720632	1/40
125	4	MIS-125/4	720637	1/30

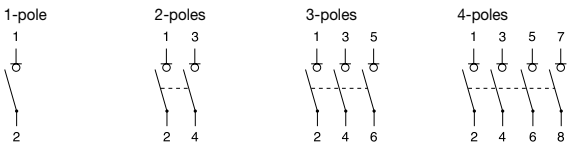
■ Description

- Load circuit breaker with isolating function
- Design according to IEC/EN 60947-3
- Highly wear resistant contacts
- Quick make, black toggle
- Terminal capacity 50 mm^2
- Compatible busbars with switchgear series MDRC by use of the mouth terminal in combination with standard fork busbar

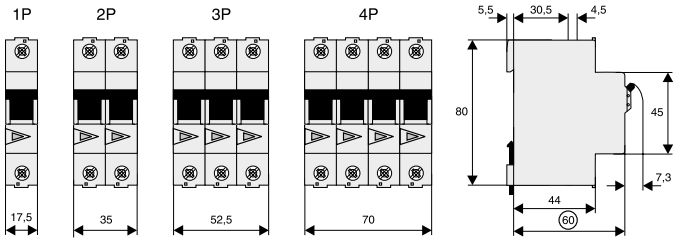
■ Technical Data

		MIS-40	MIS-63	MIS-80	MIS-100	MIS-125
Electrical						
Design Classified according to Current test marks as printed onto the device		according to IEC/EN 60947-3 IEC 61373, EN 45545-2				
Rated voltage		240/415 V				
Frequency		50/60 Hz				
Rated insulation voltage	U_i	690 V~				
Rated impulse withstand voltage	U_{imp}	6 kV				
Pollution degree		3				
Rated short-time withstand current	I_{cw}	2 kA				
Rated short-circuit making capacity	I_{cm}	2.8 kA				
Rated current 240/415V, AC23A		40 A	63 A	80 A	100 A	125 A
Number of poles		1-, 2-, 3-, 4-poles				
Maximum back-up fuse		125 A gG				
Short circuit strength - with back-up fuse according to IEC/EN 60947-3		12.5 kA	12.5 kA	12.5 kA	10 kA	10 kA
Endurance						
Electrical components operation cycles		≥ 3,000	≥ 3,000	≥ 3,000	≥ 3,000	≥ 2.000
Mechanical components operation cycles		≥ 16,000	≥ 16,000	≥ 16,000	≥ 16,000	≥ 14.000
Mechanical						
Frame size		45 mm				
Device height		80 mm				
Device width		17.5 mm/Pol				
Mounting		quick fastening with 2 lock-in positions on DIN rail IEC/EN 60715				
Degree of protection, built-in		IP40				
Terminal protection		finger and hand touch safe according to BGV A3				
Terminals top and bottom		open mouthed/lift terminals				
Terminal capacity		2.5 - 50 mm²				
Busbar thickness		0.8 - 2 mm				
Fastening torque of terminal screws		2.5 - 5 Nm				
Function		irrespective of the position of installation				
Operation temperature		-25°C up to +40°C				
Storage- and transport temperature		-35°C up to +75°C				

■ Connection diagram



■ Dimensions (mm)



Installation Contactors MK

U_s	I_n AC1	Function	Type Designation	Article No.	Units per package
Installation Contactors MK					
230 V AC	25 A	2NO	MK230/1/25-20	720282	2 / 120
230 V AC	25 A	2NC	MK230/1/25-02	720283	2 / 120
230 V AC	25 A	4NO	MK230/25-40	720284	1 / 60
230 V AC	25 A	4NC	MK230/25-04	720285	1 / 60
230 V AC	25 A	2NO+2NC	MK230/25-22	720286	1 / 60
230 V AC	40 A	4NO	MK230/40-40	720287	1 / 40
230 V AC	40 A	2NO+2NC	MK230/40-22	720288	1 / 40
230 V AC	40 A	2NO	MK230/40-20	720290	1 / 40
230 V AC	63 A	4NO	MK230/63-40	720291	1 / 40
230 V AC	63 A	2NO+2NC	MK230/63-22	720292	1 / 40
230 V AC	63 A	2NO	MK230/63-20	720294	1 / 40

Description	Type Designation	Article No.	Units per package
Accessories suitable for MK			
Sealing cover	MKAK-2TE	720295	10
Sealing cover	MKAK-3TE	720296	10
Spacer 0.5MU	Z-DST	720298	10
Suppressor RC-Combination 12-250 VAC	Z-RC/230	720299	2 / 120
Auxiliary Switch 1NO+1NC	Z-SC	720297	3

■ Description

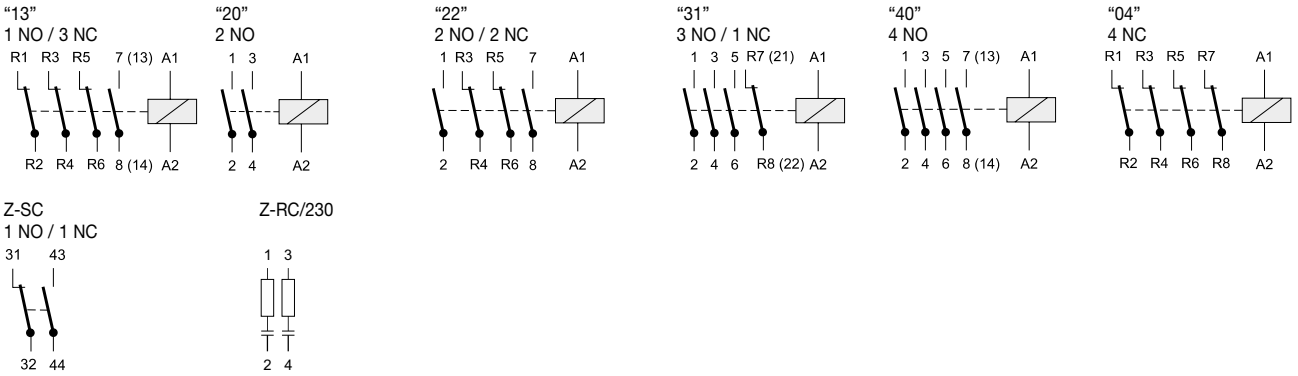
These Installtion Contactors are design to cover all applications in residential and commercial sites as for as example:
- Switching of lighting systems
- Switching of electrical heating systems
- Switching of ventilation systems
- Switching of air conditioning systems and fans
- Switching of heat pumps
- Switching of roller doors/gates and blinds

Advantages and Safety:

- Front-side switch position indicator
- Compact frame
- Large terminals
- Low switching noise
- MK low noise
- High contact force for high switching capacity
- Simple snap-on fastening of 35 mm DIN rail
- Finger and hand touch safe according to VGB 4
- Hardly flammable materials and chlorine-free and halogen-free plastics are used
- MK: Innovative AC magnet system

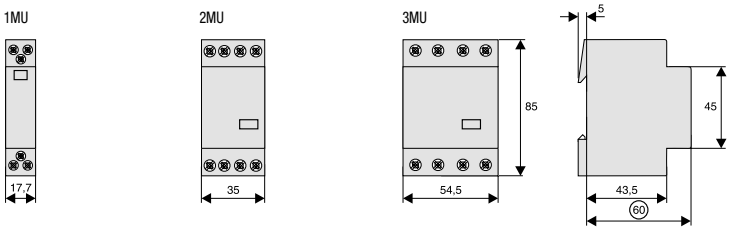
These products meets the requirement of the standards IEC/EN 60947-4-1 and IEC/EN 61095

■ Connection diagram

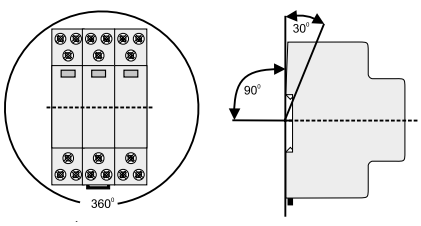


■ Dimensions (mm)

MK230/1/25-20,02 MK230/25-40,04,22 MK230/40,63 (all)

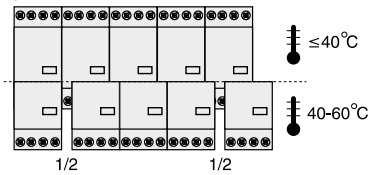


■ Permitted installation positions



■ Packing Density at full contact load

MK
Spacers recommended!



■ Technical Data

		MK230/25	MK230/40	MK230/63
Data according to		IEC 61095, EN 61095, VDE 0660, IEC 60947-4-1, EN 60947-4-1, VDE		
Utilisation category AC1 (e.g. heating system)				
Rated operational current (= I_{th})	I_n			
open at 60 °C		25 A	40 A	63 A
Service life of switching element		0.1 S x 10^6	0.1 S x 10^6	0.1 S x 10^6
Rated operational power AC1 220 - 240 V		9.5 kW	16 kW	25 kW
Rated operational power AC1 380 - 415 V		17 kW	27.5 kW	43 kW
Lowest switching power		24 V / 100 mA	24 V / 100 mA	24 V / 100 mA
Utilisation category AC3 (Switching of 3phase AC motors)				
Rated operational current	I_n	9 A	27 A	30 A
Service life of switching element		0.15 S x 10^6	0.15 S x 10^6	0.15 S x 10^6
Rated power of 3phase AC motors 50-60 Hz, 220 V		2.2 kW	7.5 kW	8 kW
Rated power of 3phase AC motors 50-60 Hz, 230-240 V		2.5 kW	8 kW	8.5 kW
Rated power of 3phase AC motors 50-60 Hz, 380-415 V		4 kW	12.5 kW	15 kW
Utilisation category DC1 (Switching of resistive loads, L/R ≤ 15 ms), values for NO contacts				
1pole 24 V DC		25 A	40 A	63 A
1pole 48 V DC		22 A	25 A	26 A
1pole 60 V DC		18 A	19 A	21 A
1pole 110 V DC		5 A	7 A	8 A
1pole 220 V DC		0.5 A	0.7 A	0.7 A
2pole in series 24 V DC		25 A	40 A	63 A
2pole in series 48 V DC		25 A	40 A	44 A
2pole in series 60 V DC		25 A	33 A	36 A
2pole in series 110 V DC		16 A	17 A	18 A
2pole in series 220 V DC		4 A	5 A	6 A
3pole in series 24 V DC		25 A	40 A	63 A
3pole in series 48 V DC		25 A	40 A	63 A
3pole in series 60 V DC		25 A	40 A	61 A
3pole in series 110 V DC		25 A	31 A	34 A
3pole in series 220 V DC		10 A	15 A	16 A
4pole in series 24 V DC		25 A	40 A	63 A
4pole in series 48 V DC		25 A	40 A	63 A
4pole in series 60 V DC		25 A	40 A	63 A
4pole in series 110 V DC		25 A	40 A	63 A
4pole in series 220 V DC		15 A	20 A	21 A
Utilisation category DC3 and DC5 (Switching of resistive loads, L/R ≤ 15 ms), values for NO contacts				
1pole 24 V DC		15 A	23 A	25 A
1pole 48 V DC		5 A	10 A	10 A
1pole 60 V DC		4 A	5 A	5 A
1pole 110 V DC		1 A	1.5 A	1.5 A
1pole 220 V DC		0.1 A	0.3 A	0.3 A
2pole in series 24 V DC		25 A	40 A	45 A
2pole in series 48 V DC		17 A	23 A	25 A
2pole in series 60 V DC		13 A	15 A	15 A
2pole in series 110 V DC		5 A	5 A	5 A
2pole in series 220 V DC		0.5 A	1 A	1 A
3pole in series 24 V DC		25 A	40 A	63 A
3pole in series 48 V DC		25 A	40 A	45 A
3pole in series 60 V DC		25 A	30 A	30 A
3pole in series 110 V DC		15 A	15 A	15 A
3pole in series 220 V DC		3 A	4 A	4 A
4pole in series 24 V DC		25 A	40 A	63 A
4pole in series 48 V DC		25 A	40 A	63 A
4pole in series 60 V DC		25 A	40 A	63 A
4pole in series 110 V DC		25 A	40 A	45 A
4pole in series 220 V DC		8 A	10 A	10 A
Main switching elements (U_{imp} = 4 kV, Duty Cycle: 100%)				
Rated insulation voltage	U_i	440 V AC	440 V AC	440 V AC
Rated operational voltage	U_e	440 V AC	440 V AC	440 V AC
Permissible switching frequency AC1, AC3	z	300 x/h	600 x/h	600 x/h
Endurance mechanical components		1 x 10^6	1 x 10^6	1 x 10^6

■ Technical Data (continue page)

		MK230/25	MK230/40	MK230/63
Auxiliary switching elements (U_{imp} = 4 kV, Duty Cycle: 100%)				
Rated insulation voltage	U_i	440 V AC	440 V AC	440 V AC
Nominal thermal current = It_h, 40°C		25 A	40 A	63 A
Nominal thermal current = It_h, 60°C		25 A	40 A	63 A
Utilisation category AC15 (Controlling of electromagnetic load)				
Rated operational current 220-240 V	I_e	-	-	-
Rated operational current 380-415 V	I_e	-	-	-
Rated operational current 440 V	I_e	-	-	-
Utilisation category DC13 (Controlling of electromagnetic load at DC)				
Rated operational current per pole 24-60 V	I_e	-	-	-
Rated operational current per pole 110 V	I_e	-	-	-
Rated operational current per pole 220 V	I_e	-	-	-
Trip Coil Power				
MK				
Switching on		14 - 18 VA	33 - 45 VA	33 - 45 VA
Holding		4.4 - 8.4 VA	7 VA	7 VA
		1.6 - 3.2 W	2.6 W	2.6 W
Operating range of trip coils multiple of U_e (-40 to +40°C)				
MK				
Coil voltage 50 Hz		24, 220 - 240 V	220 - 240 V	220 - 240 V
Coil voltage 60 Hz		24, 230 - 264 V	230 - 264 V	230 - 264 V
Power loss per current path	P_v	2 W	3 W	7 W
Power loss per device at nominal current load 1pole	P_{vges}	5.2 W	5.6 W	5.6 W
Power loss per device at nominal current load 2pole	P_{vges}	7.2 W	8.6 W	16.6 W
Power loss per device at nominal current load 3pole	P_{vges}	9.2 W	11.6 W	23.6 W
Power loss per device at nominal current load 4pole	P_{vges}	11.2 W	14.6 W	30.6 W
Switching noise (on and off), typical mean values		80 dB	78 dB	78 dB
Terminal capacity				
Main conductor				
one or several wires		1.5 - 10 mm^2	2.5 - 25 mm^2	2.5 - 25 mm^2
fine-wire		1.5 - 6 mm^2	2.5 - 16 mm^2	2.5 - 16 mm^2
fine wires with wire end sleeve		1.5 - 6 mm^2	2.5 - 16 mm^2	2.5 - 16 mm^2
number of conductors per terminal		1	1	1
Coil				
one or several wires		0.75 - 2.5 mm^2	0.75 - 2.5 mm^2	0.75 - 2.5 mm^2
fine-wire		0.5 - 2.5 mm^2	0.5 - 2.5 mm^2	0.5 - 2.5 mm^2
fine wires with wire end sleeve		0.5 - 1.5 mm^2	0.5 - 1.5 mm^2	0.5 - 1.5 mm^2
number of conductors per terminal		1	1	1
Weight		0.22 kg/unit	0.36 kg/unit	0.36 kg/unit
Tightening torque of terminal screws				
Main contacts		0.8 - 1.4 Nm	2.5 - 3.0 Nm	2.5 - 3.0 Nm
Coil		0.6 - 1.2 Nm	0.6 - 1.2 Nm	0.6 - 1.2 Nm
Short circuit protection (main circuit), maximum nominal current of fuse				
Co-ordination type (1), gL (gG)		35 A	63 A	80 A
Short circuit protection (auxiliary circuit), maximum nominal current of fuses				
Short-circuit current 1 kA, without fusing of contacts, gL (gG)		-	-	-
Switching times at control voltage U_s ±10%				
Make delay		9 - 15 ms	11 - 15 ms	11 - 15 ms
Break delay		4 - 8 ms	6 - 13 ms	6 - 13 ms
Arc duration		10 - 15 ms	10 - 15 ms	10 - 15 ms
Pollution degree		3	3	3
Overvoltage category (grounded neutral system)		1 - 3	1 - 3	1 - 3

■ Installation Contactors MK for Lighting Systems

The decisive factors are the type, connection and current consumption of lamps during switch-on and in permanent operation. Only 90 % of the continuous current of switching devices should be used in view of higher current consumption as a result of increases of voltage. The maximum number of lamps per phase that can be operated by a switching device is dependent on the nominal current and making current of lamps on the one hand, and on the continuous current and making capacity of the switching devices on the other. Thus, e.g. in lead-lag circuits, the continuous current of contactors can be used, while this is not possible in fluorescent tubes with separate compensation.

		MK230/25	MK230/40	MK230/63
Utilisation category AC1				
Rated operational current	I_e	25 A (60 °C)	40 A (60 °C)	63 A (60 °C)
Making capacity root mean square	$I_{r.m.s.}$	200 A	360 A	480 A
Making capacity peak value	I_{peak}	280 A	510 A	680 A
Utilisation category AC5a				
Rated operational power 250 V cosφ = 0.45		1.3 kW	3.4 kW	5.5 kW
Rated operational power 220-240 V~ cosφ = 0.90		1.2 kW	3.1 kW	5.1 kW
DUO		3.7 kW	6.3 kW	10 kW
Utilisation category AC5b				
Rated operational power 240V~		3 kW	5.7 kW	8 kW

Incandescent Lamps

The incandescent lamp filament has a very low ohmic resistance when it is cold. Therefore, when switching on, there is a high peak current (up to 20x In). When switching off, only the nominal current is switched off.

Utilisation category AC5b	Power	Current	MK230/25	MK230/40	MK230/63
	W	A	max. number of lamps per current path at 230 V, 50 Hz		
Incandescent Lamps AC5B (with or except halogen)	60	0.27	50	92	129
	100	0.45	30	55	77
	200	0.91	15	27	38
	300	1.36	10	19	26
	500	2.27	6	11	16
	1000	4.5	3	6	8
Low voltage halogen lamps (12 or 24V) with transformer (with electronic transformer)	0.09	52	110	174	-
	0.22	24	50	80	-
	75	0.33	16	35	54
	100	0.43	12	27	43
	150	0.65	9	19	29
	200	0.87	6	14	23
	300	1.30	4	9	14

LED Lamps

Lamp Types		MK230/25	MK230/40	MK230/63
LED Lamp. Pay attention on the inrush current of the ballast and cosφ of the lamp.	max. permissible inrush current contactor [A]	233	424	565
max. number of lamps per current path	$\frac{\text{inrush current contactor [A]}}{\text{inrush current lamp/ballast [A]}}$	= max. number of lamps per current path ($I_{nLED} \leq I_{th}$)		

■ Fluorescent Tubes, Mercury Arc Lamps

High- and low pressure discharge lamps with mercury vapour, with or without fluorescent-coated glass body are perfectly identical in their electrical behaviour.
In order to limit the operational current and pre-conduction current, and to achieve the initial peak voltage, reactance coils are used as ballast. Capacitors are used for compensation of the resulting reactive current, which are either connected in series with the coil (lead-lag circuit) or parallel to the mains (separate compensation, very rarely used now). The high making current in case of separate compensation (max. 30 x nominal current of the capacitor) which goes down quickly is usually attenuated considerably by the feed line.

Utilisation category AC5a		
	Fluorescent lamps without comp. or with series comp.	$I = I_{eAC1}$ x 0.5
	Lead-lag circuit (2x..)	$I = I_{eAC1}$ x 0.35
	Fluorescent tubes with parallel compensation	$I = I_{peak}$ / 100 (take into account compensation capacitor)
I / I_{Lampe} = number of connectable lamps per current path	Fluorescent tubes with electronic ballast	$I = I_{peak}$ / 50
	Mercury arc lamps, HD without compensation	$I = I_{eAC1}$ x 0.5
	Mercury arc lamps, HD with compensation	$I = I_{peak}$ / 100 (take into account compensation capacitor)

Utilisation category AC5a	**Power**	**Current**	**Capacitor**	**MK230/25**	**MK230/40**	**MK230/63**
Lamp Types	W	A	µF	max. number of lamps per current path at 230 V, 50 Hz		
Fluorescent tubes without compensation or with series compensation	11	0.16	1.3	75	210	310
	18	0.37	2.7	34	90	140
	24	0.35	2.5	34	90	140
	36	0.43	3.4	30	70	140
	58	0.67	5.3	20	45	70
	65	0.67	5.3	19	40	65
	85	0.8	5.3	16	35	60
Fluorescent tubes lead-lag circuit	11	0.07	-	2 x 110	2 x 220	2 x 250
	18	0.11	-	2 x 55	2 x 130	2 x 200
	24	0.14	-	2 x 44	2 x 110	2 x 160
	36	0.22	-	2 x 33	2 x 70	2 x 100
	58	0.35	-	2 x 22	2 x 46	2 x 70
	65	0.35	-	2 x 16	2 x 40	2 x 60
	85	0.47	-	2 x 11	2 x 30	2 x 40
Fluorescent tubes with parallel compensation	11	0.16	3.0	43	67	107
	18	0.37	4.0	32	50	80
	24	0.35	4.0	32	50	80
	36	0.43	4.0	32	50	80
	58	0.67	7.0	18	36	46
	65	0.67	7.0	18	36	46
	85	0.8	8.0	16	33	44
Fluorescent tubes with electronic ballast	18	0.09	-	40	100	150
	36	0.16	-	20	50	75
	58	0.25	-	15	30	55
	80	0.4	-	10	20	30
	2 x 18	0.17	-	20	50	60
	2 x 36	0.32	-	10	25	30
	2 x 58	0.49	-	7	15	20
Mercury arc lamps, high pressure without compensation e.g.: HQL, HPL	50	0.61	-	21	38	55
	80	0.8	-	16	28	40
	125	1.15	-	11	20	28
	250	2.15	-	6	11	15
	400	3.25	-	4	7	10
	700	5.4	-	2	4	6
	1000	7.5	-	1	3	4
Mercury arc lamps, high pressure with compensation e.g.: HQL, HPL	50	0.28	7	18	36	50
	80	0.41	8	16	31	44
	125	0.65	10	13	25	35
	250	1.22	18	7	14	19
	400	1.95	25	5	10	14
	700	3.45	45	3	6	8
	1000	4.8	60	2	4	6

■ Metal Halide Lamps

Metal halide lamps are a version of high-pressure mercury arc lamps with higher luminous efficiency and fidelity of colour (metalloids [halogens] added to the mercury fill up the Hg-spectrum with its many gaps). Ballast and ignition devices are necessary. Starting time 3 ... 5 minutes at 1.4 - 2 x I.

After switching on, it is not possible to light the lamp again immediately (lamp extinguishes after a power cut-off of only 1/2 period). Therefore, in many cases in important facilities ionisation of part of the lamps is maintained by switching over to 415 V, 500 Hz (e.g. to an emergency power supply). In this case, the lamp lights immediately after the mains voltage is on again. Otherwise, this would take several minutes. When using suitable ignition devices, the lamps can be lit again immediately.

I / I_{Lampe} = number of connectable lamps per current path	Metal halide lamps (HQI) without compensation	$I = I_{eAC1} \times 0.5$
	Metal halide lamps (HQI) with compensation	$I = I_{peak} / 100$ (take into account compensation capacitor)
	Transformer for low voltage halogen lamps	$I = I_{peak} / 50$

	Power	Current	Capacitor	MK230/25	MK230/40	MK230/63
Lamp Types	W	A	µF	max. number of lamps per current path at 230 V, 50 Hz		
Metal halide lamps without compensation e.g. HQI, HPI	35	0.53	-	28	57	-
	70	1	-	15	30	-
	150	1.8	-	8	17	-
	250	3	-	5	10	-
	400	3.5	-	4	8	-
	1000	9.5	-	1	3	-
	2000	16.5	-	-	2	-
400 V per pole	2000	10.5	-	-	2	-
	3500	18	-	-	1	-
Metal halide lamps with electronic ballast (50-125 xI_n) HQI	20	0.1	i	9	18	20
	35	0.2	i	6	11	13
	70	0.36	i	5	12	12
	150	0.7	i	4	10	10
Metal halide lamps with compensation, with parallel compensation e.g. HQI, HPI	35	0.25	6	21	42	58
	70	0.45	12	11	21	29
	150	0.75	20	7	13	18
	250	1.5	33	4	9	11
	400	2.1	35	4	9	10
	1000	5.8	95	1	3	4
	2000	11.5	148	-	2	2
400 V per pole	2000	6.6	58	-	3	4
	3500	11.6	100	-	2	3
Transformers for low-voltage halogen lamps	20	-	-	52	110	174
	50	-	-	24	50	80
	75	-	-	16	35	54
	100	-	-	12	27	43
	150	-	-	9	19	29
	200	-	-	5	14	23
	300	-	-	4	9	14

■ Sodium Vapour Lamps

For 200 W, 1200 mm high-pressure lamps and low-pressure lamps, reactance coils are used as ballast. For smaller lamps, stray field transformers can be used as ballast. Take into account, the long starting period.

Low pressure lamps:

Without compens.: Making current 1 x Xl_e, cosφ 0.3; starting time 5 ... 10min
Decisive for selection of device: 60%
Constant current I = I_{eAC1} x 0.6

With compensation: Making current 20 x Xl_e, cosφ 0.45; starting time 5 ... 10min (at 1.6 x I_n), I = I_{peak}/200

High pressure lamps:

Without compens.: Making current 1.4 x Xl_e, cosφ 0.5; starting time 5 ... 10min
Decisive for selection of device: 60%
Constant current I = I_{eAC1} x 0.6

With compensation: Making current 20 x Xl_e, cosφ 0.95; starting time 5 ... 10min (at 1.6 x I_n)

	Power	Current	Capacitor	MK230/25	MK230/40	MK230/63
Lamp Types	W	A	µF	max. number of lamps per current path at 230 V, 50 Hz		
Sodium vapour lamps low-pressure without compensation	35	1.5	-	9	22	30
	55	1.5	-	9	22	30
	90	2.4	-	6	13	19
	135	3.3	-	4	10	14
	150	3.3	-	4	10	14
	180	3.3	-	4	10	14
	200	3.3	-	4	10	14
Sodium vapour lamps low-pressure with compensation, with parallel compensation	35	0.31	20	6	15	18
	55	0.42	20	6	15	18
	90	0.63	30	4	10	12
	135	0.94	45	3	7	8
	150	1	40	3	8	9
	180	1.16	40	3	8	9
	200	1.32	30	-	10	12
Sodium vapour lamps high-pressure without compensation	150	1.8	-	8	15	22
	250	3	-	5	10	13
	330	3.7	-	4	8	10
	400	4.7	-	3	6	8
	1000	10.3	-	1	3	4
Sodium vapour lamps high pressure with compensation, with parallel compensation	150	0.83	20	7	20	25
	250	1.5	33	4	12	15
	330	2	40	3	10	13
	400	2.4	48	2	8	12
	1000	6,3	106	1	4	6
Sodium vapour lamps high pressure with electronic ballast (50-125 xI_n)	20	0.1	i	9	18	20
	35	0.2	i	6	11	13
	70	0.36	i	5	12	12
	150	0.7	i	4	10	10

■ Utilisation Categories of Contactors

Type of current	Utilisation category	Typical Applications I = Making current, I_c = Breaking current, I_e = Rated operational current, U = Voltage, U_e = Rated operational voltage, U_r = Recovery voltage	Verification of electrical service life Switching on I_e A	I I_e	U U_e	cosφ	Switching off I_c I_e	U_r U_e	cosφ	Verification of switching capacity Switching on I_e A	I I_e	U U_e	cosφ	Switching off I_c I_e	U_r U_e	cosφ
AC	AC-1	Non-inductive or slightly inductive load Resistance furnaces	all values	1	1	0.95	1	1	0.95	all values	1.5	1.05	0.8	1.5	1.05	0.8
	AC-2	Slip ring motors: starting, switching off	all values	2.5	1	0.65	2.5	1	0.65	all values	4	1.05	0.65	4	1.05	0.8
	AC-3	Squirrel cage motors: starting, switching off	$I_e \leq 17$	6	1	0.65	1	0.17	0.65	$I_e \leq 100$	10	1.05	0.45	8	1.05	0.45
		(running motors[4])	$I_e > 17$	6	1	0.35	1	0.17	0.35	$I_e > 100$	8	1.05	0.35	6	1.05	0.35
	AC-4	Squirrel cage motors: starting, plugging	$I_e \leq 17$	6	1	0.65	6	1	0.65	$I_e \leq 100$	12	1.05	0.45	10	1.05	0.45
		reversing, inching	$I_e > 17$	6	1	0.35	6	1	0.35	$I_e > 100$	10	1.05	0.35	8	1.05	0.35
	AC-5	Switching of electric discharge lamp controls									3.0	1.05	0.45	3.0	1.05	0.45
	AC-5b	Switching of incandescent lamps									1.5[2]	1.05	[2]	1.05[2]	1.05	[2]
	AC-6a[3]	Switching of transformers														
	AC-6b[3]	Switching of capacitor banks														
	AC-7a	Slightly inductive loads in household appliances and similar applications	according to manufacturer specifications							1.5	1.05	0.8	1.5	1.05	0.8	
	AC-7b	Motor loads for household appliances									8,0	1.05	[1]	8,0	1.05	[1]
	AC-8a	Switching of hermetically enclosed refrigerant compressor motors with manual reset of overload releases[5]									6,0	1.05	[1]	6,0	1.05	[1]
	AC-8b	Switching of hermetically enclosed refrigerant compressor motors with automatic reset of overload releases[5]									6,0	1.05	[1]	6,0	1.05	[1]
DC	DC-1	Non-inductive or slightly inductive load, Resistance furnaces	all values	1	1	1	1	1	1	all values	1.5	1.05	1	1.5	1.05	1
	DC-3	Shunt motors: starting, plugging, reversing, inching, dynamic braking	all values	2.5	1	2	2.5	1	2	all values	4	1.05	2.5	4	1.05	2.5
	DC-5	Series motors: starting, plugging, reversing, inching, dynamic braking	all values	2	1	7.5	2.5	1	7.5	all values	4	1.05	2.5	4	1.05	2.5
	DC-6	Switching of incandescent lamps									1.5[2]	1.05	[2]	1.5[2]	1.05	[2]

acc. to IEC 947-4-1, EN 60 947 VDE 0660 Part 102

[1] $\cos\varphi = 0.45$ for $I_e \leq 100$ A; $\cos\varphi = 0.35$ for $I_e \leq 100$ A.

[2] The tests must be carried out with an incandescent lamp load connected.

[3] In this case, the test data must be derived from the test values for AC-3 or AC-4 according to a special table.

[4] Devices for utilisation category AC-3 may be used for occasional inching or plugging during a limited period, such as for setting up a machine. However, during this limited period of time, the number of operations must not exceed five per minute or ten in a ten minute period.

[5] Hermetically enclosed refrigerant compressor motor means a combination of a compressor and a motor both of which are housed in the same enclosure with no external shaft or shaft seals, the motor running in the refrigerant.

■ Utilisation Categories of Auxiliary Switches

Type of current	Utilisation category	Typical Applications I = Making current, I_c = Breaking current, I_e = Rated operational current, U = Voltage, U_e = Rated operational voltage, U_r = Recovery voltage, $t_{0.95}$ = the time in ms until 95% of the stationary current has been reached, P = U_e x I_e = Rated power in Watts	Normal conditions of use Switching on I / I_e	U / U_e	cosφ	Switching off I_c / I_e	U_r / U_e	cosφ	Divergent conditions of use Switching on I / I_e	U / U_e	cosφ	Switching off I_c / I_e	U_r / U_e	cosφ
AC	AC-12	Control of resistive and solid state loads in optocoupler input circuits	1	1	0.9	1	1	0.9	-	-	-	-	-	-
	AC-13	Control of solid state loads with transformerisolation	2	1	0.65	1	1	0.65	10	1.1	0.65	1.1	1.1	0.65
	AC-14	Control of small electromagnetic loads (max. 72 VA)	6	1	0.3	1	1	0.3	6	1.1	0.7	6	1.1	0.7
	AC-15	Control of electromagnetic loads (above 72 VA)	10	1	0.3	1	1	0.3	10	1.1	0.3	10	1.1	0.3
			I / I_e	U / U_e	$t_{0.95}$	I_c / I_e	U_r / U_e	$t_{0.95}$	I / I_e	U / U_e	$t_{0.95}$	I_c / I_e	U_r / U_e	$t_{0.95}$
DC	DC-12	Control of resistive and solid state loads in optocoupler input circuits	1	1	1 ms	1	1	1 ms	-	-	-	-	-	-
	DC-13	Control of electromagnets	1	1	6xP[1)]	1	1	6xP[1)]	1.1	1.1	6xP[1)]	1.1	1.1	6xP[1)]
	DC-14	Control of electromagnetic loads with economy resistors in the circuit	10	1	15 ms	1	1	15 ms	10	1.1	15 ms	10	1.1	15 ms

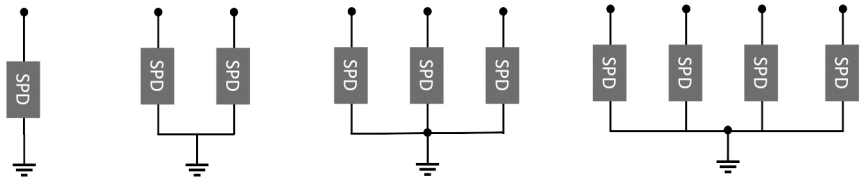
acc. to IEC 947-4-1, EN 60 947 VDE 0660 Part 102

[1)] The value „6xP“ is the result of an empirical relationship which is found to represent most direct current magnetic loads up to an upper limit of P = 50W with 6 [ms]/[W] = 200 [ms]. Loads with a rated power above 50 W are composed of small loads located parallel to each other. Therefore, 300 ms is an upper limit independent of the power rating.

Surge Protection

■ Connection of SPDs

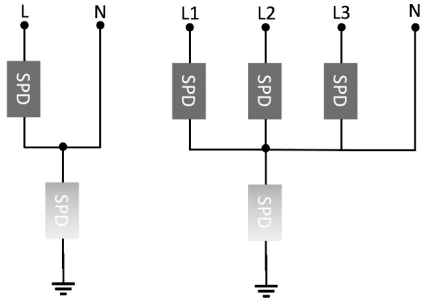
Connection Type 1 (CT1)



SPD between every live connection and earth potential!

- To be fitted in-front of an RCD
- The „3+0“ connection is used in TN-C and TN-C-S systems (if the PEN connection is established within 0.5 m)
- 2+0 / 4+0 connections are used in TN-S systems, given that no RCD is in-front of the SPD

Connection Type 2 (CT2)



An additional SPD is installed between neutral and protective earth (galvanic separation is ensured).

- Can be installed behind an RCD (various conditions need to be met)
- 1+1 connection suited for TN-C-S and TT networks (single phase)
- 3+1 suited for TN-C-S and TT systems (three phase)
- Easy application due to the possibility to be fitted in front or after an RCD (dependent on supply network, test class and type of RCD)

Connection of an SPD after an RCD

- It is not recommended (or forbidden by local regulations) to install a test class 1 tested SPD after an RCD
- The minimum surge current capabilities for an RCD in-front of an SPD shall be 3 kA
- Please be aware that even a surge current proof RCD can trip if an SPD is placed in series
- Connecting neutral and protective Earth behind an RCD is forbidden. Galvanic separation is needed (1+1/3+1 connection)

■ Installation of an SPD

Cross-section of the connected cables

Class 1 tested / class 1 and 2 tested SPDs

- At least **16 mm²** to earth potential
- Possibility to be reduced to 6 mm²*

Class 2 tested SPDs

- At least **6 mm²** to earth potential
- Possibility to be reduced to 2 mm²*

* IEC-60364-4-43 allows a smaller cross-section, if the installation is performed in such a way, that damages due to short circuits are minimized

Cable length

The complete length of connecting cables shall not exceed 0.5 m!

If this is not possible:

- The installed SPD shall provide a sufficient voltage protection level (lower than the minimum required protection level for the installation)
- Installation of a second coordinated SPD which then fulfills the needed voltage protection level of the installation.

Max. back-up fuse

- Every SPD shall have back-up protection
- The back-up fuse shall establish a safe state of the installation after an SPD fails/reaches it‘s end of life
- This protection device shall be capable of handling the short circuit of the installation
- The internal resistance of the protection device influences the voltage protection level and shall be chosen accordingly

Endurance of an SPD

Every SPD has endurance capabilities which rely on following factors:

- Amount of discharges
- Amplitude of discharges
- Duration/waveform of discharges

A higher Imax value can therefore offer a prolonged endurance of an SPD in an installation

Possible failure modes of SPDs

- High impedance fault, where the disconnection is done by the SPD itself.
- Low impedance failure, which requires the back-up protection to disconnect the SPD from the installation
- Interchanging fault

It should be noted, that the mode of disconnection of the SPD depends on the behaviour at it´s end of life.

Poles	Max. Continous Operating Voltage U_c	Type Designation	Article No.	Units per package

Combined Surge Protective Device MSPD-T12-350

- incl. FM contact (change-over contact)
- for TN-C

3pole	350 VAC	MSPD-T12-350/3-AX	720336	1

- incl. FM contact (change-over contact)
- for TN-S/TT

3pole+NPE	350 VAC	MSPD-T12-350/3+NPE-AX	720337	1

Range of protection	Max. Continous Operating Voltage U_c	Type Designation	Article No.	Units per package

Insert for MSPD-T12-350

L-N / L-PEN	350 VAC	MSPD-T12-350	720338	1
N-PE	350 VAC	MSPD-T12-350/NPE	720339	1

■ Description Surge Protective Class T1/T2

- Ready-to-connect Combined Surge Protection Device Type 1/2 on the basis of spark gaps
- Consisting of the base unit and plug-type modules
- Scope of application:
  To protect consumer systems against transient overvoltages caused by direct and indirect lightning strikes, as well as switching operations
- Lightning protection class I and II according to IEC 62305

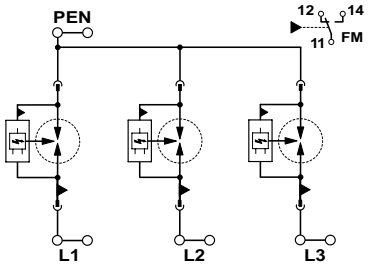
■ Technical Data

		MSPD-T12-350/3-AX	MSPD-T12-350/3+NPE-AX
General data			
Standards/regulations		IEC 61643-11, EN 61643-11	IEC 61643-11, EN 61643-11
IEC test classification		T1 / T2	T1 / T2
EN type		T1 / T2	T1 / T2
Number of ports		One	One
SPD design		Voltage-switching type	Voltage-switching type
Mode of protection		L-PEN	L-N, L-PE, N-PE
Mounting type		DIN rail 35 mm	DIN rail 35 mm
Surge protection fault message		Optical, remote indicator contact	Optical, remote indicator contact
Color		Light grey RAL 7035	Light grey RAL 7035
Insulating material		PBT-FR	PBT-FR
Housing material		PBT-FR	PBT-FR
Air clearances and creepage distances (according to EN 60664-1 and EN 61643-11)			
Degree of pollution		2	2
Overvoltage category		III	III
Material group		I	I
CTI value of material		≥ 600	≥ 600
U_{max}		< 2 kV	< 2 kV
Flammability rating according to UL 94		V-0	V-0
Degree of protection		IP20 (only when all terminal points are used)	IP20 (only when all terminal points are used)
Shock (operation)		30 g (Half-sine / 11 ms / 3x ±X, ±Y, ±Z)	30 g (Half-sine / 11 ms / 3x ±X, ±Y, ±Z)
Vibration (operation)		5 g (5 - 500 Hz/2.5 h/X, Y, Z)	5 g (5 - 500 Hz/2.5 h/X, Y, Z)
Ambient temperature (operation)		-40 °C ... 80 °C	-40 °C ... 80 °C
Ambient temperature (storage/transport)		-40 °C ... 80 °C	-40 °C ... 80 °C
Permissible humidity (operation)		5 % ... 95 %	5 % ... 95 %
Altitude		≤ 2000 m (amsl (above mean sea level))	≤ 2000 m (amsl (above mean sea level))
Width		106.8 mm	142.4 mm
Height		97 mm	95 mm
Depth		71.2 mm (incl. DIN rail 7.5 mm)	71.2 mm (incl. DIN rail 7.5 mm)
Horizontal pitch		6 Module units	8 Module units
Electrical data			
Nominal voltage	U_N	240/415 V AC (TN-C)	240/415 V AC (TN-S) 240/415 V AC (TT)
Nominal frequency	f_N	50 Hz	50 Hz
Maximum continuous operating voltage	U_C	350 V AC	350 V AC
Reference test voltage	U_{REF}	264 V AC	264 V AC
Rated load current	I_L	125 A (< 55 °C)	125 A (< 55 °C)
Nominal discharge current (8/20) µs	I_n		
(L-PEN)		25 kA	-
(L-N)		-	25 kA
(L-PE)		-	25 kA
(N-PE)		-	100 kA
Maximum discharge current (8/20) µs	I_{max}		
(L-PEN)		50 kA	-
(L-N)		-	50 kA
(L-PE)		-	50 kA
Impulse discharge current (10/350) µs			
Peak value	I_{imp}	25 kA (L-PEN)	25 kA (L-N)
Impulse discharge current (10/350) µs (L-PE)			
Peak value	I_{imp}	-	25 kA

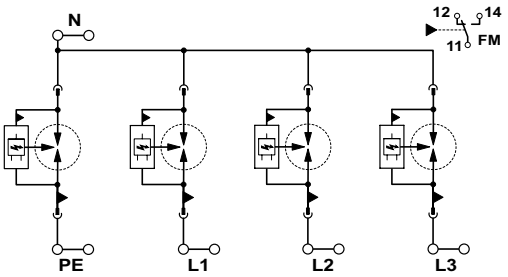
		MSPD-T12-350/3-AX	MSPD-T12-350/3+NPE-AX
Impulse discharge current (10/350) µs (N-PE)			
Peak value	I_{imp}	-	100 kA
Total discharge current (10/350) µs	I_{total}	75 kA	100 kA
Follow current interrupt rating	I_{fi}		
(L-PEN)		50 kA	-
(L-N)		-	50 kA
(N-PE)		-	100 A
Short-circuit current rating	I_{SCCR}	50 kA	50 kA
Voltage protection level	U_p		
(L-PEN)		≤ 1.5 kV	-
(L-N)		-	≤ 1.5 kV
(L-PE)		-	≤ 2.5 kV
(N-PE)		-	≤ 1.5 kV
Residual voltage	U_{res}		
(L-PEN)		≤ 1.5 kV (at I_n)	-
(L-N)		-	≤ 1.5 kV (at I_n)
(L-PE)		-	≤ 2.5 kV (at I_n)
(N-PE)		-	≤ 1.5 kV (at I_n)
Front of wave sparkover voltage at 6 kV (1.2/50) µs			
(L-PEN)		≤ 1.5 kV	-
(L-N)		-	≤ 1.5 kV
(L-PE)		-	≤ 2.5 kV
(N-PE)		-	≤ 1.5 kV
TOV behavior at U_T			
(L-PEN)		415 V AC (5 s / withstand mode)	-
		457 V AC (120 min / withstand mode)	-
(L-N)		-	415 V AC (5 s / withstand mode)
			457 V AC (120 min / withstand mode)
(N-PE)		-	1200 V AC (200 ms / withstand mode)
Response time	t_A	≤ 100 ns	≤ 100 ns
Current tripping factor	k	1.6	1.6
Max. backup fuse with branch wiring		315 A (gG)	315 A (gG)
Max. backup fuse with V-type through wiring (at 35 mm²)		125 A (gG)	125 A (gG)
Additional technical data			
Follow current interrupt rating	I_{fi}	100 kA (264 V AC)	100 kA (264 V AC) (L-N)
Short-circuit current rating	I_{SCCR}	100 kA (264 V AC)	100 kA (264 V AC)
Remote signaling			
Connection name		Remote fault indicator contact	Remote fault indicator contact
Switching function		PDT contact	PDT contact
Connection method		Plug-in/screw connection via COMBICON	Plug-in/screw connection via COMBICON
Operating voltage		12 V AC ... 250 V AC	12 V AC ... 250 V AC
		125 V DC (200 mA DC)	125 V DC (200 mA DC)
Operating current		10 mA AC ... 1 A AC	10 mA AC ... 1 A AC
		1 A DC (30 V DC)	1 A DC (30 V DC)
Screw thread		M2	M2
Conductor cross section			
flexible		0.14 mm² ... 1.5 mm²	0.14 mm² ... 1.5 mm²
solid		0.14 mm² ... 1.5 mm²	0.14 mm² ... 1.5 mm²
AWG		28 ... 16	28 ... 16
Stripping length		7 mm	7 mm
Tightening torque		0.25 Nm	0.25 Nm
Connection data			
Connection method		**Screw terminal blocks**	**Screw terminal blocks**
Screw thread		M5	M5
Connection technology		Biconnect terminal block	Biconnect terminal block
Conductor cross section			
flexible, solid		2.5 mm² ... 35 mm²	2.5 mm² ... 35 mm²
AWG		13 ... 2	13 ... 2
Stripping length		18 mm	18 mm
Connection method		**Fork-type cable lug**	**Fork-type cable lug**
Diameter		5 mm	5 mm
Conductor cross section flexible		1.5 mm² ... 16 mm²	1.5 mm² ... 16 mm²
Tightening torque		4.5 Nm	4.5 Nm

■ Circuit diagrams

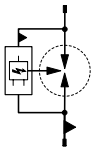
MSPD-T12-350/3-AX



MSPD-T12-350/3+NPE-AX

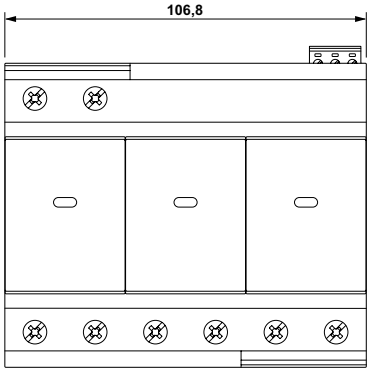


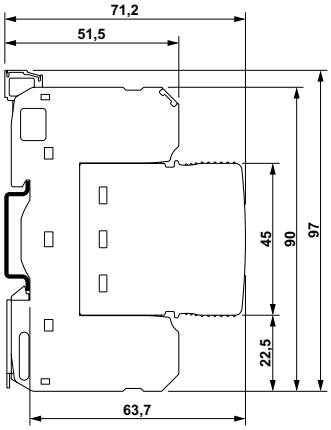
MSPD-T12-350, MSPD-T12-350/NPE



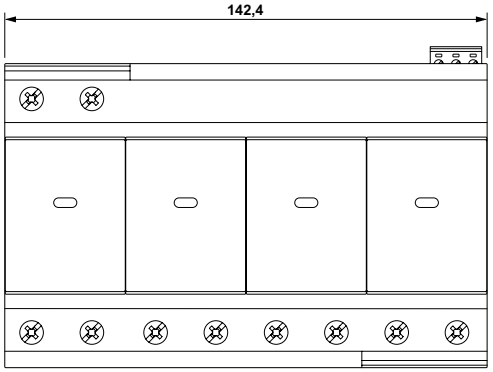
■ Dimensions (mm)

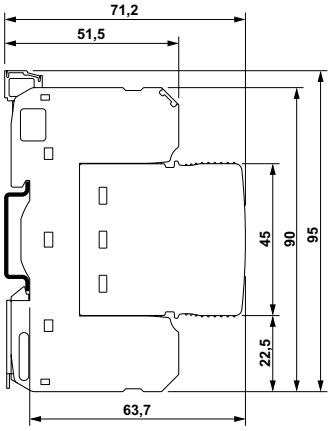
MSPD-T12-350/3-AX



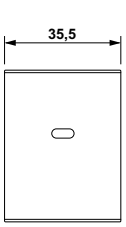


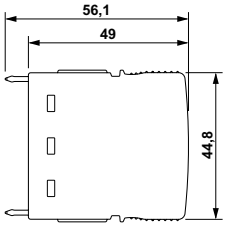
MSPD-T12-350/3+NPE-AX





MSPD-T12-350, MSPD-T12-350/NPE





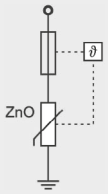
Poles	Max. Continous Operating Voltage U_c	I_n (8/20) µs	Type Designation		Article No.	Units per package
Plug-in surge arrester MSPD-T2						
Single phase supply / 1+1 connection						
1+N	280 VAC	20 kA	MSPD-T2-280-1+NPE	T3 tested	720340	1/60
Single phase supply / 2+0 connection						
2pole	280 VAC	2x20 kA	MSPD-T2-280/2	T3 tested	720341	1/60
Three phase supply / 3+0 connection (TN-C)						
3pole	280 VAC	3x20 kA	MSPD-T2-280/3	T3 tested	720342	1/40
Three phase supply / 3+1 connection (TN-S/TT)						
3+N	280 VAC	20 kA	MSPD-T2-280-3+NPE	T3 tested	720343	1/30
Plug-in surge arrester MSPD-T2. Insert						
Insert (1pole/path)						
Insert	280 VAC	20 kA	MSPD-T2-280	T3 tested	720344	2/120

Class T2 tested SPD, MSPD-T2

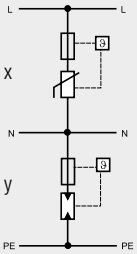
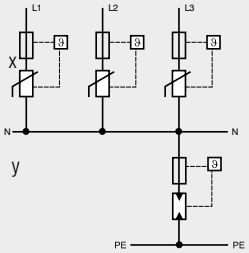
■ Description

- Field of application:
- For the protection of low voltage distribution systems against transient overvoltage caused by direct and indirect lightning stroke and switching operations
- Test class II according to IEC 61643-11
- SPD-type T2, according to EN 61643-11
- Auxiliary switch ASAUXSC-SPM for remote message transmission can be mounted onto the device
- MSPD-T2 280 is additional class 3 tested

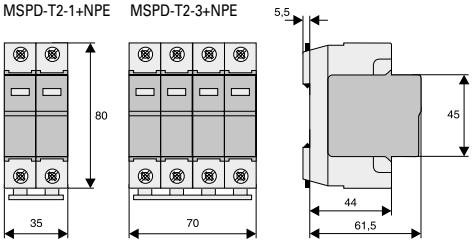
■ Technical Data

Inserts		MSPD-T2-280
Electrical		
Mechanical coding		x
Responding time (rate of voltage rise 5 kV/µs)		< 25 ns
Voltage protection level at nominal discharge current / U_{oc}	U_p	< 1.4 kV
Voltage protection level at 5 kA (8/20) µs	U_p	1000 V
Max. continuous operating voltage	U_C	280 VAC
TOV test value (5 s)	U_T	348 VAC
Rated frequency		50 Hz
Open circuit voltage	U_{oc}	10 kV
Nominal discharge current (8/20) µs	I_n	20 kA
Max. discharge current	I_{max}	40 kA
Follow current interrupt rating	I_{fi}	–
Open Circuit Voltage	U_{oc} [T3]	6 kV
Voltage protection level	U_p [T3]	900 V
Maximum back-up fuse Maximum short-circuit current		≤ 125 AgL 50 $kA_{r.m.s.}$ | PLHT-C100 20 $kA_{r.m.s.}$
Connection diagram		
Mechanical		
Frame size		45 mm
Device height		80 mm
Device width		
1pole		17.5 mm (1MU)
1+1pole, 2pole		35 mm (2MU)
3pole		52.5 mm (3TE)
3+1pole, 4pole		70 mm (4TE)
Mechanical coding		
1pole		x
1+1pole		yx
2pole		xx
3pole		xxx
3+1pole		yxxx
4pole		xxxx
Weight base 1P, 1+1P, 2P, 3P, 3+1P, 4P		53/120/120/180/240/240 g
Weight complete devices 1P, 1+1P, 2P, 3P, 3+1P, 4P		110/201/220/330/412/440 g
Permitted ambient temperature		-40°C to +70°C
Degree of protection		IP20
Upper and lower lift terminal capacity		4 - 25 mm^2
Upper and lower open mouthed terminals for busbar thickness up to		1.5 mm
Tightening torque of terminal screws		2.4 - 3 Nm
Quick fastening on DIN rail according to		IEC/EN 60715

■ Technical Data

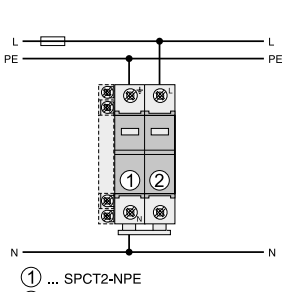
			MSPD-T2-1+NPE	MSPD-T2-3+NPE
Electrical				
Mechanical coding			yx	yxxx
Responding time (rate of voltage rise 5 kV/µs)	L-N/N-PE/L-PE		< 25ns/< 100ns/< 100ns	< 25ns/< 100ns/< 100ns
Max. continuous operating voltage	L-N/N-PE	U_C	335VAC/260VAC	280VAC/260VAC
TOV test value		U_T		
5 s	L-N		415 VAC	350 VAC
200 ms	N-PE		1200 VAC	1200 VAC
Rated frequency			50 Hz	50 Hz
Nominal discharge current (8/20) µs	L-N/N-PE/L-PE	I_n	20 kA	20 kA
Voltage protection level at I_n	L-N/N-PE/L-PE	U_p	≤1600V/≤1000V/≤1650V	≤1000V/≤1000V/≤1300V
Max. discharge current (8/20) µs	L-N/N-PE/L-PE	I_{max}	40 kA	40 kA
Follow current interrupt rating	N-PE	I_{fi}	100 $A_{r.m.s.}$	100 $A_{r.m.s.}$
Maximum back-up fuse Maximum short-circuit current			≤ 125 AgL 50 $kA_{r.m.s.}$	PLHT-C100 20 $kA_{r.m.s.}$
Connection diagram				
Mechanical				
Mechanical coding of base			yx	yxxx
Frame size			45 mm	45 mm
Device height			80 mm	80 mm
Device width			35 mm	70 mm
Weight			201 g	412 g
Permitted ambient temperature			-40°C to +70°C	-40°C to +70°C
Degree of protection (built-in)			IP40	IP40
Upper and lower lift terminal capacity			1 - 25 mm^2	1 - 25 mm^2
Upper and lower open mouthed terminals for busbar thickness up to			1.5 mm	1.5 mm
Tightening torque of terminal screws			2.4 - 3 Nm	2.4 - 3 Nm
Quick fastening on DIN rail according to			IEC/EN 60715	IEC/EN 60715

■ Dimensions (mm)



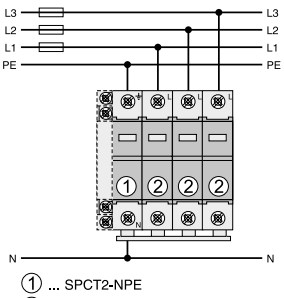
■ Application Examples

SPCT2-1+NPE
TN-, TT-System
3 x 230/400 VAC
3 x 240/415 VAC



① ... SPCT2-NPE
② ... SPCT2-335

SPCT2-3+NPE
TN-S-, TT-System
3 x 230/400 VAC
3 x 240/415 VAC



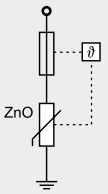
① ... SPCT2-NPE
② ... SPCT2-280

Poles	Max. Continous Operating Voltage U_c	I_n (8/20) µs	Type Designation	Article No.	Units per package
Surge arrester MSPD-ET2, 1- to 4pole					
Single phase supply / 1+0 connection					
1pole	280 VAC	10 kA	MSPD-ET2-280/1	720345	2/120
Single phase supply / 1+1 connection					
1pole+N	280 VAC	10 kA	MSPD-ET2-280/1+NPE	720346	1/60
Single phase supply / 2+0 connection					
2pole	280 VAC	2x10 kA	MSPD-ET2-280/2	720347	1/60
Surge arrester MSPD-ET2, Insert					
Insert (1pole/path)					
Insert	280 VAC	10 kA	MSPD-ET2-280	720348	2/120

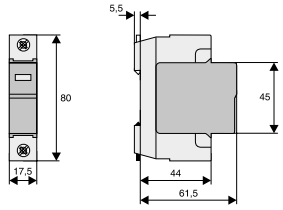
■ Description Surge arrester MSPD-ET2

- Field of application:
- For the protection of low voltage distribution systems against transient overvoltage caused by direct and indirect lightning stroke and switching operations
- Test class II according to IEC 61643-11
- SPD-type T2, according to EN 61643-11
- Busbars ZV-KSBI are available for all customary applications
- Suitable for busbar connection to all Xtra Combinations switchgear

■ Technical Data

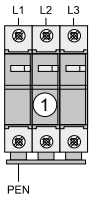
		MSPD-ET2-280
Electrical		
Responding time (rate of voltage rise 5 kV/µs)		< 25 ns
Voltage protection level at nominal discharge current	U_p	< 1.2kV
Voltage protection level at 5 kA (8/20) µs	U_p	1000 V
Max. continuous operating voltage	U_C	280 VAC
TOV test value (5 s)	U_T	335 VAC
Rated frequency		50 Hz
Nominal discharge current (8/20) µs	I_n	10 kA
Max. discharge current	I_{max}	20 kA
Follow current interrupt rating	I_{fi}	–
Maximum back-up fuse Maximum short-circuit current		≤ 125 AgL 50 $kA_{r.m.s.}$
Connection diagram		
Mechanical		
Frame size		45 mm
Device height		80 mm
Device width		17.5 mm
Weight		87 g
Permitted ambient temperature		-40°C to +70°C
Degree of protection		IP20
Upper and lower lift terminal capacity		4 - 25 mm^2
Upper and lower open mouthed terminals for busbar thickness up to		1.5 mm
Tightening torque of terminal screws		2.4 - 2.5 Nm
Quick fastening on DIN rail according to		IEC/EN 60715

■ Dimensions (mm)

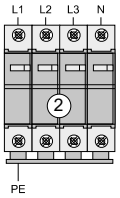


■ Application Examples MSPD-ET2 according to IEC 60364-5-53 Clause 534

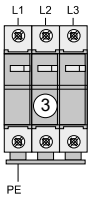
TN-C-System
3 x 230/400 VAC
(3 x 220/380 VAC)
(3 x 240/415 VAC)



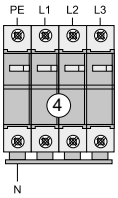
TN-S-System
3 x 230/400 VAC
(3 x 220/380 VAC)
(3 x 240/415 VAC)



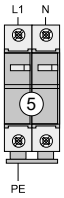
TT-System
3 x 230 VAC
(3 x 220 VAC)



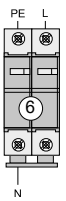
TN-S-/TT-System
3 x 230/400 VAC
(3 x 220/380 VAC)
(3 x 240/415 VAC)



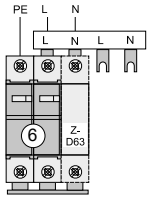
TN-S-System
1 x 230 VAC
(1 x 220 VAC)
(1 x 240 VAC)



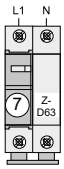
TN-S-/TT-System
1 x 230 VAC
(1 x 220 VAC)
(1 x 240 VAC)



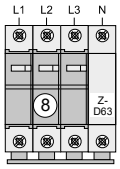
TN-S-/TT-System
1 x 230 VAC
(1 x 220 VAC) (1 x 240 VAC)



TN-S-/TT-System
230 VAC

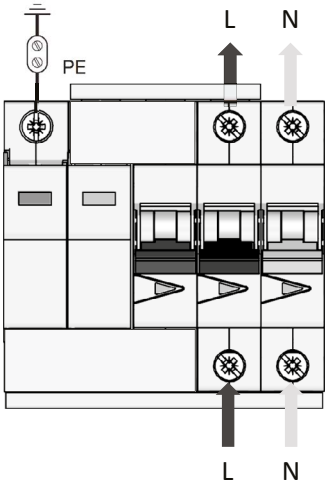


TN-S-/TT-System
3 x 230/400 VAC



		①	②	③	④	
	IEC 60364-5-53 Clause 534	**MSPD-ET2-** 280/3	**MSPD-ET2-** 280/4	—	**MSPD-ET2-** 335/3+NPE	
A	ÖVE ÖNORM E8101	**MSPD-ET2-** 335/3	**MSPD-ET2-** 335/4	—	**MSPD-ET2-** 335/3+NPE	
D	VDE V 0100-534	**MSPD-ET2-** 280/3	**MSPD-ET2-** 280/4	---	**MSPD-ET2-** 335/3+NPE	
N		**MSPD-ET2-** 280/3	**MSPD-ET2-** 280/4	**MSPD-ET2-** 280/3	---	

		⑤	⑥	⑦	⑧	
	IEC 60364-5-53 Clause 534	**MSPD-ET2-** 280/2	**MSPD-ET2-** 335/1+NPE	—	—	
A	ÖVE ÖNORM E8101	**MSPD-ET2-** 335/2	**MSPD-ET2-** 335/1+NPE	---	—	
D	VDE V 0100-534	**MSPD-ET2-** 280/2	**MSPD-ET2-** 335/1+NPE	---	---	
F	UTE C 20-443	---	—	**MSPD-ET2-** 280/1	**MSPD-ET2-** 280/3	



MCPS combined SPD and MCB protection.
MCB to IEC EN60898-1
SPD class 2
Conforming to EN 50550

Article No.	Type Designation	Specification
722935	MCPS-C25/1N-06P	In = 25 A -10/20 kA - 30/60 kA
722936	MCPS-C32/1N-06P	In = 32 A -10/20 kA - 30/60 kA
722937	MCPS-C40/1N-06P	In = 40 A -10/20 kA - 30/60 kA
722938	MCPS-C50/1N-06P	In = 50 A - 20/40 kA - 30/60 kA
722939	MCPS-C63/1N-06P	In = 63 A - 20/40 kA - 30/60 kA
REPLACEMENT CARTRIDGES		
720345	MSPD-ET2-280/1	Class 2 tested SPD, SPET2, 1P, 280V, 10kA
720346	MSPD-ET2-280/1+NPE	Class 2 tested SPD, SPET2 1P+N, 280V, 10kA
720347	MSPD-ET2-280/2	Class 2 tested SPD, SPET2 2P, 280V, 10kA
720348	MSPD-ET2-280	Surge arrester SPET2, Insert 280 VAC

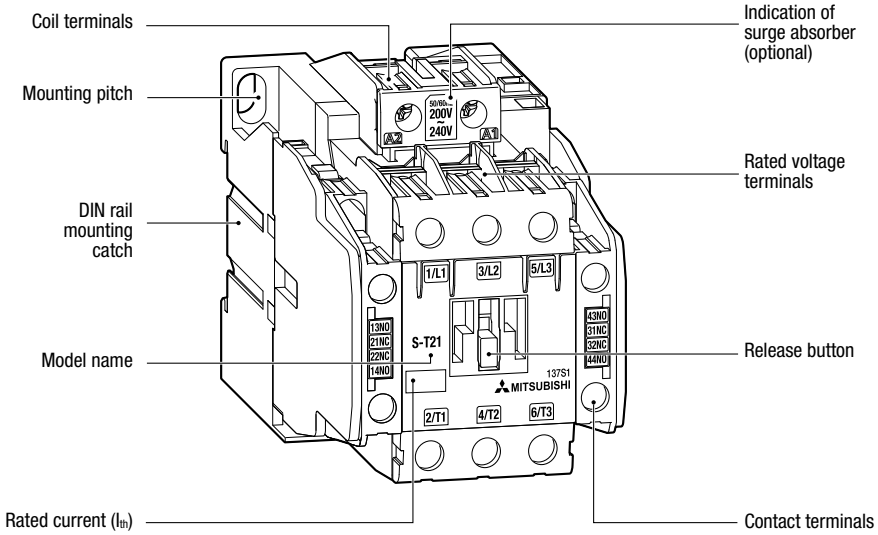
■ Technical Data

For use inside enclosures (IP20)		
Surge protection	Type 2, transient	
Conforms to EN 61643-11		
For use in networks	TN / TT / TN-S	
Response time	<25 ns	
Ifi	100 Aeff	
Nominal discharge voltage	≤ 1.5 kV	
Uc	MC (between phase and ground and between neutral and ground): 260 V AC / MD (between phase and neutral): 335 V AC	
	25, 32 and 40 A	**50 and 63 A**
Replaceable cartridges	MSPD-ET2-280	MSPD-ET2-280
In (8/20) us	10 kA(L-N)	20 kA(L-N)
	30 kA(N-PE)	30 kA(N-PE)
Imax	20 kA(L-N)	40 kA (L-N)
	60 kA(N-PE)	60 kA(N-PE)

Surge protection	Permanent Type
Conforms to EN 50550	
For use in networks	TN/TT/TN-S
Response time	Between 50-100 ms
Impulse voltage Uimp	4kV
Ue (consumption)	230 V AC (0.4W)

Circuit breaker	1 pole + neutral
Conforms to EN 60898	
For use in networks	TN/TT/TN-S
Response time	Curve C
Icn (230 VAC)	6kA
In (depending on model)	25 - 32 - 40 - 50 - 63 A

General purpose contactors



The main benefits:

- Easy mounting and wiring
- Easy inspection
- Built-in surge absorber
- Safety and speedy terminal functions
- Thermo plastic improves the barrier strength
- Coil boasts lower coil consumption
- Improvement of Electromagnet (DC electromagnet with AC operation)
- Less noise nor surge from coil
- Conform to IEC947-4-1, EN-Standards
- Mounting of the contactors is described on page 247.

Handling of the contactors

S(D)-T10 to S(D)-T80 units can all be mounted on DIN rail (35 mm wide).

A variety of blocks and optional features are available including:

- Standard front clip-on auxiliary contact blocks (4-pole-type and 2-pole-type)
- Low-level signal front-clip-on auxiliary contact blocks
- Side clip-on auxiliary contact blocks
- Surge absorbers (varistor and CR models)
- Surge absorbers with LED operating indicators
- Mechanical interlocks

Contactor coils have ultra-wide range of ratings

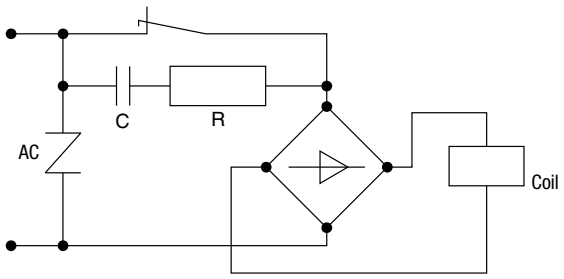
The number of coil types has been cut by two-thirds and there is no need to re-wire for different frequencies. The coil also withstands large voltage drops.

Compact arc quenching and magnet layout greatly reduces installation space.

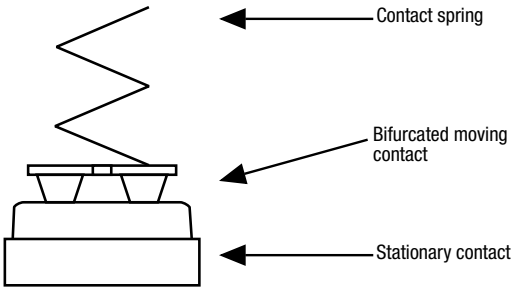
The coil rating is displayed in a location readily visible even after the unit is installed onto the panel.

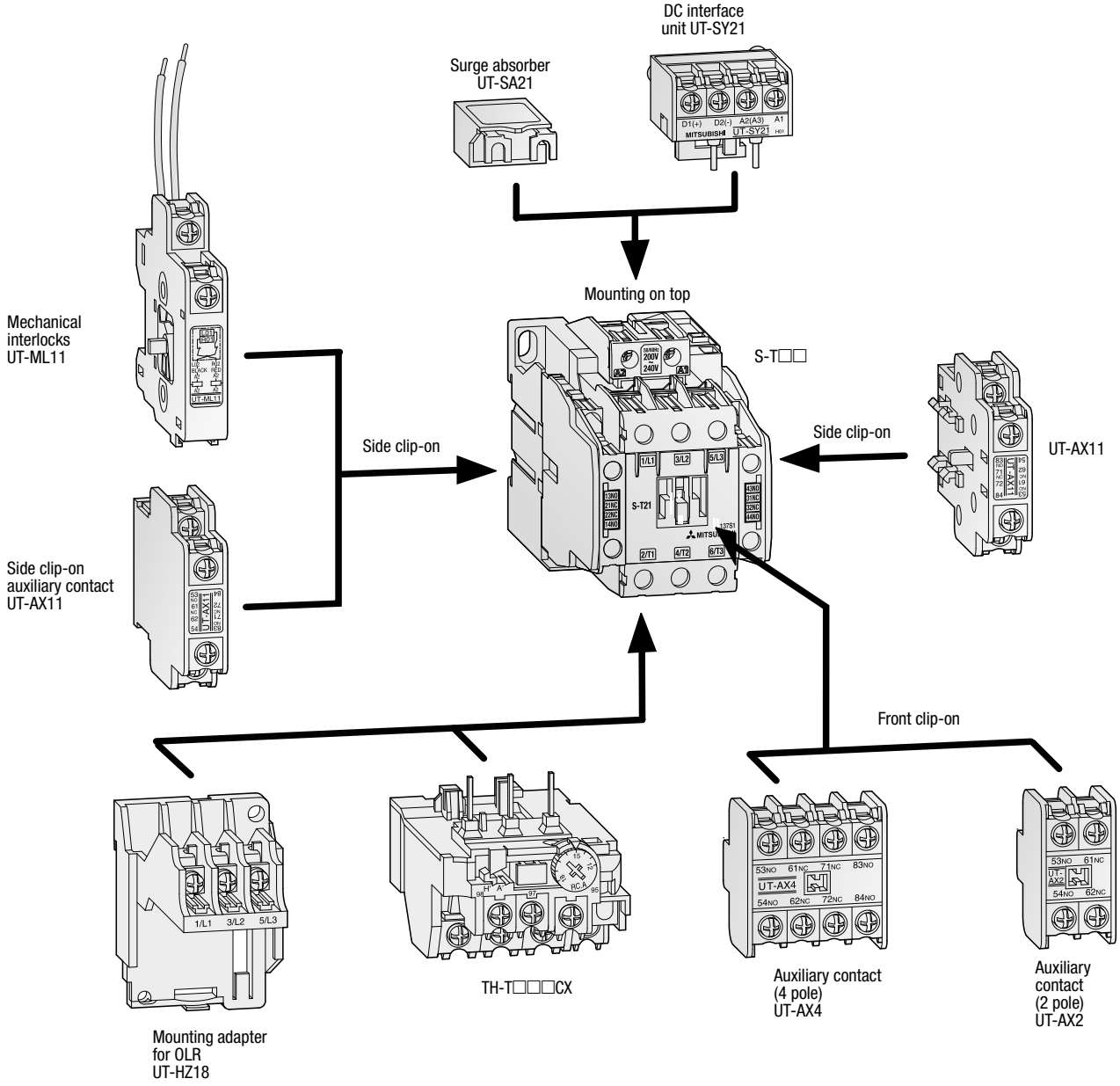
Contacts are visible when the cover is removed, allowing them to be checked easily.

Internal circuit of the electromagnet

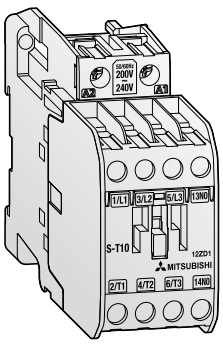


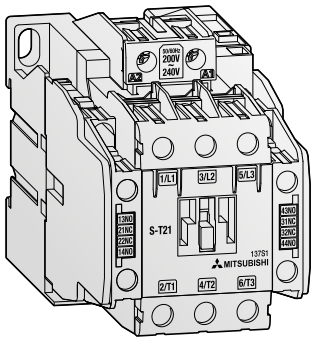
Bifurcated auxiliary contact




DC interface unit UT-SY21
Surge absorber UT-SA21
Mounting on top
Mechanical interlocks UT-ML11
Side clip-on
S-T□□
Side clip-on
UT-AX11
Side clip-on auxiliary contact UT-AX11
Front clip-on
Mounting adapter for OLR UT-HZ18
TH-T□□□CX
Auxiliary contact (4 pole) UT-AX4
Auxiliary contact (2 pole) UT-AX2

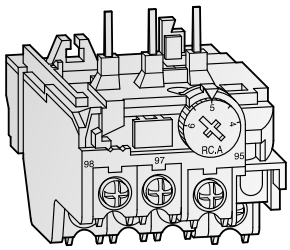
Three-phase motor ratings IEC category AC3 for contactors								
Contactor	AC-operated	S-T10AC	S-T12AC	S-T20AC	S-T21AC	S-T25AC	S-T32AC	S-T35
	DC-operated	—	SD-T12DC	SD-T20DC	SD-T21DC	—	SD-T32DC	SD-T35
AC 380–440 V	kW	4	5.5	7.5	11	15	15	18.5
Rated continuous current Ith	A	20	20	20	32	32	32	60
Auxiliary contacts (standard)		1 NO or 1 NC	1 NO + 1 NC	1 NO + 1 NC or 2 NO	1 NO + 1 NC	2 NO + 2 NC	—	2 NO + 2 NC

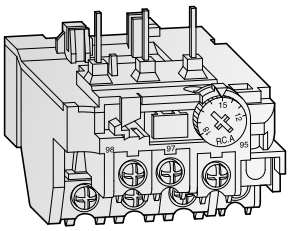


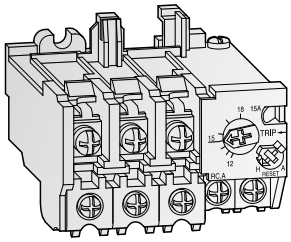


S-T10AC	S-T12AC	S-T20AC	S-T21AC	S-T25AC	S-T32AC	S-T35
—	SD-T12DC	SD-T20DC	SD-T21DC	—	SD-T32DC	SD-T35
Connecting parts	—		UN-TH21		UN-TH50	

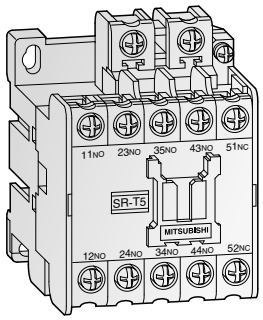
Thermal overload relays			
Type	TH-T18KP	TH-T25KP	TH-T25KP/TH-T50KP
Setting range	0.1 – 18 A	0.24 – 26 A	0.24 – 34 A



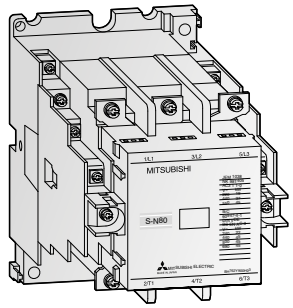


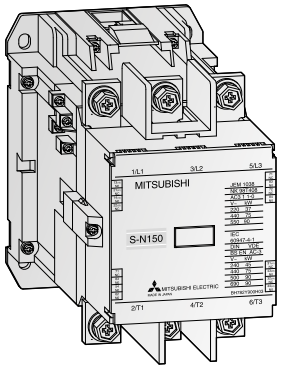


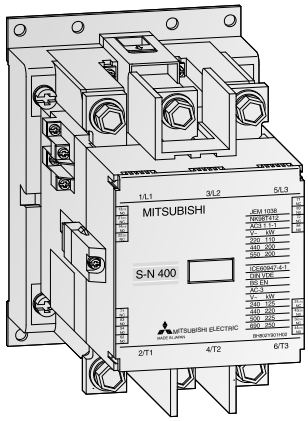
Contactor relays			
AC-operated type	SR-T5	SR-T5	SR-T5
DC-operated type	SRD-T5	SRD-T5	SRD-T5
Auxiliary contacts	5 NO	4 NO, 1 NC	3 NO, 2 NC



Three-phase motor ratings IEC category AC-3											
S-T50	S-T65	S-T80	S-T100	S-N125	S-N150	S-N180	S-N220	S-N300	S-N400	S-N600	S-N800
SD-T50	SD-T65	SD-T80	SD-T100	SD-N125	SD-N150	—	SD-N220	SD-N300	SD-N400	SD-N600	SD-N800
22	30	45	55	60	75	90	132	160	220	330	440
80	100	120	150	150	200	260	260	350	450	800	1000
2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC	2 NO + 2 NC

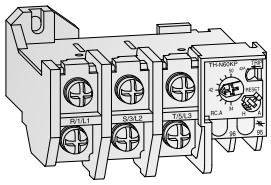


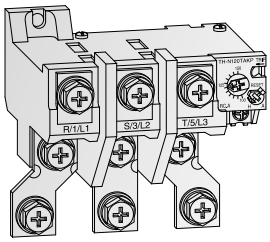


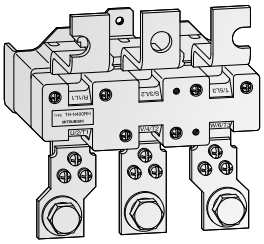


S-T50	S-T65	S-T80	S-T100	S-N125	S-N150	S-N180	S-N220	S-N300	S-N400	S-N600	S-N800
SD-T50	SD-T65	SD-T80	SD-T100	SD-N125	SD-N150	—	SD-N220	SD-N400	SD-N400	SD-N600	SD-N800
UT-TH50	BH559N350		AC operated: BH569N350 DC operated: BH569N352	BH579N355	BH589N355	BH589N355		—		—	

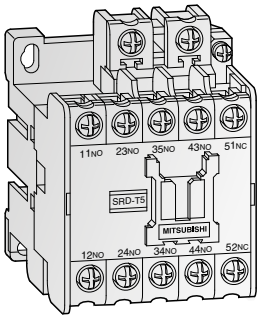
Thermal overload relays							
TH-T25KP/ TH-T50KP	TH-T65KP	TH-T65KP/ TH-T100KP	TH-T65KP/ TH-T100KP	TH-N120TAKP	TH-N220RHKP	TH-N400RHKP	TH-N600KP
0.24 – 50 A	12 – 65 A	12 – 80 A	12 – 100 A	34 – 150 A	65 – 250 A	85 – 400 A	200 – 800 A







Contactor relays			
AC-operated type	SR-T5	SR-T5	SR-T5
DC-operated type	SRD-T5	SRD-T5	SRD-T5
Auxiliary contacts	5 NO	4 NO, 1 NC	3 NO, 2 NC



Specifications			S-T10 AC□□□V 1A	S-T10 AC□□□V 1B	S-T12 AC□□□V 1A1B	S-T12 AC□□□V 2A	S-T12 AC□□□V 2B	S-T20 AC□□□V 1A1B	S-T20 AC□□□V 2A	S-T21 AC□□□V 2A2B	S-T25 AC□□□V 2A2B	S-T32 AC□□□V
Rated data												
Applicable standard			All types: IEC60947-4-1, EN60947-4-1, JIS C8201-4-1									
Rated insulation voltage		V	All types: 690									
Rated impulse withstand voltage		kV	All types: 6									
Rated frequency		Hz	All types: 50/60									
Pollution degree			All types: 3									
Rated operational power (current) Category AC-3 (Three-phase squirrel-cage motor load, standard responsibility)	220–240 V	kW (A)	2.5 (11)	2.5 (11)	3.5 (13)	3.5 (13)	3.5 (13)	4.5 (18)	4.5 (18)	5.5 (25)	7.5 (30)	7.5 (32)
	380–440 V	kW (A)	4 (9)	4 (9)	5.5 (12)	5.5 (12)	5.5 (12)	7.5 (18)	7.5 (18)	11 (23)	15 (30)	15 (32)
	500 V	kW (A)	4 (7)	4 (7)	5.5 (9)	5.5 (9)	5.5 (9)	7.5 (17)	7.5 (17)	11 (17)	15 (24)	15 (24)
	690 V	kW (A)	4 (5)	4 (5)	5.5 (7)	5.5 (7)	5.5 (7)	7.5 (9)	7.5 (9)	7.5 (9)	11 (12)	11 (12)
Rated operational power (current) Category AC-4 (Three-phase squirrel-cage motor load, inching responsibility)	220–240 V	kW (A)	1.5 (8)	1.5 (8)	2.2 (11)	2.2 (11)	2.2 (11)	3.7 (18)	3.7 (18)	3.7 (18)	4.5 (20)	5.5 (26)
	380–440 V	kW (A)	2.2 (6)	2.2 (6)	4 (9)	4 (9)	4 (9)	5.5 (13)	5.5 (13)	5.5 (13)	7.5 (17)	11 (24)
	500 V	kW (A)	2.7 (6)	2.7 (6)	5.5 (9)	5.5 (9)	5.5 (9)	5.5 (10)	5.5 (10)	5.5 (10)	7.5 (12)	7.5 (13)
Rated operational power (current) Category AC-1 (Resistance, heater load)	100–240 V	kW (A)	20	20	20	20	20	20	20	32	32	32
	380–440 V	kW (A)	11	11	13	13	13	13	13	32	32	32
Conventional free air thermal current Ith		A	20	20	20	20	20	20	20	32	32	32
Minimum applicable load level			All types: 48 V 200 mA									
Auxiliary contact rating												
Contact arrangement	Standard		1 NO	1 NC	1 NO + 1 NC	2 NO	2 NC	1 NO + 1 NC	2 NO	2 NC	2 NO + 2 NC	—
Max. number of additional options ①	Front clip-on	pcs.	1	1	1	1	1	1	1	1	1	1
	Side clip-on	pcs.	2	2	2	2	2	2	2	2	2	2
Rated operational current (Category AC-15 : Alternating current coil load)	120 V	A	6	6	6	6	6	6	6	6	6	6
	240 V	A	3	3	3	3	3	3	3	3	3	3
Rated operational current (Category DC-13 : Direct current coil load)	24 V	A	3	3	3	3	3	3	3	3	3	3
	110 V	A	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Conventional free air thermal current Ith		A	10	10	10	10	10	10	10	10	10	10
Minimum applicable load level			All types: 20 V 3 mA									
Performance												
Mechanical durability [ten thousand times]			All types: 1,000									
Electrical durability [ten thousand times]			Please refer to the Electrical durability curve on page 237.									
Switching frequency [times/hour]	Category AC-3		1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
	Category AC-4		300	300	300	300	300	300	300	300	300	300
	Category AC-1		1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
Coil consumption (at rated coil voltage) ③	Inrush	(VA)	45	45	45	45	45	45	45	75	75	55
	Sealed	(VA)	7	7	7	7	7	7	7	6	6	4.5
	Watts	(W)	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.4	2.4	1.8
Mechanical data												
Dimensions (WxHxD)		mm	36x75x78	36x75x78	43x75x78	43x75x78	43x75x78	43x75x78	43x75x78	63x81x81	63x81x81	43x81x81
Order information	**AC 24 V**	Art. no.	279140	279197	279204	279211	279218	279225	279232	279239	279246	279253
	AC 48 V		279141	279198	279205	279212	279219	279226	279233	279240	279247	279254
	AC 100 V		279142	279199	279206	279213	279220	279227	279234	279241	279248	279255
	AC 200 V		279143	279200	279207	279214	279221	279228	279235	279242	279249	279256
	AC 300 V		279144	279201	279208	279215	279222	279229	279236	279243	279250	279257
	AC 400 V		279195	279202	279209	279216	279223	279230	279237	279244	279251	279258
	AC 500 V		279196	279203	279210	279217	279224	279231	279238	279245	279252	279259

Specifications			S-T35 AC□□□V	S-T50 AC□□□V	S-T65 AC□□□V	S-T80 AC□□□V	S-T100 AC□□□V	S-N125 AC□□□V	S-N150 AC□□□V	S-N180 AC□□□V	S-N220 AC□□□V	S-N300 AC□□□V	S-N400 AC□□□V	S-N600 AC□□□V	S-N800 AC□□□V
Rated data															
Applicable standard			All types: IEC60947-4-1, EN60947-4-1, JIS C8201-4-1												
Rated insulation voltage			690							1000					
Rated impulse withstand voltage		kV	All types: 6												
Rated frequency		Hz	All types: 50/60												
Pollution degree			All types: 3												
Rated operational power (current) Category AC-3 (Three-phase squirrel-cage motor load, standard responsibility)	220–240 V	kW (A)	11(40)	15(55)	18.5(65)	22(85)	30(105)	37(125)	45(150)	55(180)	75(250)	90(300)	125(400)	190(630)	220(800)
	380–440 V	kW (A)	18.5(40)	22(48)	30(65)	45(85)	55(105)	60(120)	75(150)	90(180)	132(250)	160(300)	220(400)	330(630)	440(800)
	500 V	kW (A)	18.5(32)	25(38)	37(60)	45(75)	55(85)	60(90)	90(140)	110(180)	132(200)	160(250)	225(350)	330(500)	500(720)
	690 V	kW (A)	15(17)	22(26)	30(38)	45(52)	55(65)	60(70)	90(100)	110(120)	132(150)	200(220)	250(300)	330(420)	500(630)
Rated operational power (current) Category AC-4 (Three-phase squirrel-cage motor load, inching responsibility)	220–240 V	kW (A)	5.5(26)	7.5(35)	11(50)	15(65)	19(80)	15	18.5	22	22	37	45	65	75
	380–440 V	kW (A)	11(24)	15(32)	22(47)	30(62)	37(75)	22	30	37	45	60	75	110	130
	500 V	kW (A)	11(17)	15(24)	22(38)	30(45)	37(55)	22	37	45	55	60	90	130	150
Rated operational power (current) Category AC-1 (Resistance, heater load)	100–240 V	A	60	80	100	120	150	150	200	260	260	350	450	660	800
	380–440 V	A	60	80	100	120	150	150	200	260	260	350	450	660	800
Conventional free air thermal current Ith		A	60	80	100	120	150	150	200	260	260	350	450	800	1000
Minimum applicable load level			All types: 48 V 200 mA												
Auxiliary contact rating															
Contact arrangement	Standard		2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC
Max. number of additional options	Front clip-on	pcs.	1	1	1	1	—	—	—	—	—	—	—	—	—
	Side clip-on	pcs.	2	2	2	2	2	2	2	2	2	2	2	2	2
Rated operational current (Category AC-15 : Alternating current coil load)	120 V AC		6	6	6	6	6	6	6	6	6	6	6	6	6
	240 V AC		3	3	3	3	3	5	5	5	5	5	5	5	5
Rated operational current (Category DC-13 : Direct current coil load)	24 V DC		3	3	3	3	3	5	5	5	5	5	5	5	5
	110 V DC		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Conventional free air thermal current Ith		[A]	10	10	16	16	16	16	16	16	16	16	16	16	16
Minimum applicable load level			All types: 20 V 3 mA												
Performance															
Mechanical durability [ten thousand times]			1000	1000	500	500	500	500	500	500	500	500	500	500	500
Electrical durability			Please refer to the Electrical durability curve on page 237.												
Switching frequency [times/hour]	Category AC-3		1800	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
	Category AC-4		300	300	300	300	300	300	300	300	300	300	300	300	300
	Category AC-1		1200	1200	1200	1200	600	1200	1200	1200	1200	1200	1200	1200	1200
Coil consumption (at rated coil voltage)	Inrush	(VA)	110	110	115	115	210	320	320	480	480	480	480	800	800
	Sealed	(VA)	10	10	20	20	23	26	26	44	44	54	54	100	100
	Watts	(W)	3.8	3.8	2.2	2.2	2.8	3.5	3.5	5	5	7.3	7.3	15	15
Mechanical data															
Dimensions (WxHxD)		mm	75x89x91	75x89x91	88x106x106	88x106x106	100x124x127	100x150x136	120x160x145	138x204x174	138x204x174	163x243x195	163x243x195	290x310x234	290x310x234
Order Information	**AC 24 V**	Art. no.	298658	298665	298672	298679	298686	113650	113654	—	—	—	—	—	—
	AC 48 V		298661	298668	298675	298682	298689	—	—	—	—	—	—	—	—
	AC 100 V		298656	298663	298670	298677	298684	113647	113651	113656	113659	113662	113665	113668	113672
	AC 200 V		298657	298664	298671	298678	298685	113648	113652	113657	113660	113663	113666	113669	113673
	AC 300 V		298659	298666	298673	298680	298687	—	—	—	—	—	—	—	—
	AC 400 V		298660	298667	298674	298681	298688	113649	113653	113658	113661	113664	113667	113670	113674
	AC 500 V		298662	298669	298676	298683	298370	—	—	—	—	—	—	—	—

Specifications			SD-T12 DC24V 1A1B	SD-T20 DC24V 1A1B	SD-T21 DC24V 2A2B	SD-T32 DC24V
Rated data						
Applicable standard			All types: IEC60947-4-1, EN60947-4-1, JIS C8201-4-1			
Rated insulation voltage		V	All types: 690			
Rated impulse withstand voltage		kV	All types: 6			
Rated frequency		Hz	All types: 50/60			
Pollution degree			All types: 3			
Rated operational power (current) Category AC-3 (Three-phase squirrel-cage motor load, standard responsibility)	220–240 V	kW (A)	3.5 (13)	4.5 (18)	5.5 (25)	7.5 (32)
	380–440 V	kW (A)	5.5 (12)	7.5 (18)	11 (23)	15 (32)
	500 V	kW (A)	5.5 (9)	7.5 (17)	11 (17)	15 (24)
Rated operational power (current) Category AC-4 (Three-phase squirrel-cage motor load, inching responsibility)	220–240 V	kW (A)	2.2 (11)	3.7 (18)	3.7 (18)	5.5 (26)
	380–440 V	kW (A)	4 (9)	5.5 (13)	5.5 (13)	11 (24)
	500–550 V	kW (A)	5.5 (9)	5.5 (10)	5.5 (10)	7.5 (13)
Rated operational power (current) Category AC-1 (Resistance, heater load)	100–240 V	kW (A)	20	20	32	32
	380–440 V	kW (A)	13	13	32	32
Conventional free air thermal current Ith		A	20	20	32	32
Minimum applicable load level			All types: 48 V 200 mA			
Auxiliary contact rating						
Contact arrangement	Standard		1 NO + 1 NC	1 NO + 1 NC	2 NC	—
Max. number of additional options ①	Front clip-on	pcs.	1	1	1	1
	Side clip-on	pcs.	2	2	2	2
Rated operational current (Category AC-15: Alternating current coil load)	120 V	A	6	6	6	6
	240 V	A	3	3	3	3
Rated operational current (Category DC-13: Direct current coil load)	24 V	A	3	3	3	3
	110 V	A	0.6	0.6	0.6	0.6
Conventional free air thermal current Ith		A	10	10	10	10
Minimum applicable load level			All types: 20 V 3 mA			
Performance						
Mechanical durability [ten thousand times]			All types: 1,000			
Electrical durability [ten thousand times]			Please refer to the Electrical durability curve on page 237.			
Switching frequency [times/hour]	Category AC-3		1,800	1,800	1,800	1,800
	Category AC-4		300	300	300	300
	Category AC-1		1,200	1,200	1,200	1,200
Coil consumption (at rated coil voltage) ③	Inrush	VA	45	45	75	55
	Sealed	VA	7	7	6	4.5
	Watts	W	2.2	2.2	2.4	1.8
Mechanical data						
Dimensions (WxHxD)		mm	43x75x100	43x75x100	63x81x108	43x81x108
Order information	**DC 24 V**	Art. no.	287431	287519	287527	287534

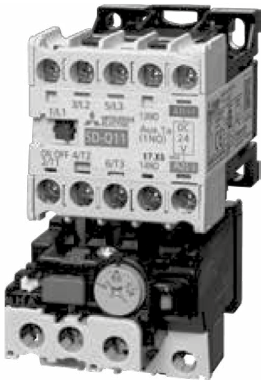
Specifications			SD-T35 DC24V	SD-T50 DC24V	SD-T65 DC24V	SD-T80 DC24V	SD-T100 DC24V	SD-N125 DC24V	SD-N150 DC24V	SD-N220 DC24V	SD-N300 DC24V	SD-N400 DC24V	SD-N600 DC24V	SD-N800 DC24V
Rated data														
Applicable standard			All types: IEC60947-4-1, EN60947-4-1, JIS C8201-4-1											
Rated insulation voltage			690							1000				
Rated impulse withstand voltage kV			All types: 6											
Rated frequency		Hz	All types: 50/60											
Pollution degree			All types: 3											
Rated operational power (current) Category AC-3 (Three-phase squirrel-cage motor load, standard responsibility)	220–240 V	kW (A)	11(40)	15(55)	18.5(65)	22(85)	30(105)	37 (125)	45 (150)	75 (250)	90 (300)	125 (400)	190 (630)	220 (800)
	380–440 V	kW (A)	18.5(40)	22(48)	30(65)	45(85)	55(105)	60 (120)	75 (150)	132 (250)	160 (300)	220 (400)	330 (630)	440 (800)
	500 V	kW (A)	18.5(32)	25(38)	37(60)	45(75)	55(85)	60 (90)	90 (140)	132 (200)	160 (250)	25 (350)	330 (500)	500 (720)
Rated operational power (current) Category AC-4 (Three-phase squirrel-cage motor load, inching responsibility)	220–240 V	kW (A)	5.5(26)	7.5(35)	11(50)	15(65)	19(80)	15	18.5	22	37	45	65	75
	380–440 V	kW (A)	11(24)	15(32)	22(47)	30(62)	37(75)	22	30	45	60	75	110	130
	500–550 V	kW (A)	11(17)	15(24)	22(38)	30(45)	7(55)	22	37	55	60	90	130	150
Rated operational power (current) Category AC-1 (Resistance, heater load)	100–240 V	A	60	80	100	120	150	150	200	260	350	450	660	800
	380–440 V	A	60	80	100	120	150	150	200	260	350	450	660	800
Conventional free air thermal current Ith		A	60	80	100	120	150	150	200	260	350	450	800	1000
Minimum applicable load level			All types: 48 V 200 mA											
Auxiliary contact rating														
Contact arrangement	Standard		2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC	2NO+2NC
Max. number of additional options	Front clip-on	pcs.	1	1	1	1	--	--	--	--	--	--	--	--
	Side clip-on	pcs.	2	2	2	2	2	2	2	2	2	2	2	2
Rated operational current (Category AC-15: Alternating current coil load)	120 VAC		6	6	6	6	6	6	6	6	6	6	6	6
	240 VAC		3	3	3	3	3	5	5	5	5	5	5	5
Rated operational current (Category DC-13: Direct current coil load)	24 VDC		3	3	3	3	3	5	5	5	5	5	5	5
	110 VDC		0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Conventional free air thermal current Ith			10	10	16	16	16	16	16	16	16	16	16	16
Minimum applicable load level			All types: 20 V 3 mA											
Performance														
Mechanical durability [ten thousand times]			1000	1000	500	500	500	500	500	500	500	500	500	500
Electrical durability [ten thousand times]			Please refer to the Electrical durability curve on page 237.											
Switching frequency [times(hour)]	Category AC-3		1800	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200
	Category AC-4		300	300	300	300	300	300	300	300	300	300	300	300
	Category AC-1		1200	1200	1200	1200	600	1200	1200	1200	1200	1200	1200	1200
Coil consumption (at 24 V DC)	Watts	W	9	9	18	18	24	31	31	41	55	55	75	75
Mechanical data														
Dimensions (WxHxD)		mm	75x89x123	75x89x123	88x106x133	88x106x133	100x134x157	100x150x161	120x160x170	138x204x200	163x243x220	163x243x220	375x310x234	375x310x234
Order information	**DC 24 V**	Art. no.	298622	298630	298638	298646	298654	113682	113683	113684	113686	113687	113688	On request

SD-Q Series DC Interface Contactors

■ Support for Direct Drive Using PLC Transistor Output

DC Interface Contactors (12 A Frame)

SD-Q11 Type



MSOD-Q11 Type

Direct Drive of Contactors Using Semiconductor Output (Transistor Output)
Can drive a direct DC interface contactor using DC24 V transistor output without use of an intermediate relay.

Wide Range of Types

SD-Q11	AC200V	2.5kW	1a(1b)	Non-Reversible Type
SD-QR11	AC200V	2.5kW	1bx2	Reversible Type
SD-Q12	AC200V	2.5kW	1a1b(2a)	Non-Reversible Type
SD-QR12	AC200V	2.5kW	1a1b x 2	Reversible Type

Can be manufactured with a thermal overload relay (model name: MSOD-Q(R)☐).

An Extensive Line of Installable Optional Units
Features auxiliary contact units and a display window.

Surge Absorber Comes Standard Built-in
Because the built-in surge absorber function controls surge voltage, it serves to prevent the negative effects of surge voltage at coil OFF, such as damage to peripheral devices.

Realizing Large Capacity and Long Product Life
Because conventional free air thermal current (rated continuity current) has increased, these are only used for circuit current (for current switching of inverters, servos, etc.). Also, they can be applied to AC440 V circuits despite their compact size.

Model Name	Rated Capacity (kW) AC-3		Free Air Thermal Current (A)	Electrical Durability (x 10000)
	200 to 240V	380 to 440V		
SD-Q11/Q12	2.5	4	20	100

Minimal Load for Auxiliary Contacts DC5 V 3 mA
By doubling the auxiliary contacts, support for levels as low as DC5 V 3 mA has been made possible. (The failure ratio in normal environments free of dust or corrosive gas is $5x10^{-7}$/cycle.)

Rail Mounting Standardized
Can be mounted on an IEC and DIN regulation compliant 35 mm width rail.

Provides Support for a Large Number of International Standards

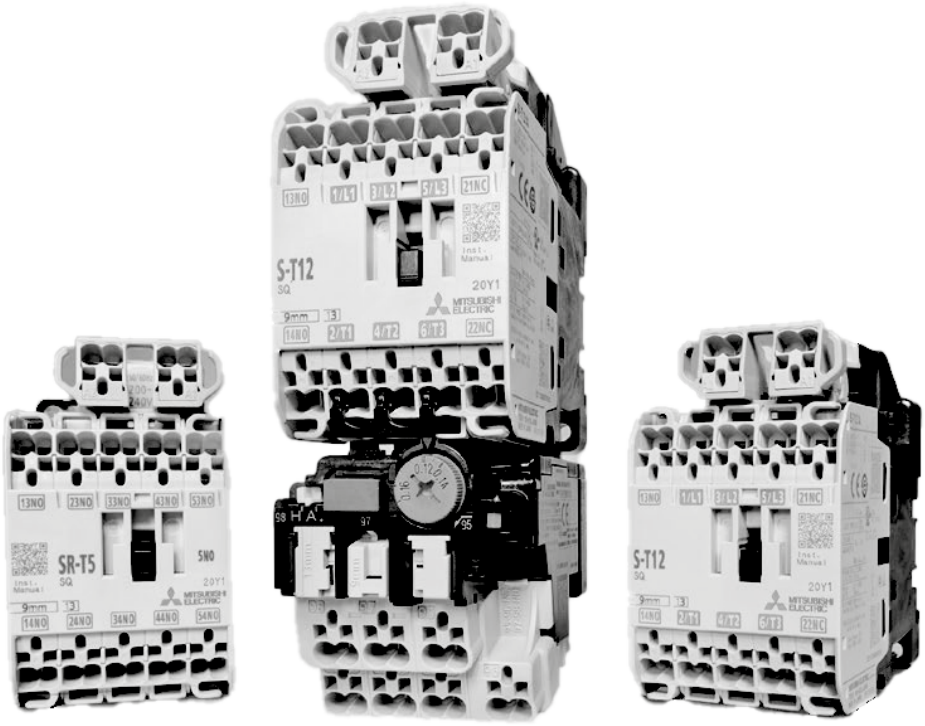
Model	Model Name	Applicable Standard				Safety Certified Standard		EC Directives	Certifying Body	CCC Certification
		JIS*1 JEM	IEC	DIN VDE	BS EN	UL	CSA	CE Mark	TÜV	GB
		Japan	International	Germany	United Kingdom Europe	US	Canada	Europe	Germany	China
						c UL us LISTED		CE	TÜV Rheinland	
Magnetic Contactors	SD-Q11, Q12 SD-QR11, QR12	◎	◎	◎	◎	◎	◎	◎	◎	◎
Magnetic Starters	MSOD-Q11 (BC) KP, Q12 (BC) KP MSOD-QR11 (BC) KP, QR12 (BC) KP	◎	◎	◎	◎	◎	◎	◎	◎	◎

Note 1 ◎ : Standard product that conforms, is compliant, or for which certification has been obtained
Note 2*1 : If JIS conformity declaration is required, please request.

Material	Material Description
147626	SD-Q11 DC24V 1A
161082	SD-Q12 DC24V 1A1B
194064	SD-Q11 DC24V 1B
237135	SD-QR12 DC24V 2A2B
472214	SD-QR11 DC24V 2B

Mitsubishi Electric Magnetic Starter

Spring Clamp Terminal Models



Key Features of the Screwless Clamping Terminals

Significant reduction in the time required for wiring

Comparison with the terminal screw model (with round crimp terminal)
Wiring with ferrules: Reduced by 22%
Wiring with solid or stranded wire: Reduced by 52%

* Wiring performed by non-experts (with 2-year experience) (The research conducted by Japan Switchboard & control system Industries Association)

Easy wiring for whoever works on

Push-in connection eliminates the need for the screw-tightening skills.

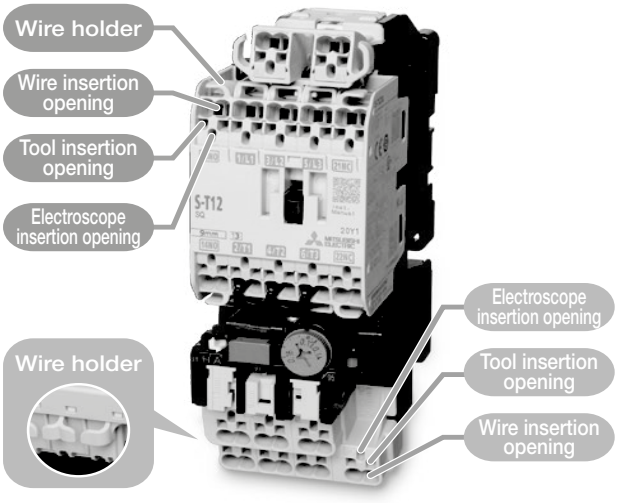
Enhanced maintenance efficiency

Screw retightening is not necessary for installation and maintenance of enclosures and machines.

Reliable wire connection

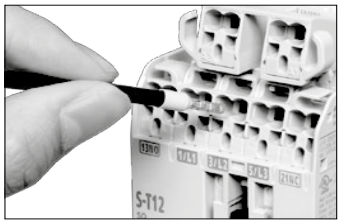
There is no risk of terminal screw loosening due to vibration or shocks, or long-term service.

■ Features



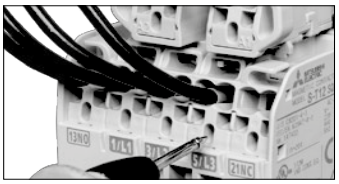
- Elemental wires can be connected directly.

- Solid wires and ferrules can be connected simply by inserting them into the terminals without using any tools.

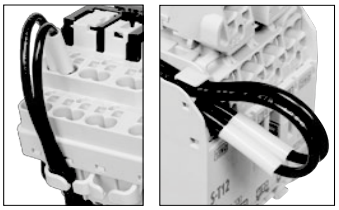


- Providing two wire insertion openings for per wiring enables crossover wiring.

- Providing the electroscope insertion openings prevents come-off of wires during continuity check.



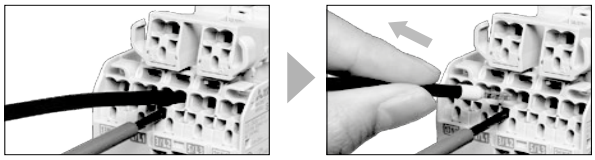
- Providing the wire holders for control and auxiliary terminals* prevents fall-off of mark tubes.
  * The magnetic relays have the wire holders for the outermost poles.



- The front side of the new models is inclined so that the wires are seated neatly after wiring to the panel surface.
- Whether to use an IEC rail or screws for installation are selectable.
- For DC operation type, direct activation is possible with transistor outputs such as programmable controllers. (24VDC, 0.1A)
- Spring clamp terminals: PUSH-IN CAGE CLAMP manufactured by WAGO Kontakttechnik GmbH & Co. KG, Germany

WAGO PUSH-IN CAGE CLAMP®

- For disconnection of a wire, insert a tool straight into a tool insertion opening on a magnetic contactor/magnetic relay and pull out the wire.



Insert the tool fully into the tool insertion opening.

Pull out the wire.

■ Connection Reliability

High connection reliability has been verified through the following tests in accordance with JIS/IEC standards.

Twisting test (JIS C 8201-1) (IEC 60947-1)
The wire is twisted after connection to check that it does not come off.

Pull-out test (JIS C 8201-1) (IEC 60947-1)
Following the twisting test, tensile force is applied to the wire for a set time to check that the wire does not come off.

Vibration test (JIS C 60068-2-6) (IEC 60068-2-6)
Vibrations are applied in X, Y, and Z directions after connection to check that there is no damage on insulators or failure in other mechanical parts. While the vibrations are applied, contacts are checked for instantaneous disconnections. Voltage drops are measured before and after the test to check that measurement values are a specified value or lower.

Shock and vibration tests (IEC 61373) (JIS E 4031)
Equipment which is to be fitted on to railway vehicles is tested; come-off of wires is checked and looseness of wire connections and occurrence of instantaneous disconnections due to the voltage drop measurement are checked before and after the tests. (Category I Class B)

■ Comparison of Wiring Time

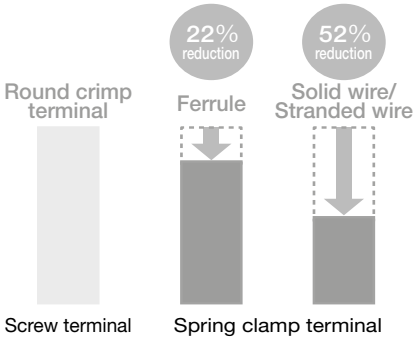
Using the spring clamp terminals improves difference in wiring quality caused by individual operators. Furthermore, connecting a solid or stranded wire to the spring clamp terminals reduces the wiring time.

Total time for the spring clamp terminal wiring was compared to that for the screw terminal (round crimp terminal) wiring. The following are the results.

·The total time was reduced by 22%
when a ferrule was connected to a spring clamp terminal.

·The total time was reduced by 52%
when a solid or stranded wire was connected to a spring clamp terminal.

* Wiring performed by non-experts (with 2-year experience) (The research conducted by Japan Switchboard & control system Industries Association)



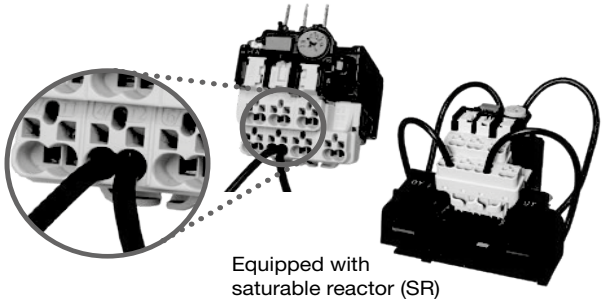
■ Features of magnetic starters and thermal overload relays

● It is possible to connect two wires to the main circuit of the thermal overload relay

Thermal overload relays have two wire insertion openings for the main circuit, which allows not only for motors to be connected, but also for the following applications.

Applications

1. Connecting a saturable reactor
2. Connecting a phase-advancing capacitor
3. Connecting a main circuit surge absorber
4. Short-circuiting the wires of the thermal overload relay at the start of a motor (IE3 motor supported).



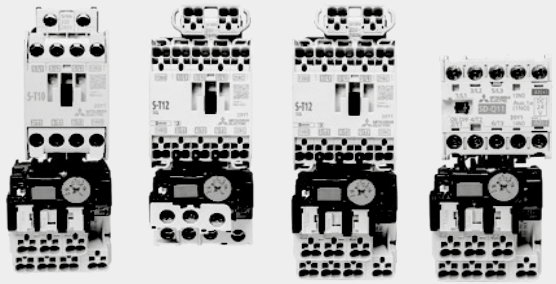
Equipped with saturable reactor (SR)

* Up to one motor can be connected to one thermal overload relay.

● Can be used together with models with screw terminals

Models with spring clamp terminals and screw terminals can be flexibly combined.

Combination examples



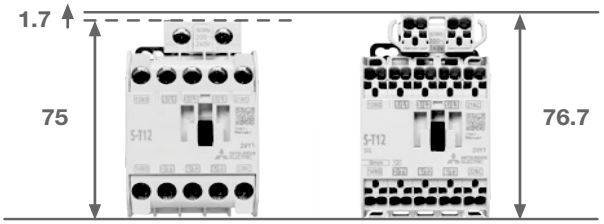
S-T10 + TH-T18KPSQ *1	S-T12SQ + UT-TH18 + TH-T18KP *1	S-T12SQ + TH-T18KPSQ	SD-Q11 + TH-T18KPSQ *1

*1: Combinations of different types of terminals cannot be ordered.

*2: According to our research as of November 2020

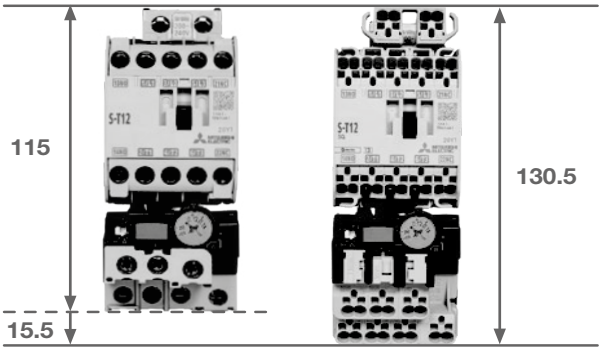
● Mounting compatibility between models with screw terminals and spring clamp terminals

The height of the new magnetic starter is kept as close to that of the screw terminal type magnetic starter as possible to ensure high mounting compatibility.



Screw terminal type (Example: S-T12)

Spring clamp terminal type (Example: S-T12SQ)



Screw terminal type (Example: MSO-T12KP)

Spring clamp terminal type (Example: MSO-T12KPSQ)

● New optional units

UT-AX2SQ, UT-AX4SQ (auxiliary contact units)

UT-AX2SQ

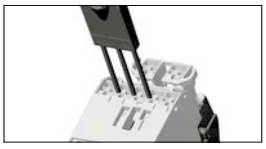
UT-AX4SQ

These units can be used together with screw terminal type magnetic contactors and relays.

The springs of the magnetic contactor can be compressed or released even after installation.

UT-RD13 (insertion tool for three poles)

This tool can be used to simultaneously compress and release the springs on three poles of spring clamp terminal type models, to shorten wiring times.



■ Applicable Wires

Wire type	Wire size		Maximum coated diameter	
	×1	×2	×1	×2
Solid wires	ϕ0.8 to ϕ2.0 20 to 12AWG	ϕ0.8 to ϕ2.0 20 to 12AWG	ϕ4.6 or less	ϕ4.6 or less on one side ϕ4.1 or less on the other side
Stranded wires Flexible stranded wires	0.5mm² to 4mm² 20 to 12AWG	0.5mm² to 4mm² 20 to 12AWG		
Ferrules without insulation collar	0.5mm² to 2.5mm² 20 to 14AWG	0.5mm² to 2.5mm² 20 to 14AWG		
Ferrules with insulation collar	0.25mm² to 2.5mm² 24 to 14AWG	0.25mm² to 2mm² 24 to 14AWG*	ϕ4.8 or less (insulation collar outer diameter)	ϕ4.8 or less on one side ϕ4.2 or less on the other side (insulation collar outer diameter)

* Two 2mm², 14AWG wires can be used for the same pole as long as they are the FE-2.08-8N-YE manufactured by WAGO.

■ Specifications

● Magnetic Starters and Contactors

Frame			T12	T20
Model	Magnetic contactors	AC operation type	S-T12SQ	S-T20SQ
		DC operation type	SD-T12SQ	SD-T20SQ
	Magnetic starters (equipped with standard 2-element thermal overload relays)	AC operation type	MSO-T12SQ	MSO-T20SQ
		DC operation type	MSOD-T12SQ	MSOD-T20SQ
	Magnetic starters (equipped with 3-element (2E) thermal overload relays)	AC operation type	MSO-T12KPSQ	MSO-T20KPSQ
		DC operation type	MSOD-T12KPSQ	MSOD-T20KPSQ
IP			IP20 (all directions)	
Auxiliary contact configuration (special)			1a1b, 2a (2b: AC models only)	
Main contact	Rated operating current (AC-3) [kW/A]	220 to 240VAC	3.5/13 (2.7/13)	4.5/18 (3.7/18)
		380 to 440VAC	5.5/12 (4/9)	7.5/18 (7.5/18)
		500VAC	5.5/9 (5.5/9)	7.5/17 (7.5/17)
	Rated thermal current (Ith)		20A	
Special model	Equipped with coil surge absorber (SA)		Available	
	Equipped with high-capacity contacts (JH)		Available	
	Equipped with saturable reactor with 2 elements (SR)		Available	
	Quick trip type with 3 elements (2E) (FSKP)		Available	

* The value in parentheses for the rated operating current is applicable in the case of magnetic contactors.

● Magnetic Relays

Number of contacts		5 poles
Model	AC operation type	SR-T5SQ
	DC operation type	SRD-T5SQ
IP		IP20 (all directions)
Auxiliary contact configuration		5a, 4a1b, 3a2b
AC circuit rating AC-15 (electromagnet load) /AC-12 (resistance load)	120VAC	6A/10A
	240VAC	3A/8A
	440VAC	1.5A/5A
	550VAC	1.2A/5A
DC circuit rating* DC-13 (electromagnet load) /DC-12 (resistance load)	24VDC	3A/10A
	48VDC	1.5A/8A
	110VDC	0.6A (2A)/5A (8A)
	220VDC	0.3A (0.8A)/1A (3A)
Rated thermal current (Ith)		10A
Special model	Equipped with coil surge absorber (SA)	Available
	Equipped with high-capacity contacts (JH)	Available

* Values in parentheses indicate the rated operating current when two poles are connected in series.

● Thermal Overload Relays

Frame		T18	
Model	Standard 2-element thermal overload relay	TH-T18SQ	
	3-element (2E) thermal overload relay	TH-T18KPSQ	
Heater designation (Available settling current range) [A]		0.12A (0.1 to 0.16A) 0.17A (0.14 to 0.22A) 0.24A (0.2 to 0.32A) 0.35A (0.28 to 0.42A) 0.5A (0.4 to 0.6A) 0.7A (0.55 to 0.85A) 0.9A (0.7 to 1.1A) 1.3A (1 to 1.6A) 1.7A (1.4 to 2A)	2.1A (1.7 to 2.5A) 2.5A (2 to 3A) 3.6A (2.8 to 4.4A) 5A (4 to 6A) 6.6A (5.2 to 8A) 9A (7 to 11A) 11A (9 to 13A) 15A (12 to 18A)
Special model	Equipped with saturable reactor with 2 elements (SR)	Available (Heater designation: 0.24 to 15A)	
	Quick trip type with 3 elements (2E) (FSKP)	Available (Heater designation: 2.1 to 15A)	

● Optional Units

	Auxiliary contact unit	Insertion tool for three poles		Connection unit
Model	UT-AX2SQ (2a, 1a1b, 2b) UT-AX4SQ (4a, 3a1b, 2a2b)	UT-RD13	UT-TH18	This unit combines a spring clamp terminal type magnetic contactor and thermal overload relay.
Supported model	S-T10, S(D)-T12/20(SQ) S(D)-T21, S-T25 S(D)-T32/T35/T50 SR(D)-T5(SQ)	S(D)-T12/20SQ SR(D)-T5SQ UT-AX2/4SQ	S(D)-T12/20SQ + TH-T18(FS) (KP) (SQ) (SR)	
Acceptable minimum order quantity	1	1	10	* Included with spring clamp terminal type magnetic starters and thermal overload relays as standard.

* Other products such as the operation coil surge absorber unit (UT-SA☐) are also available. For details, refer to the instructions "BHA11B994". ▶

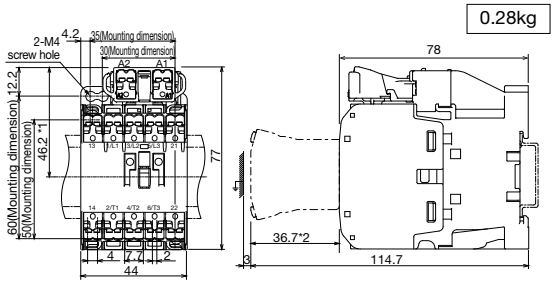
■ International Standards

Model		Applicable standard			EC Directive	Applicable standard certification			
		JIS	IEC	EN	CE	UL	CSA	TÜV	CCC
		Japan	International	Europe	Europe	U.S.	Canada	Germany	China
Magnetic Starters	MSO(D)-T□SQ	●	●	●					
	MSO(D)-T□KPSQ	●	●	●	●				●
Magnetic Contactor	S(D)-T□SQ	●	●	●	●	●	●	●	●
Thermal Overload Relays	TH-T18SQ	●	●	●					
	TH-T18KPSQ	●	●	●	●	●	●	●	●
Magnetic Relay	SR(D)-T5SQ	●	●	●	●	●	●	●	●
Optional Unit	UT-AX□SQ	●	●	●	●	●	●	●	●

■ Outline Drawings

● S-T12SQ, S-T20SQ, SR-T5SQ

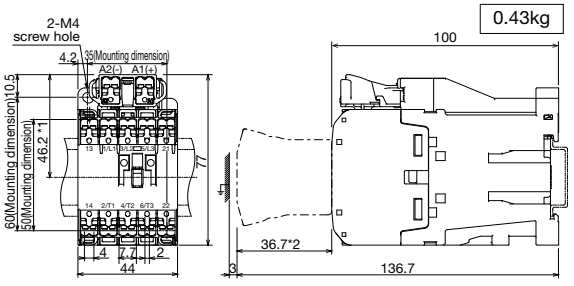
0.28kg



*1: The dimensions are measured from the center of the IEC 35-mm-wide rail.
*2: The dotted lines show when the auxiliary contact unit (UT-AX2SQ or UT-AX4SQ) is mounted on the front.

● SD-T12SQ, SD-T20SQ, SRD-T5SQ

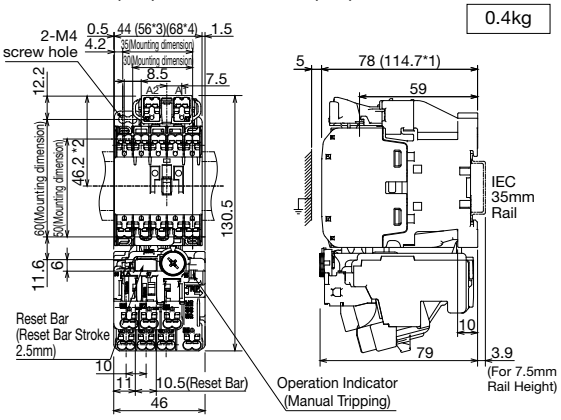
0.43kg



*1: The dimensions are measured from the center of the IEC 35-mm-wide rail.
*2: The dotted lines show when the auxiliary contact unit (UT-AX2SQ or UT-AX4SQ) is mounted on the front.

● MSO-T12(KP)SQ, MSO-T20(KP)SQ

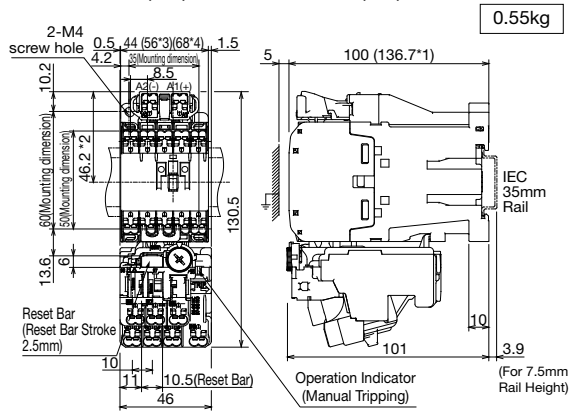
0.4kg



*1 : The dimensions are shown when the head-on auxiliary contact unit (UT-AX2SQ or UT-AX4SQ) is mounted.
*2 : The dimensions are measured from the center of a 35-mm-wide rail.
*3, *4 : The dimensions indicated by *3 are shown when one side-on auxiliary contact unit (UT-AX11: screw terminal type) is mounted. The dimensions indicated by *4 are shown when a side-on auxiliary contact unit is mounted on both sides. Both head-on and side-on auxiliary contact units cannot be mounted.

● MSOD-T12(KP)SQ, MSOD-T20(KP)SQ

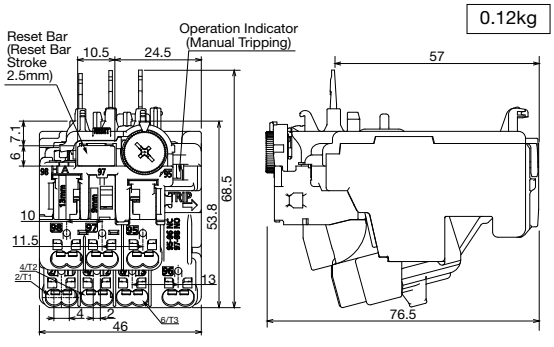
0.55kg



*1 : The dimensions are shown when the head-on auxiliary contact unit (UT-AX2SQ or UT-AX4SQ) is mounted.
*2 : The dimensions are measured from the center of a 35-mm-wide rail.
*3, *4 : The dimensions indicated by *3 are shown when one side-on auxiliary contact unit (UT-AX11: screw terminal type) is mounted. The dimensions indicated by *4 are shown when a side-on auxiliary contact unit is mounted on both sides. Both head-on and side-on auxiliary contact units cannot be mounted.

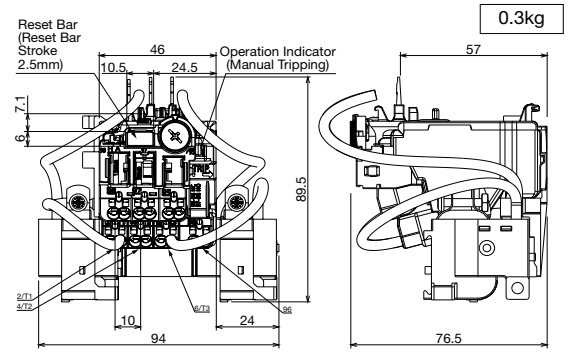
● TH-T18(KP)SQ

0.12kg



● TH-T18SQSR

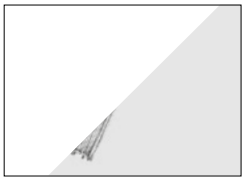
0.3kg



* The UT-AX2SQ and UT-AX4SQ weigh 0.03kg each.

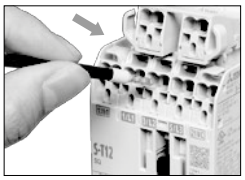
■ Wiring Procedure

Ferrule

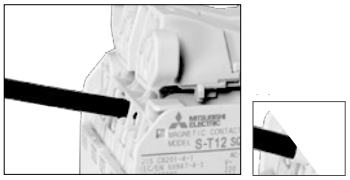


Cut off wire sheathing at a specified length.

Crimp a ferrule.



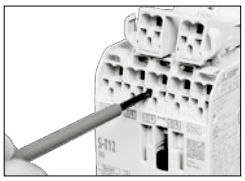
Push in the wire.
* Insert the wire to the end.



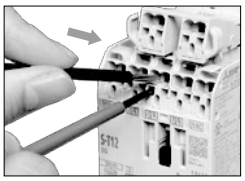
Check that the wire has been connected.
* When the insulation collar is inserted deeper than the surface of a wire insertion opening, the wire is connected properly.

Stranded wire, flexible stranded wire

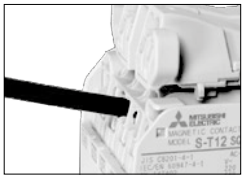
Cut off wire sheathing at a specified length.



Insert the tool fully into a tool insertion opening.



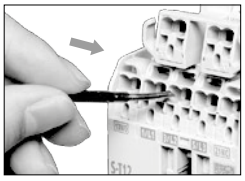
Insert the wire fully into the wire insertion opening.
* Insert the wire to the end.



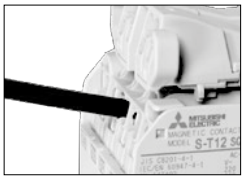
Remove the tool and check that the wire has been connected.
* Ensure the wire connection by pulling the wire gently.

Solid wire

Cut off wire sheathing at a specified length.



Push in the wire.
* Insert the wire to the end.



Check that the wire has been connected.
* Ensure the wire connection by pulling the wire gently.

Material	Material Description	Technical Description
577788	S-T12SQ AC100V 1A1B	Magnetic contactor. 5,5kW; Ith = 20A 1NO + 1NC; Us = AC 100V; IP20
577789	S-T12SQ AC200V 1A1B	Magnetic contactor. 5,5kW; Ith = 20A 1NO + 1NC; Us = AC 200V; IP20
577790	S-T12SASQ AC100V 1A1B	Magnetic contactor. 5,5kW; Ith = 20A 1NO + 1NC; Us = AC 100V; IP20
577791	S-T12SASQ AC200V 1A1B	Magnetic contactor. 5,5kW; Ith = 20A 1NO + 1NC; Us = AC 200V; IP20
577802	S-T20SQ AC100V 1A1B	Magnetic contactor. 7,5kW; Ith = 20A 1NO + 1NC; Us = AC 100V; IP20
577803	S-T20SQ AC200V 1A1B	Magnetic contactor. 7,5kW; Ith = 20A 1NO + 1NC; Us = AC 200V; IP20
577804	S-T20SASQ AC100V 1A1B	Magnetic contactor. 7,5kW; Ith = 20A 1NO + 1NC; Us = AC 100V; IP20
577805	S-T20SASQ AC200V 1A1B	Magnetic contactor. 7,5kW; Ith = 20A 1NO + 1NC; Us = AC 200V; IP20
577806	SR-T5SQ AC100V 5A	Contactor relays. 5NO; Ith = 10A; Us = AC 100V; IP20
577807	SR-T5SQ AC200V 5A	Contactor relays. 5NO; Ith = 10A; Us = AC 200V; IP20
577808	SR-T5SQ AC100V 4A1B	Contactor relays. 4NO + 1NC; Ith = 10A; Us = AC 100V; IP20
577809	SR-T5SQ AC200V 4A1B	Contactor relays. 4NO + 1NC; Ith = 10A; Us = AC 200V; IP20
577810	SR-T5SQ AC100V 3A2B	Contactor relays. 3NO + 2NC; Ith = 10A; Us = AC 100V; IP20
577811	SR-T5SQ AC200V 3A2B	Contactor relays. 3NO + 2NC; Ith = 10A; Us = AC 200V; IP20
577812	SD-T12SQ DC24V 1A1B	Magnetic contactor. 5,5kW; Ith = 20A 1NO + 1NC; Us = DC 24V; IP20
577813	SD-T12SASQ DC24V 1A1B	Magnetic contactor. 5,5kW; Ith = 20A 1NO + 1NC; Us = DC 24V; IP20
577814	SD-T20SQ DC24V 1A1B	Magnetic contactor. 7,5kW; Ith = 20A 1NO + 1NC; Us = DC 24V; IP20
577815	SD-T20SASQ DC24V 1A1B	Magnetic contactor. 7,5kW; Ith = 20A 1NO + 1NC; Us = DC 24V; IP20
577816	SRD-T5SQ DC24V 5A	Contactor relays. 5NO; Ith = 10A; Us = DC 24V; IP20
577817	SRD-T5SQ DC24V 4A1B	Contactor relays. 4NO + 1NC; Ith = 10A; Us = DC 24V; IP20
577818	SRD-T5SQ DC24V 3A2B	Contactor relays. 3NO + 2NC; Ith = 10A; Us = DC 24V; IP20
577819	SRD-T5SQ DC100V 5A	Contactor relays. 5NO; Ith = 10A; Us = DC 100V; IP20
577820	SRD-T5SQ DC100V 4A1B	Contactor relays. 4NO + 1NC; Ith = 10A; Us = DC 110V; IP20
577821	SRD-T5SQ DC100V 3A2B	Contactor relays. 3NO + 2NC; Ith = 10A; Us = DC 125V; IP20
577822	SRD-T5SQ DC110V 5A	Contactor relays. 5NO; Ith = 10A; Us = DC 110V; IP20
577823	SRD-T5SQ DC110V 4A1B	Contactor relays. 4NO + 1NC; Ith = 10A; Us = DC 110V; IP20
577824	SRD-T5SQ DC110V 3A2B	Contactor relays. 3NO + 2NC; Ith = 10A; Us = DC 110V; IP20
598513	TH-T18SQ 2.1A	OverloadRelay.Ith=1,7~2,5A;forS(D)-T10,12,20;2-element ThermalRelays;SpringClamp
598514	TH-T18SQ 15A	OverloadRelay.Ith=12,0~18,0A;S-(D)-T10,12,20;2-element ThermalRelays;SpringClamp
598515	TH-T18KPSQ 2.1A	OverloadRelay.Ith=1,7~2,5A;forS(D)-T10,12,20;3-element ThermalRelays;SpringClamp
598516	TH-T18KPSQ 15A	OverloadRelay.Ith=12,0~18,0A;S-(D)-T10,12,20;3-element ThermalRelays;SpringClamp
598517	TH-T18FSKPSQ 2.1A	OverloadRelay.Ith=1,7~2,5A;S(D)-T10,12,20;Quick Trip 3-element Type;SpringClamp
598518	TH-T18FSKPSQ 15A	OverloadRelay.Ith=12,0~18,0A;S-(D)-T10,12,20;QuickTrip 3-elem.Type;SpringClamp
598519	TH-T18SQSR 2.1A	OverloadRelay;for S(D)-T10,12,20;2-element Saturable Reactor Type;Spring Clamp
598520	TH-T18SQSR 15A	OverloadRelay;for S(D)-T10,12,20;2-element Saturable Reactor Type;Spring Clamp
598521	UT-AX2SQ 1A1B	Auxiliary contact. 1NO + 1NC; front clip-on; for S-T, SR-T;Spring Clamp
598522	UT-AX4SQ 2A2B	Auxiliary contact. 2NO + 2NC; front clip-on; for S-T, SR-T;Spring Clamp

■ Specifications – standard auxiliary contacts

Rated data of auxiliary contacts			S-N	S-T
Rated continuous current I_{th}		A	16	10
Rated operating current				
Category AC-15	AC 110 V	A	6	6
	AC 230 V	A	5	3
	AC 500 V	A	3	1.5
	AC 660 V	A	1,5	
Category DC-13	DC 24 V	A	5	3
	DC 48 V	A	3	1.5
	DC 110 V	A	0.6 (0.8 for UN-AX2CX, UN-AX4CX, UN-AX11CX)	0.6
	DC 220 V	A	0.2	0.3

For detailed description please see page 248.

■ Environmental conditions

Environmental conditions for all contactors			
Ambient temperature		° C	-25 to +55
Ambient humidity		RH	45 to 85 %
Coil voltage tolerance			0.85 to 1.1 times rated coil voltage
Vibration resistance	10–55 Hz	G	2
Shock resistance		G	5

■ Coil ratings

In case of special order:

The following tables show the devices which are additionally available. Please contact Mitsubishi Electric for further information.

AC rated voltage – S-T10 to S-T100

Coil designation	Range 50/60 Hz [V]	Standard
AC 24 V	24	●
AC 48 V	48–50	
AC 100 V	100–127	●
AC 200 V	200–240	●
AC 300 V	260–360	
AC 400 V	380–440	●
AC 500 V	460–550	

For detailed description of the types please see page 108.

DC rated voltage – SD-N/T types

Coil designation	Range [V]	Standard
DC 12 V	12	
DC 24 V	24	●
DC 48 V	48	
DC 100 V	100	
DC 110 V	110	
DC 125 V	120–125	
DC 200 V	200	
DC 220 V	220	

For detailed description of the types please see page 110 and 227.

AC rated voltage – S-N125 to S-N800

Coil designation	Range 50/60 Hz [V]	Standard
AC 24 V ①	24	
AC 48 V ①	48–50	
AC 100 V	100–127	●
AC 200 V	200–240	●
AC 300 V	260–350	
AC 400 V	380–440	●
AC 500 V	460–550	

① Available for S-N125 to S-N150 only.

For detailed description of the types please see page 225.

■ Performance of MS series contactors

Electrical life

The electrical life of the main contacts of a contactor is determined mainly by the circuit-opening duty it will perform.

The relationship between electrical life and rated current of Mitsubishi Electric contactors under normal and jogging duties of squirrel-cage motors is shown in the figures.

In the case of a mixture of normal and jogging duties, the expected contactor life can be determined as follows:

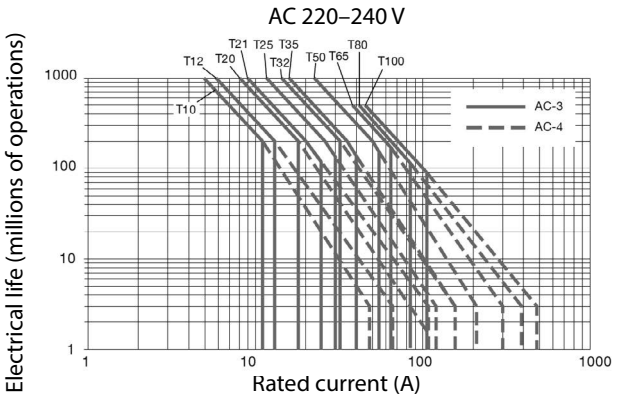
$$N = Nr/1 + \frac{\alpha}{100}\,(Nr/Ni - 1)$$

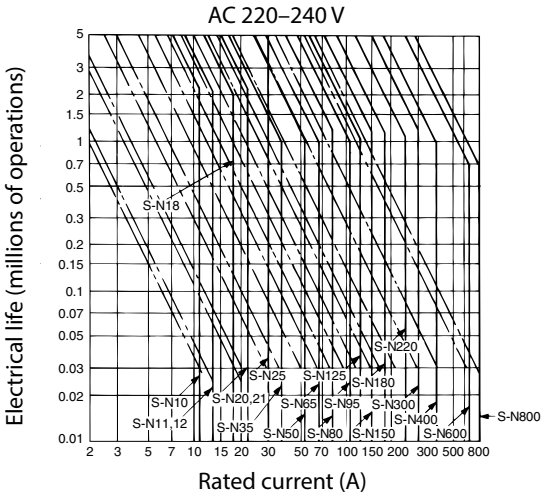
N: Life in the case of α % jogging duty

Nr: Life in the case of normal duty

Ni: Life in the case of 100 % jogging duty

α: Percentage of jogging duty

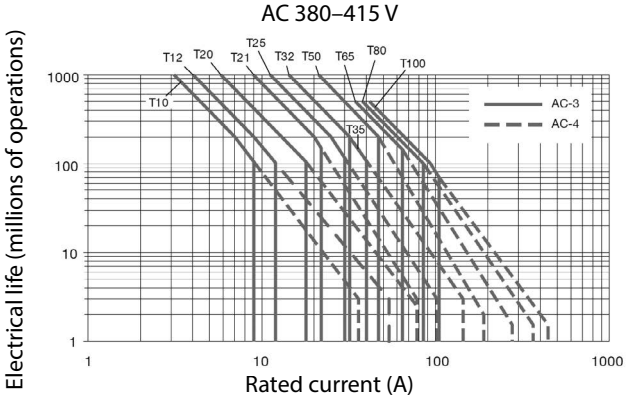


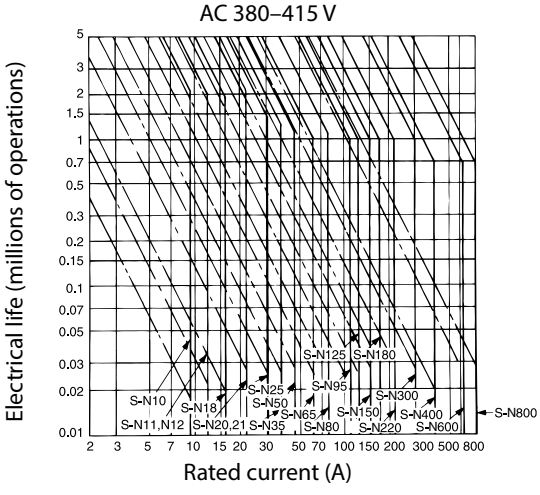


Electrical life versus rated operating current

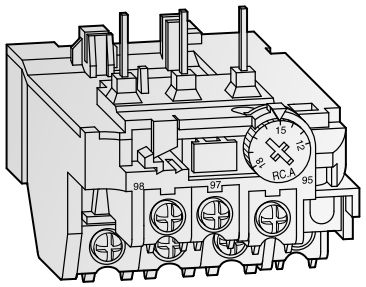
— Normal duty, 6 I_e ON, I_e OFF, on-load factor 40 %, 1200 operations/hour (AC-3)

–.– Jogging duty, 6 I_e ON, 6 I_e OFF, on-load factor 7 %, 600 operations/hour (AC-4)-S-T10 to S-N300 300 operations/hour (AC-4)-S-N400 to S-N600 150 operations/hour (AC-4)-S-N800





■ Thermal overload relays description



TH-T18KP

A selection of relays for optimum motor protection characteristics

The thermal relay line-up includes the phase failure protection type models (three-element relays).

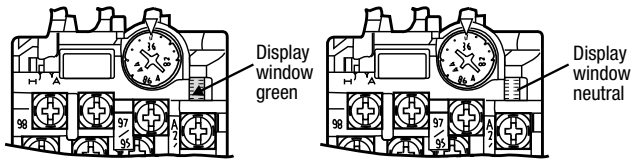
This array of protection characteristics allows you to choose the units suited to your motor protection needs.

Benefits:

- An operation indicator makes maintenance and inspection easy.
- 1 NO and 1 NC contact
- Rated current can be set easily
- Finger protection up to TH-N60KPCX
- Trip-free reset bar
- Convenient reset release (optional)

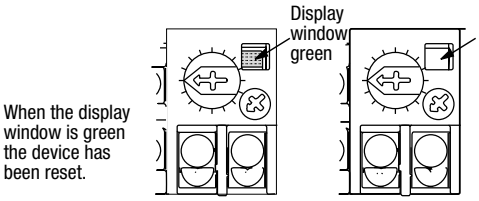
■ Display

TH-T18KP



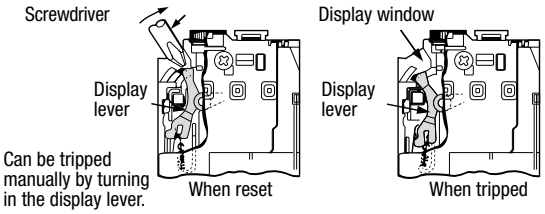
When the green of the display lever can be seen, the device has been reset.

TH-T25KP – TH-N600KP

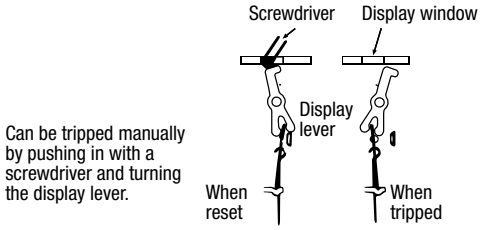


■ External trip mechanism

TH-T18KP

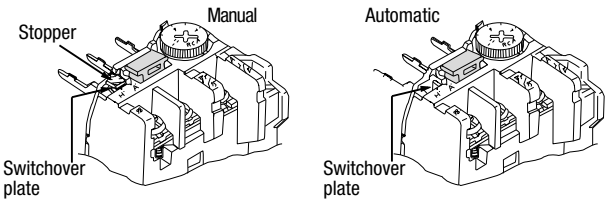


TH-T25KP – TH-N600KP



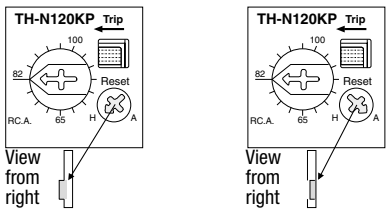
■ Switching between automatic and manual reset

TH-T18KP



Switching from manual to automatic: Break the stopper off and then, slide the switchover plate to the right (to position A) to immobilize the reset bar.
Switching from automatic to manual: Slide the switchover plate to the left (to position H).

TH-T25KP – TH-N600KP



Switching from manual to automatic: Flip the stopper on the end of the reset bar down and then, after pushing it all the way in, rotate it counterclockwise 90° (to position A).
Switching from automatic to manual: Rotate the reset bar 90° clockwise (to position H) and the reset bar will pop out

■ Specifications

Specifications				TH-T18KP □□□ A	TH-T25KP □□□ A	TH-T50KP □□□ A	TH-T65KP □□□ A	TH-T100KP □□□ A	TH-N120KP □□□ A	TH-N120TAKP □□□ A	TH-N220RHKP □□□ A	TH-N400RHKP □□□ A	TH-N600KP □□□ A ①
Rated data													
Max. setting current			A	18	26	50	65	100	100	150	220	400	800
Range of setting current			A	0.12–18	0.24–26	24–50	12–65	54–100	34–100	85–150	65–250	85–400	200–800
Rated insulation voltage			V	690	690	690	690	690	690	690	1000	1000	690
Auxiliary contacts				For all types: 1 NO + 1 NC									
Max. heater dissipation per current path		Min. setting	W	0.8	1.5	1.6	2.4	2.5	2.5	3.2	2.5	2.5	2.5
		Max. setting	W	1.8	3.0	3.2	5.5	6.0	7.1	8.6	6.0	6.0	6.0
Rated operating current of auxiliary contacts													
Category AC-15	NO contact	120 V	A	2	2	2	2	2	2	2	2	2	2
		240 V	A	1	1	1	1	1	1	1	1	1	1
		500 V	A	0.5	0.5	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	NC contact	120 V	A	2	3	3	3	3	3	3	3	3	3
		240 V	A	1	2	2	2	2	2	2	2	2	2
		500 V	A	0.5	1	0.3	1	1	1	1	1	1	1
Category DC-13		48 V	A	0.4	0.5	1	1	1	0.5	0.5	0.5	0.5	0.5
		110 V	A	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		220 V	A	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Sizes													
Main terminal screw size		Line side	mm	—	M4	M5	M6	M6	M8	M8	—	—	M4
		Load size	mm	M3.5	M4	M5	M6	M6	M8	M8	M10	M12	M4
Max. conductor size	Main	Line side	mm²	—	6	14			38	60	—	—	6
		Load side	mm²	2.5	6	14			38	60	70	240	6
	Busbar	Line side	mm	—	10.2		17	17	20	20	—	—	—
		Load side	mm	7.5	10.2	13.3	17	15	20	20	25	30	—
Auxiliary contacts			mm²	2.5	2.5	2	2	2	4	4	4	4	4
Bimetal heating				Direct	Direct	Direct	Direct	Direct	Direct	Direct	Via CTs	Via CTs	Via CTs ①
Weight			kg	0.11	0.16	0.2	0.26	0.32	0.48	0.75	2.5	2.7	0.14
Dimensions (WxHxD)			mm	45x55x76.5	63x51x69	74.3x72x83.5	89x57x83.5	89x73.5x83.5	103x67x105	112x87x105	144 x114 x180	144x160x194	63x42x83.5
Order information			Art. no.	See page 240 for order information									

① Used with current transformer (to be supplied by the customer), for further information, see table on bottom of the page.

■ Selection guide of the current transformers for TH-N600KP

For the TH-N600KP the customer has to use a transformer with specifications as described in the following table.

Specifications					
Heater designation		A	250	330	500	660
Setting range		A	200–300	260–400	400–600	520–800
Current transformer ratio			400/5A	500/5A	750/5A	1,000/5A
Current transformer capacity			at least 15 VA	at least 15 VA	at least 15 VA	at least 15 VA
Recommended Mitsubishi Electric current transformer model number	Cable		CW-15L 400/5A 15 VA	CW-15L 500/5A 15 VA	CW-15L 750/5A 15 VA	—
	Bus bar		CW-15LM 400/5A 15 VA	CW-15LM 500/5A 15 VA	CW-15LM 750/5A 15 VA	CW-40LM 1000/5A 40 VA

Order information for thermal overload relays

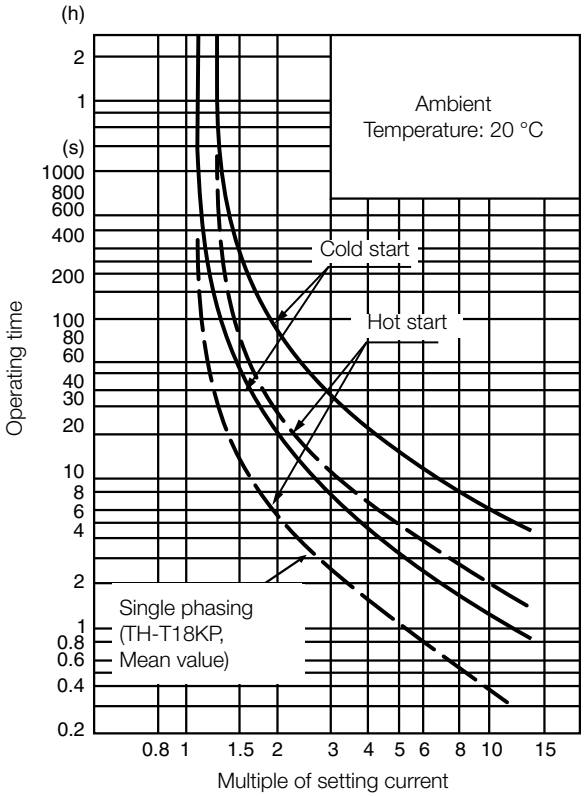
Range (A)	Heater designation	TH-T18KP □□□ A	TH-T25KP □□□ A	TH-T50KP □□□ A	TH-T65KP □□□ A	TH-T100KP □□□ A	TH-N120KP □□□ A	TH-N120TAKP □□□ A	TH-N220RHKP □□□ A	TH-N400RHKP □□□ A	TH-N600KP □□□ A ④
0.10–0.16	0.12 A	279281									
0.14–0.22	0.17 A	279282									
0.20–0.32	0.24 A	279283	279298								
0.28–0.42	0.35 A	279284	279299								
0.40–0.60	0.5 A	279285	279300								
0.55–0.85	0.7 A	279286	279301								
0.70–1.10	0.9 A	279287	279302								
1.00–1.60	1.3 A	279288	279303								
1.40–2.00	1.7 A	279289	279304								
1.70–2.50	2.1 A	279290	279305								
2.00–3.00	2.5 A	279291	279306								
2.80–4.40	3.6 A	279292	279307								
4.00–6.00	5 A	279293	279308								
5.20–8.00	6.6 A	279294	279309								
7.00–11.0	9 A	279295	279310								
9.00–13.0	11 A	279296	279311								
12.0–18.0	15 A	279297	279312		298608						
16.0–22.0	19 A		279313								
18.0–26.0	22 A				298609						
24.0–34.0	29 A			298605	298610						
30.0–40.0	35 A			298606	298611						
34.0–50.0	42 A			298607	298612		124425				
43.0–65.0	54 A				298613		124426				
54.0–80.0	67 A					298614	124427				
65.0–100	82 A					298615	124428		124432		
85.0–105	95 A										
85.0–125	105 A							124430	124433	124438	
100–150	125 A							124431 ①	124434	124439	
120–180	150 A								124435	124440	
140–220	180 A								124436 ②	124441	
170–250	210 A								124437 ②		
200–300	250 A									124442	On request
260–400	330 A									124443 ③	On request
400–600	500 A										On request
520–800	660 A										On request ④
Contactors modified with thermal overload relays correspond to motor starter combination (see also the overview on pages 222 and 223)											
Contactors – with connecting parts ⑥		S-T10, S-T12, S-T20, SD-T12 SD-T20	S-T21, S-T25 SD-T21 S-T35 SD-T35 S-T50 SD-T50	S-T35 SD-T35 S-T50 SD-T50	S-T65 SD-T65 S-T80 SD-T80 S-T100 SD-T100	S-T80 SD-T80 S-T100 SD-T100	S-N125, S-N150, SD-N125, SD-N150	S-N125, S-N150, SD-N125, SD-N150	S-N180, S-N220, SD-N220	S-N300, S-N400, SD-N300, SD-N400	S-N600, S-N800, SD-N600, SD-N800
		For connecting parts see page 254.									
Stand-alone type ⑦		●	●	—	○		○	○	○	○	○
With connecting part		UT-HZ18CX	UN-RM20	—	—	—	—	—	—	—	—

① For all -N150 only.
② For all -N220 only.
③ For all -N400 only.
④ TH-N600KP must be used with the current transformers (to be supplied by the customer), see page 239.
⑤ For all -N800 only.
⑥ For the standard operation it is important to use the thermal overload relay with one of the mentioned contactors and if necessary with a connecting part.
⑦ ● Stand-alone with finger protection
○ Stand-alone without finger protection
— Stand-alone not possible

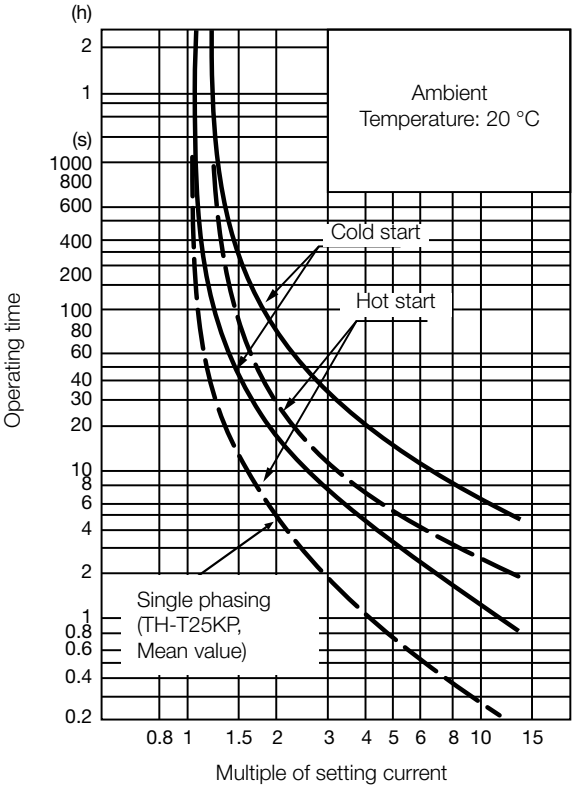
Range (A)	Heater designation	Max. fuse rating (AC 660 V) IEC 269-1 (A)			Standard wire size, (mm^2) recom-mended	Motor capacity (three phase 50/60 Hz, based on four poles) (kW)			
		aM	gG	gM		AC 220–240 V	AC 380 V	AC 400–440 V	AC 500 V
0.10–0.16	0.12 A	0.5	0.5	—	2				
0.14–0.22	0.17 A	0.5	1	—	2				
0.20–0.32	0.24 A	1	2	—	2	0.03	0.06	0.06	0.09
0.28–0.42	0.35 A	1	2	—	2	0.05	0.09	0.09	0.12
0.40–0.60	0.5 A	1	2	—	2	0.06	0.12	0.12	0.18
0.55–0.85	0.7 A	2	4	—	2	0.09	0.18	0.18	0.25
0.70–1.10	0.9 A	2	4	—	2	0.12	0.25	0.25	0.37
1.00–1.60	1.3 A	2	4	—	2	0.18	0.37	0.37; 0.55	0.55
1.40–2.00	1.7 A	4	6	—	2	0.25	0.55	0.75	0.75
1.70–2.50	2.1 A	4	6	—	2	0.37	0.75	—	1.1
2.00–3.00	2.5 A	6	10	—	2	0.55	1.1	1.1	1.5
2.80–4.40	3.6 A	6	10	—	2	0.75	1.5	1.5	2.2
4.00–6.00	5 A	8	16	—	2	1.1	2.2	2.2	3
5.20–8.00	6.6 A	12	20	—	2	1.5	3	3; 3.7	3.7
7.00–11.0	9 A	12	20	—	2	2.2	3.7; 4	3; 3.7	5.5
9.00–13.0	11 A	16	25	32M35	2	3	5.5	5.5	7.5
12.0–18.0	15 A	20	32	32M50	3.5	3.7	7.5	7.5; 9	9
16.0–22.0	19 A	25	40	32M63	3.5	5.5	11	11	11
18.0–26.0	22 A	40	63	32M63	5.5	5.5	11	11	15
24.0–34.0	29 A	50	80	63M80	8	7.5	15	15	18.5
30.0–40.0	35 A	63	80	63M80	8	9	18.5	18.5	22
34.0–50.0	42 A	63	100	100M100	14	11	22	22	30
43.0–65.0	54 A	80	125	100M125	22	15	30	30	37
54.0–80.0	67 A	100	160	100M160	22	18.5	37	37	45
65.0–100	82 A	125	200	100M200	38	22	45	45	55
85.0–105	95 A	—	200	100M200	38	30	55	55	—
85.0–125	105 A	—	250	200M250	50	30	55	55	75
100–150	125 A	—	250	200M250	60	37	75	75	90
120–180	150 A	—	315	200M315		45	90	90	110
140–220	180 A	—	400	—		55	110	110	132
170–250	210 A	—	500	—		75	132	132	—
200–300	250 A	—	630	—		75	132; 160	132; 160	160
260–400	330 A	—	630	—		90; 110	200	200	220; 250
400–600	500 A	—	800	—		132; 160	220; 250; 300	220; 250; 300	400
520–800	660 A	—	1000	—		200; 220	400	400	500

■ Characteristics of thermal overload relays

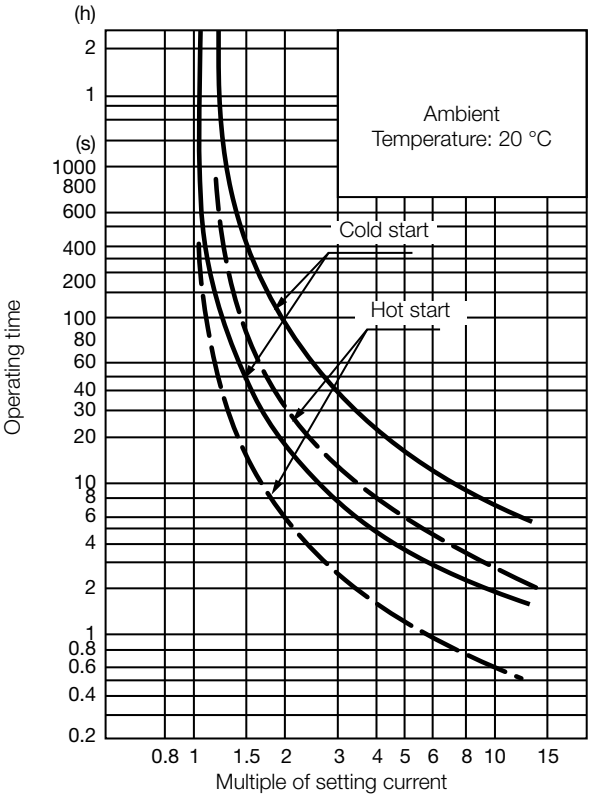
■ TH-T18KP



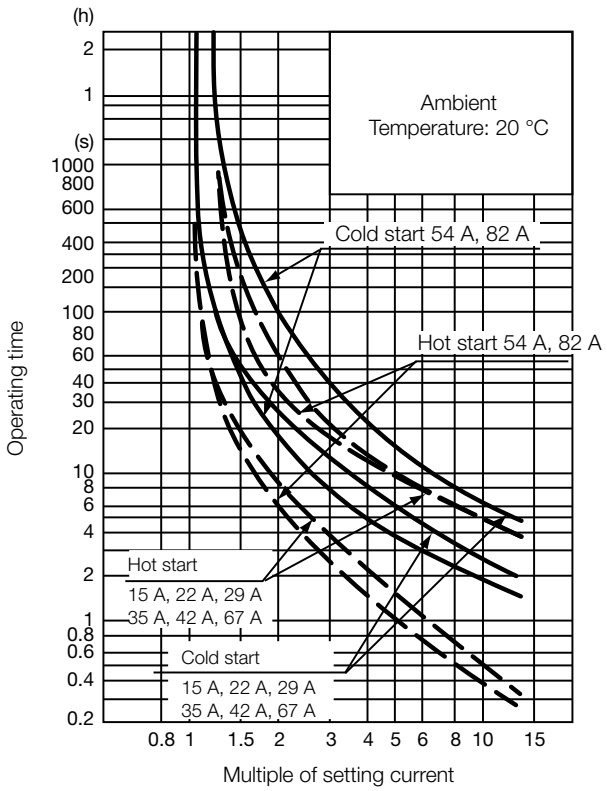
■ TH-T25KP



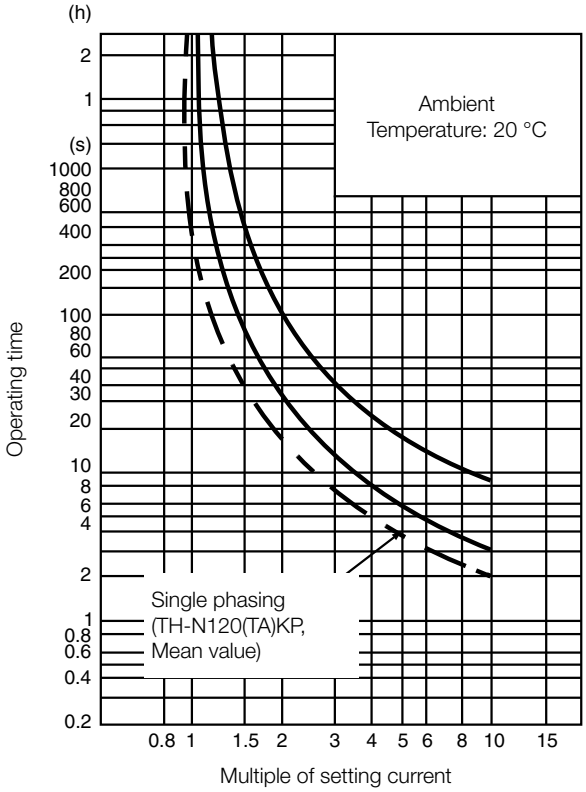
■ TH-T50KP



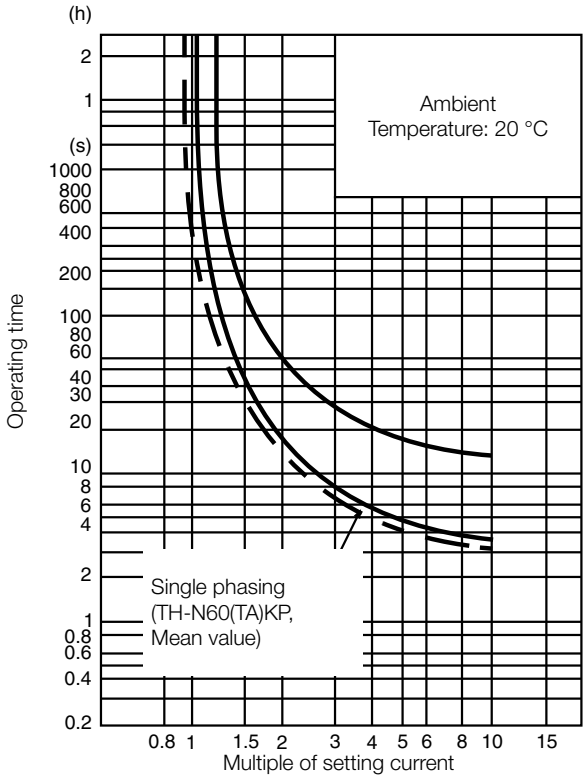
■ TH-T65KP, TH-T100KP



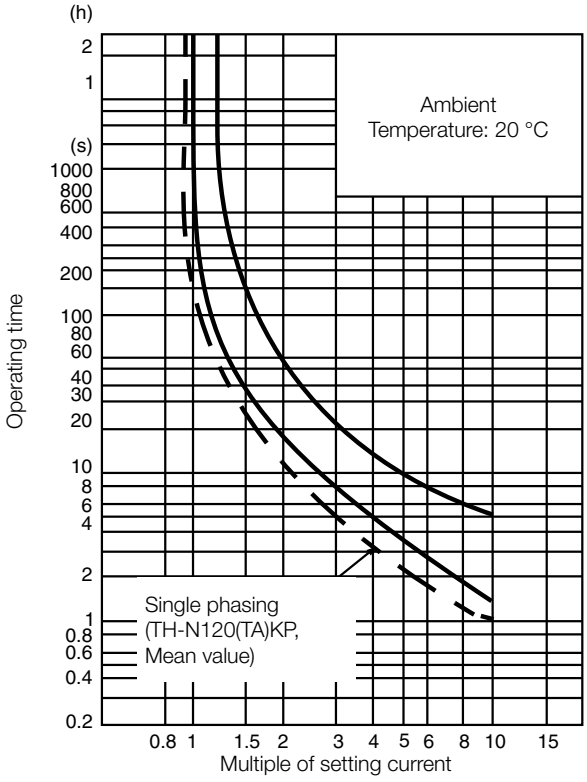
■ TH-N120KP, TH-N120TAKP



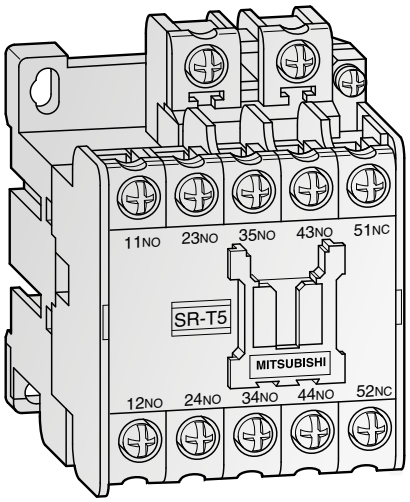
■ TH-N220RHKP, TH-N400RHKP



■ TH-N600KP



■ Contactor relay features



SR-T5

Contactor relays are designed for use in low voltage control circuit applications.

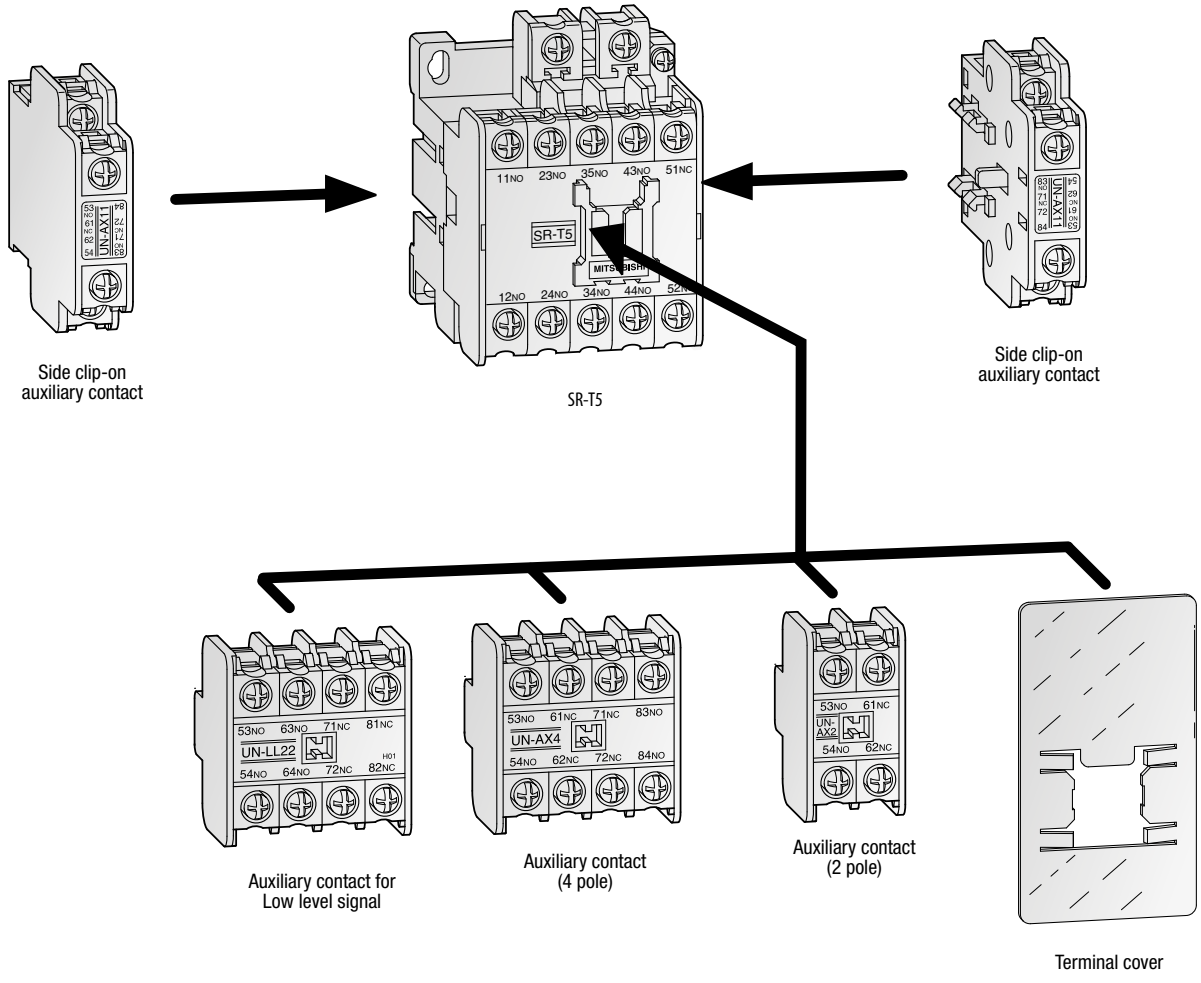
Benefits:

- High reliability: By adopting bifurcated moving contacts and by improving the shape of the contacts, contact performance has been made more reliable than ever.
- Different types as:
  Standard, big capacity or overlap contact
- Long life
- Mountable on 35 mm DIN rails
- Dust-proof construction
- Easily visible coil ratings
- Easy wiring (self-rising terminal screws)
- Various accessories common with the series S-N and S-T contactors (front and side clip-on type additional auxiliary contact blocks, surge absorbers)
- Finger protected types are available (DIN 57106/VDE 0106 Part 100) (Suffix “CX”)

Our standard contactor relay version is with 4 auxiliary contacts.

With side clip-on or front clip-on a number of max. 8 auxiliary contacts is possible.

Type of auxiliary contact	Symbol		Code
Normally open	NO	=	A
Normally closed	NC	=	B



■ Specifications

Specifications			SR-T5 AC□□□V5A	SR-T5 AC□□□V4A1B	SR-T5 AC□□□V3A2B	SRD-T5 DC24V3A2B
Contact arrangement						
Contact arrangement			5 NO	4 NO + 1 NC	3 NO + 2 NC	3 NO + 2 NC
Rated data						
Rated insulation voltage		V	690	690	690	690
Rated continuous current I_{th}		A	16	16	16	16
Rated operating current; Category AC-15 (coil load)	120 V	A	6	6	6	6
	240 V	A	3	3	3	3
	440 V	A	1.5	1.5	1.5	1.5
	550 V	A	1.2	1.2	1.2	1.2
Rated operating current; Category AC-12 (coil load)	120 V	A	10	10	10	10
	240 V	A	8	8	8	8
	440 V	A	5	5	5	5
	550 V	A	5	5	5	5
Rated operating current; Category DC-13 (large coil load)	24 V	A	3	5	5	5
	48 V	A	1.5	3	3	3
	110 V	A	0.6 (2) ①	0.6 (2) ①	0.6 (2) ①	0.6 (2) ①
	220 V	A	0.3 (0.8) ①	0.3 (0.8) ①	0.3 (0.8) ①	0.3 (0.8) ①
Rated operating current; Category DC-12 (resistive load)	24 V	A	10	10	10	10
	48 V	A	8	8	8	8
	110 V	A	5 (8) ①	5 (8) ①	5 (8) ①	5 (8) ①
	220 V	A	1 (3) ①	1 (3) ①	1 (3) ①	1 (3) ①
Electrical data						
Coil consumption (at rated coil voltage)	Inrush	VA	45	45	45	—
	Sealed	VA	7	7	7	—
	Watts	W	2.2	2.2	2.2	3.3 (2.2)
Switching frequency		Oper./h	1,800	1,800	1,800	1,800
Operating time (average)	Making	ms	15	15	15	50
	Breaking	ms	10	10	10	10
Mechanical data						
Electrical life		Oper. (million)	0.5	0.5	0.5	0.5
Mechanical life			10	10	10	10
Conductor size		mm²	1–2.5	1–2.5	1–2.5	1–2.5
Weight		kg	0.3	0.3	0.3	0.62
Dimensions (WxHxD) ◁		mm	43x78x78	43x78x78	43x78x78	43x78x110
Order information	**AC24V**	Art. no.	279260	279267	279274	—
	AC48V		279261	279268	279275	—
	AC100V		279262	279269	279276	—
	AC200V		279263	279270	279277	—
	AC300V		279264	279271	279278	—
	AC400V		279265	279272	279279	—
	AC500V		279266	279273	279280	—
Order information	**DC24V**	Art. no.	—	—	—	287541

▷ Parenthesized rated operating current is for switching the load in 2-pole series connection.
◁ Dimensions on request.

■ Environmental conditions

Environmental conditions for all contactor relays			
Ambient temperature		° C	-25 to +55
Ambient humidity		RH	45 to 85 %
Coil voltage tolerance			0.85 to 1.1 times rated coil voltage
Vibration resistance	10–55 Hz	G	2
Shock resistance		G	5

■ Coil ratings

In case of special order:

The following tables show the devices which are additionally available.
Please contact Mitsubishi Electric for further information.

AC rated voltage (for SR-N)

50 Hz	60 Hz	Ordering designation	Standard
24	**24**	**AC 24 V**	●
48–50	**48–50**	**AC 48 V**	●
100	100–110	AC 100 V	
110–120	**115–120**	**AC 120 V**	●
125–127	127	AC 127 V	
200	200–220	AC 200 V	
208–220	220	AC 220 V	
220–240	**230–240**	**AC 230 V**	●
240–260	260–280	AC 260 V	
346–380	380	AC 380 V	
380–415	**400–440**	**AC 400 V**	●
415–440	460–480	AC 440 V	
500	500–550	AC 500 V	

For detailed description of the types please see page 245.

DC rated voltage (for SRD-N)

	Ordering designation	Standard
24	**AC 24 V**	●
48	AC 48 V	
100	AC 100 V	
110	AC 120 V	
120–125	AC 127 V	
200	AC 200 V	
220	AC 220 V	

For detailed description of the types please see page 245.

AC rated voltage (for SR-T)

50 Hz	60 Hz	Ordering designation	Standard
24	24	**AC 24 V**	
48–50	48–50	**AC 48 V**	
100–127	100–127	**AC 100 V**	
200–240	200–240	**AC 200 V**	
260–300	260–300	**AC 300 V**	
380–440	380–440	**AC 400 V**	
460–550	460–550	**AC 500 V**	

For detailed description of the types please see page 245.

DC rated voltage (for SRD-T)

Coil designation	Rated voltage (= Ordering designation)	Standard
DC 12 V	**DC 12 V**	
DC 24 V	**DC 24 V**	
DC 48 V	**DC 48 V**	
DC 100 V	**DC 100 V**	
DC 110 V	**DC 110 V**	
DC 120–125 V	**DC 120–125 V**	
DC 200 V	**DC 200 V**	
DC 220 V	**DC 220 V**	

For detailed description of the types please see page 245.

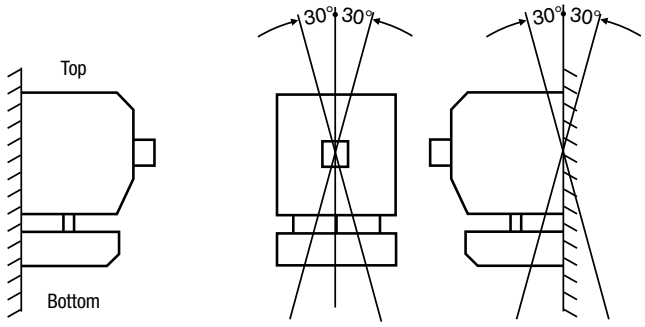
■ Mounting

Mounting attitude of contactors and contactor relays

The construction and characteristics of contactors and contactor relays require that they be installed at the correct attitude. This attitude should not be changed, as the operating characteristics will be affected.

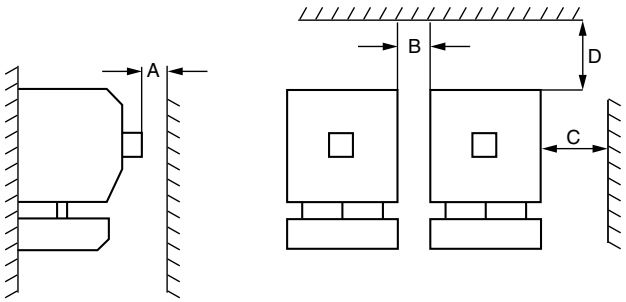
To assure proper performance, Mitsubishi Electric contactors and contactor relays should be mounted on a vertical supporting surface with the line terminals upwards and the load terminals downwards. The supporting surface may have a maximum inclination of 30° from the vertical in any direction.

Instruction in detail also for horizontal installation on request.



Regular installation | Inclined installation

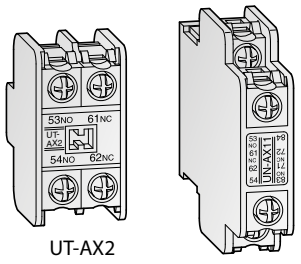
Minimal gaps for installation of contactor and contactor relays

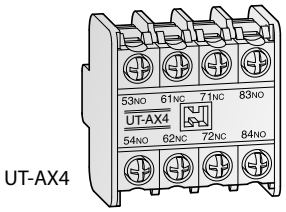


Frame size	A	B	C	D
S-T10, S-T12	5	5	10	15
S-T20, S-T21	5	5	10	15
S-T25, S-T32	5	5	10	15
S-T35	5	5	10	15
S-T50, S-T65	5	10	10	25
S-T80, S-T100	10	10	16	25
S-N125	10	12	16	25
S-N150	10	12	16	30
S-N180, S-N220	10	12	16	50
S-N300, S-N400	10	12	16	90
S-N600, S-N800	10	15	20	90

All dimensions in mm

■ Auxiliary contact blocks





UT-AX4

Application

All contactors can be extended by additional contacts which are available as a compact module.

The auxiliary contacts are simple and safe to extend by means of front or side clips.

When ordering please check that the auxiliary contact fits for your magnetic contactor.

Type of auxiliary contact	Symbol		Code
Normally open	NO	=	A
Normally closed	NC	=	B

Auxiliary contact blocks for S-T10 to S-T50, SD-T12 to SD-T50, SR-T5, SRD-T5

Specifications		UT-AX2 2A	UT-AX2 1A1B	UT-AX2 2B	UT-AX4 4A	UT-AX4 2A2B	UT-AX4 3A1B	UT-AX11
Contact arrangement		2 NO	1 NO+ 1 NC	2 NC	4 NO	2 NO+ 2 NC	3 NO+1 NC	1 NO+ 1 NC
Order information	Art. no.	279316	279315	279317	279320	279318	279319	279314

Auxiliary contact blocks for S-T65, S-T80, SD-T65 and SD-T80

Specifications		UN-AX2CX 2A	UN-AX2CX 1A1B	UN-AX2CX 2B	UN-AX4CX 4A	UN-AX4CX 2A2B	UN-AX4CX 3A1B	UN-AX11CX
Contact arrangement		2 NO	1 NO+ 1 NC	2 NC	4 NO	2 NO+ 2 NC	3 NO+1 NC	1 NO+ 1 NC
Order information	Art. no.	52625	52626	52627	52628	52629	52630	52631

Specifications			For all types on this page
Clip-on type			Front ②③ / UT-AX11 and UN-AX11: Side
Rated cont. curr. Ith			16
Rated insulation voltage			690
Category AC-15 (coil load)	AC 110 V	A	6
	AC 230 V	A	5 (3 for UT-AX)
	AC 440 V	A	3 (1.5 for UT-AX)
Category DC-13 (large coil load)	DC 48 V	A	3
	DC 110 V	A	0.8
	DC 220 V	A	0.2
Mechanical life		oper.	10 mill.
Electrical life		oper.	0.5 mill.
Switching frequency		opr./ hour	1.800
Perm. amb. temperature		°C	-25–+55
Perm. amb. humidity		RH	45–85 %
Conductor size		mm^2	1.0–2.5

▷ Contact reliability may be decreased if it is operated more than 1 million operations.
◁ Front clip-on and side clip-on should not be mounted both.
△ Maximum 1 piece of auxiliary contact block can be mounted on a contactor/relay.
▽ Maximum 2 pieces of auxiliary contact blocks can be mounted on a contactor/relay.

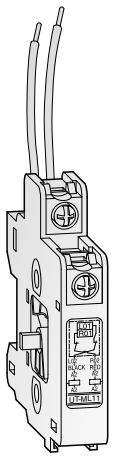
■ Auxiliary contact blocks (continued)

Auxiliary contact blocks for S-T100, S-N125 to S-N800

Specifications			UN-AX80	UN-AX150	UN-AX600
Contactors			S-T100 SD-T100 S-N125 SD-N125	S-N150 S-N180 S-N220 S-N300 S-N400 SD-N150 SD-N180 SD-N220 SD-N300 SD-N400	S-N600 S-N800 SD-N600 SD-N800
Contact arrangement			1 NO + 1 NC	1 NO + 1 NC	2 NO + 2 NC
Clip-on type			Side	Side	Side
Rated cont. curr. Ith		A	16	16	16
Rated insulation voltage		V	690	690	690
Category AC-15 (Coil load)	AC 110 V	A	6	6	6
	AC 230 V	A	5	5	5
	AC 440 V	A	3	3	3
Category DC-13 (large coil load)	DC 48 V	A	3	3	3
	DC 110 V	A	0.8	0.8	0.8
	DC 220 V	A	0.2	0.2	0.2
Mechanical life		oper.	10 mill.	10 mill.	10 mill.
Electrical life		oper.	0.5 mill.	0.5 mill.	0.5 mill.
Switching frequency		opr./hour	For all types: 1,800		
Perm. amb. temperature		°C	For all types: -25 to +55		
Perm. amb. humidity		RH	For all types: 45 % to 85 %		
Conductor size		mm^2	For all types: 1.0 to 2.5		
Order information		Art. no.	113691	113702	113703

Maximum 2 pieces of auxiliary contact blocks can be mounted on a contactor/relay.

■ Mechanical interlocks



Application

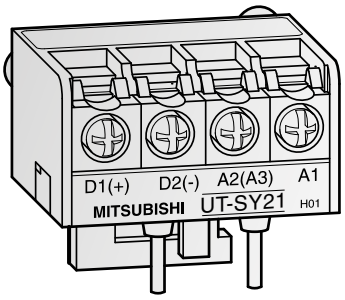
Two contactors are safely and simply secured against one another through mechanical interlocking.

The mechanical interlocks are simple and safe to mount by means of side clips.

On UT-ML11 the relevant interlock status can also be obtained through an electric query.

Specifications		UT-ML20	UN-ML21	UN-ML80	UN-ML150	UN-ML220
Contactors		SD-T12 SD-T20	S-T21 S-T25 S-T32 SD-T21 SD-T32 S(D)-T35 S(D)-T50 S(D)-T65 S(D)-T80	S(D)-T100 S-N125 SD-N125	S-N150 SD-N150	S-N180 S-N220 S-N300 S-N400 SD-N220 SD-N300 SD-N400
Order information	Art. no.	295824	52634	124294	125992	124293

■ DC interface modules



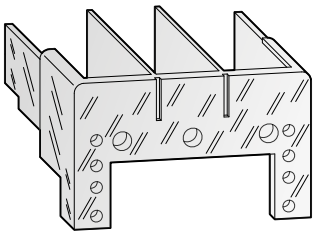
Application

Despite the low current requirements of our contactors and contactor relays, a number of PLC types with transistor outlets only allow direct control via the DC interface module.

In accordance to the used contactor it can be mounted directly on the contactor or on a separate location.

Specifications		UT -SY21	UT-SY22	UN-SY31	UN-SY32	UN-SY11	UN-SY12
Contactors		S-T10 S-T12 S-T20 S-T21 S-T25 S-T32 S-T50 SR-T5	S-T10 S-T12 S-T20 S-T21 S-T25 S-T32 S-T50 SR-T5	S-T65 S-T80	S-T65 S-T80	S-N125 S-N150 S-N180 S-N220 S-N300 S-N400	S-N125 S-N150 S-N180 S-N220 S-N300 S-N400
Output		Solid state	Relay	Solid state	Relay	Solid state	Relay
Mounting to contactor		Direct	Direct	Direct	Direct	Separate	Separate
Order information	Art. no.	On request	On request	On request	On request	On request	On request

■ Terminal covers



Application

The terminal covers warrant protection against contacts being accidentally touched.

These covers are to retrofit contactors which do not have a terminal cover (like types without "CX" designation).

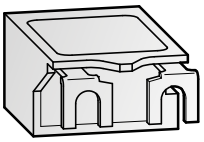
Specifications		UN-CZ500 ①	UN-CZ800 ①	UN-CZ1250 ①	UN-CZ1500 ①	UN-CZ2200 ①	UN-CZ3000 ①
Contactors		S(D)-T65 S(D)-T80	S(D)-T100	S-N125, SD-N125	S-N150, SD-N150	S-N180/N220, SD-N220	S-N300/N400, SD-N300/N400
Order information	Art. no.	127116	113704	113705	113706	113707	113708

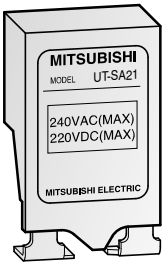
▷ 2 pcs. are required for one contactor .

Specifications		UN-CZ501 ②	UN-CZ801 ②	UN-CZ1251 ②	UN-CZ1501 ②	UN-CZ2201 ②	UN-CZ3001 ②
Contactor and Thermal Overheat Relay		S(D)-T65/T80, TH-T	S(D)-T100, TH-T	SD-N125, TH-N	SD-N150, TH-N	SD-N180/N220, TH-N	SD-N300/N400, TH-N
Order information	Art. no.	127117	125994	125995	125996	125997	125998

◁ This part is only for the load side (1 piece). For the line side one UN-CZ□□0 is required.

■ Surge absorbers





Application

Surge absorbers serve the purpose of avoiding currency surges when coils are switched off.

They can be mounted safely and easily behind the terminal strips.

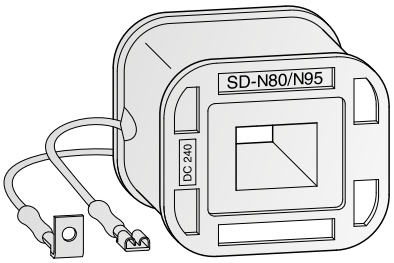
Contactors and relays with built-in surge absorbers, varistor-type are available on your request.

For S-T65 up to S-T100 and S-N125 up to S-N800 the surge absorber are implemented as standard.

Specifications			UT-SA21 AC□□□V	UT-SA22 AC□□□V	UT-SA23 AC□□□V	UT-SA25 AC□□□V	UT-SA13 DC□□□V
Contactors			S-T10 S-T12 S-T20 S-T21 S-T25 S-T32 S-T35 S-T50 SD-T12 SD-T20 SD-T21 SD-T32 SD-T35 SD-T50 SR-T5 SRD-T5	S-T10 S-T12 S-T20 S-T21 S-T25 S-T32 S-T35 S-T50 SD-T12 SD-T20 SD-T21 SD-T32 SD-T35 SD-T50 SR-T5 SRD-T5	S-T10 S-T12 S-T20 S-T21 S-T25 S-T32 S-T35 S-T50 SR-T5	S-T10 S-T20 S-T21 S-T25 S-T32 S-T35 S-T50 SD-T12 SD-T20 SD-T21 SD-T32 SD-T35 SD-T50 SR-T5 SRD-T5	SD-T12 SD-T20 SD-T21 SD-T32 SD-T35 SD-T50 SRD-T5
Voltage range			For AC 48 V AC 24–50 V DC 24–48 V	For AC 200 V AC 50–240 V DC 60–220 V	For AC 200 V AC 24–240 V	For AC 048 V AC 24–50 V DC 24–60 V	For DC 200 V DC 24–220 V
			For AC 200 V AC 24–240 V DC 24–220 V			For AC 200 V AC 24–240 V DC 24–220 V	
			For AC 400 V AC 24–480 V				
Varistor			●	—	—	—	—
Varistor with operating indicator (LED)			—	●	—	—	—
Varistor and CR			—	—	—	●	—
CR			—	—	●	—	●
Order information	**AC 48 V**	Art. no.	279322	—	—	279327	—
	AC 100 V		—	—	—	—	—
	AC 200 V		279323	279325	279326	279328	—
	AC 400 V		279324	—	—	—	—
	DC 200 V		—	—	—	—	On request

Note: For other voltage ranges please contact Mitsubishi Electric.

■ Replacement coils



Application

If, for technical or logistic reasons, a coil needs to be replaced, then this can be done fast and safely, as it involves very simple operations.

When ordering please check for the right voltage classification.

Changing procedure is done for

- S-T35 up to S-T100 by loosening a number of screws
- S-N125 to S-N800, SD-N125 to SD-N800 by replacing the coil cartridge.

AC-operated coils

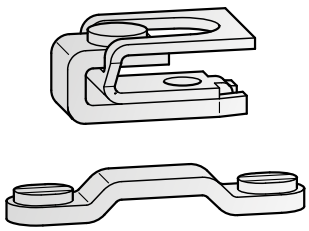
Specifications			S-T35-COIL AC□□□V	S-T65-COIL AC□□□V	S-T100-COIL AC□□□V	S-N125-COIL AC□□□V	S-N180-COIL AC□□□V	S-N300-COIL AC□□□V	S-N600-COIL AC□□□V
Contactors			S-T35 S-T50	S-T65 S-T80	S-T100	S-N125 S-N150	S-N180 S-N220	S-N300 S-N400	S-N600 S-N800
Weight		kg	0.08	0.27	0.6	0.46	0.6	0.9	2.0
Order information	AC 24 V	Art. no.	498117	674423	674438	125895	—	—	—
	AC 48 V		674416	674419	674439	125899	—	—	—
	AC 100 V		674417	674420	674440	125893	125900	125915	125920
	AC 120 V		—		—	—	—	—	—
	AC 127 V		—	—	—	—	—	—	—
	AC 200 V		498116	674421	674441	125894	125901	125916	125921
	AC 220 V		—	—	—	—	—	—	—
	AC 230 V		—	—	—	—	—	—	—
	AC 260 V		—	—	—	—	—	—	—
	AC 300 V		—	—	—	125896	125912	125917	125922
	AC 380 V		—	—	—	—	—	—	—
	AC 400 V		674418	674422	674442	125897	125913	125918	125923
	AC 440 V		—	—	—	—	—	—	—
	AC 500 V		—	—	—	125898	125914	125919	125924

For information about the voltage range refer to page 246.

Note: For other voltage ranges please contact Mitsubishi Electric.

■ Replacement contact kits

Main contact kit



Application

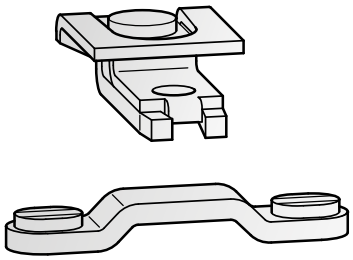
If used correctly, the contact kit does not need replacing during the lifetime stated in the documentation. However, should this still be required, then it can be done fast and without any problems, as it involves no more than a few simple operations.

The kits consist of 3 moving contacts and 6 stationary contacts.

Specifications		BHA49N306	BHA49N307	BHA59N303	BHA59N304	BHA69N303	BH779N304	BH789N301	BH799N303	BH799N304	BH809N300
Contactors		S-T35/ SD-T35	S-T50 /SD-T50	S-T65/ SD-T65	S-T80/ SD-T80	S-T100/ SD-T100	S-N125/ SD-N125	S-N150/ SD-N150	S-N180	S-N220/ SD-N220	S-N300/ SD-N300
Weight	kg	0,07	0,1	0,1	0,1	0,1	0,1	0,2	0,4	0,4	0,8
Order information	Art.no.	589875	589876	589877	589878	589879	589837	589838	589839	589840	589841

Specifications		BH809N301	BH819N302	BH819N303
Contactors		S-N400/ SD-N400	S-N600/ SD-N600	S-N800/ SD-N800
Weight	kg	0,8	2,5	2,5
Order information	Art.no.	589872	589873	589874

Auxiliary contact kit



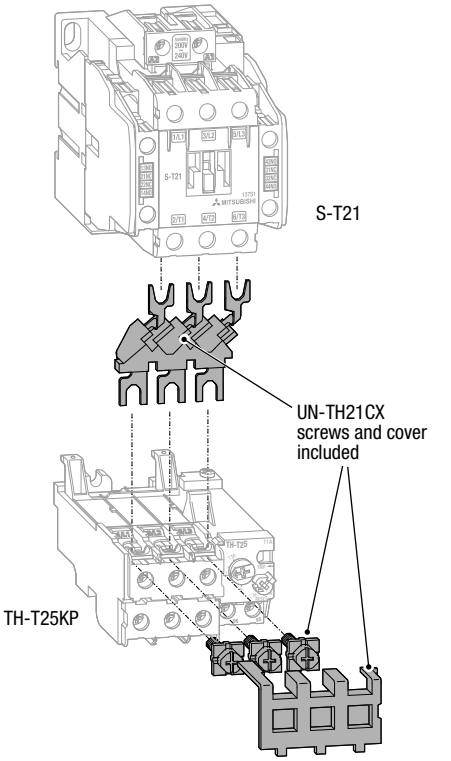
Application

If used correctly, the bifurcated moving contact warrants a maximum of contact safety and the longest possible lifetime.

Nevertheless, auxiliary contacts can be replaced safely and without any problems.

Specifications		BHA-49N304	BH-539N315	BH-579N312	UN-AX150	UN-AX600
Contactors		S-T35/50 SD-T35/50	S-T65 to S-T100 SD-T65 to SD-T100	S-N125 SD-N125	S-N150 to S-N400 SD-N150 to SD-N400	S-N600 S-N800 SD-N600 SD-N800
Kit contents	Bifurcated moving contacts	4	4	4	—	—
	Stationary contacts	8	8	8	—	—
	Contact block	—	—	—	1	1
Contact arrangement		2 NO 2 NC	2 NO 2 NC	2 NO + 2 NC	1 NO + 1 NC	2 NO + 2 NC
Weight	kg	0.03	0.02	0.02	0.04	0.1
Order information	Art. no.	On request	On request	On request	113702	113703

■ Connecting parts for contactors to thermal overload relays

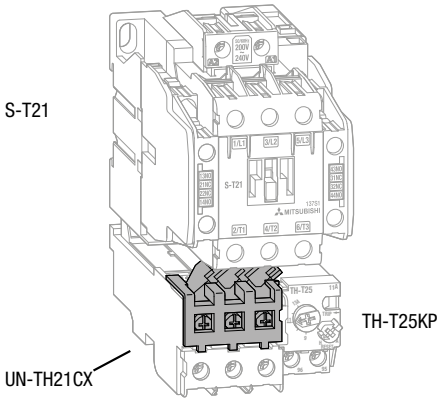


Application

For connection between the contactor and the thermal overload relay.

Connecting bars and mounting plate are included in the OLR of TH-N220RHKP and TH-N400RHKP for S-N180, S-N220, SD-N220, S-N300, SD-N300, S-N400, SD-N400.

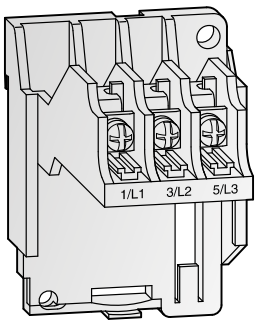
Contactor and relay mounted with connecting bar kit



Connecting bar kit

Specifications		UN-TH21CX	UT-TH50	BH559N350	BH569N350	BH569N352	BH579N355	BH589N355
Contactors		S-T21 S-T25 SD-T21	S(D)-T35 S(D)-T50	S(D)-T65 S(D)-T80 S(D)-T80	S-T100	SD-T100	S-N125 SD-N125	S-N150 SD-N150
Thermal overload relay		TH-T25KP	TH-T25KP TH-T50KP	TH-T65KP TH-T100	TH-T65KP TH-T100KP	TH-T65KP TH-T100KP	TH-N120KP, TH-N120TAKP	TH-N120KP, TH-N120TAKP
Weight	kg	0.02	0.02	0.02	0.04	0.04	0.36	0.36
Order information	Art. no.	141108	307329	126000	126001	126002	126003	126004

■ Separate mounting adapter



Application

For the stand-alone application the thermal overload relay TH-T18KP must be use with the separate mounting adapter UT-HZ18.

Specifications		UT-HZ18	UN-RM20
Thermal overload relays		TH-T18KP	TH-T25KP
Order information	Art. no.	293229	293220

Motor circuit breaker

MMP-T32 series

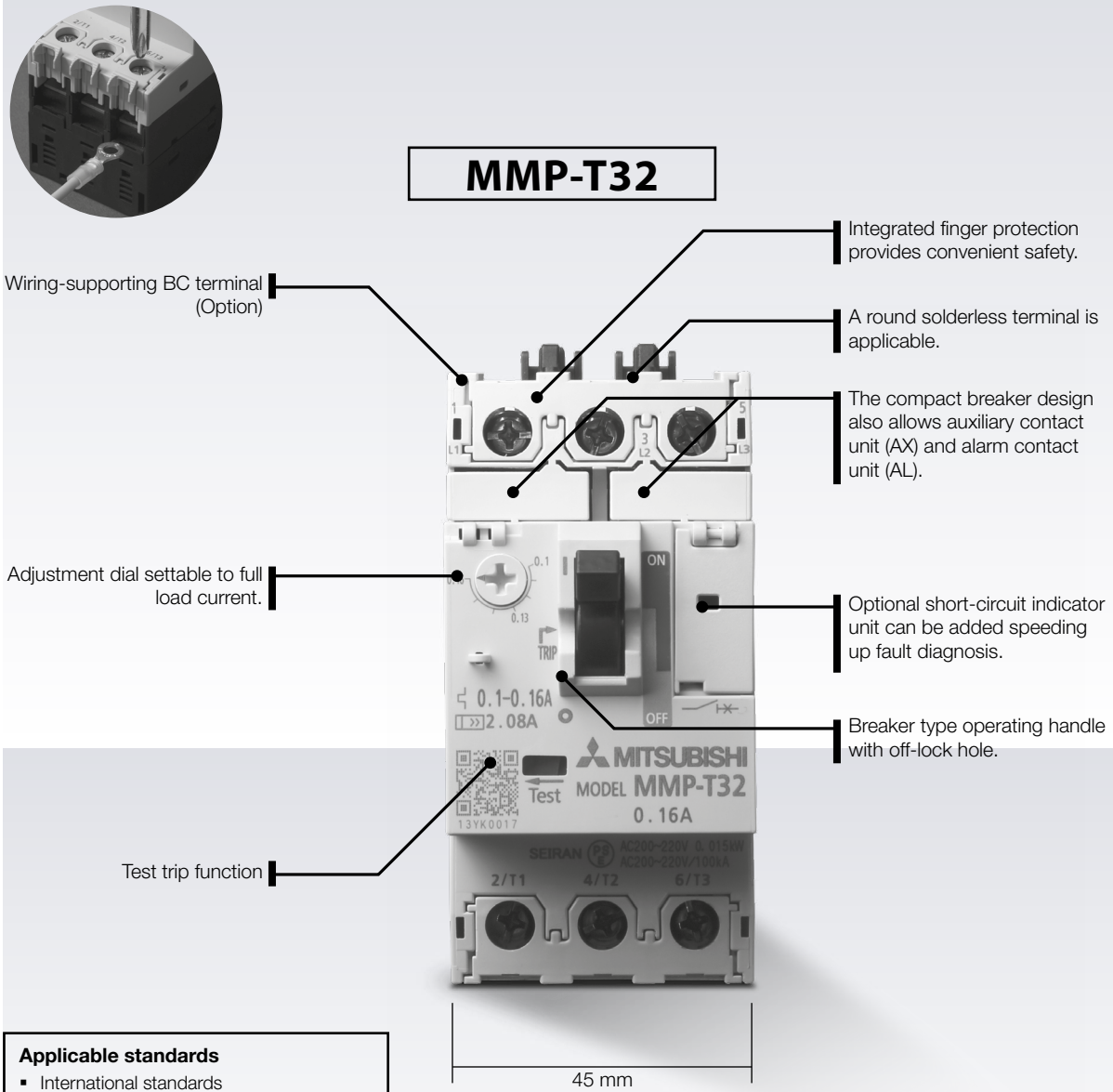
Special features:

- Self-protected manual motor controller
- Reliable protection and superior performance
- Compact design
- Smart wiring
- Safety & quality
- Global standards

Advantages of adopting this device

MMP-T32 integrates low voltage circuit breakers and thermal overload relay functions. This device is capable of protecting the motor branch circuits from overload, phase-loss and short-circuit occurrences. The MMP-T32 enables more secure wiring and motor protection than standard open type starters.

In addition to motor protection, integrating the Mitsubishi MS-T series contactor provides a smaller footprint, and the combination motor controller will help eliminate wiring and save time in panel design.



Applicable standards

- International standards
  IEC60947-2, 60947-4-1
  No. 60947-4-1 *1
  TUV approval CE CCC
- Domestic standards in Japan
  JIS C8201-2-1 Ann.1, 8201-4-1
  Electric applicable safety law
  (Electric articles other than specified) *1

*1) MMP-T32LF is not applicable.

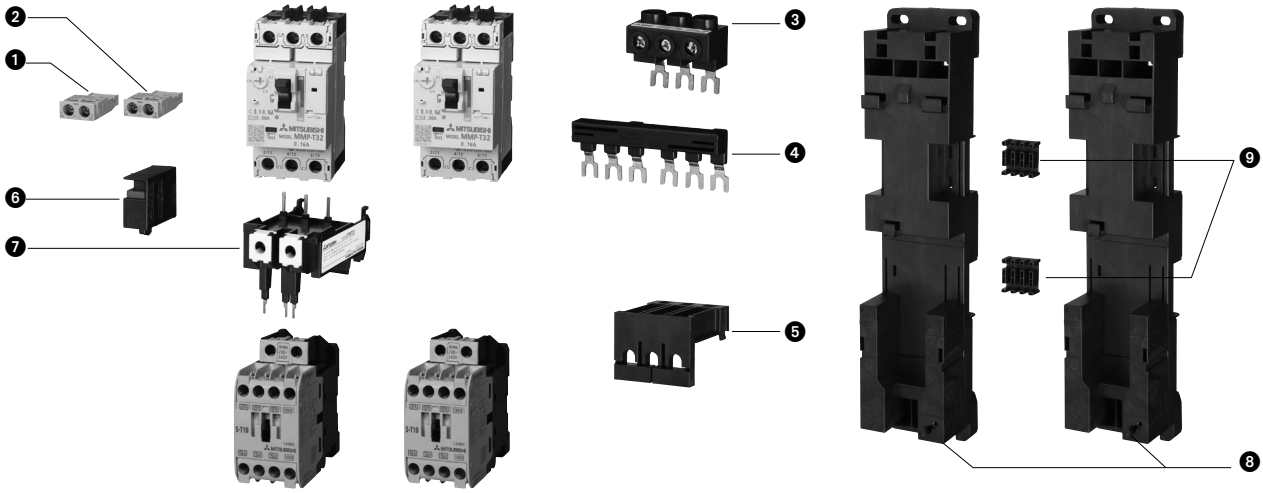
Specifications

Frame A			32						32					
Type name			MMP–T32						MMP–T32LF					
Standard			JIS C8201-2-1 Ann.1, JIS 8201-4-1, EN60947-2, EN60947-4-1, IEC60947-2, IEC60947-4-1, GB14048.2						EN60947-2, EN60947-4-1, IEC60947-2, IEC60947-4-1, GB14048.2					
Number of poles			3											
Handle shape			Tumbler handle											
Rated current in [A]			0.1 to 32											
Rated operational voltage Ue [V]			200 to 690											
Rated frequency [Hz]			50/60											
Rated insulation voltage Ui [V]			690											
Rated impulse withstand voltage Uimp [kV]			6											
Rated short-circuit breaking capacity [kA] JIS C8201-2-1 Ann.1 IEC60947-2	Rated current Ie [A]		200/240 V		400/415 V		440/460 V		200/240 V		400/415 V		440/460 V	
	Heater designation	Current setting range	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics	Icu	Ics
	0.16	0.1–0.16	100		100		100		100		100		100	
	0.25	0.16–0.25	100		100		100		100		100		100	
	0.4	0.25–0.4	100		100		100		100		100		100	
	0.63	0.4–0.63	100		100		100		100		100		100	
	1	0.63–1	100		100		100		100		100		100	
	1.6	1–1.6	100		100		100		100		100		100	
	2.5	1.6–2.5	100		100		100		100		100		100	
	4	2.5–4	100		100		100		100		100		100	
	6.3	4–6.3	100		100		100		100		100		50	50
	8	5.5–8	100		100		50	38	100		100		15	15
	10	7–10	100		100		50	38	100		100		15	15
	13	9–13	100		100		50	38	100		15	7.5	8	4
	18	12–18	100		50	38	35	27	100		15	7.5	8	4
	25	18–25	100		50	38	35	27	50		15	6	6	3
	32	24–32	100		50	38	35	27	50		10	5	6	3
Selectivity category	JIS C8201-2-1 Ann.1 IEC60947-2		Cat.A											
Utilization category	JIS C8201-4-1 IEC60947-4-1		AC-3											
Trip class (JIS C8201-4-1, IEC60947-4-1)			10											
Instantaneous release current			13 x Maximum Ie											
Durability	Mechanical [times]		100,000											
	Electrical [times]		100,000											
Phase loss sensitive			Yes											
Trip display			Yes											
Test trip function			Yes											
Auxiliary contact unit			UT-MAX (1a or 1b) AC-12: 125 V/5 A, 250 V/3 A											
Alarm contact unit			UT-MAL (1a or 1b) DC-12: 125 V/0.4 A, 250 V/0.2 A											
Short-circuit indicator unit			UT-TU											
Weight [g]			330											

Breaking capacity at 415 V	Current setting range	Model	Code
100 KA	0.1–0.16 A	MMP-T32LF-0.16A	288426
100 KA	0.16–0.25 A	MMP-T32LF-0.25A	288427
100 KA	0.25–0.4 A	MMP-T32LF-0.4A	288428
100 KA	0.4–0.63 A	MMP-T32LF-0.63A	288429
100 KA	0.6–1 A	MMP-T32LF-1.0A	288430
100 KA	1–1.6 A	MMP-T32LF-1.6A	288431
100 KA	1.6–2.5 A	MMP-T32LF-2.5A	288432
100 KA	2.5–4 A	MMP-T32LF-4.0A	288433
100 KA	4–6.3 A	MMP-T32LF-6.3A	288434
100 KA	5.5–8 A	MMP-T32LF-8A	288435
100 KA	7–10 A	MMP-T32LF-10A	288436
15 KA	9–13 A	MMP-T32LF-13A	288437
15 KA	12–18 A	MMP-T32LF-18A	288438
15 KA	18–25 A	MMP-T32LF-25A	488439
10 KA	24–32 A	MMP-T32LF-32A	288440

Breaking capacity at 415 V	Current setting range	Model	Code
100 kA	0,25-0,4	MMP-T32 0.4A	600141
100 kA	0,4-0,63	MMP-T32 0.63A	600192
100 kA	0,63-1	MMP-T32 1.0A	600193
100 kA	1-1,6	MMP-T32 1.6A	600194
100 kA	1,6-2,5	MMP-T32 2.5A	600195
100 kA	2,5-4	MMP-T32 4.0A	600196
100 kA	4-6,3	MMP-T32 6.3A	600197
100 kA	7-10	MMP-T32 10A	600198
100 kA	9-13	MMP-T32 13A	600199
50 kA	12-18	MMP-T32 18A	600200
50 kA	18-25	MMP-T32 25A	600201
50 kA	24-32	MMP-T32 32A	600202

Options list



Number	Model	Code	Specification	Description
❶	UT-MAX 1A	288455	1a	Auxiliary contact unit with ON/OFF operation.
	UT-MAX 1B	288456	1b	
	UT-MAXLL 1A	288457	1a	Auxiliary contact unit with ON/OFF operation. (for light load)
	UT-MAXLL 1B	288458	1b	
❷	UT-MAL 1A	288451	1a	Alarm contact unit with trip operation.
	UT-MAL 1B	288452	1b	
	UT-MALLL 1A	288453	1a	Alarm contact unit with trip operation. (for light load)
	UT-MALLL 1B	288454	1b	
❸	UT-EP3	288449		A unit to connect a large size electric wires to MMP-T32.
❹	UT-2B4	288445	45 mm	A unit to supply power to two or three MMP-T32.
			Twin type	
	UT-3B4	288446	45 mm	
			Triple type	
	UT-2B5	288447	57 mm	
			Twin type	
	UT-3B5	288448	57 mm	
			Triple type	
❺	UT-CV3	288450		Power supply-side terminal cover for type E/F. Kit includes terminal adapter, terminal cover and 3 screws.
❻	UT-TU	288459		Unit has red indicator which shows only when the device is tripped due to short-circuit.
❼	UT-MT20	288460	For S-T10/T12/T20	Used to connect the MMP-T32 and magnetic contactor electrically and mechanically.
	UT-MT32	288461	For S-T32	
	UT-MT20D	293623	For SD-T12/T20	
	UT-MT32D	293624	For SD-T32	
❽	UT-BT20	288462	For UT-MT20	A plate to install the combination starter with MMP-T32 and magnetic contactor. Rail mounting and screw mounting are available.
	UT-BT32	288463	For UT-MT32	
	UT-BT32D	293626	For UT-MT20D/MT32D	
❾	UT-RT10	288464	For S-2xT10, SD-2xT10	Blocks for mechanical connection of two mounting base units.
	UT-RT20	288465	For S-2xT12/20, SD-2xT12/20	
	UT-RT32	288466	For S-2xT32, SD-2xT32	

Mitsubishi Electric Energy Management

Mitsubishi Electric can offer a wide range of both components and systems to help customers achieve better energy efficiency and management.

EcoAdviser
Link: Energy Saving Support Software EcoAdviser - Mitsubishi Electric Factory Automation - EMEA

What is EcoAdviser?
Supporting activities range from management to the reduction of CO_2 emissions and energy use

Management of CO_2 emissions and energy use
Centralized management of data on electricity, water, air, gas, heavy oil, and more!

Analysis of causes of energy loss
Our proprietary AI technology can be used to automatically extract energy losses!

Diagnosis of energy loss factors
Automatically determine energy loss factors and display rankings. Estimated effects of improvements can also be checked!

Verification of effectiveness of energy conservation measures
Simply select a period of time to check the effects of improvements before and after implementing energy conservation measures!

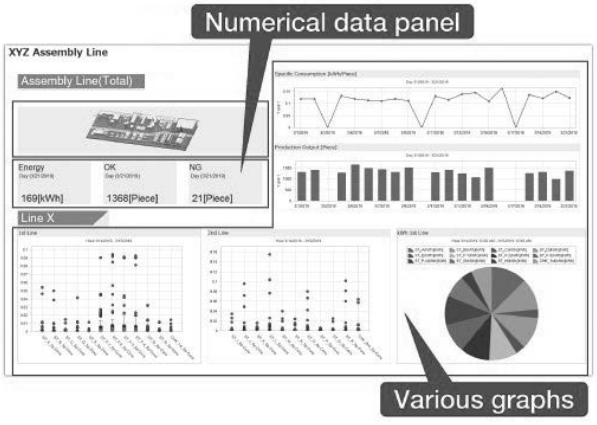
1. Management: Visualization of CO_2 emissions and energy use

Keep track of energy using an extensive range of graphs. EcoAdviser makes it much more efficient to conduct energy conservation activities like creating reports and various daily tasks that had previously been completed using spreadsheet software. It also leverages visualization to assist with initiatives implemented at workplaces, and can help raise awareness by boosting understanding.

Creating dashboards is an effective way to highlight information to company members!

- Identify CO_2 emissions and energy use by each department and process
- Understand areas of improvement in energy conservation, etc.
- Make dashboard easily by putting graphs and results of energy-loss factor diagnosis on it
- Show the dashboard at the production site to improve the energy saving awareness of the employees.

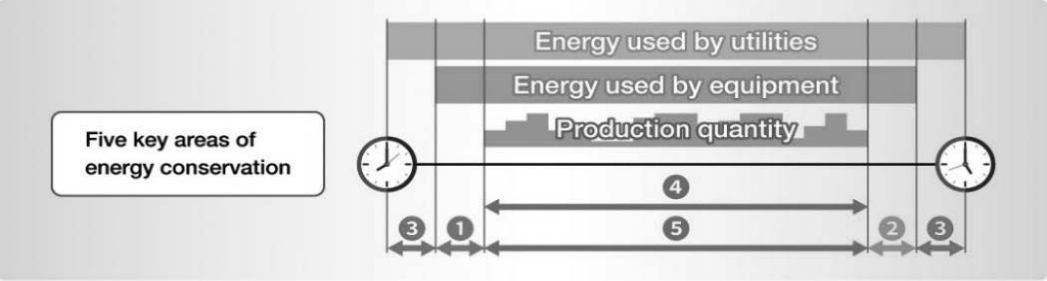
Screen designs can be created at will for each customer!



2. Analysis: Automatic extraction of energy loss at production facilities **<AI diagnosis edition>**

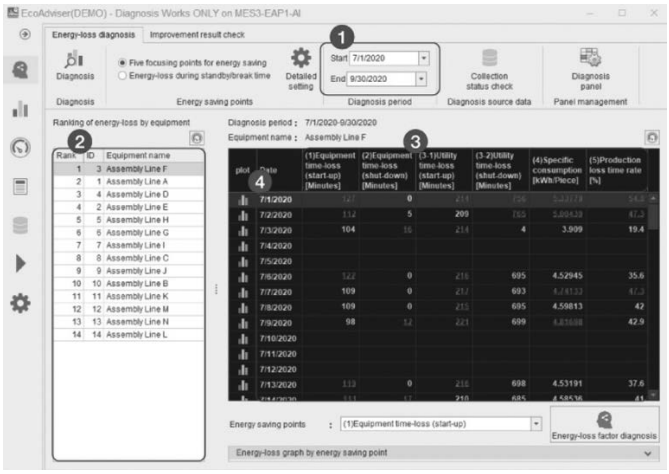
An approach that focuses on five key areas of energy conservation perspectives by drawing on Mitsubishi Electric's know-how developed over many years, and automatically identifies energy loss from each of these perspectives.

Five key areas of energy conservation



1. Production equipment start-up to start of production time
2. End of production to production equipment shutdown time
3. Utilities* time loss:
   - Utilities start-up to production equipment start-up time
   - Production equipment shutdown to utilities shutdown time
4. Specific units from start of production to end of production
5. Ratio of time with no production from start of production to end of production

*Auxiliary equipment that operates in tandem with production equipment (e.g., ventilation fans, mist collectors, compressors, etc.)



Energy Loss Diagnostic Screen

1. Diagnosis period
Energy losses can be extracted by simply selecting the period for diagnosis.

2. Ranking display
Automatically ranks equipment in order of energy loss.

3. Five key areas of energy conservation
Energy loss for each of the five key areas of energy conservation is displayed for each day.

4. Energy loss extraction screen
The energy loss time (unit: minutes), specific unit requirement, and ratio of production loss time for each day are displayed on a single screen, with the worst day highlighted.

3. Diagnosis: Diagnosis of energy loss factors <AI diagnosis edition>

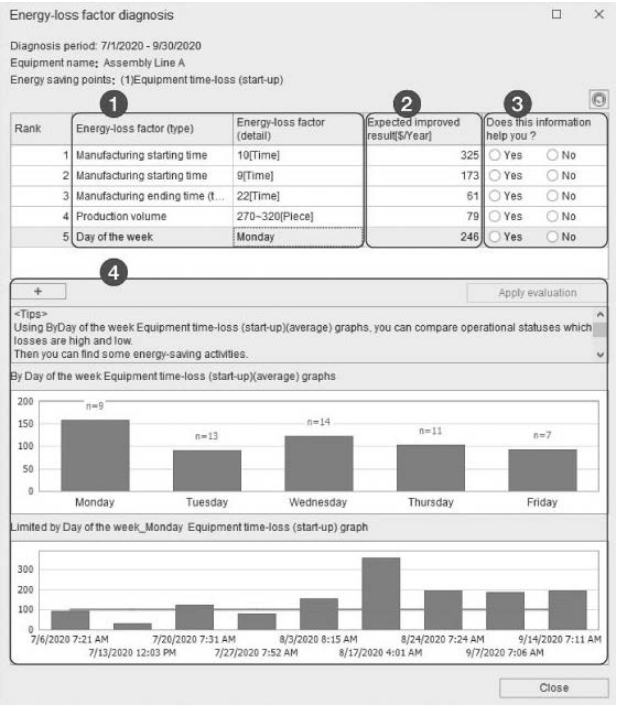
Date, time, and production information is used to rank items correlating with factors causing energy loss, and presented together with the effects of expected improvements.

What is energy loss factor diagnosis?

This refers to items that are closely associated with days when energy losses are greater than normal.

Factors closely correlating with energy loss such as date and time, equipment and so on are prioritized in terms of potential for reducing losses through recommended countermeasures.

Diagnosis results	Measures based on results of diagnosis
Monday	Revise the start-up/shutdown times of the associated equipment at the start of the week.
Start-up 6 AM	Remind employees not to start-up equipment unnecessarily early in the morning.
250 units produced on the day	Revise the production plan, as losses are higher on days with low production quantity.



Energy Loss Factor Diagnosis Screen

1. Diagnosis of energy loss factors
Factors that are closely correlated with energy loss are automatically identified and ranked using AI (day of the week, start-up time, production quantity, etc.).

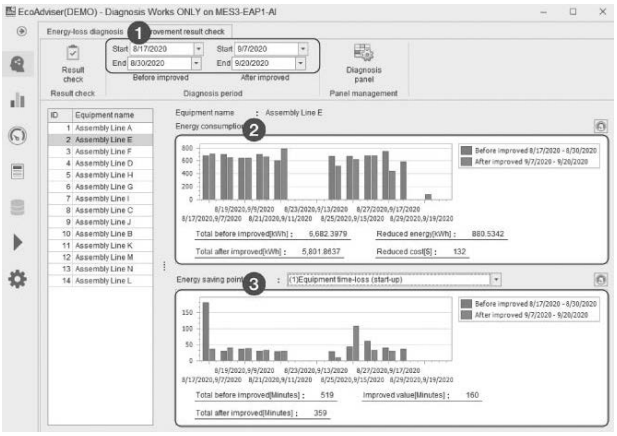
2. Effects of expected improvement
The estimated improvement effect is automatically calculated and displayed in monetary terms.

3. Evaluation of diagnosis results
User evaluations are reflected in the results of subsequent diagnoses. Evaluations are ranked higher if they are useful, and are displayed higher in the list.

4. Presentation of advice
Comments and graphs that could be useful for improvements are presented.

4. Verification: Verification of effectiveness of energy conservation measures **<AI diagnosis edition>**

By simply selecting the period before and after the improvements were made, the amount of electricity usage, electricity consumption charges, and energy loss before and after the measures were implemented can be checked easily.



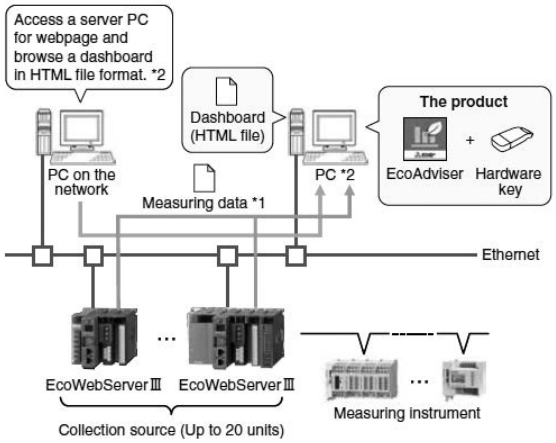
Before/After Energy Conservation Measures Effectiveness Verification Screen

1. Diagnosis period
Effectiveness can be verified by simply selecting the period before and after the improvements were made.

2. Effects of improvements on the amount of electricity usage and the reduction in electricity charges
Comparisons can be made on an electricity usage and monetary basis.

3. Effects of improvement from an energy conservation perspective
The energy loss of selected energy conservation perspectives can be compared.

System configuration



*1: The software collects measuring data from Zoom (1 min.) data file and Demand (daily) data file basis in EcoWebServer.
*2: To browse a dashboard in HTML file on a PC in the network, it is necessary to enable Web server functionality such as IIS on the PC.

We also provide integrated system with ICONICS Suite.
To find out more details of our products and solutions, please contact our sales team in your region.

Order Information

Type	Discription	Code
MES3-EAP1-AI	EcoAdviser - Energy Saving Data Analysis and Diagnosis, CD, USB <AI diagnosis edition>	677997
MES3-EAP1-DA	EcoAdviser - Energy Saving Data Analysis, CD, USB	677998

Energy measuring unit EcoMonitorLight

Product outline

Simple & easier providing energy visualization.

Introducing the EcoMonitorLight, an energy measuring unit with an integrated display that provides easy energy visualization in order to provide ways to save energy and to comply with the Energy Saving Act in response to the need for a simple manner to figure out energy consumption.

EcoMonitorLight unit EMU4-FD1-MB

Specifications

Type		EMU4-FD1-MB	
Phase wire system		3-phase 4-wire, 3-phase 3-wire, 1-phase 3-wire, 1-phase 2-wire	
Rating	Current	AC 5 A, AC 1 A	
	Voltage	3-phase 4-wire: max. AC 277/480 V; 3-phase 3-wire: (DELTA) max. AC 220 V, (STAR) max. AC 440 V 1-phase 3-wire: max. AC 110/220 V; 1-phase 2-wire: (DELTA) max. AC 220 V, (STAR) max. AC 440 V	
	Frequency	50–60 Hz (common)	
Item		**Measurement Item**	**EMU4-FD1-MB**
Measurement elements	Current (A)	A1, A2, A3, AN	±0.5 %
	Current demand (DA)	DA1, DA2, DA3, DAN	
	Voltage (V)	V12, V23, V31, V1N, V2N, V3N	
	Active power (W)	W1, W2, W3, ΣW	±0.5 %
	Reactive power (var)	var1, var2, var3, Σvar	
	Apparent power (VA)	VA1, VA2, VA3, ΣVA	
	Power factor (PF)	PF1, PF2, PF3, ΣPF	±0.5 %
	Frequency (Hz)	Hz	±0.5%
	Active energy (Wh)	Imported, exported	Class 0.5S (IEC62053-22)
	Reactive energy (varh)	Imported lag, imported lead, exported lag, exported lead	Class 2.0 (IEC32053-23)
	Harmonic current (HI)		±2.5 % (1 to 15th)
	Harmonic voltage (HV)		
Communication specification		MODBUS®RTU communication	
External input	Input signal	Non-voltage form A contact, 1 input (choose the function from below)	
	Function	Setting to “pulse input”: Pulse count (0–999,999 counts)	
		Setting to “contact input”:Contact monitoring only Contact monitoring and energy measuring at work (when contact is on)	
External output	Output signal	Non-voltage Form A contact, 1 output (choose the function from below)	
	Function	Upper limit monitoring of current demand, Lower limit monitoring of current demand, Upper/lower limit monitoring of voltage, Upper limit monitoring of power demand, Lower limit monitoring of power demand, Upper/lower limit monitoring of power factor, Upper limit monitoring of pulse count,	
		Pulse output, Output item: Energy use	
Accessible optional plug-in module	EMU4-CM-C	CC-Link communication	
	EMU4-LM	Logging module (SD CARD)	
	EMU4-CM-MT	MODBUS®TCP communication	
Auxiliary power		AC 100–240 V (+10 %,-15 %) 50/60 Hz	
Weight kg		0.3	
Dimension (HxWxD) mm		90x75x75	
Attachment method		IEC rail mounting	
Operating temperature/humidity		-5 to +55 °C (average temperature: 35 °C or less per day), 30 to 85 % RH, non-condensing	
Storage temperature/humidity		-10 to +60 °C	
Optional part (For EMU4-LM)		SD memory card (EMU4-SD2GB) ①	

① Make sure to use the SD memory card manufactured by Mitsubishi Electric Corporation (Model EMU4-SD2GB). Using other types of the SD memory cards may cause trouble such as data destruction of the memory card or system failure.

Order information

Type	Description	Code
EcoMonitorLight unit		
EMU4-FD1-MB	Base unit	304059
Plug-in modules (accessories)		
EMU4-CM-C	CC-Link communication for EcoMonitorLight	292655
EMU4-LM	Data logging module for EcoMonitorLight	284752
EMU4-CM-MT	MODBUS TCP communication module for EcoMonitorLight	304060

Energy monitoring

Multi-measuring instrument Super-S series

Product outline

Mitsubishi Electric multi-measuring instrument SS series features high performance and crystal clear display. Pre written function blocks available for Mitsubishi Electric PLCs and HMIs for Modbus RTU connection of our ME96 meter ranges. Code for mapping to Iconics SCADA also available. Quick pre-engineered solutions for visualization of your Energy Consumption.

Multi-measuring instrument SS series

Specifications

Type		ME96SSHB-MB, ME96SSRB-MB, ME96SSEB-MB,			
Phase wire system		3-phase 4-wire, 3-phase 3-wire (3 CT, 2 CT), 1-phase 3-wire, 1-phase 2-wire (common)			
Rating	Current	AC 5 A, AC 1 A (common)			
	Voltage	3-phase 4-wire: max. AC 277/480 V 3-phase 3-wire: (DELTA) max. AC 220 V, (STAR) max. AC 440 V 1-phase 3-wire: max. AC 220/440 V 1-phase 2-wire: (DELTA) max. AC 220 V, (STAR) max. AC 440 V			
	Frequency	50–60 Hz (common)			
	Item	**Measurement item**	**ME96SSHB-MB**	**ME96SSRB-MB**	**ME96SSEB-MB**
Measurement elements	Current (A)	A1, A2, A3, AN, A_{AVG}			
	Current demand (DA)	DA1, DA2, DA3, DAN, DA_{AVG}	±0.1 %	±0.2 %	±0.5 %
	Voltage (V)	V12, V23, V31, V_{AVG} (L-L), V1N, V2N, V3N, V_{AVG} (L-N)			
	Active power (W)	W1, W2, W3, ΣW			
	Reactive power (var)	var1, var2, var3, Σvar	±0.2 %	±0.5 %	±0.5 %
	Apparent power (VA)	VA1, VA2, VA3, ΣVA			
	Power factor (PF)	PF1, PF2, PF3, ΣPF	±0.2 %	±0.5 %	±0.5 %
	Frequency (Hz)	Hz	±0.1 %	±0.1 %	±0.2 %
	Active energy (Wh)	Imported, exported	Class 0.5S (IEC62053-22)	Class 0.5S (IEC62053-22)	Class 0.5S (IEC62053-22)
	Reactive energy (varh)	Imported lag, imported lead, exported lag, exported lead	Class 1S (IEC62053-24)	Class 1S (IEC62053-24)	Class 1S (IEC62053-24)
	Apparent energy (VAh)	Imported + exported	±2.0 %	±2.0 %	±2.0 %
	Harmonic current (HI)	Only odd number	±1.0 % (1 to 31st)	±1.0 % (1 to 19th)	±2.0 % (THD only)
	Harmonic voltage (HV)	Only odd number	±1.0 % (1 to 31st)	±1.0 % (1 to 19th)	±2.0 % (THD only)
	Rolling demand (DW)	Rolling block, fixing block	±0.2 %	±0.5 %	—
	Rolling demand (Dvar)	Rolling block, fixing block	±1.0 %	±1.0 %	—
	Rolling demand (DVA)	Rolling block, fixing block	±1.0 %	±1.0 %	—
	Periodic active energy (Wh)	Periodic active energy 1, periodic active energy 2, periodic active energy 3	Class 0.5S (IEC62053-22)	Class 0.5S (IEC62053-22)	—
	Operation time (h)	Operation time 1, operation time 2	(Reference)	(Reference)	(Reference)
Communication specification		MODBUS®RTU communication			
Accessible optional plug-in module (only ME96SSHB-MB, ME96SSRB-MB)	ME-4210-SS96B	4-analog output, 2-pulse output, 1-digital input			—
	ME-0040C-SS96	CC-Link communication, 4-digital input			—
	ME-0052-SS96	5-digital input, 2-digital output			—
	ME-0000BU-SS96	Logging module (SD CARD)			—
	ME-0000MT-SS96	MODBUS® TCP communication			—
Incorrect wiring determination support function			○	○	○
Internal logging			○	○	—
Auxiliary power		AC 100–240 V (±15 %), DC 100–240 V (-30 % +15 %)			
Weight	kg		0.5	0.5	0.3
Dimension (HxWxD)	mm		96x96x90	96x96x90	96x96x36
Attachment method		Embedding attachment			
Operating temperature/humidity		-5 to +55 °C (average temperature: 35 °C or less per day), 0 to 85 % RH, non-condensing			
Storage temperature/humidity		-25 to +75 °C (average temperature: 35 °C or less per day), 0 to 85 % RH, non-condensing			
Optional part (For ME-0000BU-SS96)		SD memory card (EMU4-SD2GB) ①			

① Make sure to use the SD memory card manufactured by Mitsubishi Electric Corporation (Model EMU4-SD2GB). Using other types of the SD memory cards may cause trouble such as data destruction of the memory card or system failure.

Order information

Type	Description	Code
ME96SS□B units		
ME96SSHB-MB	Multi-measuring instrument high performance model	506375
ME96SSRB-MB	Multi-measuring instrument standard model	506376
ME96SSEB-MB	Multi-measuring instrument economic model	498862
Plug-in modules (accessories)		
ME-4210-SS96B	4 Analog outputs 2 pulse outputs, 1 digital input	506663
ME-0040C-SS96	CC-Link communication, 4 digital inputs	273874
ME-0052-SS96	5 digital inputs, 2 digital outputs	273895
ME-0000BU-SS96	Data logging module for ME96	297421
ME-0000MT-SS96	Modbus TCP communication module for ME96	297420

Related Product

Our asset energy management offering can be broken down into these key components:

ICONICS Suite
Energy AnalytiX Genesis 64 – for visualising asset energy performance.

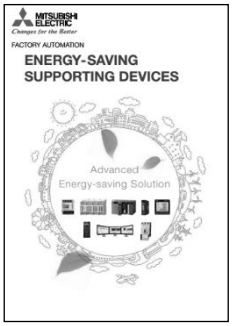
Link: ICONICS Automation Software Suite catalog

We also provide integrated system with EcoAdviser.
To find out more details of our products and solutions, please contact our sales team in your region.

Controllers
Mitsubishi Electric modular and compact PLCs used for energy data collection and aggregation from plant assets.

We also provide A Local, open, scalable solution for energy monitoring, with Energy Meter and PLC
To find out more details of our products and solutions, please contact our sales team in your region.

Energy saving supporting devices catalog



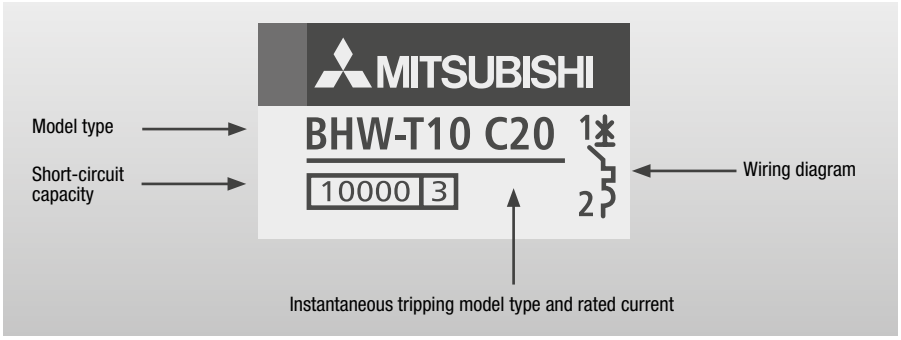
Link: Energy-Saving Supporting Devices Catalog

DIN series

Miniature circuit breakers and residual current circuit breakers

Product line-up

Model type		No. of poles [P]	Rating	Instantaneous tripping	Voltage [V]	Short-circuit capacity [kA]	Compliance standard
MCB	BHW-T10	1, 2, 3, 4	6 to 63 A 0.5 to 63 A	TYPE B TYPE C, D	240/415AC	10	IEC 60898-1
	BH-D6	1, 2, 3, 4 (3+N)	0.5~63A	TYPE B, C, D	230/400AC	6	IEC 60898-1
		1+N	0.5~40A	TYPE B, C	230AC		
	BH-D10	1, 2, 3, 4 (3+N)	0.5~63A	TYPE B, C, D	230/400AC	10	IEC 60898-1
	BH-D10 (For DC)	1	0.5~63A	TYPE B, C	125DC	10	IEC 60898-2
					230/400AC	6	
		2			250DC	10	
					400AC	6	
	BH-DN	1+N	6~20A	TYPE C	230AC	4.5	IEC 60898-1
RCCB	BVW-T	2(1+N), 4(3+N)	16 to 63 A	-	240/415AC	-	IEC 61008-1
	BV-D	2(1+N), 4(3+N)	25, 40, 63A	-	230/400AC	-	IEC 61008-2-2



Explanation of markings (example model type: BHW-T10)

Construction features

- **State of the art design**

  Elegant appearance, cover and handle in arc shape make comfortable operation.
- **Mounting/removal**

  By means of a unique snap mechanism products can be mounted on DIN rail strip or removed even from a row of devices by lifting the clip without dismantling the whole row.
- **Dual position clip**

  Dual position plastic clip helps in easy mounting and renewal of MCBs on DIN channel.
- **Bi-connect terminals**

  Both sides of terminals are bi-connect type, giving ultimate flexibility.
- **High terminal capacity**

  Deep serrated terminals able to accommodate 35 mm² cable.

Miniature circuit breakers (MCB)

- **Trip free mechanism**

  During fault MCB trips even if handle is held in ON position.
- **Low watt loss**

  Power loss values are much lesser than IEC specified values; making it one of the most energy efficient MCB.
- **Energy limiting class: 3**

  High current limiting performance under fault conditions achieved due to ultra fast contact opening and rapid quenching of arc.
- **Circuit identification**

  Legend plates for circuit identifications and hence enhanced safety.

Residual current circuit breakers (RCCB)

- Automatically disconnect the circuit when earth fault/leakage current occurs and exceeds the rated sensitivity and also fulfill the function of isolation.
- High short-circuit current withstand capacity with backup protection fuse.
- Fire resistant plastic parts endures abnormal heating and strong impact.
- Independent of power supply and line voltage, and free from external interference, voltage fluctuation.
- Prevents nuisance tripping due to transient voltage with help of filtering device (Immunized).
- Test button “T” is provided for periodic checkup.

BHW-T10

BH-D6

BH-DN

BVW-T

BV-D

Specifications

Miniature circuit breakers (MCB)

Miniature circuit breakers (MCB)									
Type				BHW-T10					
No. of poles P				1	2	3	4	1	2	3	4
Instantaneous tripping				Type B				Type C, D ①			
Rated insulation voltage U_i [V]				660				660			
Rated current I_n [A] at ambient temperature 30° C				6, 10, 16, 20, 25, 32, 40, 50, 63				0.5, 1, 2, 3, 4, 5, 6, 10, 16, 20, 25, 32, 40, 50, 62			
Rated short-circuit capacity [kA]	IEC/EN 60898-1 (Icn)	AC	240 V	10				10			
			240 V/ 415 V	10				10			
			415 V	—	10			—	10		
Energy limiting class ②											
Number of operating cycles	Without current										
	With current										
Type of overcurrent release				Thermal-magnetic							
Mounting				IEC 35 mm rail							
Applicable wire size				1 to 25 mm²							
Mass [kg]				0.13	0.26	0.39	0.52	0.13	0.26	0.39	0.52
Accessories (optional) ③	Auxiliary switch (AX)			●							
Terminal connection				Solderless							
Based on Standard				IEC/EN 60898-1							
CE marking				●							

① Type C: (5 I_n <, 10 I_n), Type D: (10 I_n <, 20 I_n)
② Except for type D
③ Available soon
In case of installing breakers side by side, reduce the passing current to under 80 % of the rated current.

Residual current breakers (RCCB)

Residual current breakers (RCCB)			
Type		BVW-T	
No. of poles P		2 (1+N) ①	4 (3+N) ①
Rated current I_n [A] at ambient temperature 30° C		25, 40, 63	
Rated voltage [V AC]		240	415
Rated current sensitivity $I_{\triangle n}$ [mA]		30, 300	
Max. operating time at $I_{\triangle n}$ [s]		0.04	
Pulsating current sensitivity		Type AC	
Rated making and breaking capacity I_m [A]		500 (In 25, 40 A), 630 (In 63 A)	
Rated conditional short-circuit current I_{nc} [kA]		5	
Rated residual making and breaking capacity $I_{\triangle m}$ [A]		500 (In 25, 40 A), 630 (In 63 A)	
Rated conditional residual short-circuit current $I_{\triangle c}$ [kA]		6	
Number of operating cycles	Without current	4,000 ②	
	With current	2,000	
Type of overcurrent release		—	
Mounting		IEC 35 mm rail	
Applicable wire size		1 to 25 mm²	
Mass [kg]		0.22	0.44
Terminal connection		Solderless	
Based on standard		IEC/EN 61008-1	
CE marking		●	

① N pole is a switched neutral pole (without overcurrent release device).
② In case of ampere rating 32, 40 and 63 A, the number of operating cycles is 3,000.

Model				BH-D6					
No. of poles [P]				1	2	3	4(3+N)*1	2(1+N)*1	
Instantaneous tripping				Type B, C, D				Type B, C	
Rated insulation voltage U_i [V]				440					
Rated current I_n [A] at ambient temperature 30°C				0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63				0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40	
Rated short-circuit breaking capacity [kA]	EC 60898-1 EN 60898-1 GB/T 10963.1 (I_{cn})	AC	230V	6	-			6	
			230/ 400V	6	-			-	
			400V	-	6			-	
	EC 60898-2 EN 60898-2 GB/T 10963.2 (I_{cn})	DC	125V	-					
			250V	-					
		AC	230/ 400V	-					
			400V	-					

*1: N pole is a switched neutral pole (without overcurrent release device).

Model				BH-D10			
No. of poles [P]				1	2	3	4(3+N)*1
Instantaneous tripping				Type B, C, D			
Rated insulation voltage U_i [V]				440			
Rated current I_n [A] at ambient temperature 30°C				0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63			
Rated short-circuit breaking capacity [kA]	EC 60898-1 EN 60898-1 GB/T 10963.1 (I_{cn})	AC	230V	10	-		
			230/ 400V	10	-		
			400V	-	10		
	EC 60898-2 EN 60898-2 GB/T 10963.2 (I_{cn})	DC	125V	-			
			250V	-			
		AC	230/ 400V	-			
			400V	-			

*1: N pole is a switched neutral pole (without overcurrent release device).

		RCCB	
Model		BV-D	
No. of poles [P]		2(1+N)*1	4(3+N)*1*3
Rated current In [A] at ambient temperature 30°C		25, 40, 63	
Rated operational voltage U_e [VAC]		230	230/400
Rated residual operating current $I_{\Delta n}$ [mA]		30, 300	
Max. operating time at 5 $I_{\Delta n}$ [s]		0.04	
Pulsating current sensitivity		Type AC	
Residual operation		Dependent on line voltage	
Dimensions [mm]	**a**	36	72
	b	85	
	c	44	
	ca	70	
Mass [kg]		0.2	0.35
Rated frequency [Hz]		50/60	
Short-circuit protective device		BH-D6	
Rated making and breaking capacity I_m [A]		500 (I_n 25, 40A), 630 (I_n 63A)	
Rated conditional short-circuit current I_{nc} [kA]		6	
Rated residual making and breaking capacity $I_{\Delta m}$ [A]		500 (I_n 25, 40A), 630 (I_n 63A)	
Rated conditional residual short-circuit current $I_{\Delta o}$ [kA]		6	
Reverse connection		Available	
Number of operating cycles	**Without current**	8,000	
	With current	8,000	
Type of overcurrent release		-	
Mounting		IEC35mm rail	
Applicable wire size		1 to 25mm²	
Terminal connection		Solder less	
Based on standard		IEC 61008-1, IEC 61008-2-2, EN 61008-1, GB/T 16916.1, GB/T 16916.22	
CE marking		Self-declaration	
UKCA marking		Self-declaration	
CCC		Certified	

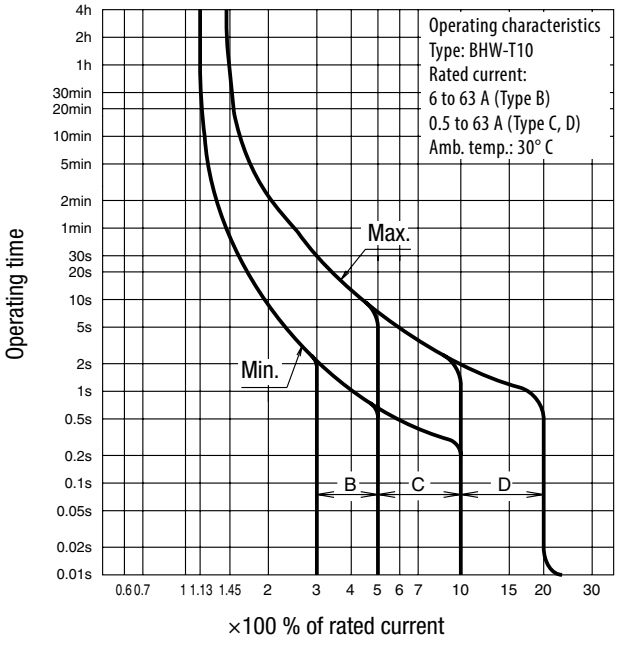
Model				BH-D10 (For DC)	
No. of poles [P]				1	2
Instantaneous tripping				Type B, C	
Rated insulation voltage U_i [V]				250	
Rated current I_n [A] at ambient temperature 30°C				0.5, 1, 1.6, 2, 3, 4, 6, 10, 13, 16, 20, 25, 32, 40, 50, 63	
Rated short-circuit breaking capacity [kA]	EC 60898-1 EN 60898-1 GB/T 10963.1 (I_{cn})	AC	230V	-	-
			230/ 400V	-	-
			400V	-	-
	EC 60898-2 EN 60898-2 GB/T 10963.2 (I_{cn})	DC	125V	10	-
			250V	-	10
		AC	230/ 400V	6	-
			400V	-	6

*1: N pole is a switched neutral pole (without overcurrent release device).

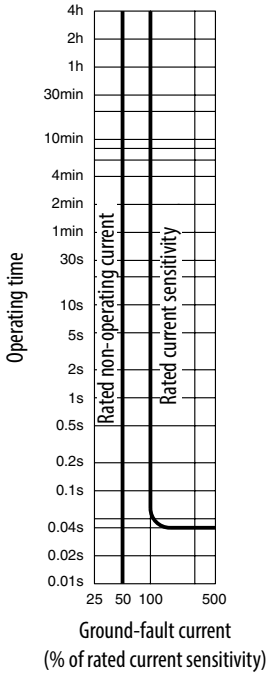
Model				BH-DN
No. of poles [P]				2(1+N)*1
Instantaneous tripping				Type C
Rated insulation voltage U_i [V]				230
Rated current I_n [A] at ambient temperature 30°C				6, 10, 16, 20
Rated short-circuit breaking capacity [kA]	IEC 60898-1 EN 60898-1 GB/T 10963.1 (I_{cn})	AC	230V	4.5

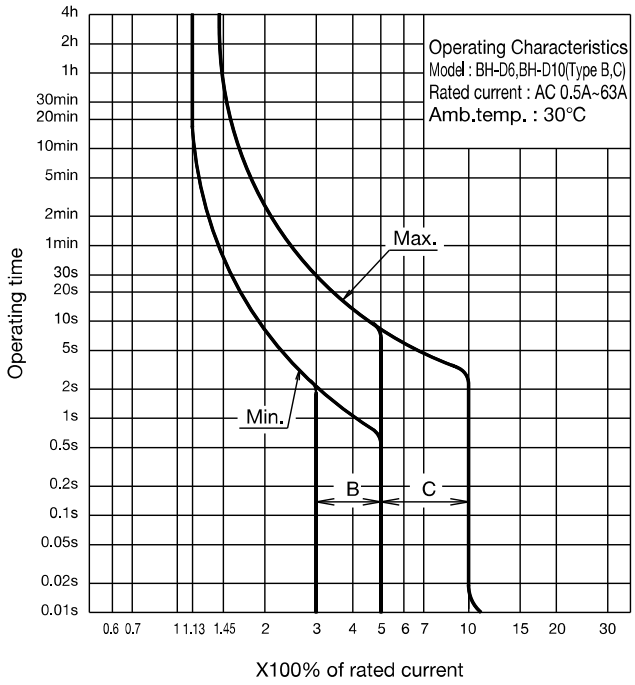
*1: N pole is a switched neutral pole (without overcurrent release device).

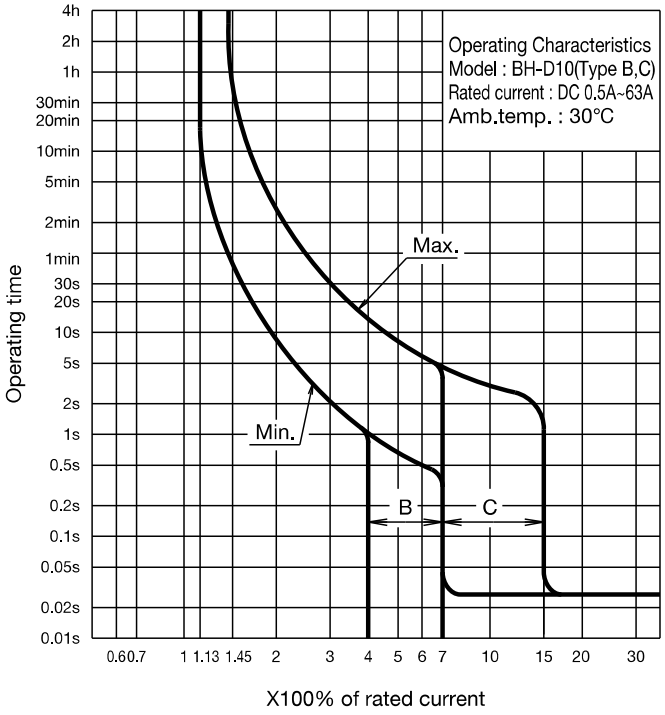
Operating characteristics



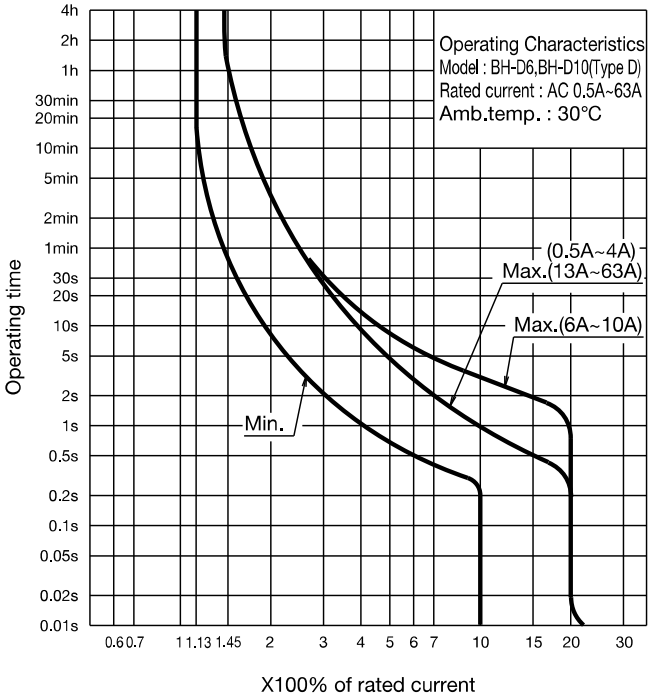
Earth-leakage tripping characteristics

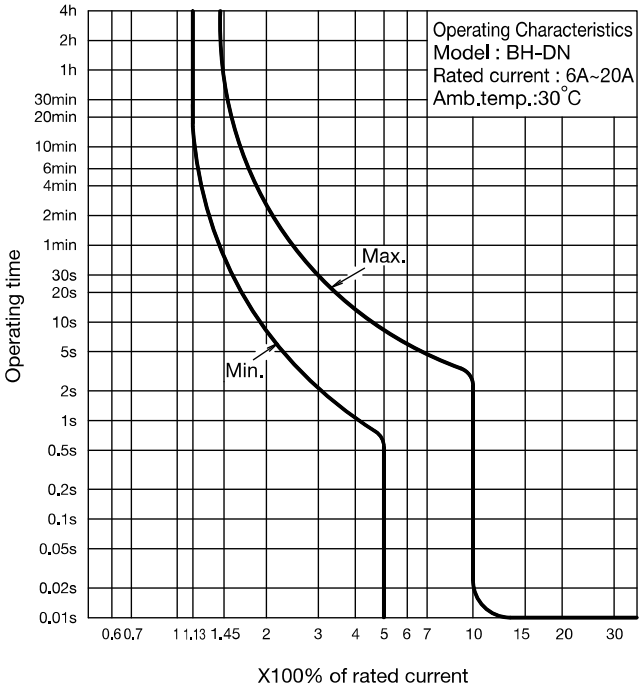






∗When using BH-D10 (for DC) in AC circuit,
characteristic curve of BH-D10 (Type B, C) for AC is applied.





Ordering information

Miniature circuit breakers (MCB)

Reference ①	Codes			
Type B	**1 pole**	**2 poles**	**3 poles**	**4 poles**
BHW-T10 ☐ Type B 6 A	291889	291908	291917	291926
BHW-T10 ☐ Type B 10 A	291890	291909	291918	291927
BHW-T10 ☐ Type B 16 A	291891	291910	291919	291928
BHW-T10 ☐ Type B 20 A	291892	291911	291920	291929
BHW-T10 ☐ Type B 25 A	291893	291912	291921	291930
BHW-T10 ☐ Type B 32 A	291894	291913	291922	291931
BHW-T10 ☐ Type B 40 A	291905	291914	291923	291932
BHW-T10 ☐ Type B 50 A	291906	291915	291924	291933
BHW-T10 ☐ Type B 63 A	291907	291916	291925	291934
Type C	**1 pole**	**2 poles**	**3 poles**	**4 poles**
BHW-T10 ☐ Type C 0.5 A	291953	291968	291983	291998
BHW-T10 ☐ Type C 1 A	291954	291969	291984	291999
BHW-T10 ☐ Type C 2 A	291955	291970	291985	292000
BHW-T10 ☐ Type C 3 A	291956	291971	291986	292001
BHW-T10 ☐ Type C 4 A	291957	291972	291987	292002
BHW-T10 ☐ Type C 5 A	291958	291973	291988	292003
BHW-T10 ☐ Type C 6 A	291959	291974	291989	292004
BHW-T10 ☐ Type C 10 A	291960	291975	291990	292005
BHW-T10 ☐ Type C 16 A	291961	291976	291991	292006
BHW-T10 ☐ Type C 20 A	291962	291977	291992	292007
BHW-T10 ☐ Type C 25 A	291963	291978	291993	292008
BHW-T10 ☐ Type C 32 A	291964	291979	291994	292009
BHW-T10 ☐ Type C 40 A	291965	291980	291995	292010
BHW-T10 ☐ Type C 50 A	291966	291981	291996	292011
BHW-T10 ☐ Type C 63 A	291967	291982	291997	292012
Type D	**1 pole**	**2 poles**	**3 poles**	**4 poles**
BHW-T10 ☐ Type D 0.5 A	292043	292058	292073	292088
BHW-T10 ☐ Type D 1 A	292044	292059	292074	292089
BHW-T10 ☐ Type D 2 A	292045	292060	292075	292090
BHW-T10 ☐ Type D 3 A	292046	292061	292076	292091
BHW-T10 ☐ Type D 4 A	292047	292062	292077	292092
BHW-T10 ☐ Type D 5 A	292048	292063	292078	2920993
BHW-T10 ☐ Type D 6 A	292049	292064	292079	292094
BHW-T10 ☐ Type D 10 A	292050	292065	292080	292095
BHW-T10 ☐ Type D 16 A	292051	292066	292081	292096
BHW-T10 ☐ Type D 20 A	292052	292067	292082	292097
BHW-T10 ☐ Type D 25 A	292053	292068	292083	292098
BHW-T10 ☐ Type D 32 A	292054	292069	292084	292099
BHW-T10 ☐ Type D 40 A	292055	292070	292085	292100
BHW-T10 ☐ Type D 50 A	292056	292071	292086	292101
BHW-T10 ☐ Type D 63 A	292057	292072	292087	292102

① ☐ The white square must indicate the number of poles → 1P or 2P or 3P or 4P

Type C	1 pole	2 poles	3 poles	4 poles
BH-D10 ☐ 0.5A Type C N	247850	247866	247882	247898
BH-D10 ☐ 1A Type C N	247851	247867	247883	247899
BH-D10 ☐ 1.6A Type C N	247852	247868	247884	247900
BH-D10 ☐ 2A Type C N	247853	247869	247885	247901
BH-D10 ☐ 3A Type C N	247854	247870	247886	247902
BH-D10 ☐ 4A Type C N	247855	247871	247887	247903
BH-D10 ☐ 6A Type C N	247856	247872	247888	247904
BH-D10 ☐ 10A Type C N	247857	247873	247889	247905
BH-D10 ☐ 13A Type C N	247858	247874	247890	247906
BH-D10 ☐ 16A Type C N	247859	247875	247891	247907
BH-D10 ☐ 20A Type C N	247860	247876	247892	247908
BH-D10 ☐ 25A Type C N	247861	247877	247893	247909
BH-D10 ☐ 32A Type C N	247862	247878	247894	247910
BH-D10 ☐ 40A Type C N	247863	247879	247895	247911
BH-D10 ☐ 50A Type C N	247864	247880	247896	247912
BH-D10 ☐ 63A Type C N	247865	247881	247897	247913

BH-DN ☐ 20A TYPE C N	247291
BH-DN ☐ 6A TYPE C N	247960
BH-DN ☐ 10A TYPE C N	247961
BH-DN 1P 16A TYPE C N	247962

Residual current breakers (RCCB)

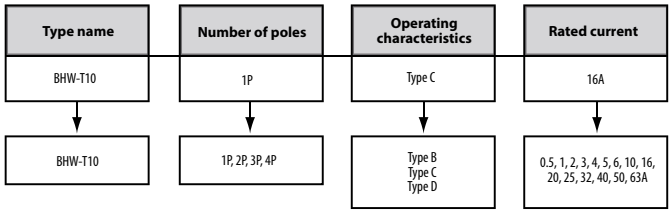
Reference ①	Codes	
30 mA	**2 poles**	**4 poles**
BVW-T ☐ 25A 30 mA	293548	293603
BVW-T ☐ 40A 30 mA	293550	293605
BVW-T ☐ 63A 30 mA	293551	293606
300 mA	**2 poles**	**4 poles**
BVW-T ☐ 25A 300 mA	293598	293613
BVW-T ☐ 40A 300 mA	293600	293615
BVW-T ☐ 63A 300 mA	293601	293616

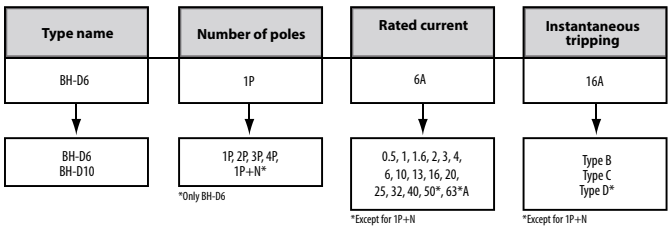
30 mA	2 poles	4 poles
BV-D ☐ 25A 30MA N	247624	247618
BV-D ☐ 40A 30MA N	247622	247616
300 mA	**2 poles**	**4 poles**
BV-D ☐ 25A 300MA N		247619
BV-D ☐ 40A 300MA N	247623	247617
BV-D ☐ 63A 300MA N		247615

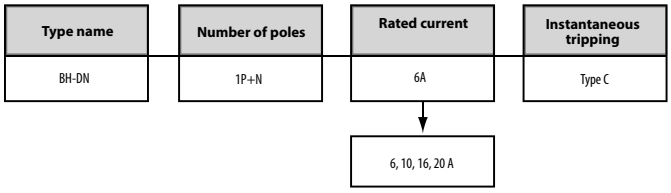
① ☐ The white square must indicate the number of poles →2P or 4P

Reference identification

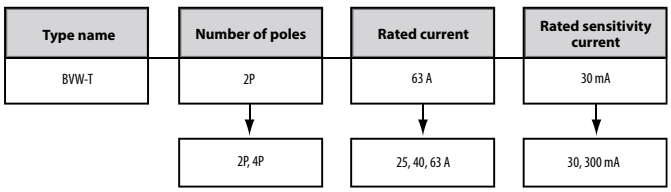
Miniature circuit breakers (MCB)

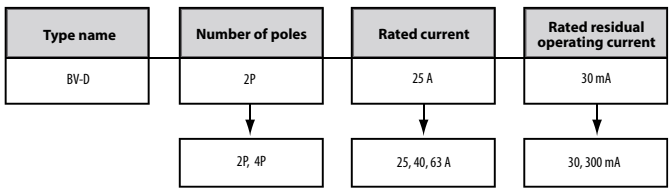






Residual Current Breakers (RCCB)





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