MAIN CATALOG 2023

Motor control and protection
for rolling stock applications

- Speed-up your projects
- Safety and protection
- Continuous operation

Motor control and protection
for rolling stock applications

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Motor control and protection
Advanced but simple

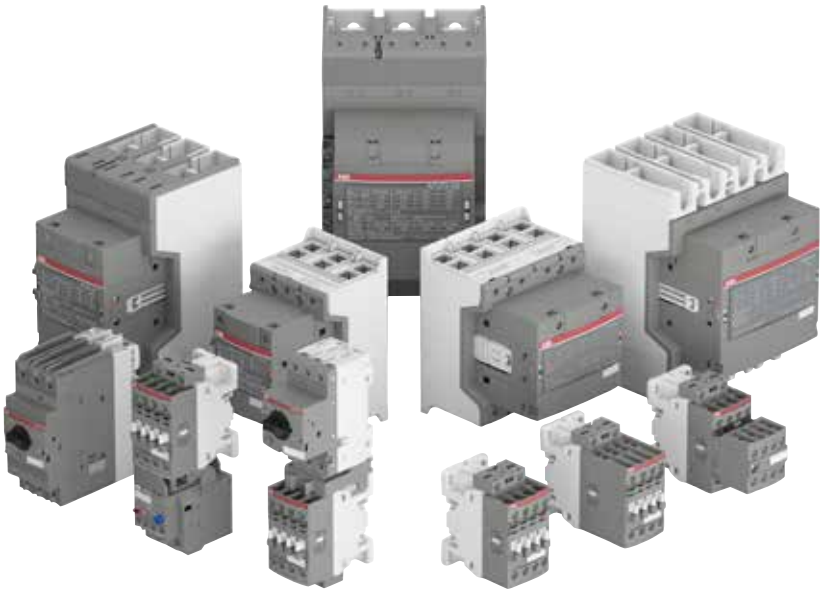


ABB supports the high levels of expectations for safe means of transport. Being a market leader in supplying products and services to rolling stock manufacturers, we are present in more than 100 countries and we can provide strong local support to your projects. With a truly global organization, we are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

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

Safety and protection
Protect persons and equipments
ABB offers a broad range of protection and control devices, meeting the latest rolling stock requirements specifically, designed for switching, protecting against electrical shocks, short-circuits, overloads, phase failures and for monitoring various application parameters.
The different connection technologies available, screw and Push-in Spring terminals for standard ferrules, or screw terminals for ring tongue ferrules, will ensure a secured cable connection.

Continuous operation
Secure uptime
Handle the large voltage fluctuation to battery use thanks to control devices. Reduce maintenance costs and downtimes, and make troubleshooting easier with a real motor protection and control.
Reduce train energy consumption
with lighter devices increasing passenger capacity and 68% less coil energy consumption improving power management.

Sustainable mobility for a better world

The requirements for rolling stock are increasing and will continue to do so. The task is to implement ever faster connections, while also increasing traveler comfort. During their everyday work, the trains are exposed to very high environmental, electrical and mechanical loads. This means a constant stream of new, increased and standardized safety standards for rolling stock.

In order to function reliably and safely, trains require special equipment. For example, trains that are primarily used in tunnels, high-speed trains as well as night trains with sleeping cars require vibration-proof devices. In addition, passenger safety must be ensured, so that, in an emergency, no additional risk is posed by defective electrical devices.

This is a key concern, particularly when escape routes are limited or restricted, for example in tunnel systems. Due to these different requirements, rolling stock applications require different standards than equipment used in building infrastructure such as stations.

IRIS Certification

ABB manages and always focuses on optimizing all processes as required by IRIS certification. (International Railway Industry Standard certification created by the European Union of railways industry). Dedicated ABB manufacturing companies are IRIS certified.

Keep moving with ABB's contactors and motor protection devices for rolling stock applications.

Millions of people across the world travel by rail each year. ABB's control and protection portfolio adheres to all relevant international standards, insuring the reliable operation of trains and the safe arrival of passengers.

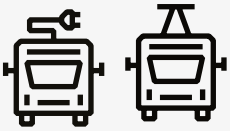
Our products can be installed in any environment including passenger or driver cabins, for main or urban line trains, underground trains or trams circulating frequently in tunnels or underground passages.

Manual motor starters, contactors, contactor relays, overload relays and electronic relays are used in a wide variety of rolling stock applications.

Applications

Train

Flaps | Heating | Gear control | Vehicle | Exterior / interior door and step | ventilation, air conditioning | Underfloor containers | Control converters | Hygiene cubicles | Propulsion | Lighting | Brake | Heating



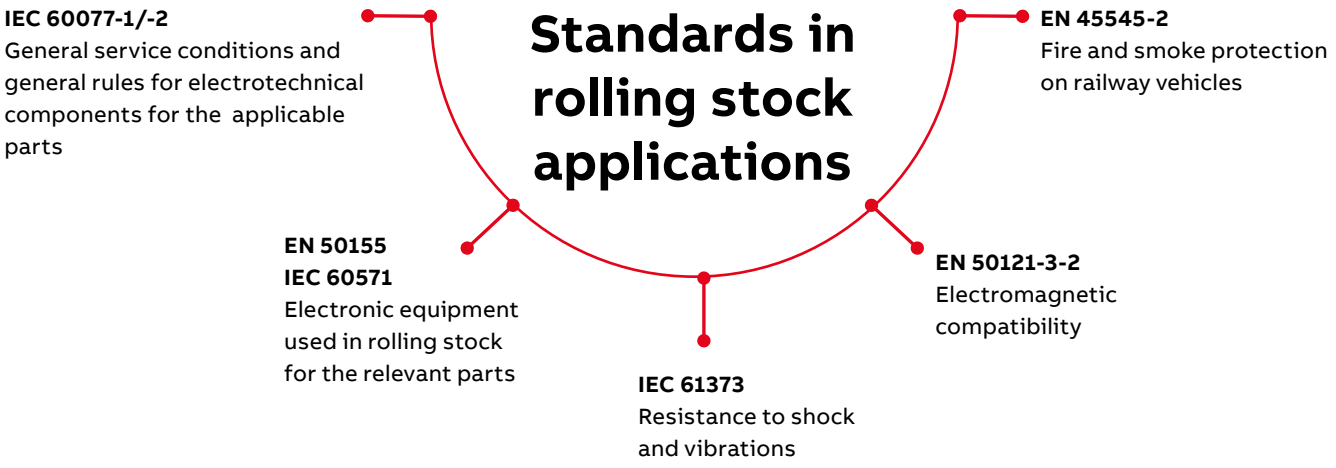
eBus / trolleys

Heating | Ventilation | Air conditioning | Lighting | Control and protection converters

Rail standards keep you on track
Standard overview

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

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



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

Freedom of movement
Even under the most extreme conditions

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

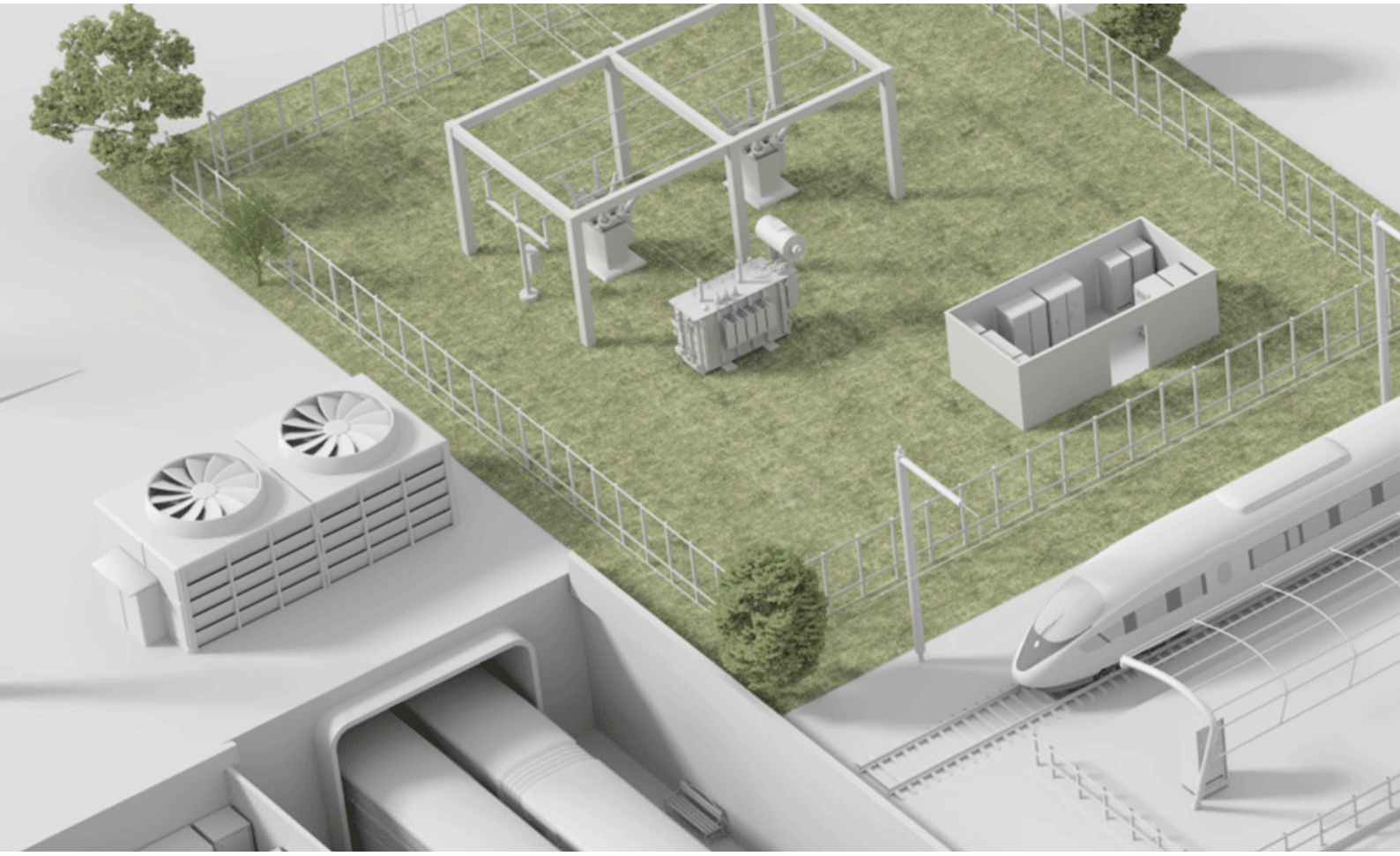
Climatic conditions
A key factor is the changing climatic conditions. All devices used in rolling stock must prove that they can continue to perform when there are major temperature variations or a rapid temperature increase. Humidity limit values set high standards, so that no failures occur, particularly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

Electrical conditions
Voltage variations are common in rail travel. They range from roughly -30 % to +25 % of the rated voltage and can be the cause of major damage. All the electrical components used in the train must provide prior proof that they can work safely within this range.
However, interference emissions from cables or radiation can also impair the function of the electronic devices. Before the devices can be used in rail applications, they must, among other things, prove their electromagnetic compatibility according to the testing and measuring principles, to show that they do not cause any high frequency fault above a specified value.

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

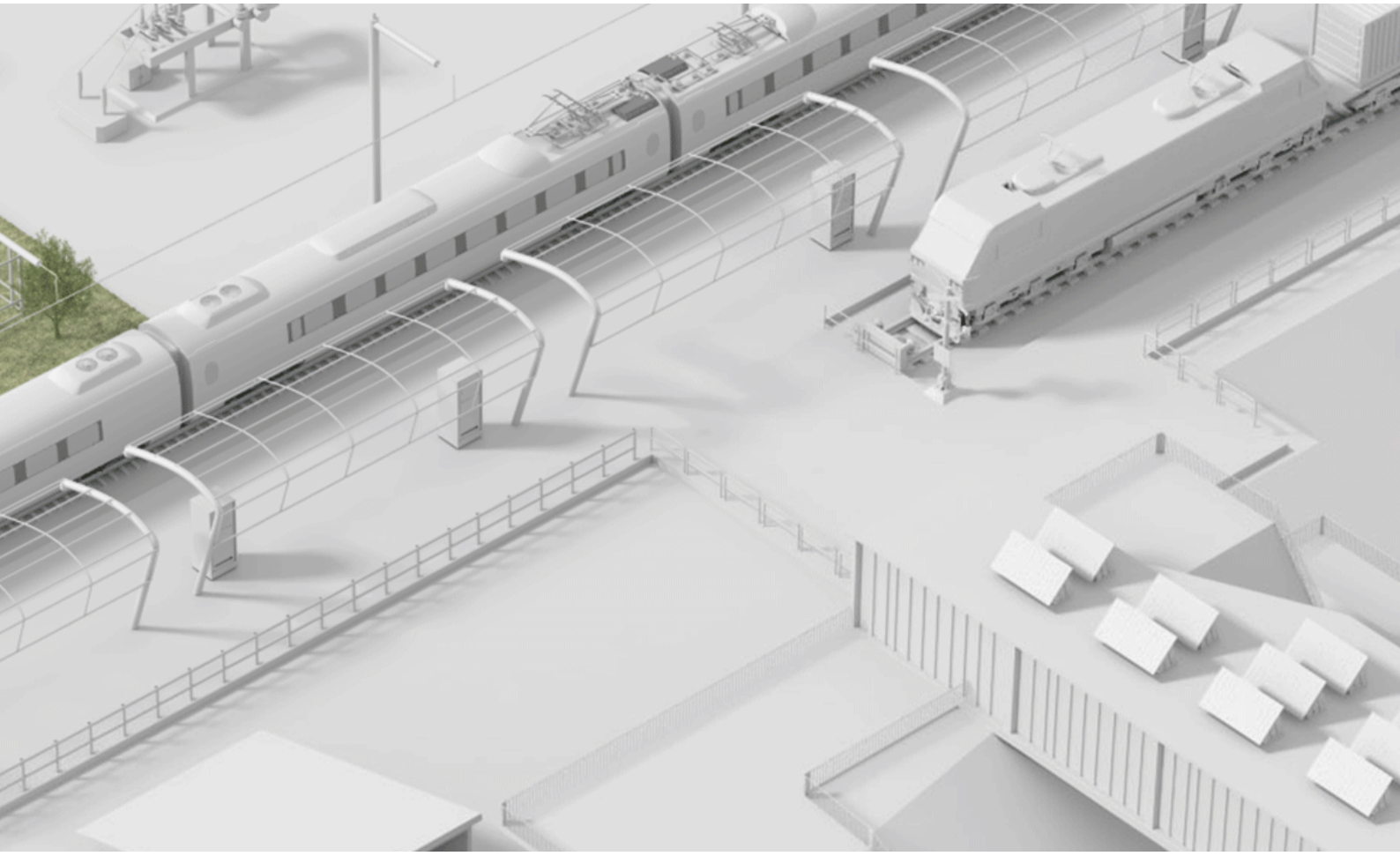
Easy Connect technology Push-in Spring terminals
Several types of terminals are available to connect cables with standard ferrules or ring tongue ferrules in regards with material design requirements.
In case of standard ferrule use, Push-in Spring terminals 2-in-1 connection allows to use ferruled and rigid cables (Push-in mode) or cables without ferrule (Spring mode) in the same terminal. In Push-in mode, cables can be inserted by just simply pushing them in by hand.
For de-wiring, only one screwdriver size is needed for the entire range. No twisting or turning is required avoiding damages to the terminals and to your installation as a whole. Push-in Spring terminals are completely secure, making your equipment the perfect solution for environments with high levels of vibrations.

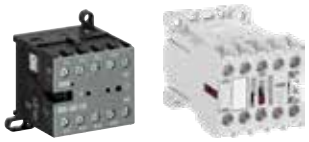
Sustainable mobility for a better world



Manual motor starters
Compact and powerful range for motor protection up to 45 kW (400 V) / 80 A complying with the latest railway rolling stock standards and allowing installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds.
They are mainly used to switch motors ON/OFF manually and to provide fuseless protection against short-circuits, overloads and phase failures.

Contactors and contactor relays
3 and 4-pole contactors up to 200 kW/400 V AC-3, 300 hp / 480 V, and up to 600 V AC-1, 4 and 8-pole contactor relays can be installed in any environment including passenger or driver cabins, for main or urban line trains, underground trains or trams circulating frequently in tunnels or underground passages. They are used in rolling stock applications such as lighting, heating, breaking, air conditioning, ventilator and door control. They are available with non-detachable screws for standard or ring tongue ferrules and meet all rolling stock standards.





Mini contactors and mini contactor relays
Developed to guarantee high performances and reliability without compromises, even where the space is limited, B and M mini contactors offer high flexibility in all applications thanks to their small dimensions, techinical features and wide set of variants available.
They are equipped with non-detachable screws for standard or ring tongue ferrules and meet main rolling stock standards.

Electronic relays and control
Installed in trains, they are constantly exposed to a harsh operating environment:
continuous vibrations, high electrical and mechanical load and changing environmental temperatures. These conditions therefore require superior quality.
ABB's electronic relays meet the requirements for rolling stock standards and are reliable even under constant strain.

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

Features and benefits

Meet all main rolling stock standards and directives

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

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

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

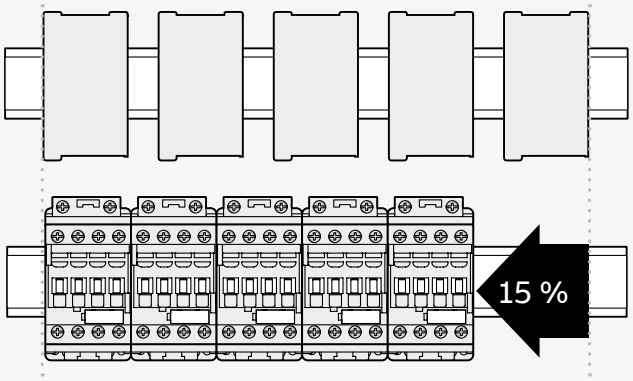
Optimize the number of needed codes by 60%

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

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

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

Conventional DC operated contactors



AF..(Z)B contactors

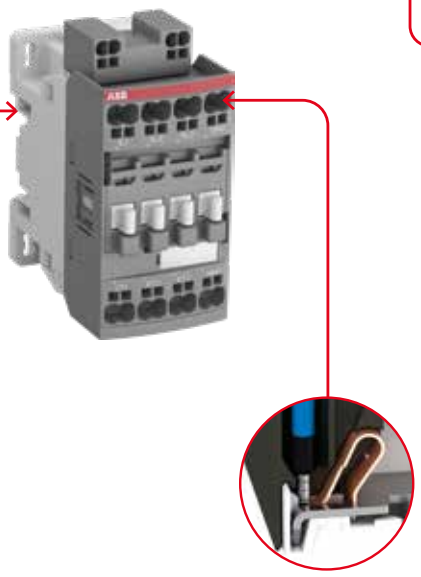
Reduce the size of the installations and minimize the train energy needs

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

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

Push-in Spring terminals for connection with standard ferrules

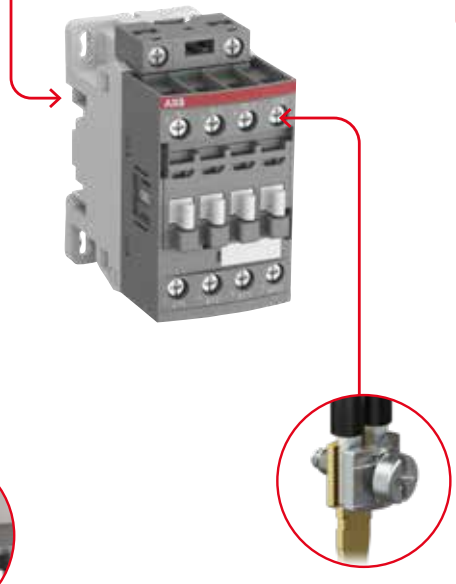
With the new Push-in Spring terminals, one push is all you need for a faster than ever installation, an easier than ever wiring and a reliable as ever connection.



From 9 to 38 A

Screw terminals for connection with standard ferrules

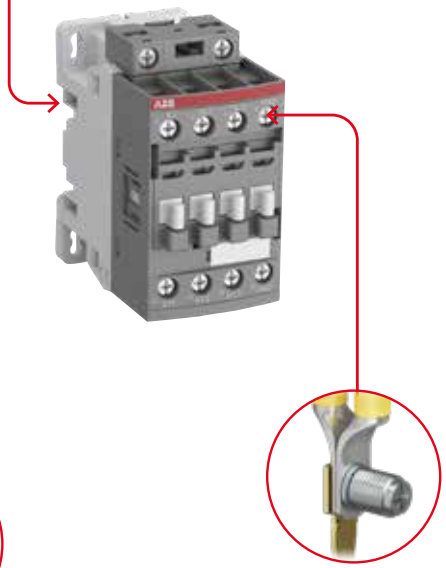
For a safe insertion and wiring of cables.



From 9 to 370 A

Screw terminals for connection with ring tongue ferrules

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



From 9 to 370 A

Extend your control circuit possibilities with AF09(Z)B ... AF96B

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

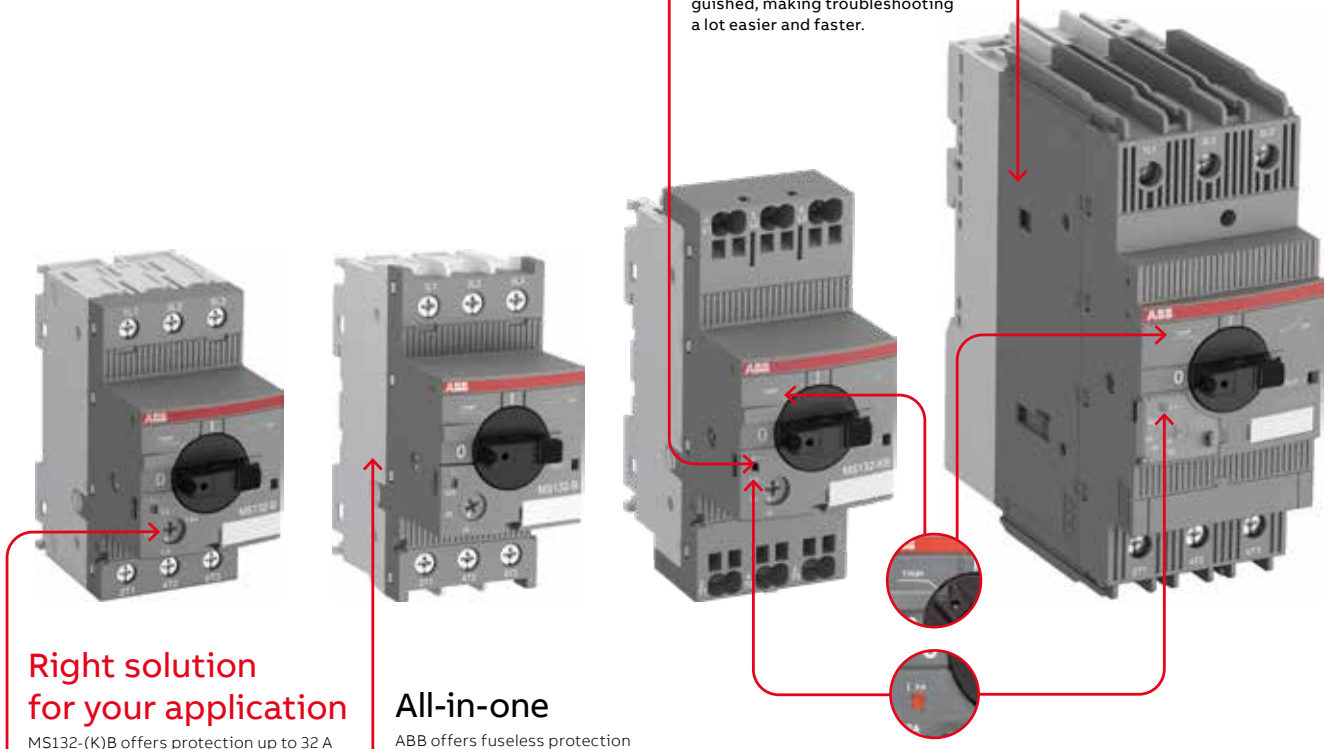
More functionalities with the same compact width for AF116B ... AF370B contactors

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

MS and MO manual motor starters
A complete motor protection concept

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

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



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

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

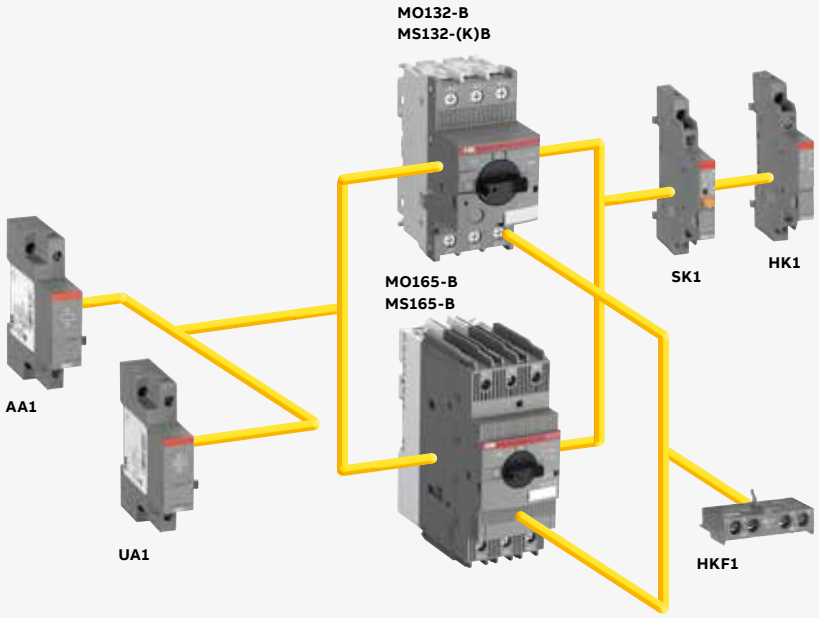
Protection wherever you are
Take into account the highest applicable level of fire and smoke behaviour
European standard: EN 45545-2 (HL2, HL3).

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

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

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

The right accessories for your applications

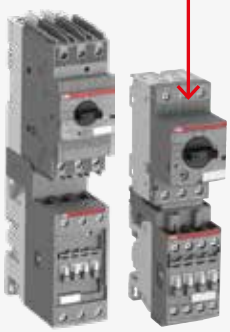


Harmonized range of accessories
All types up to 80 A share the same main accessories like auxiliary contacts, signaling contacts, shunt trips and undervoltage releases. This significantly reduces the part list and makes selection of the right accessories easy.

Save wiring time
and avoid mistakes by using a connecting link

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

With a lockable handle
maintenance will be safe for every technician



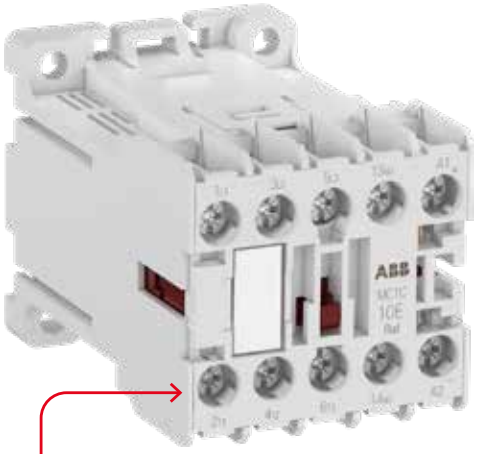
Easy to connect
Save wiring time and avoid mistakes by using a connecting link between ABB manual motor starters and soft starters or contactors. This creates harmonious and compact starter combinations that are easy to mount.

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

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

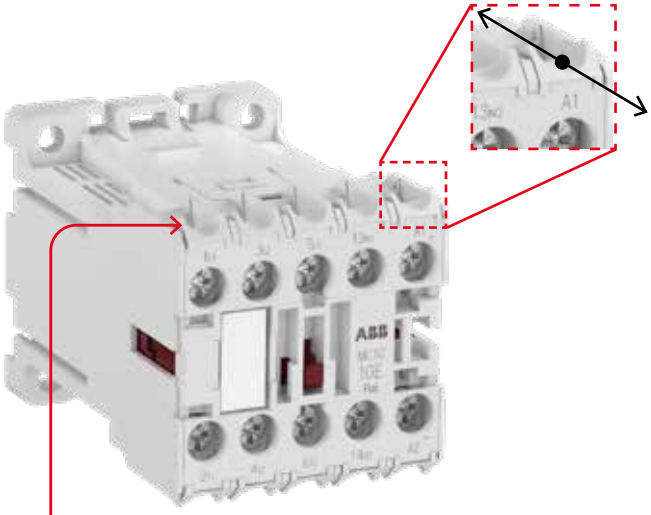
M mini contactors
A performance-dimension optimized solution

DC



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

Lugs easy connection



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

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

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

B, K mini contactors
The most compact in the market

DC

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

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

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

Electronic relays and control

Even under the most extreme conditions

Conductor car

Insulation monitoring relays

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

Time relays

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

Passenger car

Time relays

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

Single-phase monitoring relays

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

Restaurant car

Three-phase monitoring relays

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

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

Benefits for train constructors through push-in terminal technology
Regular train maintenance is essential to ensure passenger safety. Usually, maintenance work is performed on trains after every 100,000 km (~ 62,000 miles). For example, within these maintenance cycles, the train's electrical components are dismantled and subjected to testing. The cabling within the train remains intact and is used again after the testing, in order to remount and install the appropriate components.

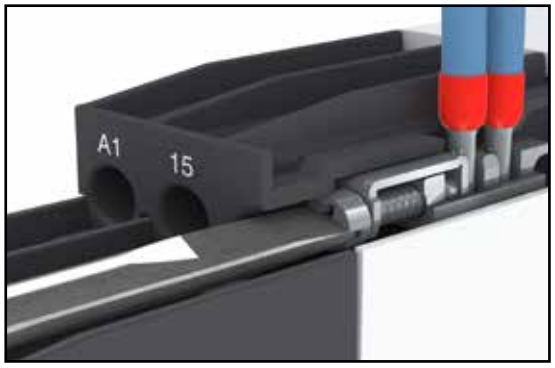
As this is very complex for many of the devices within the train, there are various methods of reducing the work involved:

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

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

—
Easy Connect Technology push-in terminals

—
Tool-free mounting of wires



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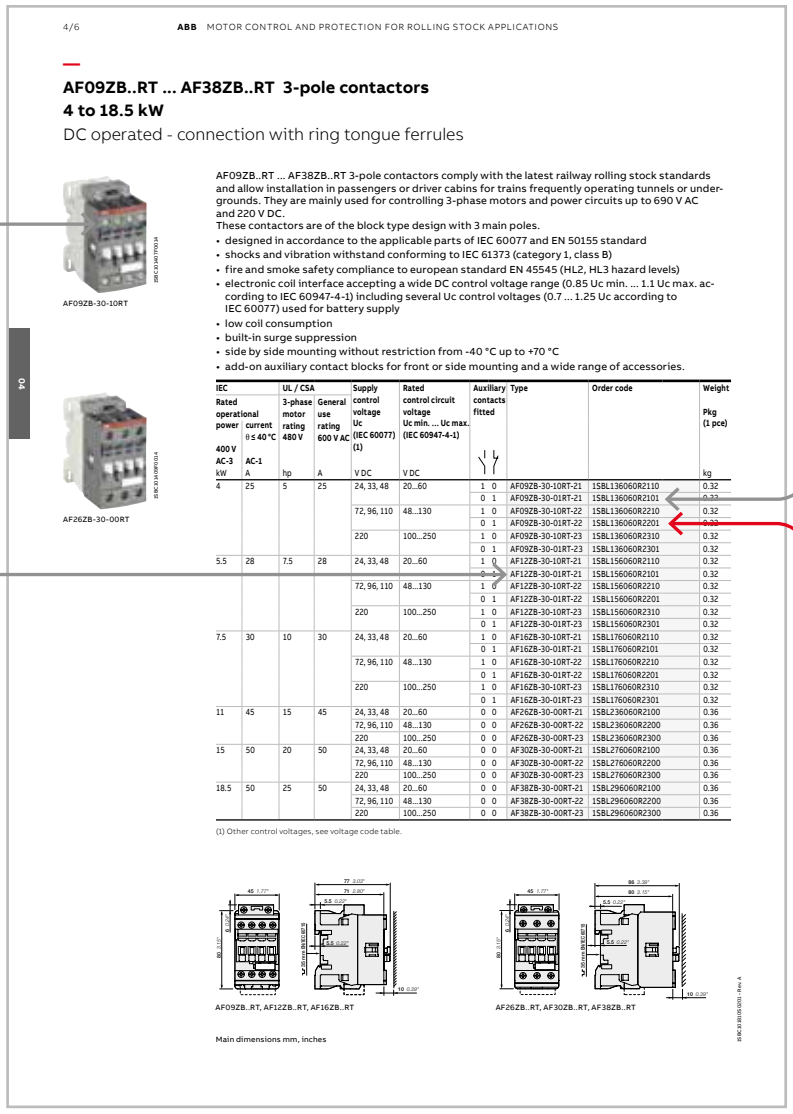
Wiring of double-cage chamber connection terminals with screw driver

How to use this catalog



4/6 **ABB** MOTOR CONTROL AND PROTECTION FOR ROLLING STOCK APPLICATIONS

AF09ZB..RT ... AF38ZB..RT 3-pole contactors
4 to 18.5 kW
DC operated - connection with ring tongue ferrules

AF09ZB-30-10RT

AF26ZB-30-00RT

AF09ZB..RT ... AF38ZB..RT 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or underground. They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.
These contactors are of the block type design with 3 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC Rated operational power 400 V AC-3 kW	UL / CSA 3-phase motor rating 480 V hp	General use rating 600 V AC AC-1 A	Supply control voltage Uc (IEC 60077) (1) V DC	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1) V DC	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
4	5	25	24, 33, 48	20...60	1 0	AF09ZB-30-10RT-21	1SBL136060R2110	0.32
					0 1	AF09ZB-30-01RT-21	1SBL136060R2101	0.32
			72, 96, 110	48...130	1 0	AF09ZB-30-10RT-22	1SBL136060R2210	0.32
					0 1	AF09ZB-30-01RT-22	1SBL136060R2201	0.32
			220	100...250	1 0	AF09ZB-30-10RT-23	1SBL136060R2310	0.32
					0 1	AF09ZB-30-01RT-23	1SBL136060R2301	0.32
5.5	7.5	28	24, 33, 48	20...60	1 0	AF12ZB-30-10RT-21	1SBL156060R2110	0.32
					0 1	AF12ZB-30-01RT-21	1SBL156060R2101	0.32
			72, 96, 110	48...130	1 0	AF12ZB-30-10RT-22	1SBL156060R2210	0.32
					0 1	AF12ZB-30-01RT-22	1SBL156060R2201	0.32
			220	100...250	1 0	AF12ZB-30-10RT-23	1SBL156060R2310	0.32
					0 1	AF12ZB-30-01RT-23	1SBL156060R2301	0.32
7.5	10	30	24, 33, 48	20...60	1 0	AF16ZB-30-10RT-21	1SBL176060R2110	0.32
					0 1	AF16ZB-30-01RT-21	1SBL176060R2101	0.32
			72, 96, 110	48...130	1 0	AF16ZB-30-10RT-22	1SBL176060R2210	0.32
					0 1	AF16ZB-30-01RT-22	1SBL176060R2201	0.32
			220	100...250	1 0	AF16ZB-30-10RT-23	1SBL176060R2310	0.32
					0 1	AF16ZB-30-01RT-23	1SBL176060R2301	0.32
11	15	45	24, 33, 48	20...60	0 0	AF26ZB-30-00RT-21	1SBL236060R2100	0.36
			72, 96, 110	48...130	0 0	AF26ZB-30-00RT-22	1SBL236060R2200	0.36
			220	100...250	0 0	AF26ZB-30-00RT-23	1SBL236060R2300	0.36
15	20	50	24, 33, 48	20...60	0 0	AF30ZB-30-00RT-21	1SBL276060R2100	0.36
			72, 96, 110	48...130	0 0	AF30ZB-30-00RT-22	1SBL276060R2200	0.36
			220	100...250	0 0	AF30ZB-30-00RT-23	1SBL276060R2300	0.36
18.5	25	50	24, 33, 48	20...60	0 0	AF38ZB-30-00RT-21	1SBL296060R2100	0.36
			72, 96, 110	48...130	0 0	AF38ZB-30-00RT-22	1SBL296060R2200	0.36
			220	100...250	0 0	AF38ZB-30-00RT-23	1SBL296060R2300	0.36

(1) Other control voltages, see voltage code table.

AF09ZB..RT, AF12ZB..RT, AF16ZB..RT

AF26ZB..RT, AF30ZB..RT, AF38ZB..RT

Main dimensions mm, inches

Product image
Click on the product to zoom in.

Product type
Click on the product type to get 2D and/or 3D drawings.

Product order code
click on the product order code to obtain the data sheet, the agreement and all technical information regarding that reference.

Product order code
For direct product details information, use product type or order code, ex: **www.abb.com/product-details/AF09ZB-30-01RT-22** or **www.abb.com/product-details/1SBL136060R2201**

Web catalog

Print catalog

Find more information on our marketing material page.

Chart and data of motor rated operational powers and currents are available in the customer made motor starting solutions chapter.

The products in this catalog can also be found together with product news life cycle status, data sheets, certificates and tools at:

https://new.abb.com/low-voltage/products/motor-protection

Ordering details

Orders can be placed either using the type code or the order code. The type codes or order codes generally relate to single devices like a contactor, overload relays or an accessory but they can sometimes relate to an indivisible set (ex: connecting kits) or a bag (ex 50 function markers). See the description of the device.

Packaging unit

Products are generally packed as single units but very small products or accessories are often proposed in collective packs. Please refer to the “Package quantity” in the ordering detail charts.

Standards and approvals for the products

Products in this catalog are designed tested and have third party approvals and markings in compliance with major international or local standards such as IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-2, IEC/EN 60947-5-1 or UL 60947-4-1, IEC/EN 61812-1.
See "Standards" section.
For applicable parts and description of railway rolling stock standards, see the “Standards” section and the technical data pages of respective products.

Standards and approvals for design and manufacturing

ABB has set up a quality assurance organization in compliance with the requirements of ISO 9001 standard and ABB factories are ISO 9001 approved.

Guarantee

The information contained in this catalog reflects the current state of our knowledge and aims to present our products and their possible applications as defined within the standards. The product data, ratings and utilization conditions are indicated in their respective sections, thus the information does not guarantee special utilizations or combination of characteristics that have not been defined or tested according to normalized values or test conditions defined with the standards.

Liability

The devices in this catalog do not endanger safety when they are selected, mounted, commissioned, used, maintained and deposed with the rules and standards that apply to them.

Main online tools

2D and 3D CAD models, ABB CAD Download center

Download 2D or 3D files according to your needs (STEP, IGES...)

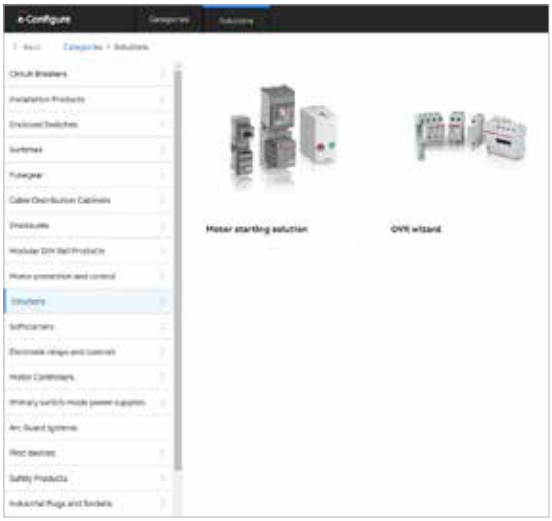
Selected Optimized Coordination tables - SOC

Selected Optimized Coordination tables SOC

Data sheets, installation instructions, certificates

For direct product details information, use product type or order code, ex:
www.abb.com/productdetails/AF09ZB-30-10-21 or
www.abb.com/productdetails/1SBL136061R2110

Configurators e-Configure



https://econfigure.xe.abb.com/global/#/categories/cfg-solution-Configurators

Main online tools

2D and 3D CAD models, ABB CAD Download center

Download 2D or 3D files according to your needs (STEP, IGES...)

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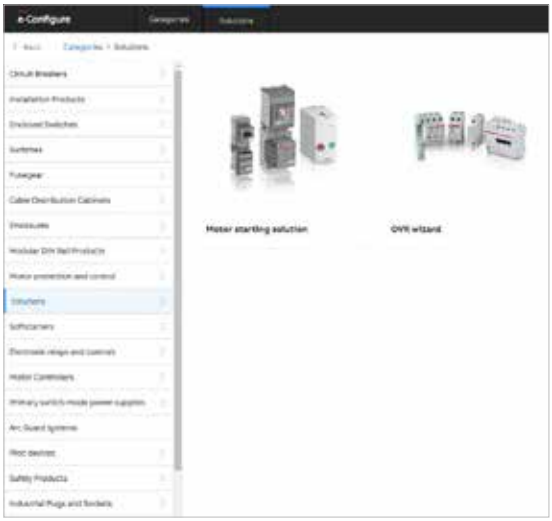
Configurators e-Configure



https://econfigure.xe.abb.com/global/#/categories/cfg-solution-Configurators

Manual motor starters

Manual motor starters

2/2 **Overview**

Ordering details – 0.10 to 80 A – with thermal and electromagnetic protection

2/4 MS132-B manual motor starters
2/5 MS132-KB manual motor starters with Push-in Spring terminals
2/6 MS165-B manual motor starters

Ordering details – 0.16 to 80 A – with electromagnetic protection

2/7 MO132-B manual motor starters magnetic only
2/8 MO165-B manual motor starters magnetic only

2/9 **Technical data**

2/18 **Main accessories**

For more information please find our electronic data sheets online, for example:

www.abb.com/productdetails/**MS132-0.16B**
www.abb.com/productdetails/**1SAM350200R1001**

Manual motor starters

Overview

Type	MS132-B	MS132-KB	MS165-B
Thermal and electromagnetic protection	Yes		Yes
Electromagnetic protection	-		-
Phase loss sensitivity	Yes		Yes
Switch position	ON/OFF/TRIP		ON/OFF/TRIP
Magnetic trip indication	Yes		Yes
Lockable handle without accessories	Yes		Yes
Disconnecting feature	Yes		Yes
Width	45 mm		55 mm
Rated operational current I_e	0.16 ... 32 A		16 ... 80 A
Setting range	0.1 ... 32 A		10 ... 80 A
Ambient air temperature	-25 ... +60 °C (1)		-20 ... +60 °C (1)

(1) Compensated

Accessories

Auxiliary contact		HKF1, HK1
Signalling contact	for tripped alarm	SK1
	for short-circuit alarm	CK1
Shunt trip		AA1
Undervoltage release		UA1

Short-circuit ratings for 400 V AC

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

	MO132-B	MO165-B
	-	-
	Yes	Yes
	-	-
	ON/OFF/TRIP	ON/OFF/TRIP
	-	-
	Yes	Yes
	Yes	Yes
	45 mm	55 mm
	0.16 ... 32 A	16 ... 80 A
	-	-
	-25 ... +60 °C	-25 ... +60 °C

	HKF1, HK1
	SK1
	-
	AA1
	UA1

	Performance range MO132-B, MO165-B

	Type	**Short-circuit breaking capacity**	
		I_{cu}	I_{cs}
	MO132-0.16B	100 kA	100 kA
	MO132-0.25B	100 kA	100 kA
	MO132-0.4B	100 kA	100 kA
	MO132-0.63B	100 kA	100 kA
	MO132-1.0B	100 kA	100 kA
	MO132-1.6B	100 kA	100 kA
	MO132-2.5B	100 kA	100 kA
	MO132-4.0B	100 kA	100 kA
	MO132-6.3B	100 kA	100 kA
	MO132-10B	100 kA	100 kA
	MO132-12B	100 kA	100 kA
	MO132-16B / MO165-16B	100 kA	100 kA
	MO165-20B	100 kA	100 kA
	MO132-20B	100 kA	100 kA
	MO132-25B / MO165-25B	50 kA / 100 kA	50 kA / 100 kA
	MO132-32B	50 kA	25 kA
	MO165-32B	100 kA	100 kA
	MO165-42B	50 kA	50 kA
	MO165-54B	50 kA	30 kA
	MO165-65B	50 kA	30 kA
	MO165-73B	30 kA	30 kA
	MO165-80B	30 kA	30 kA

02

MS132-B manual motor starters

0.10 to 32 A – with thermal and electromagnetic protection

MS132-10B

MS132-32B

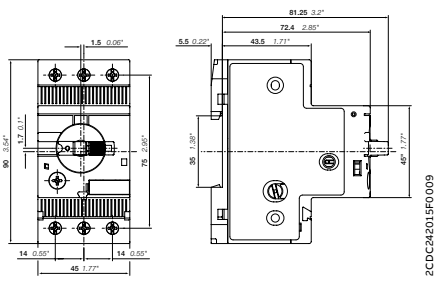
MS132-B is a compact and powerful range for motor protection up to 15 kW (400 V) / 32 A in width of 45 mm, complying with the latest railway rolling stock standards and allowing installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds.

They offer a reliable protection for motors in the event of overload or phase failure. The devices have trip class 10. This type has also a clear and reliable indication of fault in a separate window in the event of short-circuit tripping. Further features are the build-in disconnect function, temperature compensation, trip-free mechanism and a rotary handle with a clear switch position indication.
The manual motor starter is suitable for three- and single phase applications. The handle is lockable to protect against unauthorized changes. Auxiliary contacts, signaling contacts, undervoltage releases, shunt trips, power in-feed blocks are available as accessory.

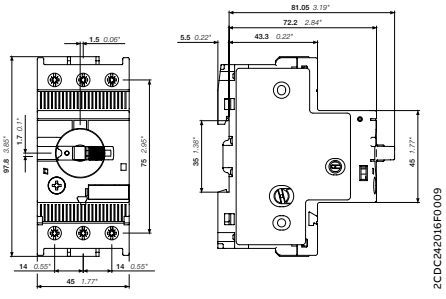
These are suitable throughout the MS132-(K)B/MS165-B/MO132-B/MO165-B range.
- designed in accordance to the applicable parts of IEC/EN 60077 standard
- shocks and vibration withstand conforming to IEC/EN 61373 (category 1, class B)
- usable according to European fire and smoke safety standard EN 45545-2

Rated operational power 400 V AC-3, AC-3e kW	Setting range A	Short-circuit breaking capacity Ics at 400 V AC kA	Rated instantaneous short-circuit current setting Ii A	Type	Order code	Weight (1 pce) kg
-	0.10 ... 0.16	100	2.00	MS132-0.16B	1SAM350200R1001	0.215
0.06	0.16 ... 0.25	100	3.10	MS132-0.25B	1SAM350200R1002	0.215
0.09	0.25 ... 0.40	100	5.00	MS132-0.4B	1SAM350200R1003	0.215
0.18	0.40 ... 0.63	100	7.90	MS132-0.63B	1SAM350200R1004	0.215
0.25	0.63 ... 1.00	100	12.5	MS132-1.0B	1SAM350200R1005	0.215
0.55	1.00 ... 1.60	100	20.0	MS132-1.6B	1SAM350200R1006	0.265
0.75	1.60 ... 2.50	100	31.3	MS132-2.5B	1SAM350200R1007	0.265
1.50	2.50 ... 4.00	100	50.0	MS132-4.0B	1SAM350200R1008	0.265
2.20	4.00 ... 6.30	100	78.8	MS132-6.3B	1SAM350200R1009	0.265
4.00	6.30 ... 10.0	100	150	MS132-10B	1SAM350200R1010	0.265
5.50	8.00 ... 12.0	100	180	MS132-12B	1SAM350200R1012	0.310
7.50	10.0 ... 16.0	100	240	MS132-16B	1SAM350200R1011	0.310
7.50	16.0 ... 20.0	100	300	MS132-20B	1SAM350200R1013	0.310
11.0	20.0 ... 25.0	50	375	MS132-25B	1SAM350200R1014	0.310
15.0	25.0 ... 32.0	25	480	MS132-32B	1SAM350200R1015	0.310

Note: Manual motor starters should always be selected so that the actual motor current is within the setting range.



MS132-B ≤ 10 A



MS132-B ≥ 10 A

Main dimensions mm, inches

MS132-KB manual motor starters with Push-in Spring terminals

0.10 to 32 A – with thermal and electromagnetic protection

2CDC241010V0021

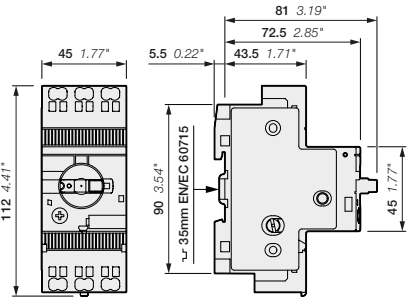
MS132-KB

The MS132-KB series is a compact and powerful range for motor protection up to 15 kW (400 V)/32 A with a width of only 45 mm. The innovative Push-in Spring terminals enable tool-free wiring and eliminate the need for routine re-tightening.

The MS132-KB also has a clear and reliable indication of fault in a separate window in the event of short-circuit tripping. Further features are the built-in disconnect function, temperature compensation, trip-free mechanism and a rotary handle with a clear switch position indication.

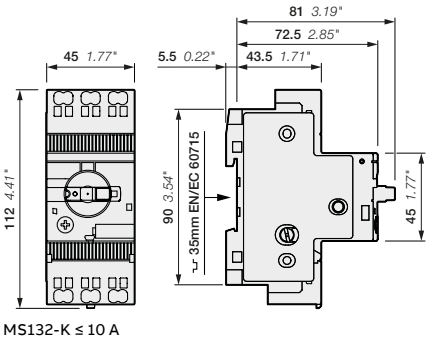
The manual motor starter is suitable for three- and single phase applications. The handle is lockable to protect against unauthorized changes. Auxiliary contacts, signaling contacts, undervoltage releases, shunt trips, power in-feed blocks are available as accessory. These are suitable throughout the MS132-(K)B/MS165-B/MO132-B/MO165-B range.

- designed in accordance to the applicable parts of IEC/EN 60077 standard
- shocks and vibration withstand conforming to IEC/EN 61373 (category 1, class B)
- usable according to European fire and smoke safety standard EN 45545-2.

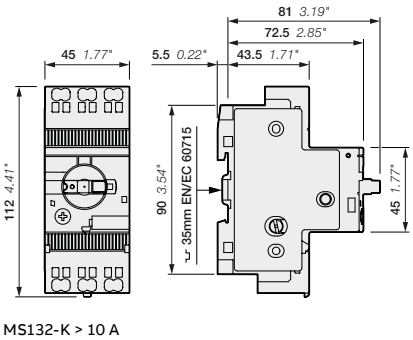


Rated operational power 400 V AC-3, AC-3e kW	Setting range A	Short-circuit breaking capacity Ics at 400 V AC kA	Rated instantaneous short-circuit current setting Ii A	Type	Order code	Weight (1 pce) kg
0.03(1)	0.10 ... 0.16	100	2.00	MS132-0.16KB	1SAM350210R1001	0.256
0.06	0.16 ... 0.25	100	3.10	MS132-0.25KB	1SAM350210R1002	0.256
0.09	0.25 ... 0.40	100	5.00	MS132-0.4KB	1SAM350210R1003	0.256
0.18	0.40 ... 0.63	100	7.90	MS132-0.63KB	1SAM350210R1004	0.256
0.25	0.63 ... 1.00	100	12.5	MS132-1.0KB	1SAM350210R1005	0.256
0.55	1.00 ... 1.60	100	20.0	MS132-1.6KB	1SAM350210R1006	0.298
0.75	1.60 ... 2.50	100	31.3	MS132-2.5KB	1SAM350210R1007	0.280
1.50	2.50 ... 4.00	100	50.0	MS132-4.0KB	1SAM350210R1008	0.286
2.20	4.00 ... 6.30	100	78.8	MS132-6.3KB	1SAM350210R1009	0.289
4.00	6.30 ... 10.0	100	150	MS132-10KB	1SAM350210R1010	0.296
7.50	10.0 ... 16.0	100	240	MS132-16KB	1SAM350210R1011	0.316
7.50	16.0 ... 20.0	100	300	MS132-20KB	1SAM350210R1013	0.317
11.0	20.0 ... 25.0	50	375	MS132-25KB	1SAM350210R1014	0.316
15.0	25.0 ... 32.0	25	480	MS132-32KB	1SAM350210R1015	0.316

Note: Manual motor starters should always be selected so that the actual motor current is within the setting range.
(1) 690 V



MS132-K ≤ 10 A



MS132-K > 10 A

Main dimensions mm, inches

MS165-B manual motor starters

10 to 80 A – with thermal and electromagnetic protection

2CDC241012V0017

MS165-65B

MS165-B is a compact and powerful range for motor protection up to 45 kW (400 V) / 80 A in width of 55 mm, complying with the latest railway rolling stock standards and allowing installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds.

They offer a reliable protection for motors in the event of overload or phase failure. The devices have trip class 10. This type has also a clear and reliable indication of fault in a separate window in the event of short-circuit tripping. Further features are the build-in disconnect function, temperature compensation, trip-free mechanism and a rotary handle with a clear switch position indication.

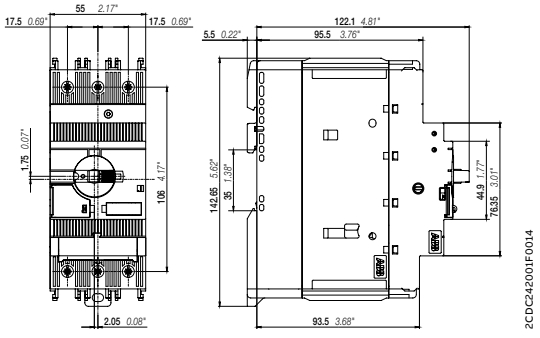
The manual motor starter is suitable for three- and single phase applications. The handle is lockable to protect against unauthorized changes. Auxiliary contacts, signaling contacts, undervoltage releases, shunt trips, power in-feed blocks are available as accessory.

These are suitable throughout the MS132-(K)B/MS165-B/MO132-B/MO165-B range.

- designed in accordance to the applicable parts of IEC/EN 60077 standard
- shocks and vibration withstand conforming to IEC/EN 61373 (category 1, class B)
- usable according to European fire and smoke safety standard EN 45545-2.

Rated operational power 400 V AC-3, AC-3e	Setting range	Short-circuit breaking capacity Ics at 400 V AC	Rated instantaneous short-circuit current setting Ii	Type	Order code	Weight (1 pce)
kW	A	kA	A			kg
7.5	10 ... 16	100	240	MS165-16B	1SAM451200R1011	0.950
7.5	14 ... 20	100	300	MS165-20B	1SAM451200R1012	0.950
11	18 ... 25	100	375	MS165-25B	1SAM451200R1013	0.960
15	23 ... 32	100	480	MS165-32B	1SAM451200R1014	0.970
22	30 ... 42	50	630	MS165-42B	1SAM451200R1015	0.970
22	40 ... 54	30	810	MS165-54B	1SAM451200R1016	0.970
30	52 ... 65	30	975	MS165-65B	1SAM451200R1017	0.980
37	62 ... 73	30	1022	MS165-73B	1SAM451200R1018	1.000
45	70 ... 80	30	1120	MS165-80B	1SAM451200R1019	1.000

Note: Manual motor starters should always be selected so that the actual motor current is within the setting range.



MS165-B

Main dimensions mm, inches

MO132-B manual motor starters magnetic only

0.16 to 32 A – with electromagnetic protection

2CDC241003V0021

MO132-1.0B

2CDC241004V0021

MO132-32B

MO132-B is a compact and powerful range for starter protection up to 15 kW (400 V) / 32 A in width of 45 mm, complying with the latest railway rolling stock standards and allowing installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds.

They offer a reliable protection for starters in the event of short-circuit including a reliable indication of fault in a separate window. Further features are the build-in disconnect function, trip-free mechanism and a rotary handle with a clear switch position indication.

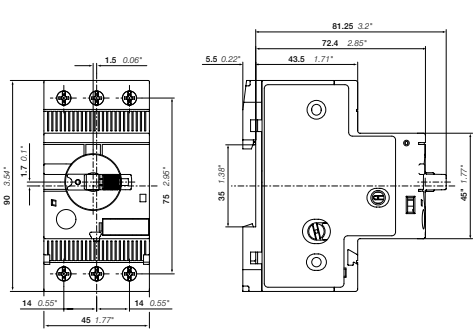
The manual motor starter is suitable for three- and single-phase applications. The handle is lockable to protect against unauthorized changes. Auxiliary contacts, signaling contacts, undervoltage releases, shunt trips, power in-feed blocks are available as accessory.

These are suitable throughout the MS132-(K)B / MS165-B / MO132-B / MO165-B range.

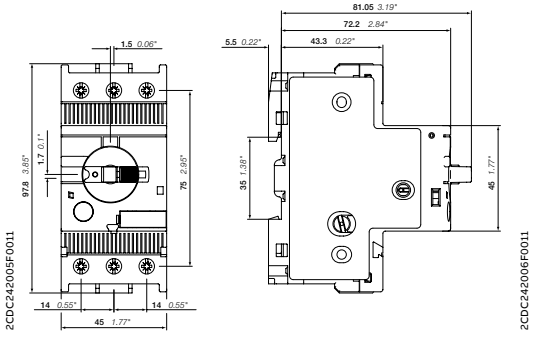
- designed in accordance to the applicable parts of IEC/EN 60077 standard
- shocks and vibration withstand conforming to IEC/EN 61373 (category 1, class B)
- usable according to European fire and smoke safety standard EN 45545-2.

Rated operational power 400 V AC-3, AC-3e kW	Rated operational current A	Short-circuit breaking capacity Ics at 400 V AC kA	Rated instantaneous short-circuit current setting Ii A	Type	Order code	Weight (1 pce) kg
-	0.16	100	2.00	MO132-0.16B	1SAM360200R1001	0.215
0.06	0.25	100	3.10	MO132-0.25B	1SAM360200R1002	0.215
0.09	0.40	100	5.00	MO132-0.4B	1SAM360200R1003	0.215
0.12	0.63	100	7.90	MO132-0.63B	1SAM360200R1004	0.215
0.25	1.0	100	12.5	MO132-1.0B	1SAM360200R1005	0.215
0.55	1.6	100	20.0	MO132-1.6B	1SAM360200R1006	0.265
0.75	2.5	100	31.3	MO132-2.5B	1SAM360200R1007	0.265
1.5	4.0	100	50.0	MO132-4.0B	1SAM360200R1008	0.265
2.2	6.3	100	78.8	MO132-6.3B	1SAM360200R1009	0.265
4.0	10	100	125	MO132-10B	1SAM360200R1010	0.265
5.5	12	100	150	MO132-12B	1SAM360200R1012	0.310
7.5	16	100	200	MO132-16B	1SAM360200R1011	0.310
7.5	20	100	250	MO132-20B	1SAM360200R1013	0.310
11	25	50	313	MO132-25B	1SAM360200R1014	0.310
15	32	25	400	MO132-32B	1SAM360200R1015	0.310

Note: For overload protection of motors, an appropriate thermal or electronic overload relay must be used



MO132-B ≤ 10 A



MO132-B ≥ 10 A

Main dimensions mm, inches

MO165-B manual motor starters magnetic only

16 to 80 A – with electromagnetic protection

2CDC241015V0016

MO165-65B

MO165-B is a compact and powerful range for starter protection up to 45 kW (400 V) / 80 A in width of 55 mm, complying with the latest railway rolling stock standards and allowing installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds.

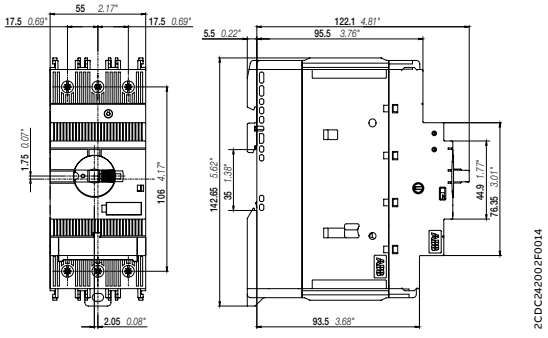
They offer a reliable protection for starters in the event of short-circuit including a reliable indication of fault in a separate window. Further features are the build-in disconnect function, trip-free mechanism and a rotary handle with a clear switch position indication.

The manual motor starter is suitable for three- and single phase applications. The handle is lockable to protect against unauthorized changes. Auxiliary contacts, signaling contacts, undervoltage releases, shunt trips, power in-feed blocks are available as accessory.

These are suitable throughout the MS132-(K)B / MS165-B / MO132-B / MO165-B range.

- designed in accordance to the applicable parts of IEC/EN 60077 standard
- shocks and vibration withstand conforming to IEC/EN 61373 (category 1, class B)
- usable according to European fire and smoke safety standard EN 45545-2.

Rated operational power 400 V AC-3, AC-3e kW	Rated operational current A	Short-circuit breaking capacity Ics at 400 V AC kA	Rated instantaneous short-circuit current setting Ii A	Type	Order code	Weight (1 pce) kg
7.5	16	100	240	MO165-16B	1SAM461200R1011	0.950
7.5	20	100	300	MO165-20B	1SAM461200R1012	0.950
11	25	100	375	MO165-25B	1SAM461200R1013	0.960
15	32	100	480	MO165-32B	1SAM461200R1014	0.970
22	42	50	630	MO165-42B	1SAM461200R1015	0.970
22	54	30	810	MO165-54B	1SAM461200R1016	0.970
30	65	30	975	MO165-65B	1SAM461200R1017	0.980
37	73	30	1022	MO165-73B	1SAM461200R1018	1.000
45	80	30	1120	MO165-80B	1SAM461200R1019	1.000



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MO165-B

Main dimensions mm, inches

Technical data

MS132-(K)B, MS165-B, MO132-B, MO165-B

Main circuit – Utilization characteristics according to IEC/EN

Type		MS132-(K)B	MS165-B	MO132-B	MO165-B
Standards		IEC/EN 60947-1, IEC/EN 60947-2, IEC/EN 60947-4-1, IEC/EN 60077-2 (applicable parts), IEC/EN 60077-1 (applicable parts), IEC/EN 61373, EN 45545-2, TR CU 001/2011			
Fire and smoke standards		EN 45545 (HL2, HL3)			
Rated operational voltage U_e		690 V AC / 250 V DC	690 V AC / 250 V DC	690 V AC	690 V AC / 250 V DC
Rated frequency		DC, 50/60 Hz	DC, 50/60 Hz	50/60 Hz	DC, 50/60 Hz
Trip class		10	10	-	-
Number of poles					
Duty time					
Mechanical durability		100000 cycles	50000 cycles	100000 cycles	50000 cycles
Electrical durability	up to 16 A	50000 cycles	25000 cycles	50000 cycles	25000 cycles
	20 ... 65 A	50000 cycles	25000 cycles	50000 cycles	25000 cycles
Rated impulse withstand voltage U_{imp}		6 kV	8 kV	6 kV	8 kV
Rated insulation voltage U_i		690 V	1000 V	690 V	1000 V
Rated operational current I_e					
Rated operational current DC-5 I_e 3 conducting paths in series up to 250 V		See "Rated operational current Ie"	See "Rated operational current Ie"	-	See "Rated operational current Ie"
Rated instantaneous short-circuit current setting I_i					
Rated service short-circuit breaking capacity I_{cs}					
Rated ultimate short-circuit breaking capacity I_{cu}					
Rated service short-circuit breaking capacity DC I_{cs} 3 conducting paths in series up to 250 V		10 kA	100 kA	-	100 kA

Short-circuit breaking capacity and back-up fuses

Ics Rated service short-circuit breaking capacity
Icu Rated ultimate short-circuit breaking capacity
Icc Prospective short-circuit current at installation location

Note: Maximum rated current of the back-up fuses if $I_{cc} > I_{cs}$

Type	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC		
	Ics kA	Icu kA	gG, aM A	Ics kA	Icu kA	gG, aM A	Ics kA	Icu kA	gG, aM A	Ics kA	Icu kA	gG, aM A	Ics kA	Icu kA	gG, aM A
MS132-0.16(K)B	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MS132-0.25(K)B	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MS132-0.4(K)B	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MS132-0.63(K)B	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MS132-1.0(K)B	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MS132-1.6(K)B	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MS132-2.5(K)B	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MS132-4.0(K)B	100	100	- (1)	100	100	- (1)	30	30	35 (2)	20	20	35 (2)	3	3	32 (2)
MS132-6.3(K)B	100	100	- (1)	100	100	- (1)	30	30	63 (2)	20	20	63 (2)	3	3	50 (2)
MS132-10(K)B	100	100	- (1)	100	100	- (1)	30	30	100 (2)	20	20	100 (2)	3	3	50 (2)
MS132-12B	100	100	- (1)	100	100	- (1)	30	30	100 (2)	20	20	100 (2)	3	3	63 (2)
MS132-16(K)B	100	100	- (1)	100	100	- (1)	30	30	125 (2)	20	20	125 (2)	3	3	63 (2)
MS132-20(K)B	100	100	- (1)	100	100	- (1)	30	30	125 (2)	20	20	125 (2)	3	3	80 (2)
MS132-25(K)B	30	50	125 (2)	30	50	125 (2)	30	30	125 (2)	10	10	125 (2)	3	3	100 (2)
MS132-32(K)B	25	50	125 (2)	25	50	125 (2)	30	30	125 (2)	10	10	125 (2)	3	3	100 (2)

(1) No back-up fuse required, because short-circuit proof up to 100 kA.
(2) Rated back-up fuse for short-circuit up to 100 kA.

02

Technical data

MS132-(K)B, MS132-B, MS165-B, MO132-B, MO165-B

Type	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC			250 V DC (3)		
	Ics kA	Icu kA	gG A	Ics kA	Icu kA	gG A	Ics kA	Icu kA	gG A	Ics kA	Icu kA	gG A	Ics kA	Icu kA	gG A	Ics kA	Icu kA	gG A
MS165-16B	100	100	- (1)	100	100	- (1)	75	75	125 (2)	20	20	125 (2)	8	8	63 (2)	100	100	- (1)
MS165-20B	100	100	- (1)	100	100	- (1)	75	75	125 (2)	20	20	125 (2)	8	8	63 (2)	100	100	- (1)
MS165-25B	100	100	- (1)	100	100	- (1)	50	50	125 (2)	20	20	125 (2)	8	8	80 (2)	100	100	- (1)
MS165-32B	100	100	- (1)	100	100	- (1)	50	50	125 (2)	20	20	125 (2)	5	5	100 (2)	100	100	- (1)
MS165-42B	50	50	125 (2)	50	50	125 (2)	50	50	125 (2)	20	20	125 (2)	5	5	100 (2)	100	100	- (1)
MS165-54B	30	50	125 (2)	30	50	125 (2)	30	45	125 (2)	20	20	125 (2)	5	5	100 (2)	100	100	- (1)
MS165-65B	30	50	125 (2)	30	50	125 (2)	30	45	125 (2)	20	20	125 (2)	5	5	100 (2)	100	100	- (1)
MS165-73B	30	30	200 (1)	30	30	200 (1)	6	8	200 (1)	18	18	200 (1)	10	10	160 (1)	100	100	- (1)
MS165-80B	30	30	200 (1)	30	30	200 (1)	6	8	200 (1)	18	18	200 (1)	10	10	160 (1)	100	100	- (1)

(1) No back-up fuse required, short-circuit proof up to 100 kA.
(2) Rated back-up fuse for short-circuit up to 100 kA.
(3) 3 poles in series.

Type	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC		
	Ics kA	Icu kA	gG, aM A	Ics kA	Icu kA	gG, aM A	Ics kA	Icu kA	gG, aM A	Ics kA	Icu kA	gG, aM A	Ics kA	Icu kA	gG, aM A
MO132-0.16B	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MO132-0.25B	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MO132-0.4B	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MO132-0.63B	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MO132-1.0B	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MO132-1.6B	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MO132-2.5B	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)	100	100	- (1)
MO132-4.0B	100	100	- (1)	100	100	- (1)	30	30	35 (2)	20	20	35 (2)	3	3	32 (2)
MO132-6.3B	100	100	- (1)	100	100	- (1)	30	30	63 (2)	20	20	63 (2)	3	3	50 (2)
MO132-10B	100	100	- (1)	100	100	- (1)	30	30	100 (2)	20	20	100 (2)	3	3	50 (2)
MO132-12B	100	100	- (1)	100	100	- (1)	30	30	100 (2)	20	20	100 (2)	3	3	63 (2)
MO132-16B	100	100	- (1)	100	100	- (1)	30	30	125 (2)	20	20	125 (2)	3	3	63 (2)
MO132-20B	100	100	- (1)	100	100	- (1)	30	30	125 (2)	20	20	125 (2)	3	3	80 (2)
MO132-25B	30	50	125 (2)	30	50	125 (2)	10	10	125 (2)	10	10	125 (2)	3	3	100 (2)
MO132-32B	25	50	125 (2)	25	50	125 (2)	10	10	125 (2)	10	10	125 (2)	3	3	100 (2)

(1) No back-up fuse required, because short-circuit proof up to 100 kA.
(2) Rated back-up fuse for short-circuit up to 100 kA.

Type	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC			250 V DC (3)		
	Ics kA	Icu kA	gG A	Ics kA	Icu kA	gG A	Ics kA	Icu kA	gG A	Ics kA	Icu kA	gG A	Ics kA	Icu kA	gG A	Ics kA	Icu kA	gG A
MO165-16B	100	100	- (1)	100	100	- (1)	75	75	125 (2)	20	20	125 (2)	8	8	63 (2)	100	100	- (1)
MO165-20B	100	100	- (1)	100	100	- (1)	75	75	125 (2)	20	20	125 (2)	8	8	63 (2)	100	100	- (1)
MO165-25B	100	100	- (1)	100	100	- (1)	50	50	125 (2)	20	20	125 (2)	8	8	80 (2)	100	100	- (1)
MO165-32B	100	100	- (1)	100	100	- (1)	50	50	125 (2)	20	20	125 (2)	5	5	100 (2)	100	100	- (1)
MO165-42B	50	50	125 (2)	50	50	125 (2)	50	50	125 (2)	20	20	125 (2)	5	5	100 (2)	100	100	- (1)
MO165-54B	30	50	125 (2)	30	50	125 (2)	30	45	125 (2)	20	20	125 (2)	5	5	100 (2)	100	100	- (1)
MO165-65B	30	50	125 (2)	30	50	125 (2)	30	45	125 (2)	20	20	125 (2)	5	5	100 (2)	100	100	- (1)
MO165-73B	30	30	200 (1)	30	30	200 (1)	6	8	200 (1)	6	8	200 (1)	6	8	160 (1)	100	100	- (1)
MO165-80B	30	30	200 (1)	30	30	200 (1)	6	8	200 (1)	6	8	200 (1)	6	8	160 (1)	100	100	- (1)

(1) No back-up fuse required, short-circuit proof up to 100 kA.
(2) Rated back-up fuse for short-circuit up to 100 kA.
(3) 3 poles in series.

Technical data

MS132-(K)B, MS165-B, MO132-B, MO165-B

Main circuit – Utilization characteristics according to UL/CSA

Type		MS132-(K)B	MS165-B	MO132-B	MO165-B
Standards		UL 60947-4-1, UL 60947-1			
Rated operational voltage Ue acc. to UL/CSA		600 V AC	1000 V AC	600 V AC	1000 V AC
Trip class		10		-	
Motor ratings (1)	Horsepower	See table "Motor ratings, three phase"			
	Full Load Amps (FLA)	See table "Motor ratings, three phase"			
	Locked Rotor Amps (LRA)	See table "Motor ratings, three phase"			

(1) See product data sheets for UL/CSA single phase motor and general use (AC-1) ratings.

UL/CSA ratings overview

Type	MS132-(K)B	MS165-B	MO132-B	MO165-B
Manual Motor Controller	x	x	x	x
Manual Motor Controller, Suitable as Motor Disconnect	x	x	x	x
Manual Motor Controller, Suitable for use in Group Installations	x	x	x	x
Manual Motor Controller, Suitable for Tap Conductor Protection in Group Installations	x	x	x	x
Manual self-protected Combination Motor Controller (Type E)	x	x	-	-
Combination Motor Controller (Type F)	with AF(Z)B contactor	with AF(Z)B contactor	with AF(Z)B contactor and TF-B	with AF(Z)B contactor and TF-B

02

Technical data

MS132-(K)B, MS165-B, MO132-B, MO165-B

UL/CSA Motor ratings, three phase – MS132-(K)B

Type	200 V AC			208 V AC			220 ... 240 V AC			440 ... 480 V AC			550 ... 600 V AC		
	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA
MS132-0.16(K)B	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96
MS132-0.25(K)B	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5
MS132-0.4(K)B	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4
MS132-0.63(K)B	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78
MS132-1.0(K)B	-	1	6	-	1	6	-	1	6	-	1	6	1/2	1	6
MS132-1.6(K)B	-	1.6	9.6	-	1.6	9.6	-	1.6	9.6	3/4	1.6	9.6	3/4	1.6	9.6
MS132-2.5(K)B	1/2	2.5	15	1/2	2.5	15	1/2	2.5	15	1	2.5	15	1-1/2	2.5	15
MS132-4.0(K)B	3/4	4	24	3/4	4	24	1	4	24	2	4	24	3	3.9	25.6
MS132-6.3(K)B	1	6.3	37.8	1	6.3	37.8	1 1/2	6.3	37.8	3	4.8	32	5	6.1	36.8
MS132-10(K)B	2	7.8	57.5	2	7.5	55	3	9.6	64	5	7.6	46	7 1/2	9	50.8
MS132-12B	3	11	73.6	3	10.6	71	3	9.6	64	7 1/2	11	63.5	10	11	64.8
MS132-16(K)B	3	11	73.6	3	10.6	71	5	15.2	92	10	14	81	10	11	64.8
MS132-20(K)B	5	17.5	105.8	5	16.7	102	5	15.2	92	10	14	81	15	17	93
MS132-25(K)B	5	17.5	105.8	7 1/2	24.2	140	7 1/2	22	127	15	21	116	20	22	116
MS132-32(K)B	7 1/2	25.3	146	10	30.8	179	10	28	162	20	27	145	25	27	146

UL/CSA Motor ratings, three phase – MS165-B

Type	200 V AC			208 V AC			220 ... 240 V AC			440 ... 480 V AC			550 ... 600 V AC		
	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA
MS165-16B	3	11	73.6	3	10.6	71	5	15.2	92	10	14	81	10	11	64.8
MS165-20B	5	17.5	105.8	5	16.7	102	5	15.2	92	10	14	81	15	17	93
MS165-25B	5	17.5	105.8	7 1/2	24.2	140	7 1/2	22	127	15	21	116	20	22	116
MS165-32B	7 1/2	25.3	146	10	30.8	179	10	28	162	20	27	145	30	32	174
MS165-42B	10	32.2	186.3	10	30.8	179	15	42	232	30	40	218	40	41	232
MS165-54B	15	48.3	267	15	46.2	257	20	54	290	40	52	290	50	52	290
MS165-65B	20	62.1	334	20	59.4	321	20	54	290	50	65	363	60	62	348
MS165-73B	20	62.1	334	20	59.4	321	25	68	365	50	65	363	60	62	348
MS165-80B	25	78.2	420	25	74.8	404	30	80	435	60	77	435	75	77	434

hp Horsepower
FLA Full Load Amps
LRA Locked Rotor Amps

Note: Manual motor starters should always be selected so that the actual motor current is within the setting range; see ordering detail pages. Horsepower (hp) ratings are for reference only.

Technical data

MS132-(K)B, MS165-B, MO132-B, MO165-B

UL/CSA Motor ratings, three phase – MO132-B

Type	200 V AC			208 V AC			220 ... 240 V AC			440 ... 480 V AC			550 ... 600 V AC		
	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA
MO132-0.16B	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96	-	0.16	0.96
MO132-0.25B	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5	-	0.25	1.5
MO132-0.4B	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4	-	0.4	2.4
MO132-0.63B	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78	-	0.63	3.78
MO132-1.0B	-	1	6	-	1	6	-	1	6	-	1	6	1/2	1	6
MO132-1.6B	-	1.6	9.6	-	1.6	9.6	-	1.6	9.6	3/4	1.6	9.6	3/4	1.6	9.6
MO132-2.5B	1/2	2.5	15	1/2	2.5	15	1/2	2.5	15	1	2.5	15	1 1/2	2.5	15
MO132-4.0B	3/4	4	24	3/4	4	24	1	4	24	2	4	24	3	3.9	25.6
MO132-6.3B	1	6.3	37.8	1	6.3	37.8	1 1/2	6.3	37.8	3	4.8	32	5	6.1	36.8
MO132-10B	2	7.8	57.5	2	7.5	55	3	9.6	64	5	7.6	46	7 1/2	9	50.8
MO132-12B	3	11	73.6	3	10.6	71	3	9.6	64	7 1/2	11	63.5	10	11	64.8
MO132-16B	3	11	73.6	3	10.6	71	5	15.2	92	10	14	81	10	11	64.8
MO132-20B	5	17.5	105.8	5	16.7	102	5	15.2	92	10	14	81	15	17	93
MO132-25B	5	17.5	105.8	7 1/2	24.2	140	7 1/2	22	127	15	21	116	20	22	116
MO132-32B	7 1/2	25.3	146	10	30.8	179	10	28	162	20	27	145	25	27	146

UL/CSA Motor ratings, three phase – MO165-B

Type	200 V AC			208 V AC			220 ... 240 V AC			440 ... 480 V AC			550 ... 600 V AC		
	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA	hp	FLA	LRA
MO165-16B	3	11	73.6	3	10.6	71	5	15.2	92	10	14	81	10	11	64.8
MO165-20B	5	17.5	105.8	5	16.7	102	5	15.2	92	10	14	81	15	17	93
MO165-25B	5	17.5	105.8	7 1/2	24.2	140	7 1/2	22	127	15	21	116	20	22	116
MO165-32B	7 1/2	25.3	146	10	30.8	179	10	28	162	20	27	145	30	32	174
MO165-42B	10	32.2	186.3	10	30.8	179	15	42	232	30	40	218	40	41	232
MO165-54B	15	48.3	267	15	46.2	257	20	54	290	40	52	290	50	52	290
MO165-65B	20	62.1	334	20	59.4	321	20	54	290	50	65	363	60	62	348
MO165-73B	20	62.1	334	20	59.4	321	25	68	365	50	65	363	60	62	348
MO165-80B	25	78.2	420	25	74.8	404	30	80	435	60	77	435	75	77	434

hp Horsepower
FLA Full Load Amps
LRA Locked Rotor Amps

UL/CSA Maximum short-circuit current ratings – MS132-(K)B

Type	Manual Motor Controllers								Manual self-protected Combination Motor Controllers (Type E) (2)	
	Branch circuit protection, max. size per NEC/CEC (1)		for motor disconnect		for group installations		for tap conductor protection in group installations			
	Fuses	Circuit breaker	480 V	600 V	480 V	600 V	480Y / 277 V	600Y / 347 V	480Y / 277 V	600Y / 347 V
	A	A	kA	kA	kA	kA	kA	kA	kA	kA
MS132-0.16(K)B	Any Listed fuses. Size per NEC/CEC	Any Listed UL489 / CSA C22.2 No.5 circuit breaker. Size per NEC/CEC	65	47	65	47	65	47	65	47
MS132-0.25(K)B			65	47	65	47	65	47	65	47
MS132-0.4(K)B			65	47	65	47	65	47	65	47
MS132-0.63(K)B			65	47	65	47	65	47	65	47
MS132-1.0(K)B			65	47	65	47	65	47	65	47
MS132-1.6(K)B			65	47	65	47	65	47	65	47
MS132-2.5(K)B			65	47	65	47	65	47	65	47
MS132-4.0(K)B			65	47	65	47	65	47	65	47
MS132-6.3(K)B			65	18	65	35	65	18	65	18
MS132-10(K)B			65	18	65	35	65	18	65	18
MS132-12B			30	18	35	35	30	18	30	-
MS132-16(K)B			30	18	35	35	30	18	30	-
MS132-20(K)B			30	18	35	35	30	18	30	-
MS132-25(K)B			30	18	35	35	30	18	30	-
MS132-32(K)B			30	18	35	35	30	18	30	-

(1) NEC: NFPA®70 National Electrical Code®; CEC: CSA C22.1 Canadian Electrical Code.
(2) Requires the use of S1-M3-xx line-side terminal feeder block or TS1 terminal spacer.

Technical data

MS132-(K)B, MS132-B, MS165-B, MO132-B, MO165-B

UL/CSA Maximum short-circuit current ratings – MS132-(K)B with AF(Z)B contactors

Type	Combination Motor Controllers (Type F) (1) Coordination type 1			Combination Motor Controllers (Type F) (1) Coordination type 2		
	Minimum contactor size	480Y / 277 V	600Y / 347 V	Minimum contactor size	480Y / 277 V	600Y / 347 V
		kA	kA		kA	kA
MS132-0.16(K)B	AF09(Z)B ... AF38(Z)B	100	50	AF26(Z)B ... AF38(Z)B	65	47
MS132-0.25(K)B	AF09(Z)B ... AF38(Z)B	100	50	AF26(Z)B ... AF38(Z)B	65	47
MS132-0.4(K)B	AF09(Z)B ... AF38(Z)B	100	50	AF26(Z)B ... AF38(Z)B	65	47
MS132-0.63(K)B	AF09(Z)B ... AF38(Z)B	100	50	AF26(Z)B ... AF38(Z)B	65	47
MS132-1.0(K)B	AF09(Z)B ... AF38(Z)B	100	50	AF26(Z)B ... AF38(Z)B	65	47
MS132-1.6(K)B	AF09(Z)B ... AF38(Z)B	100	50	AF26(Z)B ... AF38(Z)B	65	47
MS132-2.5(K)B	AF09(Z)B ... AF38(Z)B	100	50	AF26(Z)B ... AF38(Z)B	65	47
MS132-4.0(K)B	AF09(Z)B ... AF38(Z)B	100	50	AF26(Z)B ... AF38(Z)B	65	47
MS132-6.3(K)B	AF09(Z)B ... AF38(Z)B	100	47	AF26(Z)B ... AF38(Z)B	65	47
MS132-10(K)B	AF09(Z)B ... AF38(Z)B	100	30	AF26(Z)B ... AF38(Z)B	65	47
MS132-12B	AF09(Z)B ... AF38(Z)B	65	30	AF26(Z)B ... AF38(Z)B	30	-
MS132-16(K)B	AF12(Z)B ... AF38(Z)B	65	30	AF26(Z)B ... AF38(Z)B	30	-
MS132-20(K)B	AF26(Z)B ... AF38(Z)B	65	-	AF26(Z)B ... AF38(Z)B	30	-
MS132-25(K)B	AF26(Z)B ... AF38(Z)B	50	-	AF26(Z)B ... AF38(Z)B	30	-
MS132-32(K)B	AF38(Z)B	50	-	AF26(Z)B ... AF38(Z)B	30	-

(1) Requires the use of S1-M3-xx line-side terminal feeder block or TS1 terminal spacer.

UL/CSA Maximum short-circuit current ratings – MS165-B

Type	Manual Motor Controllers								Manual self-protected Combination Motor Controllers (Type E)	
	Branch circuit protection, max. size per NEC/CEC (1)		for motor disconnect		for group installations		for tap conductor protection in group installations			
	Fuses	Circuit breaker	480 V	600 V	480 V	600 V	480Y / 277 V	600Y / 347 V	480Y / 277 V	600Y / 347 V
	A	A	kA	kA	kA	kA	kA	kA	kA	kA
MS165-16B	Any Listed fuses. Size per NEC/CEC	Any Listed UL489 / CSA C22.2 No.5 circuit breaker. Size per NEC/CEC	65	30	65	30	65	30	65	30
MS165-20B			65	30	65	30	65	30	65	30
MS165-25B			65	30	65	30	65	30	65	30
MS165-32B			65	30	65	30	65	30	65	30
MS165-42B			65	30	65	30	65	30	65	-
MS165-54B			65	30	65	30	65	30	65	-
MS165-65B			65	30	65	30	65	30	65	-
MS165-73B			50	10	50	10	50	10	50	-
MS165-80B			50	10	50	10	50	10	50	-

(1) NEC: NFPA®70 National Electrical Code®; CEC: CSA C22.1 Canadian Electrical Code.

UL/CSA Maximum short-circuit current ratings – MS165-B with AF(Z)B contactors

Type	Manual self-protected Combination Motor Controllers (Type F) Coordination type 1				Manual self-protected Combination Motor Controllers (Type F) Coordination type 2			
	Minimum contactor size	480Y / 277 V	Minimum contactor size	600Y / 347 V	Minimum contactor size	480Y / 277 V	Minimum contactor size	600Y / 347 V
		kA		kA		kA		kA
MS165-16B	AF09(Z)B...AF38(Z)B	65	AF09(Z)B...AF38(Z)B	50	AF26(Z)B...AF38(Z)B	65	AF09(Z)B...AF38(Z)B	30
MS165-20B	AF26(Z)B...AF38(Z)B	65	AF26(Z)B...AF38(Z)B	50	AF26(Z)B...AF38(Z)B	65	AF09(Z)B...AF38(Z)B	30
MS165-25B	AF26(Z)B...AF38(Z)B	65	AF26(Z)B...AF38(Z)B	50	AF26(Z)B...AF38(Z)B	65		
MS165-32B	AF26(Z)B...AF38(Z)B	65	AF26(Z)B...AF38(Z)B	50	AF26(Z)B...AF38(Z)B	65		

Technical data

MS132-(K)B, MS165-B, MO132-B, MO165-B

UL/CSA Maximum short-circuit current ratings – MO132

Type	Manual Motor Controllers							
	Branch circuit protection, max. size per NEC/CEC (1)		for motor disconnect		for group installations		for tap conductor protection in group installations	
	Fuses	Circuit breaker	480 V	600 V	480 V	600 V	480Y / 277 V	600Y / 347 V
	A	A	kA	kA	kA	kA	kA	kA
MO132-0.16B	Any Listed fuses. Size per NEC/CEC	Any Listed UL489 / CSA C22.2 No.5 circuit breaker. Size per NEC/CEC	65	47	65	47	65	47
MO132-0.25B			65	47	65	47	65	47
MO132-0.40B			65	47	65	47	65	47
MO132-0.63B			65	47	65	47	65	47
MO132-1.0B			65	47	65	47	65	47
MO132-1.6B			65	47	65	47	65	47
MO132-2.5B			65	47	65	47	65	47
MO132-4.0B			65	47	65	47	65	47
MO132-6.3B			65	18	65	35	65	18
MO132-10B			65	18	65	35	65	18
MO132-12B			30	18	35	35	30	18
MO132-16B			30	18	35	35	30	18
MO132-20B			30	18	35	35	30	18
MO132-25B			30	18	35	35	30	18
MO132-32B			30	18	35	35	30	18

(1) NEC: NFPA®70 National Electrical Code®; CEC: CSA C22.1 Canadian Electrical Code.

UL/CSA Maximum short-circuit current ratings – MO132-B with AF(Z)B contactors

Type	Combination Motor Controllers (Type F) (1) Coordination type 1 with TF			
	Contactor	OL Relay	480Y / 277 V	600Y / 347 V
			kA	kA
MO132-0.16B	AF09(Z)B ... AF38(Z)B	TF42-B	65	50
MO132-0.25B	AF09(Z)B ... AF38(Z)B	TF42-B	65	50
MO132-0.4B	AF09(Z)B ... AF38(Z)B	TF42-B	65	50
MO132-0.63B	AF09(Z)B ... AF38(Z)B	TF42-B	65	50
MO132-1.0B	AF09(Z)B ... AF38(Z)B	TF42-B	65	50
MO132-1.6B	AF09(Z)B ... AF38(Z)B	TF42-B	65	50
MO132-2.5B	AF09(Z)B ... AF38(Z)B	TF42-B	65	50
MO132-4.0B	AF09(Z)B ... AF38(Z)B	TF42-B	65	50
MO132-6.3B	AF09(Z)B ... AF38(Z)B	TF42-B	65	47
MO132-10B	AF09(Z)B ... AF38(Z)B	TF42-B	65	30
MO132-12B	AF09(Z)B ... AF38(Z)B	TF42-B	65	30
MO132-16B	AF12(Z)B ... AF38(Z)B	TF42-B	65	30
MO132-20B	AF16(Z)B ... AF38(Z)B	TF42-B	65	30
MO132-25B	AF26(Z)B ... AF38(Z)B	TF42-B	50	30
MO132-32B	AF38(Z)B	TF42-B	50	30

(1) Requires the use of S1-M3-xx line-side terminal feeder block or TS1 terminal spacer.

Technical data

MS132-(K)B, MS165-B, MO132-B, MO165-B

UL/CSA Maximum short-circuit current ratings – MO165-B

Type	Manual Motor Controllers							
	Branch circuit protection, max. size per NEC/CEC (1)		for motor disconnect		for group installations		for tap conductor protection in group installations	
	Fuses	Circuit breaker	480 V	600 V	480 V	600 V	480Y / 277 V	600Y / 347 V
	A	A	kA	kA	kA	kA	kA	kA
MO165-16B	Any Listed fuses. Size per NEC/CEC	Any Listed UL489 / CSA C22.2 No.5 circuit breaker. Size per NEC/CEC	65	30	65	30	65	30
MO165-20B			65	30	65	30	65	30
MO165-25B			65	30	65	30	65	30
MO165-32B			65	30	65	30	65	30
MO165-42B			65	30	65	30	65	30
MO165-54B			65	30	65	30	65	30
MO165-65B			65	30	65	30	65	30
MO165-73B			50	10	50	10	50	10
MO165-80B			50	10	50	10	50	10

(1) NEC: NFPA®70 National Electrical Code®; CEC: CSA C22.1 Canadian Electrical Code.

Type	Combination Motor Controllers (Type F) Coordination type 1					
	480Y / 277 V	OL Relay	Contactor	600Y / 347 V	OL Relay	Contactor
	kA			kA		
MO165-16B	65	TF42-B	AF09(Z)B ... AF38(Z)B	30	TF42-B	AF09(Z)B ... AF38(Z)B
MO165-20B	65	TF42-B	AF26(Z)B ... AF38(Z)B	30	TF42-B	AF09(Z)B ... AF38(Z)B
MO165-25B	65	TF42-B	AF26(Z)B ... AF38(Z)B	50	TF42-B	AF26(Z)B ... AF38(Z)B
MO165-32B	65	TF42-B	AF26(Z)B ... AF38(Z)B	50	TF42-B	AF26(Z)B ... AF38(Z)B

General technical data

Type			MS132-(K)B	MS165-B	MO132-B	MO165-B
Pollution degree			3	3	3	3
Phase loss sensitivity			Yes	Yes	No	No
Disconnect function acc. to IEC/EN 60947-2			Yes	Yes	Yes	Yes
Ambient air temperature						
	Operation	Open - compensated	-25 ... +60 °C	-25 ... +60 °C	-	-
		Open	-25 ... +70 °C	-25 ... +60 °C	-25 ... +60 °C	-25 ... +60 °C
		Enclosed (IB132 (1))	0 ... +40 °C	-	-	-
	Storage		-50 ... +80 °C	-50 ... +80 °C	-50 ... +80 °C	-50 ... +80 °C
Ambient air temperature compensation			Acc. to IEC/EN60947-4-1	Acc. to IEC/EN60947-4-1	-	-
Maximum operating altitude permissible			2000 m	2000 m	2000 m	2000 m
Shock and vibration withstand acc. to IEC 61373			Category 1, Class B	Category 1, Class B	Category 1, Class B	Category 1, Class B
Mounting position			Position 1-6 (optional for single mounting)	Position 1-6 (optional for single mounting)	Position 1-6 (optional for single mounting)	Position 1-6 (optional for single mounting)
Mounting			DIN-rail (EN 60715)	DIN-rail (EN 60715)	DIN-rail (EN 60715)	DIN-rail (EN 60715)
Group mounting			On request	On request	On request	On request
Recommended screw for mounting plate			-	M4	-	M4
Screw torque for mounting plate			-	2 Nm	-	2 Nm
Minimum distance to other units same type		Horizontal	0 mm	0 mm	0 mm	0 mm
		Vertical	150 mm	150 mm	150 mm	150 mm
Minimum distance to electrical conductive board		Horizontal, up to 400 V	0 mm	0 mm	0 mm	0 mm
		Horizontal, up to 690 V	> 1.5 mm	> 1.5 mm	> 1.5 mm	> 1.5 mm
		Vertical	75 mm	75 mm	75 mm	75 mm
Degree of protection		Housing	IP20	IP20	IP20	IP20
		Main circuit terminals	IP10 (IP20 for MS132-KB)	IP10	IP10	IP10

(1) not suitable for MS165-B and MO165-B

Technical data

MS132-(K)B, MS165-B, MO132-B, MO165-B

Connecting characteristics

Main circuit			
Type		**MS132-B ≤ 10 A**	**MS132-B ≥ 12 A**
Connecting capacity			
Rigid	1 or 2 x	1 ... 4 mm²	1 ... 2.5 mm² 2.5 ... 6 mm²
Flexible with ferrule	1 or 2 x	0.75 ... 2.5 mm²	0.75 ... 6 mm²
Flexible with insulated ferrule	1 or 2 x	0.75 ... 2.5 mm²	0.75 ... 6 mm²
Flexible	1 or 2 x	0.75 ... 2.5 mm²	1 ... 2.5 mm² 2.5 ... 6 mm²
Stranded acc. to UL/CSA	1 or 2 x	AWG 16-12	AWG 16-8
Stripping length		9 mm	10 mm
Tightening torque		0.8 ... 1.2 Nm / 10 ... 12 lb.in	2.0 Nm / 18 lb.in
Recommended screw driver		Pozidriv 2	Pozidriv 2

Main circuit		
Type		**MS132-KB with Push-in Spring terminals**
Connecting capacity		
Rigid solid	1 or 2 x	1 ... 2.5 mm²
Rigid stranded	1 or 2 x	1 ... 6 mm²
Flexible with ferrule	1 or 2 x	0.5 ... 4 mm²
Flexible with insulated ferrule	1 x	0.5 ... 4 mm²
	1/2 x	0.5 ... 2.5 mm²
Flexible	1 or 2 x	0.75 ... 4 mm²
Stranded acc. to UL/CSA	1/2 x	AWG 18 ... AWG 10
	1 x	AWG 8
Wire stripping length		12 mm
Screwdriver		Flat Ø 3 mm x 0.5 mm

Main circuit		
Type		**MS165-B**
Connecting capacity		
Rigid	1 or 2 x	1 ... 50 mm²
Flexible with ferrule	1 or 2 x	1 ... 35 mm²
Flexible with insulated ferrule	1 or 2 x	1 ... 35 mm²
Flexible	1 or 2 x	1 ... 35 mm²
Stranded acc. to UL/CSA	1 or 2 x	AWG 16-0
Stripping length		16 mm
Tightening torque		4.0 Nm / 35 lb.in
Recommended screw driver		Pozidriv 2

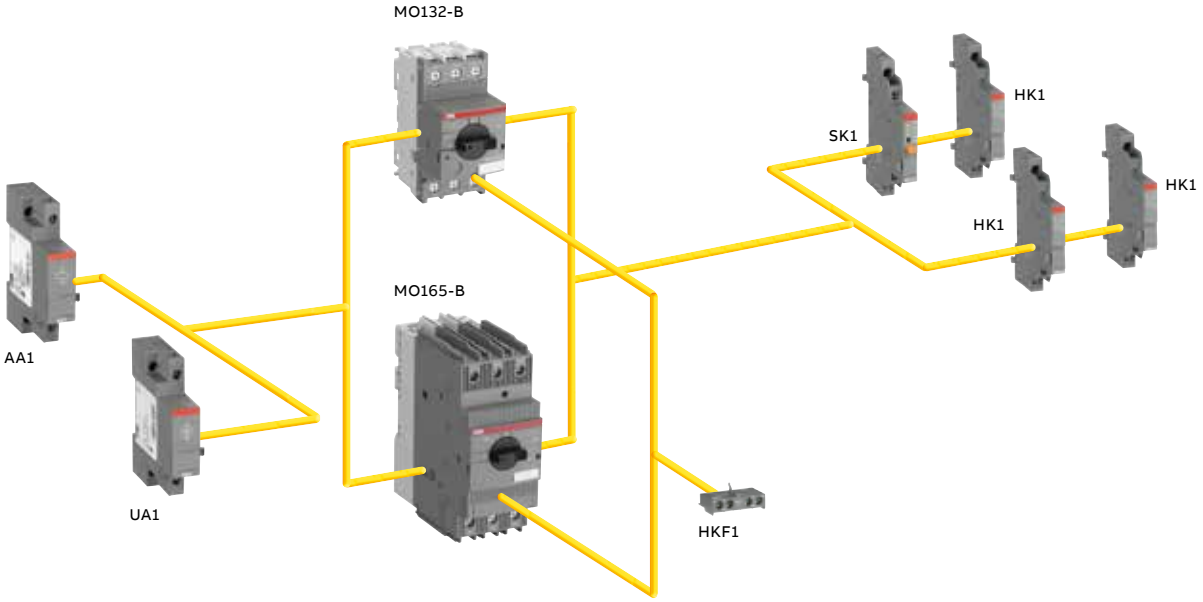
Main circuit			
Type		**MO132-B ≤ 10 A**	**MO132-B ≥ 12 A**
Connecting capacity			
Rigid	1 or 2 x	1 ... 4 mm²	1 ... 2.5 mm² 2.5 ... 6 mm²
Flexible with ferrule	1 or 2 x	0.75 ... 2.5 mm²	0.75 ... 6 mm²
Flexible with insulated ferrule	1 or 2 x	0.75 ... 2.5 mm²	0.75 ... 6 mm²
Flexible	1 or 2 x	0.75 ... 2.5 mm²	1 ... 2.5 mm² 2.5 ... 6 mm²
Stranded acc. to UL/CSA	1 or 2 x	AWG 16-12	AWG 16-8
Stripping length		9 mm	10 mm
Tightening torque		0.8 ... 1.2 Nm / 10 ... 12 lb.in	2.0 Nm / 18 lb.in
Recommended screw driver		Pozidriv 2	Pozidriv 2

Main circuit		
Type		**MO165-B**
Connecting capacity		
Rigid	1 or 2 x	1 ... 50 mm²
Flexible with ferrule	1 or 2 x	1 ... 35 mm²
Flexible with insulated ferrule	1 or 2 x	1 ... 35 mm²
Flexible	1 or 2 x	1 ... 35 mm²
Stranded acc. to UL/CSA	1 or 2 x	AWG 16-0
Stripping length		16 mm
Tightening torque		4.0 Nm / 35 lb.in
Recommended screw driver		Pozidriv 2

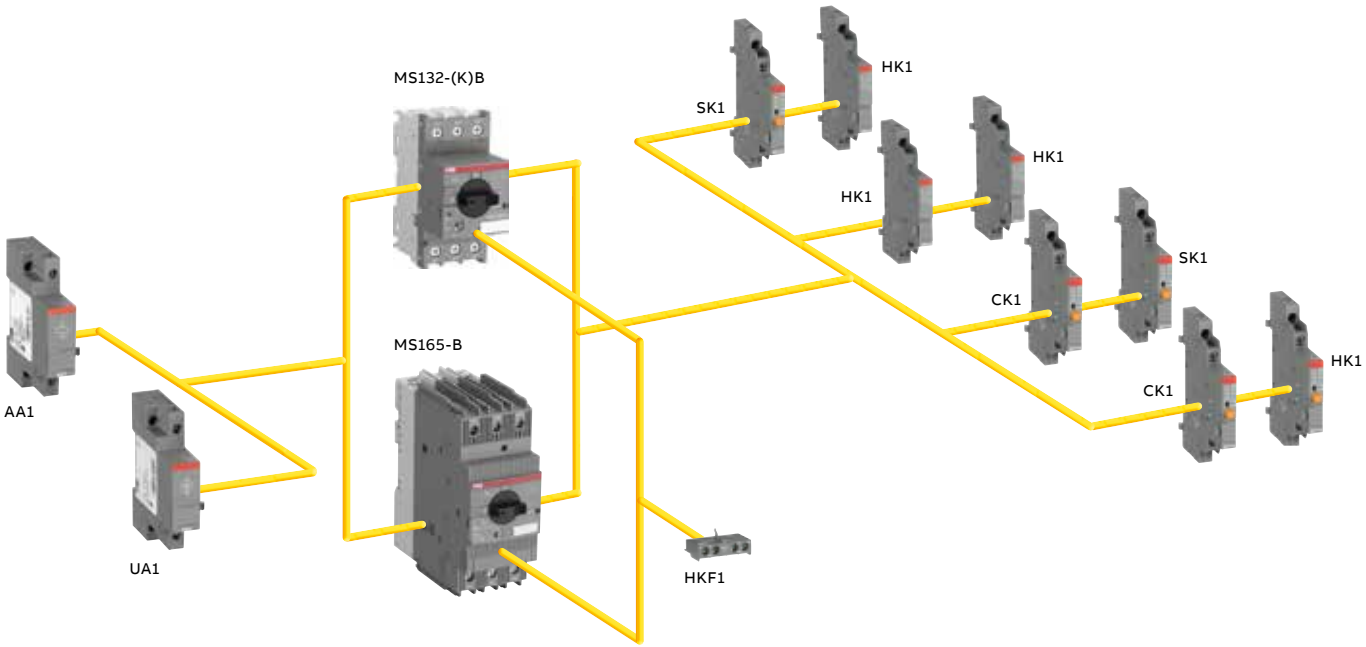
Main accessories

MS132-(K)B, MS165-B, MO132-B, MO165-B

Manual motor starters with accessories (MO132-B, MO165-B)



Manual motor starters with accessories (MS132-(K)B, MS165-B)



Note : MS132-KB + UA1 + CK1 is not possible

Main accessories with screw terminals

MS132-(K)B, MS165-B, MO132-B, MO165-B

HKF1-11

1SBC101209F0014

HK1-11

1SBC101210F0014

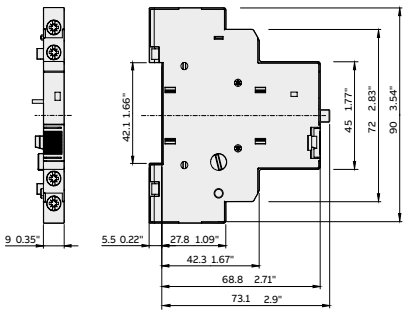
SK1-11

1SBC101286F0014

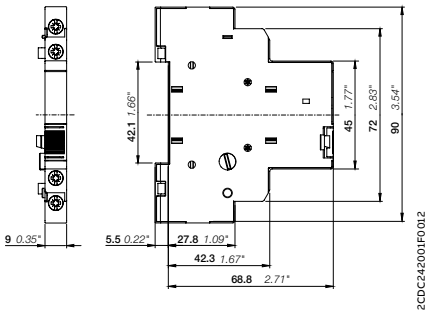
CK1-11

Manual motor starters can be equipped with auxiliary contacts for lateral/front mounting, signaling contacts for lateral mounting, undervoltage releases and shunt trips. Two different signaling contacts are available. The accessories can be fitted wiring free and without tools. A variety of combinations is possible as required for the application. The auxiliary contacts change position with the main contacts. The signaling contact SK signals tripping regardless if it was caused by short-circuit or overload. The signaling contact CK signals tripping in case it was caused by short-circuit.
Undervoltage releases are used for remote tripping of the manual motor starters especially for emergency stop circuits. Shunt trips release the MMS used for remote tripping. These main accessories are suitable throughout the MS132-(K)B/MS165-B/MO132-B/MO165-B ranges.

Suitable for	Auxiliary contacts N.O.	Auxiliary contacts N.C.	Description	Type	Order code	Pkg qty pce	Weight (1 pce) kg
Auxiliary contacts – mountable on the front							
MS132-(K)B, MS165-B, MO132-B, MO165-B	1	1		HKF1-11	1SAM201901R1001	10	0.015
	1	0		HKF1-10	1SAM201901R1003	10	0.013
	0	1		HKF1-01	1SAM201901R1004	10	0.013
	2	0		HKF1-20	1SAM201901R1002	10	0.015
Auxiliary contacts – mountable on the right							
MS132-(K)B, MS165-B, MO132-B, MO165-B	1	1	max. 2 pieces	HK1-11	1SAM201902R1001	2	0.035
	2	0	max. 2 pieces	HK1-20	1SAM201902R1002	2	0.035
	0	2	max. 2 pieces	HK1-02	1SAM201902R1003	2	0.035
	2	0	with lead contacts	HK1-20L	1SAM201902R1004	2	0.035
Signaling contacts – mountable on the right							
MS132-(K)B, MS165-B, MO132-B, MO165-B	1	1	for tripped alarm, max. 2 pieces	SK1-11	1SAM201903R1001	2	0.035
	2	0	for tripped alarm, max. 2 pieces	SK1-20	1SAM201903R1002	2	0.035
	0	2	for tripped alarm, max. 2 pieces	SK1-02	1SAM201903R1003	2	0.035
MS132-(K)B, MS165-B	1	1	for short-circuit alarm, max. 2 pieces	CK1-11	1SAM301901R1001	2	0.035
	2	0	for short-circuit alarm, max. 2 pieces	CK1-20	1SAM301901R1002	2	0.035
	0	2	for short-circuit alarm, max. 2 pieces	CK1-02	1SAM301901R1003	2	0.035



SK1



HK1

Main dimensions mm, inches

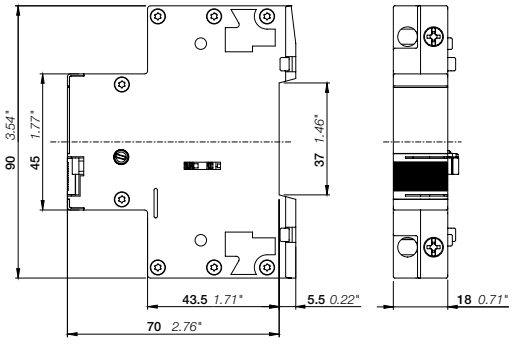
Main accessories with screw terminals

MS132-(K)B, MS165-B, MO132-B, MO165-B

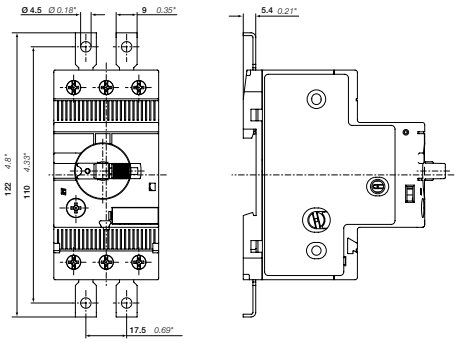
AA1-24

UA1-24

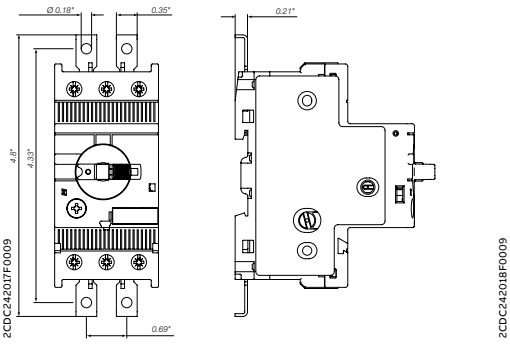
Suitable for	Rated control supply voltage 50 Hz V AC	Rated control supply voltage 60 Hz V AC	Type	Order code	Pkg qty pce	Weight (1 pce) kg
Shunt trips – mountable on the left						
MS132-(K)B, MS165-B,MO132-B, MO165-B	20 ... 24	20 ... 24	AA1-24	1SAM201910R1001	1	0.100
	110	110	AA1-110	1SAM201910R1002	1	0.100
	200 ... 240	200 ... 240	AA1-230	1SAM201910R1003	1	0.100
	350 ... 415	350 ... 415	AA1-400	1SAM201910R1004	1	0.100
Undervoltage releases – mountable on the left						
MS132-(K)B, MS165-B, MO132-B, MO165-B	20	24	UA1-20	1SAM201904R1010	1	0.100
	24	-	UA1-24	1SAM201904R1001	1	0.100
	48	-	UA1-48	1SAM201904R1002	1	0.100
	60	-	UA1-60	1SAM201904R1003	1	0.100
	110	120	UA1-110	1SAM201904R1004	1	0.100
	-	208	UA1-208	1SAM201904R1008	1	0.100
	230	240	UA1-230	1SAM201904R1005	1	0.100
	400	-	UA1-400	1SAM201904R1006	1	0.100
	415	480	UA1-415	1SAM201904R1007	1	0.100
	-	575	UA1-575	1SAM201904R1009	1	0.100
Screw fixing kit						
MS132-(K)B, MO132-B	-	-	FS116	1SAM201909R1001	10	0.020



AA1, UA1



MS132 + FS116 ≤ 10 A



MS132 + FS116 > 10 A

Main dimensions mm, inches

Main accessories with Push-in Spring terminals

MS132-(K)B, MS165-B, MO132-B, MO165-B

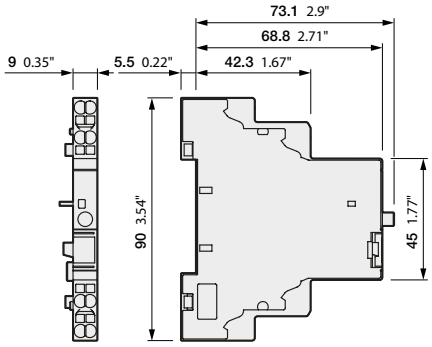
HKF1-11K

HK1-11K

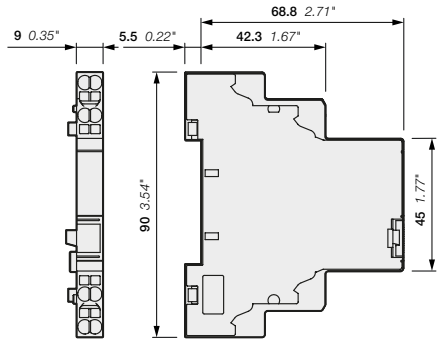
SK1-11K

Manual motor starters can be equipped with auxiliary contacts for lateral and front mounting as well as signaling contacts for lateral mounting. The accessories are equipped with Push-in Spring terminals that enable tool-free wiring. A variety of combinations is possible as required for the application. The auxiliary contacts change position with the main contacts. The signaling contact SK1 signals tripping regardless if it was caused by short-circuit or overload. These main accessories are suitable throughout the MS132-(K)B/MS165-B range.

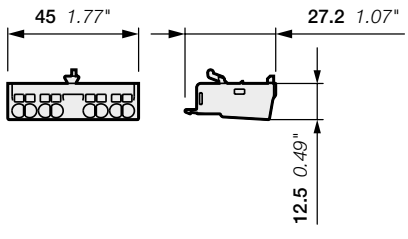
Suitable for	Auxiliary contacts N.O.	Auxiliary contacts N.C.	Description	Type	Order code	Pkg qty	Weight (1 pce) kg
Auxiliary contacts - mountable on the front							
MS132-(K)B, MS165-B, MO132-B, MO165-B.	1	1		HKF1-11K	1SAM201901R1201	10	0.016
	2	0		HKF1-20K	1SAM201901R1202	10	0.016
Auxiliary contacts - mountable on the right							
MS132-(K)B, MS165-B, MO132-B, MO165-B.	1	1	max. 2 pieces	HK1-11K	1SAM201902R1201	2	0.035
	2	0	max. 2 pieces	HK1-20K	1SAM201902R1202	2	0.035
	0	2	max. 2 pieces	HK1-02K	1SAM201902R1203	2	0.035
	2	0	with leading contacts	HK1-20LK	1SAM201902R1204	2	0.035
Signaling contacts - mountable on the right							
MS132-(K)B, MS165, MO132, MO165	1	1	for tripped alarm	SK1-11K	1SAM201903R1201	2	0.035
	2	0	for tripped alarm	SK1-20K	1SAM201903R1202	2	0.035
	0	2	for tripped alarm	SK1-02K	1SAM201903R1203	2	0.035



SK1-K



HK1-K



HKF1-K

Main dimensions mm, inches

Main accessories

MS132-(K)B, MS165-B, MO132-B, MO165-B

General technical data

Type		HK1, SK1, CK1	HKF1
Standards		IEC/EN 60947-1, IEC/EN 60947-2, IEC/EN 60947-4-1, IEC 60077-2 (applicable parts), IEC 60077-1 (applicable parts), IEC 61373, EN 45545-2.	
Rated operational voltage U_e		690 V AC / 600 DC	250 V AC / 250 V DC
Conventional free-air thermal current I_{th}		6 A	5 A
Rated frequency		50/60 Hz	
Rated impulse withstand voltage U_{imp}		6 kV	
Rated insulation voltage U_i		690 V AC	250 V AC
Pollution degree		3	
Ambient air temperature	Operation	-25 ... +70 °C	
	Storage	-50 ... +80 °C	
Resistance to shock acc. to IEC 60068-2-27		25g / 11 ms	
Resistance to vibrations acc. to IEC 60068-2-6		5g / 3 ... 150 Hz	
I_e / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category			
	24 V, 120 V	6 A	3 A
	240 V	4 A	1.5 A
	400 V	3 A	-
	440 V, 690 V	1 A	-
I_e / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category			
	24 V	2 A	1 A
	125 V	0.55 A	0.27 A
	250 V	0.27 A	0.11 A
	440 V, 600 V	0.15 A	-
Minimum switching capacity		17 V / 5 mA	
Short-circuit protective device	N.C., 95-96	10 A Type gG	
	N.O., 97-98	10 A Type gG	
Duty time		100 %	
Mounting		Right side of manual motor starter	Front of manual motor starter
Mounting positions		1-6	
Mechanical durability		100000 cycles (CK1: 10000 cycles)	100000 cycles
Electrical durability		100000 cycles (CK1: 10000 cycles)	100000 cycles

Contact utilization characteristics according to UL/CSA

Type	HK1, SK1, CK1	HKF1
Standards	UL 60947-1, UL 60947-4-1 (UL 508), CSA C22.2 No.60947-4-1 (CSA C22.2 No.14)	
Rated operational voltage U_e acc. to UL/CSA	600 V AC / 600 V DC	250 V AC / 250 V DC
Pilot duty	B600, Q600	B300, R300
AC thermal rated current	5 A	5 A
AC maximum volt-ampere making	3600 VA	3600 VA
AC maximum volt-ampere breaking	360 VA	360 VA
DC thermal rated current	2.5 A	1 A
DC maximum volt-ampere making-breaking	69 VA	28 VA

Connecting characteristics - Auxiliary circuit

Type		HK1, SK1, CK1	HKF1
Connecting capacity			
Rigid	1 or 2 x	1 ... 1.5 mm² / 0.5 ... 2.5 mm² (with Push-in Spring terminals)	1 ... 2.5 mm²
Flexible with ferrule	1 or 2 x	0.75 ... 1.5 mm² / 0.5 ... 2.5 mm² (with Push-in Spring terminals)	
Flexible with insulated ferrule	1 or 2 x	0.75 ... 1.5 mm² / 0.5 ... 1.5 mm² (with Push-in Spring terminals)	
Flexible	1 or 2 x	0.75 ... 1.5 mm² / 0.5 ... 2.5 mm² (with Push-in Spring terminals)	
Stranded acc. to UL/CSA	1 or 2 x	AWG 16-14 / AWG 20 - 14 (with Push-in Spring terminals)	
Stripping length		8 mm / 10 mm (with Push-in Spring terminals)	
Tightening torque		0.8 ... 1.2 Nm / 7 lb.in	
Recommended screw driver		Pozidriv 2	
		Flat Ø 3 mm x 0.5 mm (with Push-in Spring terminals)	

Main accessories

MS132-(K)B, MS165-B, MO132-B, MO165-B

General technical data

Type			UA1	AA1
Standards			IEC/EN 60947-1, IEC/EN 60947-4-1, UL 60947-1, UL 60947-4-1 (UL 508), CSA C22.2 No.60947-4-1 (CSA C22.2 No.14)	
Rated control supply voltage			see ordering details	AA1-24: 20-24 V 50/60 Hz; 20-70 V 50/60 Hz KB = 5 s, 20-70 V DC ON-Period = 5 s AA1-100: 110 V 50/60 Hz; 110-200 V 50/60 Hz KB = 5 s, 110-200 V DC ON-Period = 5 s AA1-230: 200-240 V 50/60 Hz, 200-350 V 50/60 Hz KB = 5 s, 200-350 V DC ON-Period = 5 s AA1-400: 350-415 V 50/60 Hz, 350-500 V 50/60 Hz KB = 5 s, 350-500 V DC ON-Period = 5 s
Rated frequency			see ordering details	50/60 Hz, DC
Operating voltage	Tripping		0.35 ... 0.7 x Us	0.7 ... 1.1 x Us
	Coil operating voltage		0.85 ... 1.1 x Us	-
Power consumption	Pull-in	**AC**	on request	on request
		DC	on request	on request
	Holding	**AC**	on request	-
		DC	on request	-
Rated impulse withstand voltage U_{imp}			6 kV	6 kV
Rated insulation voltage U_i			690 V	690 V
Pollution degree			3	3
Ambient air temperature	Operation		-25 .... +60 °C	-25 .... +60 °C
	Storage		-50 ...+80 °C	-50 ...+80 °C
Resistance to shock acc. to IEC 60068-2-27			25g / 11 ms	25g / 11 ms
Resistance to vibrations acc. to IEC 60068-2-6			5g / 3 ... 150 Hz	5g / 3 ... 150 Hz
Mounting			left side of manual motor starters	left side of manual motor starters
Mounting positions			-	-

Note : For AA1 please consider 15 min OFF-period after max. 5 s ON-period, for voltages above the rated values.

Connecting characteristics

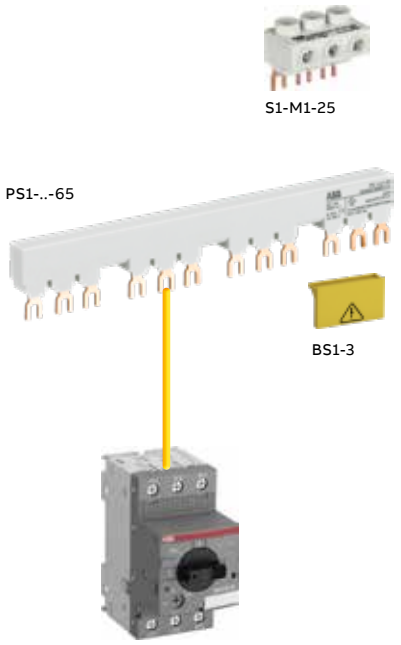
Auxiliary circuit

Type		UA1	AA1
Connecting capacity			
Rigid	1 or 2 x	1 ... 4 mm²	
Flexible with ferrule	1 or 2 x	0.75 ... 2.5 mm²	
Flexible with insulated ferrule	1 x	0.75 ... 2.5 mm²	
	2 x	0.75 ... 1.5 mm²	
Flexible	1 or 2 x	0.75 ... 2.5 mm²	
Stranded acc. to UL/CSA	1 or 2 x	AWG 16-12	
Stripping length		10 mm	
Tightening torque		0.8 ... 1.2 Nm / 7 lb.in	
Recommended screw driver		Pozidriv 2	

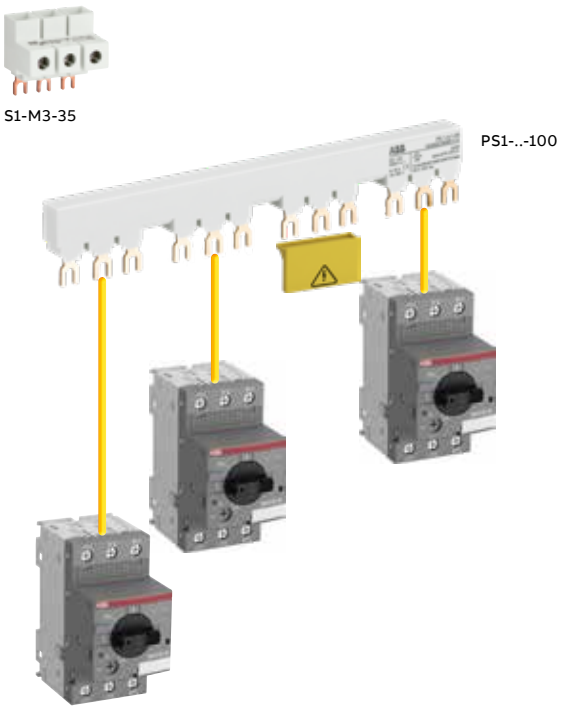
Accessories

MS132-(K)B, MS165-B, MO132-B, MO165-B

Manual motor starters with three-phase busbar systems (MS132-(K)B, MO132-B)



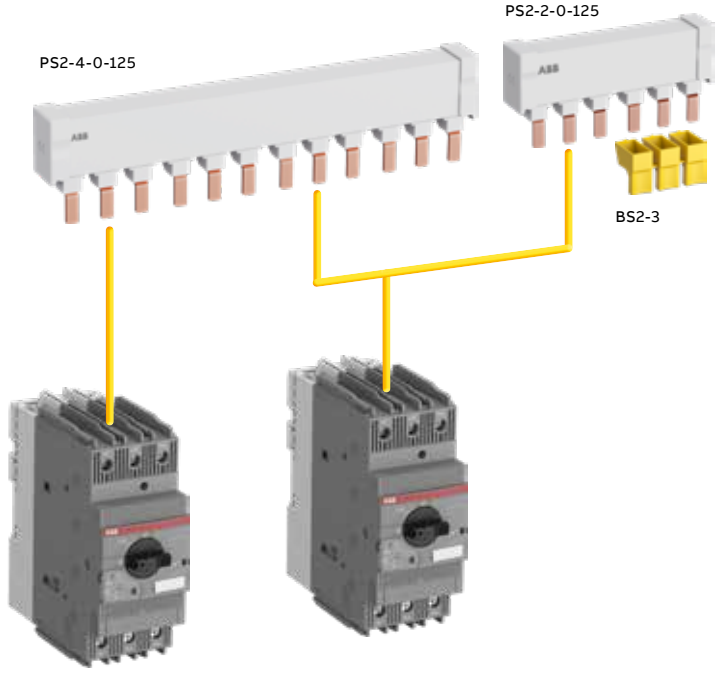
Three-phase busbar up to 65 A



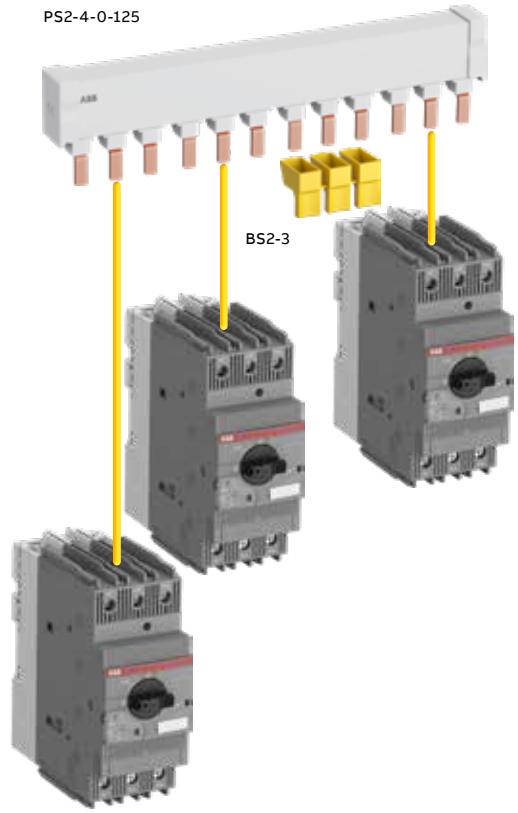
Three-phase busbar up to 100 A

Note: busbars and feeder blocks are only suitable for screw versions.

Manual motor starters with three-phase busbar systems (MS165-B, MO165-B)



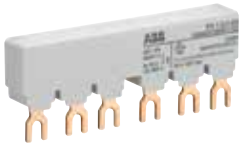
Three-phase busbar up to 125 A



Three-phase busbar up to 125 A

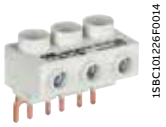
Accessories

MS132-(K)B, MO132-B



PS1-2-0-65

PS1-3-1-100



S1-M1-25

S1-M2-25

SA2

PB1-1-32

S1-PB1-25

Three-phase busbars ensure a quick and safe connection and are therefore a cost effective solution. A variety of different three-phase busbars up to 100 A are in the assortment. Between 2 and 4 manual motor starters with none, one or two lateral auxiliary contacts can be connected. Different three-phase feeder terminals are available according to the application.

Phase connecting links and phase power infeed blocks are also available for single-phase applications.

Suitable for	Rated operational current A	Number of manual motor starters	Number of lateral auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce) kg
Three-phase busbars							
MS132-B, MO132-B	65	2	0	PS1-2-0-65	1SAM201906R1102	10	0.034
	65	3	0	PS1-3-0-65	1SAM201906R1103	10	0.055
	65	4	0	PS1-4-0-65	1SAM201906R1104	10	0.077
	65	5	0	PS1-5-0-65	1SAM201906R1105	10	0.098
	65	2	1	PS1-2-1-65	1SAM201906R1112	10	0.036
	65	3	1	PS1-3-1-65	1SAM201906R1113	10	0.060
	65	4	1	PS1-4-1-65	1SAM201906R1114	10	0.087
	65	5	1	PS1-5-1-65	1SAM201906R1115	10	0.108
	65	2	2	PS1-2-2-65	1SAM201906R1122	10	0.040
	65	3	2	PS1-3-2-65	1SAM201906R1123	10	0.067
	65	4	2	PS1-4-2-65	1SAM201906R1124	10	0.095
	65	5	2	PS1-5-2-65	1SAM201906R1125	10	0.122
MS132-B, MO132-B	100	3	0	PS1-3-0-100	1SAM201916R1103	10	0.084
	100	4	0	PS1-4-0-100	1SAM201916R1104	10	0.117
	100	5	0	PS1-5-0-100	1SAM201916R1105	10	0.154
	100	3	1	PS1-3-1-100	1SAM201916R1113	10	0.094
	100	4	1	PS1-4-1-100	1SAM201916R1114	10	0.134
	100	5	1	PS1-5-1-100	1SAM201916R1115	10	0.172
	100	3	2	PS1-3-2-100	1SAM201916R1123	10	0.105

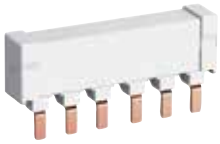
Note: busbars are only suitable for screw versions

Suitable for	Rated operational current A	Rated cross section mm²	Mounting form	Type	Order code	Pkg qty	Weight (1 pce) kg
Three-phase feeder terminals							
MS132-B, MO132-B	65	25	Flat	S1-M1-25	1SAM201907R1101	10	0.038
	65	25	High	S1-M2-25	1SAM201907R1102	10	0.051
	65	25	UL/CSA Type E/F and IEC	S1-M3-25	1SAM201907R1103	10	0.042
	100	35	UL/CSA Type E/F and IEC	S1-M3-35	1SAM201913R1103	10	0.060

Suitable for	Description	Type	Order code	Pkg qty	Weight (1 pce) kg
MS132-B, MO132-B	Protection cover for busbars	BS1-3	1SAM201908R1001	50	0.003
MS132-(K)B, MO132-B,	Screw fixing kit	FS116	1SAM201909R1001	1	0.020
	Padlock + two keys	SA2	GJF1101903R0002	10	0.020
Accessories for single-phase connection (IEC only)					
MS132-B, MO132-B	Phase connecting link	PB1-1-32	1SAM201914R1001	1	0.009
	Phase power infeed block	S1-PB1-25	1SAM201914R1002	1	0.013

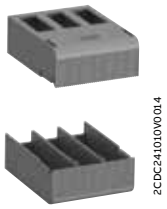
Accessories

MS165-B, MO165-B



PS2-2-0-125

PS2-3-0-125



KA165

BS2-3

SA2

Three-phase busbars ensure a quick and safe connection and are therefore a cost effective solution. A variety of different three-phase busbars up to 125 A are in the assortment. Between 2 and 4 manual motor starters with none, one or two lateral auxiliary contacts can be connected.

Suitable for	Rated operational current A	Number of Manual motor starters	Number of lateral auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce) kg
Three-phase busbars							
MS165-B, MO165-B	125	2	0	PS2-2-0-125	1SAM401920R1002	10	0.100
	125	3	0	PS2-3-0-125	1SAM401920R1003	10	0.162
	125	4	0	PS2-4-0-125	1SAM401920R1004	10	0.226
	125	2	2	PS2-2-2-125	1SAM401920R1022	10	0.117
	125	3	2	PS2-3-2-125	1SAM401920R1023	10	0.197
	125	4	2	PS2-4-2-125	1SAM401920R1024	10	0.277

Other busbar types on request.

Suitable for	Description	Type	Order code	Pkg qty	Weight (1 pce) kg
MS165-B, MO165-B	Terminal shroud	KA165	1SAM401922R1001	10	0.025
	Protection cover for busbars	BS2-3	1SAM401921R1001	10	0.005
	Padlock + two keys	SA2	GJF1101903R0002	10	0.020

Accessories

MS132-B, MS165-B, MO132-B, MO165-B

General technical data

Type		PS1-xxx-65	PS1-xxx-100	PS2-xxx-125	S1-Mx-25	S1-Mx-35
Standards		IEC/EN 60947-4-1, IEC/EN 60947-1, UL 60947-1, UL 60947-4-1 (UL 508), CSA C22.2 No.60947-4-1 (CSA C22.2 No.14)				
Rated operational voltage Ue		690 V				
Rated operational voltage Ue acc. to UL/CSA		600 V AC				
Rated operational current Ie		65 A	100 A	125 A	65 A	100 A
Rated operational current Ie acc. to UL/CSA		65 A	92 A	125 A	65 A	92 A
Rated frequency		50/60 Hz				
Rated impulse withstand voltage Uimp		6 kV				
Rated insulation voltage Ui		690 V AC				
Pollution degree		3				
Cross-section		10 mm²	16 mm²	25 mm²	25 mm²	35 mm²
Ambient air temperature	Operation	-25 ... +70 °C				
	Storage	-50 ... +80 °C				
Resistance to shock acc. to IEC 60068-2-27		25g / 11 ms				
Resistance to vibrations acc. to IEC 60068-2-6		5g / 3 ... 150 Hz				

Electrical connection - Main circuit

Type		S1-Mx-25	S1-Mx-35
Connecting capacity			
Rigid	1 x	6 ... 25 mm²	10 ... 35 mm²
Flexible with ferrule	1 x	6 ... 16 mm²	10 ... 35 mm²
Flexible with insulated ferrule	1 x	6 ... 16 mm²	10 ... 35 mm²
Flexible	1 x	6 ... 16 mm²	10 ... 35 mm²
Stranded acc. to UL/CSA	1 x	AWG 10-4	AWG 8-2
Stripping length		10 mm	12 mm
Tightening torque		2.5 Nm / 22 lb.in	4.5 Nm / 40 lb.in
Recommended screwdriver		Pozidriv 2	Hexagon SW4

AF..B contactors and NF..B contactor relays Connection with standard ferrules

3/2 **Overview**

3/5 **AF..(Z)B 3-pole contactors with screw terminals**

3/37 **AF..(Z)B..K 3-pole contactors with Push-in Spring terminals**

3/51 **AF..(Z)B 4-pole contactors with screw terminals**

3/77 **NF..(Z)B(..K) contactor relays with screw terminals and Push-in Spring terminals**

3/91 **Accessories**

3/107 **Terminal marking and positioning**

3/112 **Dimensions and voltage code table**

AF..(Z)B(..K) contactors and NF..(Z)B(..K) contactor relays

Connection with standard ferrules

AF..(Z)B(..K) 3-pole contactors

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

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

Main accessories

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

AF..(Z)B 4-pole contactors

Contactor type				AF09(Z)B	AF16(Z)B	AF26(Z)B	AF38(Z)B	AF40B	AF52B	AF80B
IEC	AC-1 Rated operational current	θ ≤ 40 °C, 690 V	A	25	30	45	55	70	100	125
	Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 60 °C, 690 V	A	25	30	40	45	60	80	105
		θ ≤ 70 °C, 690 V	A	22	26	32	37	50	70	90
UL/CSA	General use rating	600 V	A	25	30	45	55	60	80	105

Main accessories

Auxiliary contact blocks	Front mounting	CA4, CA4..K, CAT4		CA4, CA4..K
	Side mounting	CAL4-11, CAL4-11K		
Interlocking units	Mechanical	VM4	VM96-4	
	Mechanical / electrical	VEM4	-	
Surge suppressors		Built-in surge protection		

NF..(Z)B(..K) Contactors relays

Number of contacts				2 2	3 1	4 0	4 4	6 2	8 0
IEC	AC-15 Rated operational current	400 V	A	3	3	3	3	3	3
UL/CSA	Pilot Duty			A600, Q600			A600, Q600		
Contactor relay type				NF(Z)B22E NF(Z)B22EK	NF(Z)B31E NF(Z)B31EK	NF(Z)B40E NF(Z)B40EK	NF(Z)B44E NF(Z)B44EK	NF(Z)B62E NF(Z)B62EK	NF(Z)B80E NF(Z)B80EK

	18.5	22	30	37	45/55	55	75	75	90	110	132	160	200
	30	40	50	60	60/75	75	100	100	125	150	200	250	300
	AF40B	**AF52B**	**AF65B**	**AF80B**	**AF96B**	**AF116B**	**AF140B**	**AF146B**	**AF190B**	**AF205B**	**AF265B**	**AF305B**	**AF370B**
	40	53	65	80	105	116	140	146	190	205	265	305	370
	70	100	105	125	130	160	200	225	275	350	400	500	600
	60	80	90	100	105	145	175	200	250	300	350	400	500
	50	70	80	85	90	130	160	175	200	240	290	325	400
	60	80	90	105	115	160	200	200	250	300	350	400	520
	2	-	-	3	-	–	4	–	–	–	5	–	–

		CA4, CA4..K	**–**
			CAL19
	VM96-4		**VM19** (for same size contactors)
	-		

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

	–
	CAL19
	VM19 (for same size contactors)

AF..(Z)B 3-pole contactors connection with standard ferrules

	Screw terminals	
3/6	AF09ZB ... AF38ZB	DC operated
3/7	AF09(Z)B ... AF38(Z)B	AC operated
3/8	AF40B...AF96B	DC operated
3/9	AF40B...AF96B	AC operated
3/11	AF40B...AF96B	DC operated - with 1 N.O. + 1 N.C.
3/12	AF40B...AF96B	AC operated - with 1 N.O. + 1 N.C.
3/14	AF116B ... AF146B	DC operated
3/15	AF116B ... AF146B	AC operated
3/16	AF190B ... AF370B	DC operated
3/17	AF190B ... AF370B	AC operated
3/19	Technical data	
3/33	Electrical durability	

For direct product details information, use product type or order code, ex:

www.abb.com/productdetails/**AF09ZB-30-10-21**
www.abb.com/productdetails/**1SBL136061R2110**

AF09ZB ... AF38ZB 3-pole contactors

4 to 18.5 kW

DC operated - connection with standard ferrules

AF09ZB-30-10

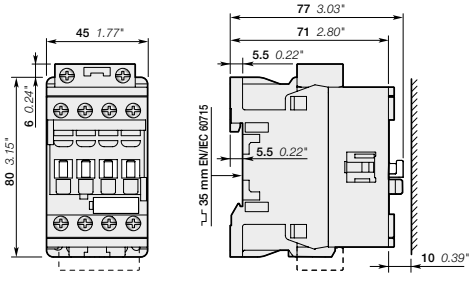
AF26ZB-30-00

AF09ZB ... AF38ZB 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC. These contactors are of the block type design with 3 main poles.

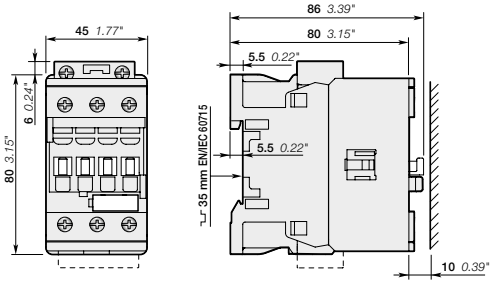
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (H2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC		UL / CSA		Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V DC	V DC				kg
4	25	5	25	24, 33, 48	20...60	1 0	AF09ZB-30-10-21	1SBL136061R2110	0.310
						0 1	AF09ZB-30-01-21	1SBL136061R2101	0.310
				72, 96, 110	48...130	1 0	AF09ZB-30-10-22	1SBL136061R2210	0.310
						0 1	AF09ZB-30-01-22	1SBL136061R2201	0.310
				220	100...250	1 0	AF09ZB-30-10-23	1SBL136061R2310	0.310
						0 1	AF09ZB-30-01-23	1SBL136061R2301	0.310
5.5	28	7.5	28	24, 33, 48	20...60	1 0	AF12ZB-30-10-21	1SBL156061R2110	0.310
						0 1	AF12ZB-30-01-21	1SBL156061R2101	0.310
				72, 96, 110	48...130	1 0	AF12ZB-30-10-22	1SBL156061R2210	0.310
						0 1	AF12ZB-30-01-22	1SBL156061R2201	0.310
				220	100...250	1 0	AF12ZB-30-10-23	1SBL156061R2310	0.310
						0 1	AF12ZB-30-01-23	1SBL156061R2301	0.310
7.5	30	10	30	24, 33, 48	20...60	1 0	AF16ZB-30-10-21	1SBL176061R2110	0.310
						0 1	AF16ZB-30-01-21	1SBL176061R2101	0.310
				72, 96, 110	48...130	1 0	AF16ZB-30-10-22	1SBL176061R2210	0.310
						0 1	AF16ZB-30-01-22	1SBL176061R2201	0.310
				220	100...250	1 0	AF16ZB-30-10-23	1SBL176061R2310	0.310
						0 1	AF16ZB-30-01-23	1SBL176061R2301	0.310
11	45	15	45	24, 33, 48	20...60	0 0	AF26ZB-30-00-21	1SBL236061R2100	0.370
				72, 96, 110	48...130	0 0	AF26ZB-30-00-22	1SBL236061R2200	0.370
				220	100...250	0 0	AF26ZB-30-00-23	1SBL236061R2300	0.370
15	50	20	50	24, 33, 48	20...60	0 0	AF30ZB-30-00-21	1SBL276061R2100	0.370
				72, 96, 110	48...130	0 0	AF30ZB-30-00-22	1SBL276061R2200	0.370
				220	100...250	0 0	AF30ZB-30-00-23	1SBL276061R2300	0.370
18.5	50	25	50	24, 33, 48	20...60	0 0	AF38ZB-30-00-21	1SBL296061R2100	0.370
				72, 96, 110	48...130	0 0	AF38ZB-30-00-22	1SBL296061R2200	0.370
				220	100...250	0 0	AF38ZB-30-00-23	1SBL296061R2300	0.370

(1) Other control voltages, see voltage code table.



AF09ZB, AF12ZB, AF16ZB



AF26ZB, AF30ZB, AF38ZB

Main dimensions mm, inches

AF09(Z)B ... AF38(Z)B 3-pole contactors

4 to 18.5 kW

AC operated - connection with standard ferrules

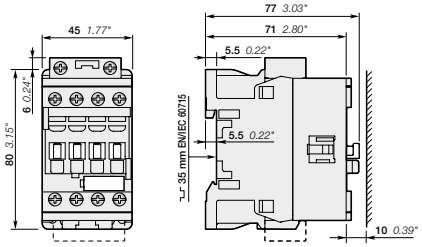
AF09(Z)B-30-10

AF26(Z)B-30-00

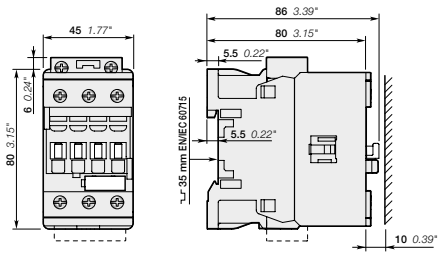
AF09(Z)B ... AF38(Z)B 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds.
They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC. These contactors are of the block type design with 3 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (H2, HL3 hazard levels)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max. of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression and side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories

IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
kW	A	hp	A	V AC 50/60 Hz				kg
4	25	5	25	24...60	1 0	AF09ZB-30-10-21	1SBL136061R2110	0.310
					0 1	AF09ZB-30-01-21	1SBL136061R2101	0.310
				48...130	1 0	AF09ZB-30-10-22	1SBL136061R2210	0.310
					0 1	AF09ZB-30-01-22	1SBL136061R2201	0.310
				100...250	1 0	AF09ZB-30-10-23	1SBL136061R2310	0.310
					0 1	AF09ZB-30-01-23	1SBL136061R2301	0.310
				250...500	1 0	AF09B-30-10-14	1SBL137061R1410	0.310
					0 1	AF09B-30-01-14	1SBL137061R1401	0.310
5.5	28	7,5	28	24...60	1 0	AF12ZB-30-10-21	1SBL156061R2110	0.310
					0 1	AF12ZB-30-01-21	1SBL156061R2101	0.310
				48...130	1 0	AF12ZB-30-10-22	1SBL156061R2210	0.310
					0 1	AF12ZB-30-01-22	1SBL156061R2201	0.310
				100...250	1 0	AF12ZB-30-10-23	1SBL156061R2310	0.310
					0 1	AF12ZB-30-01-23	1SBL156061R2301	0.310
				250...500	1 0	AF12B-30-10-14	1SBL157061R1410	0.310
					0 1	AF12B-30-01-14	1SBL157061R1401	0.310
7.5	30	10	30	24...60	1 0	AF16ZB-30-10-21	1SBL176061R2110	0.310
					0 1	AF16ZB-30-01-21	1SBL176061R2101	0.310
				48...130	1 0	AF16ZB-30-10-22	1SBL176061R2210	0.310
					0 1	AF16ZB-30-01-22	1SBL176061R2201	0.310
				100...250	1 0	AF16ZB-30-10-23	1SBL176061R2310	0.310
					0 1	AF16ZB-30-01-23	1SBL176061R2301	0.310
				250...500	1 0	AF16B-30-10-14	1SBL177061R1410	0.310
					0 1	AF16B-30-01-14	1SBL177061R1401	0.310
11	45	15	45	24...60	0 0	AF26ZB-30-00-21	1SBL236061R2100	0.370
				48...130	0 0	AF26ZB-30-00-22	1SBL236061R2200	0.370
				100...250	0 0	AF26ZB-30-00-23	1SBL236061R2300	0.370
				250...500	0 0	AF26B-30-00-14	1SBL237061R1400	0.370
15	50	20	50	24...60	0 0	AF30ZB-30-00-21	1SBL276061R2100	0.370
				48...130	0 0	AF30ZB-30-00-22	1SBL276061R2200	0.370
				100...250	0 0	AF30ZB-30-00-23	1SBL276061R2300	0.370
				250...500	0 0	AF30B-30-00-14	1SBL277061R1400	0.370
18.5	50	25	50	24...60	0 0	AF38ZB-30-00-21	1SBL296061R2100	0.370
				48...130	0 0	AF38ZB-30-00-22	1SBL296061R2200	0.370
				100...250	0 0	AF38ZB-30-00-23	1SBL296061R2300	0.370
				250...500	0 0	AF38B-30-00-14	1SBL297061R1400	0.370



AF09(Z)B, AF12(Z)B, AF16(Z)B



AF26(Z)B, AF30(Z)B, AF38(Z)B

Main dimensions mm, inches

03

AF40B...AF96B 3-pole contactors

18.5 to 45 kW

DC operated - connection with standard ferrules

AF40B-30-00

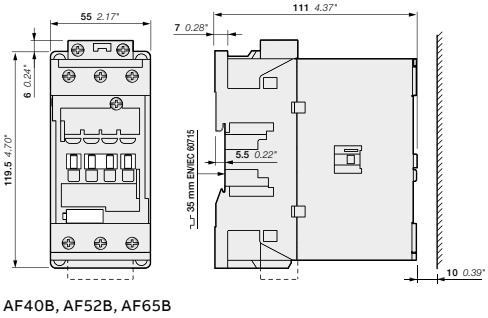
AF80B-30-00

AF40B...AF96B 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC (AF80B... AF96B up to 1000 V AC) and 220 V DC. These contactors are of the block type design with 3 main poles.

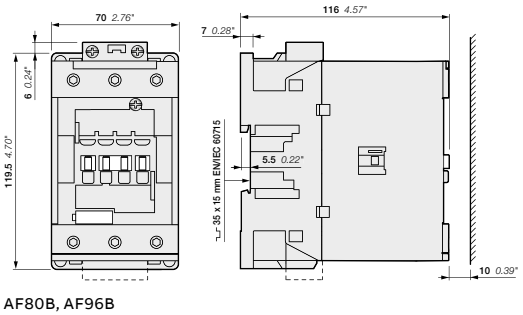
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC		UL / CSA		Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V DC	V DC				kg
18.5	70	30	60	24, 33, 48	20...60	0 0	AF40B-30-00-11	1SBL347061R1100	0.970
				72, 96, 110	48...130	0 0	AF40B-30-00-12	1SBL347061R1200	0.970
				220	100...250	0 0	AF40B-30-00-13	1SBL347061R1300	0.950
22	100	40	80	24, 33, 48	20...60	0 0	AF52B-30-00-11	1SBL367061R1100	0.970
				72, 96, 110	48...130	0 0	AF52B-30-00-12	1SBL367061R1200	0.970
				220	100...250	0 0	AF52B-30-00-13	1SBL367061R1300	0.950
30	105	50	90	24, 33, 48	20...60	0 0	AF65B-30-00-11	1SBL387061R1100	0.970
				72, 96, 110	48...130	0 0	AF65B-30-00-12	1SBL387061R1200	0.970
				220	100...250	0 0	AF65B-30-00-13	1SBL387061R1300	0.950
37	125	60	105	24, 33, 48	20...60	0 0	AF80B-30-00-11	1SBL397061R1100	1.220
				72, 96, 110	48...130	0 0	AF80B-30-00-12	1SBL397061R1200	1.220
				220	100...250	0 0	AF80B-30-00-13	1SBL397061R1300	1.170
45/55	130	60/75	115	24, 33, 48	20...60	0 0	AF96B-30-00-11	1SBL407061R1100	1.220
				72, 96, 110	48...130	0 0	AF96B-30-00-12	1SBL407061R1200	1.220
				220	100...250	0 0	AF96B-30-00-13	1SBL407061R1300	1.170

(1) Other control voltages, see voltage code table.



AF40B, AF52B, AF65B



AF80B, AF96B

Main dimensions mm, inches

AF40B...AF96B 3-pole contactors

18.5 to 45 kW

AC operated - connection with standard ferrules

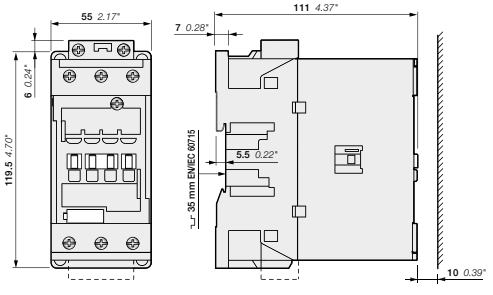
AF40B-30-00

AF80B-30-00

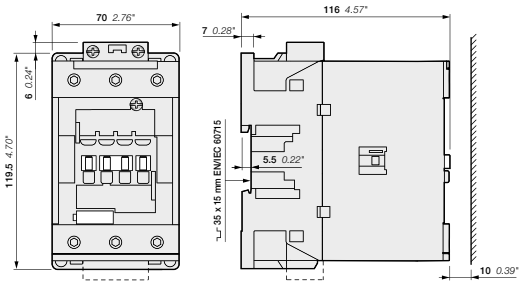
AF40B...AF96B 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC (AF80B... AF96B up to 1000 V AC) and 220 V DC. These contactors are of the block type design with 3 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting sinusoïdal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
kW	A	hp	A	V AC 50/60 Hz				kg
18.5	70	30	60	24...60	0 0	AF40B-30-00-11	1SBL347061R1100	0.970
				48...130	0 0	AF40B-30-00-12	1SBL347061R1200	0.970
				100...250	0 0	AF40B-30-00-13	1SBL347061R1300	0.950
				250...500	0 0	AF40B-30-00-14	1SBL347061R1400	0.950
22	100	40	80	24...60	0 0	AF52B-30-00-11	1SBL367061R1100	0.970
				48...130	0 0	AF52B-30-00-12	1SBL367061R1200	0.970
				100...250	0 0	AF52B-30-00-13	1SBL367061R1300	0.950
				250...500	0 0	AF52B-30-00-14	1SBL367061R1400	0.950
30	105	50	90	24...60	0 0	AF65B-30-00-11	1SBL387061R1100	0.970
				48...130	0 0	AF65B-30-00-12	1SBL387061R1200	0.970
				100...250	0 0	AF65B-30-00-13	1SBL387061R1300	0.950
				250...500	0 0	AF65B-30-00-14	1SBL387061R1400	0.950
37	125	60	105	24...60	0 0	AF80B-30-00-11	1SBL397061R1100	1.220
				48...130	0 0	AF80B-30-00-12	1SBL397061R1200	1.220
				100...250	0 0	AF80B-30-00-13	1SBL397061R1300	1.170
				250...500	0 0	AF80B-30-00-14	1SBL397061R1400	1.170
45/55	130	60/75	115	24...60	0 0	AF96B-30-00-11	1SBL407061R1100	1.220
				48...130	0 0	AF96B-30-00-12	1SBL407061R1200	1.220
				100...250	0 0	AF96B-30-00-13	1SBL407061R1300	1.170
				250...500	0 0	AF96B-30-00-14	1SBL407061R1400	1.170



AF40B, AF52B, AF65B

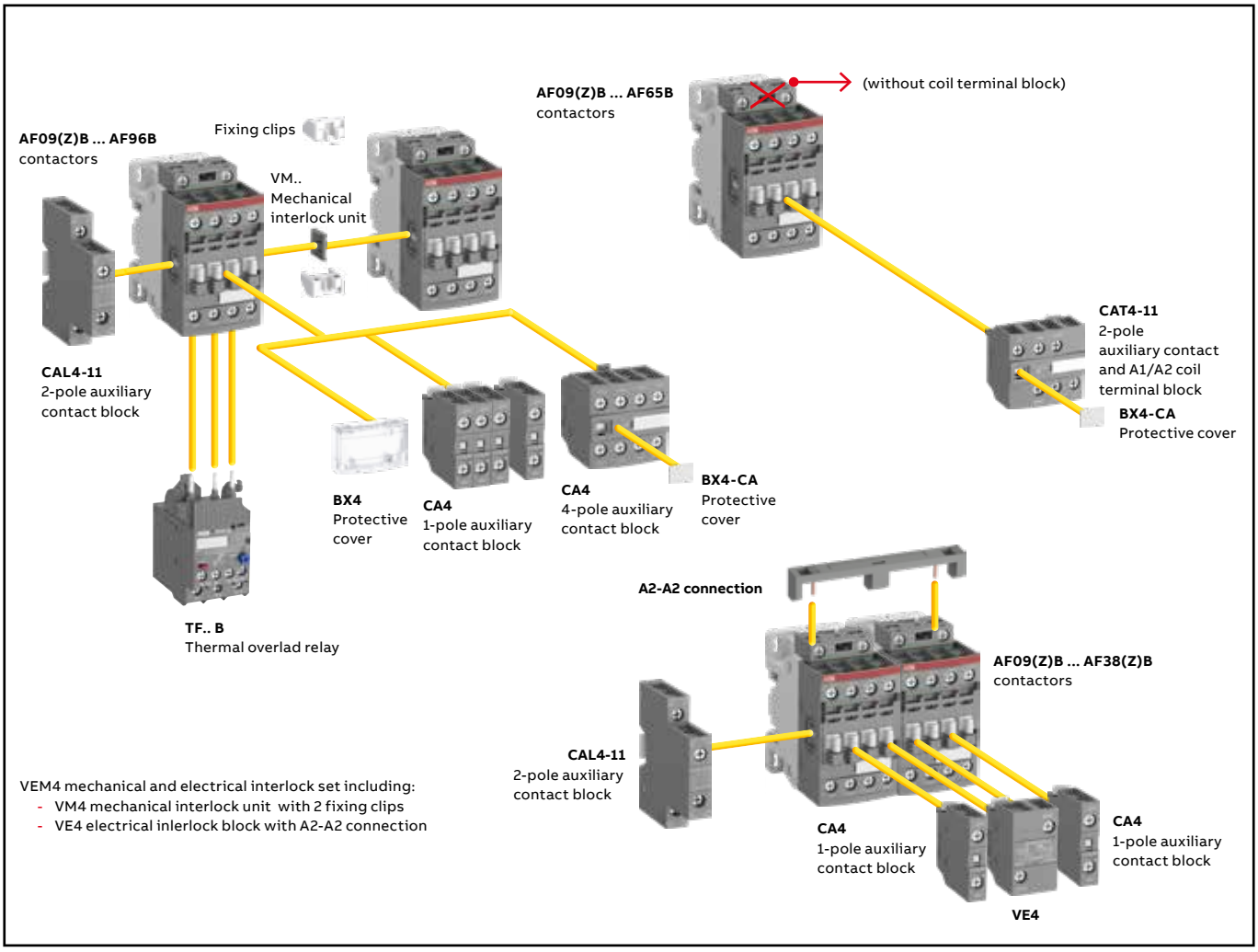


AF80B, AF96B

Main dimensions mm, inches

AF09(Z)B ... AF96B 3-pole contactors

Contactors and main accessories



VEM4 mechanical and electrical interlock set including:
- VM4 mechanical interlock unit with 2 fixing clips
- VE4 electrical inlerlock block with A2-A2 connection

Main accessory fitting details - for ordering details, technical data and other accessories: see section accessories

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor types	Main poles	Built-in auxiliary contacts	Front-mounted accessories: Auxiliary contact blocks 1-pole CA4	2-pole CAT4-11	4-pole CA4	Side-mounted accessories: Electrical and mechanical interlock set (between 2 contactors) VEM4	Auxiliary contact blocks: Left side 2-pole CAL4-11	Right side
AF09(Z)B ... AF38(Z)B (1)								
AF09(Z)B ... AF16(Z)B	3 0	0 1	4 max.	or 1	or 1	–	+ 1	–
AF09(Z)B ... AF16(Z)B	3 0	1 0	2 max.	or 1	–	–	+ 1	+ 1
AF26(Z)B ... AF38(Z)B	3 0	0 0	3 max.	–	–	+ 1	+ 1	or 1
AF40B ... AF96B								
AF40B ... AF65B	3 0	0 0	4 max.	or 1	or 1	–	+ 1	+ 1
AF80B, AF96B	3 0	0 0	4 max.	–	or 1	–	+ 1	+ 1

(1) Including add-on and built-in contacts : 4 N.C. auxiliary contacts max on positions 1, 2, 3, 4 and 3 N.C. auxiliary contacts max. on positions 1 ±30°, 5.

Overload relays fitting details (2)

Contactor types	Thermal overload relays
AF09(Z)B ... AF38(Z)B	TF42B (0.10...38 A)
AF40B ... AF65B	TF65B (22...67 A)
AF80B, AF96B	TF96B (40...96 A)

The addition of an overload relay on the contactor does not prevent fitting of many other accessories as shown above.

(2) Direct mounting - No kit required.

AF40B...AF96B 3-pole contactors

18.5 to 45 kW with 1 N.O. + 1 N.C. auxiliary contacts
DC operated - connection with standard ferrules

1SBC101005V0014

AF40B-30-11

1SBC101017V0014

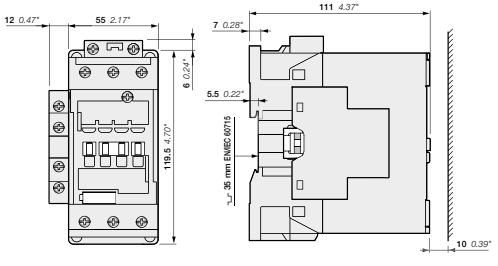
AF80B-30-11

AF40B...AF96B 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC (AF80B... AF96B up to 1000 V AC) and 220 V DC. These contactors are of the block type design with 3 main poles.

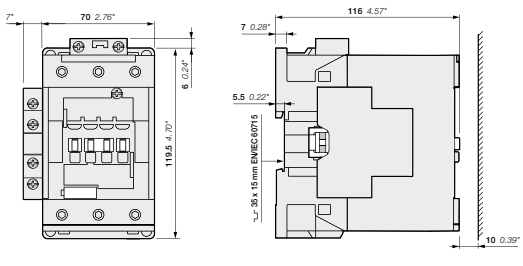
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC		UL / CSA		Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V DC	V DC				kg
18.5	70	30	60	24, 33, 48	20...60	1 1	AF40B-30-11-11	1SBL347061R1111	1.010
				72, 96, 110	48...130	1 1	AF40B-30-11-12	1SBL347061R1211	1.010
				220	100...250	1 1	AF40B-30-11-13	1SBL347061R1311	0.990
22	100	40	80	24, 33, 48	20...60	1 1	AF52B-30-11-11	1SBL367061R1111	1.010
				72, 96, 110	48...130	1 1	AF52B-30-11-12	1SBL367061R1211	1.010
				220	100...250	1 1	AF52B-30-11-13	1SBL367061R1311	0.990
30	105	50	90	24, 33, 48	20...60	1 1	AF65B-30-11-11	1SBL387061R1111	1.010
				72, 96, 110	48...130	1 1	AF65B-30-11-12	1SBL387061R1211	1.010
				220	100...250	1 1	AF65B-30-11-13	1SBL387061R1311	0.990
37	125	60	105	24, 33, 48	20...60	1 1	AF80B-30-11-11	1SBL397061R1111	1.260
				72, 96, 110	48...130	1 1	AF80B-30-11-12	1SBL397061R1211	1.260
				220	100...250	1 1	AF80B-30-11-13	1SBL397061R1311	1.210
45/55	130	60/75	115	24, 33, 48	20...60	1 1	AF96B-30-11-11	1SBL407061R1111	1.260
				72, 96, 110	48...130	1 1	AF96B-30-11-12	1SBL407061R1211	1.260
				220	100...250	1 1	AF96B-30-11-13	1SBL407061R1311	1.210

(1) Other control voltages, see voltage code table.



AF40B, AF52B, AF65B



AF80B, AF96B

Main dimensions mm, inches

AF40B...AF96B 3-pole contactors

18.5 to 45 kW with 1 N.O. + 1 N.C. auxiliary contacts
AC operated - connection with standard ferrules

1SBC101005V0014

AF40B-30-11

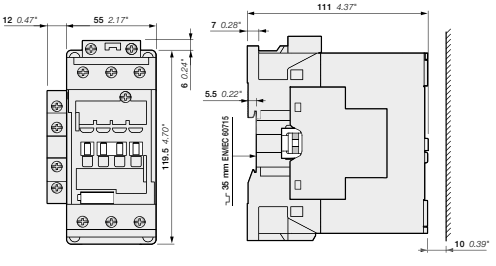
1SBC101017V0014

AF80B-30-11

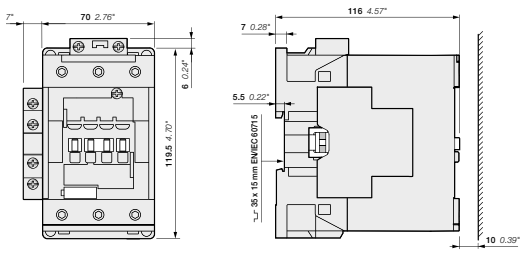
AF40B...AF96B 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC (AF80B... AF96B up to 1000 V AC) and 220 V DC. These contactors are of the block type design with 3 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting sinusoïdal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
kW	A	hp	A	V AC 50/60 Hz				kg
18.5	70	30	60	24...60	1 1	AF40B-30-11-11	1SBL347061R1111	1.010
				48...130	1 1	AF40B-30-11-12	1SBL347061R1211	1.010
				100...250	1 1	AF40B-30-11-13	1SBL347061R1311	0.990
				250...500	1 1	AF40B-30-11-14	1SBL347061R1411	0.990
22	100	40	80	24...60	1 1	AF52B-30-11-11	1SBL367061R1111	1.010
				48...130	1 1	AF52B-30-11-12	1SBL367061R1211	1.010
				100...250	1 1	AF52B-30-11-13	1SBL367061R1311	0.990
				250...500	1 1	AF52B-30-11-14	1SBL367061R1411	0.990
30	105	50	90	24...60	1 1	AF65B-30-11-11	1SBL387061R1111	1.010
				48...130	1 1	AF65B-30-11-12	1SBL387061R1211	1.010
				100...250	1 1	AF65B-30-11-13	1SBL387061R1311	0.990
				250...500	1 1	AF65B-30-11-14	1SBL387061R1411	0.990
37	125	60	105	24...60	1 1	AF80B-30-11-11	1SBL397061R1111	1.260
				48...130	1 1	AF80B-30-11-12	1SBL397061R1211	1.260
				100...250	1 1	AF80B-30-11-13	1SBL397061R1311	1.210
				250...500	1 1	AF80B-30-11-14	1SBL397061R1411	1.210
45/55	130	60/75	115	24...60	1 1	AF96B-30-11-11	1SBL407061R1111	1.260
				48...130	1 1	AF96B-30-11-12	1SBL407061R1211	1.260
				100...250	1 1	AF96B-30-11-13	1SBL407061R1311	1.210
				250...500	1 1	AF96B-30-11-14	1SBL407061R1411	1.210



AF40B, AF52B, AF65B

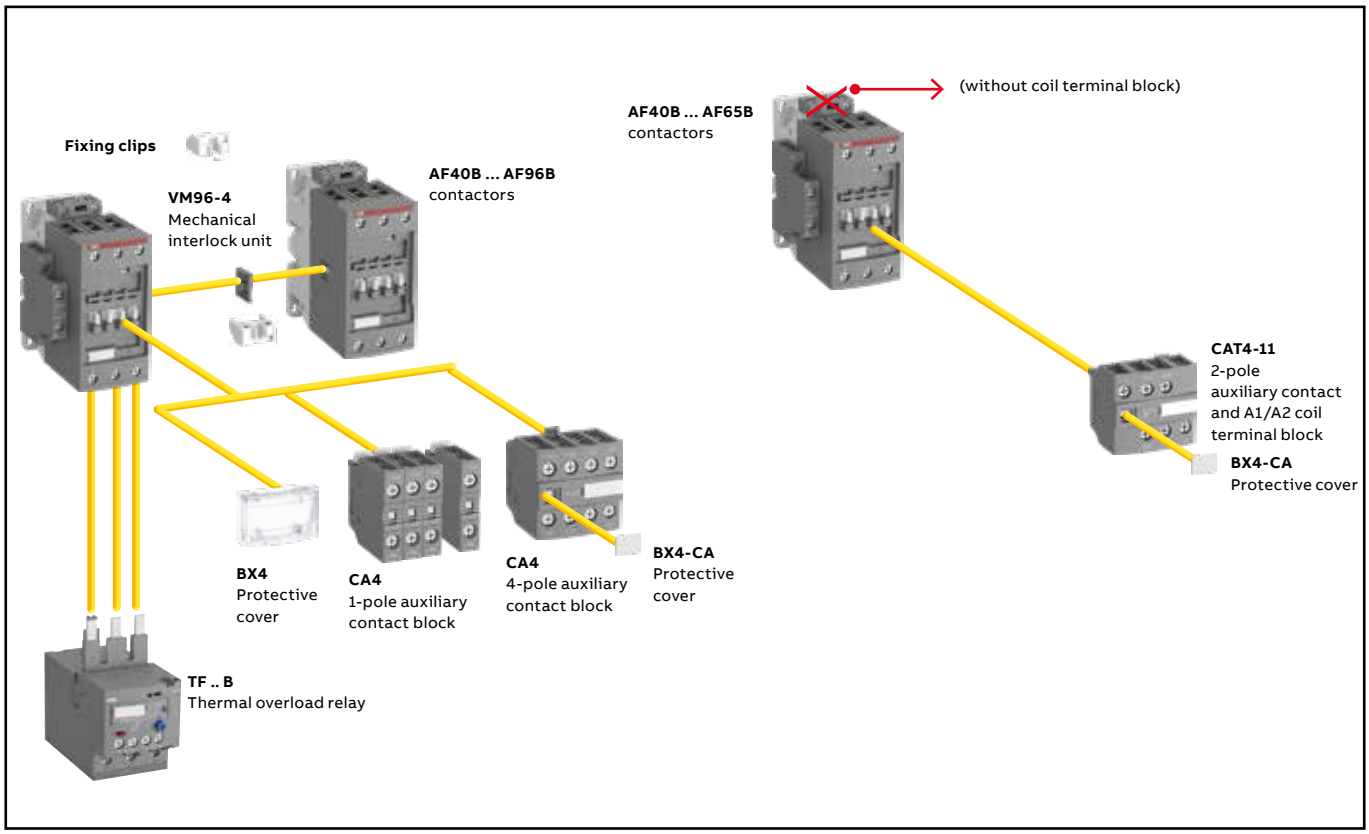


AF80B, AF96B

Main dimensions mm, inches

AF40B ... AF96B 3-pole contactors with 1 N.O. + 1 N.C. auxiliary contacts

Contactors and main accessories



Main accessory fitting details - for ordering details, technical data and other accessories: see section accessories

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor types	Main poles	Built-in auxiliary contacts	Front-mounted accessories Auxiliary contact blocks 1-pole CA4	2-pole CAT4-11	4-pole CA4	Side-mounted accessories Mechanical interlock set (between 2 contactors) VM96-4		Auxiliary contact blocks 2-pole CAL4-11 Left side	Right side
AF40B ... AF65B	3 0	1 1	4 max.	or 1	or 1	+ 1	+	–	–
			4 max.	or 1	or 1	–		–	1
AF80B, AF96B	3 0	1 1	4 max.	–	or 1	+ 1		–	–
			4 max.	–	or 1	–	+	–	1

Overload relays fitting details (2)

Contactor types	Thermal overload relays
AF40B ... AF65B	TF65B (22...67 A)
AF80B, AF96B	TF96B (40...96 A)

The addition of an overload relay on the contactor does not prevent fitting of many other accessories as shown above.

(2) Direct mounting - No kit required.

AF116B ... AF146B 3-pole contactors

55 to 75 kW

DC operated - connection with standard ferrules

1SFC101218V0001

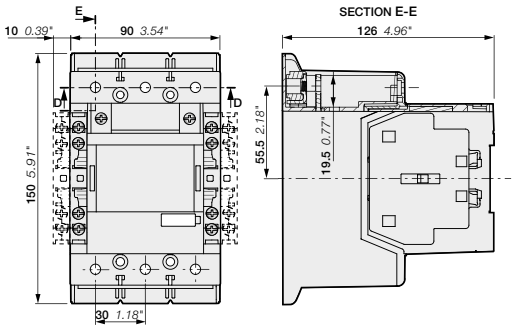
AF146B-30-22

AF116B ... AF146B 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. AF116B ... AF140B are mainly used for controlling 3-phase motors and power circuits up to 690 V AC, AF146B up to 1000 V AC and AF116B ... AF146B up to 220 V DC. These contactors are of the block type design with 3 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC		UL / CSA		Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V DC	V DC				kg
55	160	75	160	24, 33, 48	20...60	2 2	AF116B-30-22-11	1SFL427063R1122	1.500
				72, 96, 110	48...130	2 2	AF116B-30-22-12	1SFL427063R1222	1.500
				220	100...250	2 2	AF116B-30-22-13	1SFL427063R1322	1.500
75	200	100	200	24, 33, 48	20...60	2 2	AF140B-30-22-11	1SFL447063R1122	1.500
				72, 96, 110	48...130	2 2	AF140B-30-22-12	1SFL447063R1222	1.500
				220	100...250	2 2	AF140B-30-22-13	1SFL447063R1322	1.500
75	225	100	200	24, 33, 48	20...60	2 2	AF146B-30-22-11	1SFL467063R1122	1.500
				72, 96, 110	48...130	2 2	AF146B-30-22-12	1SFL467063R1222	1.500
				220	100...250	2 2	AF146B-30-22-13	1SFL467063R1322	1.500

(1) Other control voltages, see voltage code table.



AF116B, AF140B, AF146B-30-22

Main dimensions mm, inches

AF116B ... AF146B 3-pole contactors

55 to 75 kW

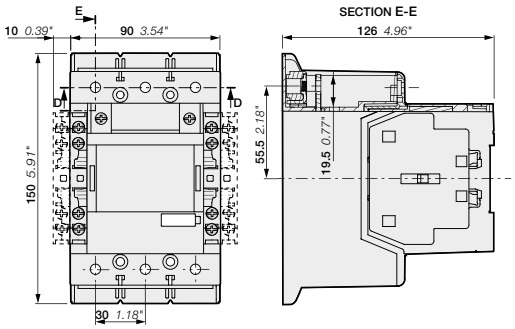
AC operated - connection with standard ferrules

AF146B-30-22

AF116B ... AF146B 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. AF116B ... AF140B are mainly used for controlling 3-phase motors and power circuits up to 690 V AC, AF146B up to 1000 V AC and AF116B ... AF146B up to 220 V DC. These contactors are of the block type design with 3 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max. of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
kW	A	hp	A	V AC 50/60 Hz				kg
55	160	75	160	24...60	2 2	AF116B-30-22-11	1SFL427063R1122	1.500
				48...130	2 2	AF116B-30-22-12	1SFL427063R1222	1.500
				100...250	2 2	AF116B-30-22-13	1SFL427063R1322	1.500
				250...500	2 2	AF116B-30-22-14	1SFL427063R1422	1.500
75	200	100	200	24...60	2 2	AF140B-30-22-11	1SFL447063R1122	1.500
				48...130	2 2	AF140B-30-22-12	1SFL447063R1222	1.500
				100...250	2 2	AF140B-30-22-13	1SFL447063R1322	1.500
				250...500	2 2	AF140B-30-22-14	1SFL447063R1422	1.500
75	225	100	200	24...60	2 2	AF146B-30-22-11	1SFL467063R1122	1.500
				48...130	2 2	AF146B-30-22-12	1SFL467063R1222	1.500
				100...250	2 2	AF146B-30-22-13	1SFL467063R1322	1.500
				250...500	2 2	AF146B-30-22-14	1SFL467063R1422	1.500



AF116B, AF140B, AF146B-30-22

Main dimensions mm, inches

AF190B ... AF370B 3-pole contactors

90 to 200 kW

DC operated - connection with standard ferrules

1SFC101219V0001

AF205B-30-22

1SFC101221V0001

AF370B-30-22

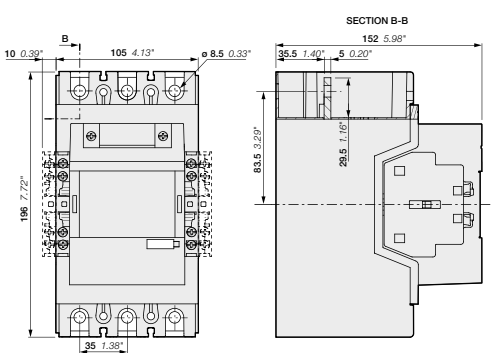
AF190B ... AF370B 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC and up to 220 V DC.

These contactors are of the block type design with 3 main poles.

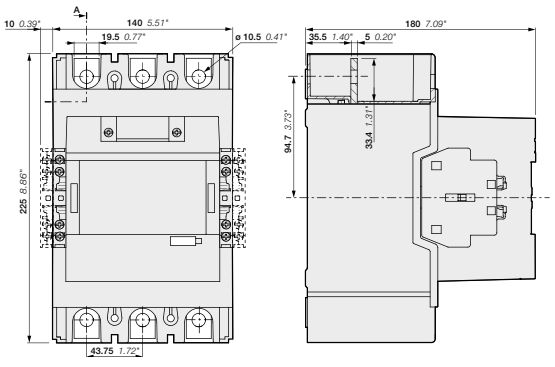
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC		UL / CSA		Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V DC	V DC				kg
90	275	125	250	24, 33, 48	20...60	2 2	AF190B-30-22-11	1SFL487063R1122	3.000
				72, 96, 110	48...130	2 2	AF190B-30-22-12	1SFL487063R1222	3.000
				220	100...250	2 2	AF190B-30-22-13	1SFL487063R1322	3.000
110	350	150	300	24, 33, 48	20...60	2 2	AF205B-30-22-11	1SFL527063R1122	3.000
				72, 96, 110	48...130	2 2	AF205B-30-22-12	1SFL527063R1222	3.000
				220	100...250	2 2	AF205B-30-22-13	1SFL527063R1322	3.000
132	400	200	350	24, 33, 48	20...60	2 2	AF265B-30-22-11	1SFL547063R1122	4.675
				72, 96, 110	48...130	2 2	AF265B-30-22-12	1SFL547063R1222	4.675
				220	100...250	2 2	AF265B-30-22-13	1SFL547063R1322	4.675
160	500	250	400	24, 33, 48	20...60	2 2	AF305B-30-22-11	1SFL587063R1122	4.675
				72, 96, 110	48...130	2 2	AF305B-30-22-12	1SFL587063R1222	4.675
				220	100...250	2 2	AF305B-30-22-13	1SFL587063R1322	4.675
200	600	300	520	24, 33, 48	20...60	2 2	AF370B-30-22-11	1SFL607063R1122	4.675
				72, 96, 110	48...130	2 2	AF370B-30-22-12	1SFL607063R1222	4.675
				220	100...250	2 2	AF370B-30-22-13	1SFL607063R1322	4.675

(1) Other control voltages, see voltage code table.



AF190B, AF205B-30-22



AF265B, AF305B, AF370B-30-22

Main dimensions mm, inches

AF190B ... AF370B 3-pole contactors

90 to 200 kW

AC operated - connection with standard ferrules

1SFC101219V0001

AF205B-30-22

1SFC101221V0001

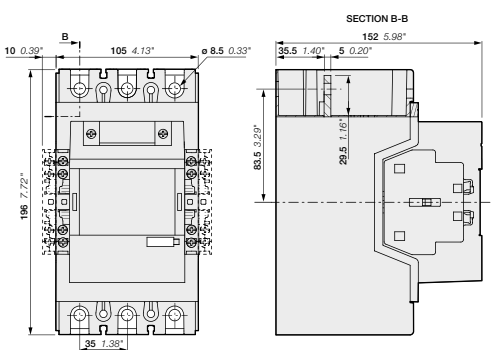
AF370B-30-22

AF190B ... AF370B 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC and up to 220 V DC.

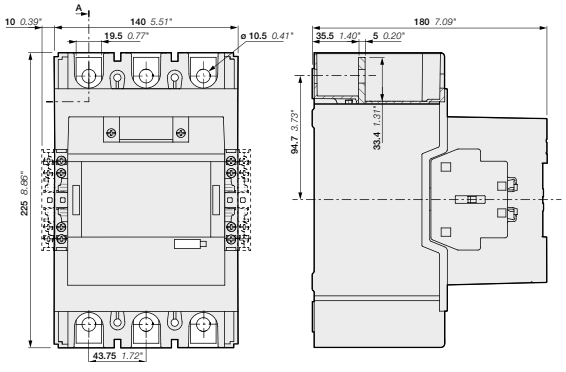
These contactors are of the block type design with 3 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
kW	A	hp	A	V AC 50/60 Hz				kg
90	275	125	250	24...60	2 2	AF190B-30-22-11	1SFL487063R1122	3.000
				48...130	2 2	AF190B-30-22-12	1SFL487063R1222	3.000
				100...250	2 2	AF190B-30-22-13	1SFL487063R1322	3.000
				250...500	2 2	AF190B-30-22-14	1SFL487063R1422	3.000
110	350	150	300	24...60	2 2	AF205B-30-22-11	1SFL527063R1122	3.000
				48...130	2 2	AF205B-30-22-12	1SFL527063R1222	3.000
				100...250	2 2	AF205B-30-22-13	1SFL527063R1322	3.000
				250...500	2 2	AF205B-30-22-14	1SFL527063R1422	3.000
132	400	200	350	24...60	2 2	AF265B-30-22-11	1SFL547063R1122	4.675
				48...130	2 2	AF265B-30-22-12	1SFL547063R1222	4.675
				100...250	2 2	AF265B-30-22-13	1SFL547063R1322	4.675
				250...500	2 2	AF265B-30-22-14	1SFL547063R1422	4.675
160	500	250	400	24...60	2 2	AF305B-30-22-11	1SFL587063R1122	4.675
				48...130	2 2	AF305B-30-22-12	1SFL587063R1222	4.675
				100...250	2 2	AF305B-30-22-13	1SFL587063R1322	4.675
				250...500	2 2	AF305B-30-22-14	1SFL587063R1422	4.675
200	600	300	520	24...60	2 2	AF370B-30-22-11	1SFL607063R1122	4.675
				48...130	2 2	AF370B-30-22-12	1SFL607063R1222	4.675
				100...250	2 2	AF370B-30-22-13	1SFL607063R1322	4.675
				250...500	2 2	AF370B-30-22-14	1SFL607063R1422	4.675



AF190B, AF205B-30-22

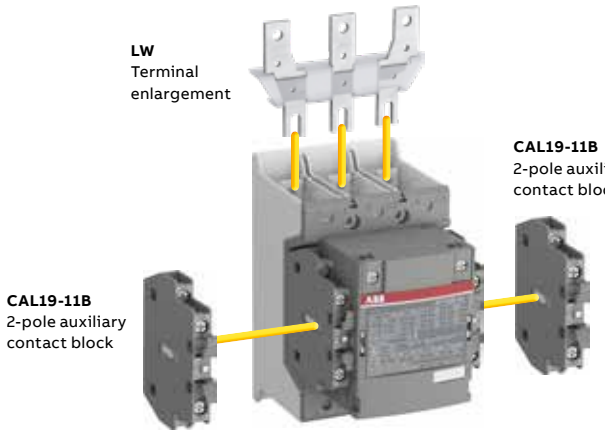


AF265B, AF305B, AF370B-30-22

Main dimensions mm, inches

AF116B ... AF370B 3-pole contactors

Contactors and main accessories



Main accessory fitting details - for ordering details, technical data and other accessories: see section accessories

Contactor types	Main poles	Available auxiliary contacts	Side-mounted accessories Auxiliary contact blocks		
			CAL19-11		CAL19-11B
AF116B ... AF370B	3 0	2 2	2 x CAL19-11 included	+	2 x CAL19-11B

AF09(Z)B ... AF38(Z)B 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

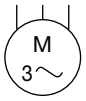
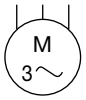
Contactor types		AF09(Z)B	AF12(Z)B	AF16(Z)B	AF26(Z)B	AF30(Z)B	AF38(Z)B
Standards (1)		IEC/EN 60947-1, IEC/EN 60947-4-1 IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), EN 50155 (applicable parts), TR CU 001/2011 IEC 61373					
Fire and smoke		EN 45545-2 (HL2, HL3)					
Rated operational voltage Ue max.		690 V					
Rated frequency (without derating)		50 / 60 Hz					
Conventional free-air thermal current Ith							
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		35 A	35 A	35 A	50 A	50 A	50 A
With conductor cross-sectional area		6 mm²	6 mm²	6 mm²	10 mm²	10 mm²	10 mm²
AC-1 Utilization category							
For air temperature close to contactor							
Ie / Rated operational current AC-1	θ ≤ 40 °C	25 A	28 A	30 A	45 A	50 A	50 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 60 °C	25 A	28 A	30 A	40 A	42 A	42 A
	θ ≤ 70 °C	22 A	24 A	26 A	32 A	37 A	37 A
With conductor cross-sectional area		4 mm²	6 mm²	6 mm²	10 mm²	10 mm²	10 mm²
AC-3, AC-3e Utilization category							
For air temperature close to contactor θ ≤ 60 °C							
Ie / Max. rated operational current AC-3, AC-3e (2)							
3-phase motors	220-230-240 V	9 A	12 A	18 A	26 A	33 A	40 A
	380-400 V	9 A	12 A	18 A	26 A	32 A	38 A
	415 V	9 A	12 A	18 A	26 A	32 A	38 A
	440 V	9 A	12 A	18 A	26 A	32 A	38 A
	500 V	9.5 A	12.5 A	15 A	23 A	28 A	33 A
	690 V	7 A	9 A	10.5 A	17 A	21 A	24 A
Rated operational power AC-3, AC-3e (2)							
1500 r.p.m. 50 Hz **1800 r.p.m. 60 Hz** **3-phase motors**	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW	11 kW
	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW	18.5 kW
	415 V	4 kW	5.5 kW	9 kW	11 kW	15 kW	18.5 kW
	440 V	4 kW	5.5 kW	9 kW	15 kW	18.5 kW	22 kW
	500 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW	22 kW
	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW	22 kW
Rated making capacity AC-3, AC-3e		10 x Ie AC-3, 12 x Ie AC-3e acc. to IEC 60947-4-1					
Rated breaking capacity AC-3, AC-3e		8 x Ie AC-3, 8.5 x Ie AC-3e acc. to IEC 60947-4-1					
Short-circuit protection device for contactors							
without thermal overload relay - Motor protection excluded (3)							
Ue ≤ 500 V AC - gG type fuse		25 A	32 A	32 A	50 A	63 A	63 A
Rated short-time withstand current Icw	1 s	300 A	300 A	300 A	700 A	700 A	700 A
at 40 °C ambient temperature,	10 s	150 A	150 A	150 A	350 A	350 A	350 A
in free air from a cold state	30 s	80 A	80 A	80 A	225 A	225 A	225 A
	1 min	60 A	60 A	60 A	150 A	150 A	150 A
	15 min	35 A	35 A	35 A	50 A	50 A	50 A
Maximum breaking capacity							
cos ϕ = 0.45	at 440 V	250 A	250 A	250 A	500 A	500 A	500 A
	at 690 V	106 A	106 A	106 A	200 A	200 A	200 A
Power dissipation per pole	Ie / AC-1	0.8 W	1 W	1.2 W	1.8 W	2.4 W	2.4 W
	Ie / AC-3, AC-3e	0.1 W	0.2 W	0.35 W	0.6 W	0.9 W	1.3 W
Max. electrical switching frequency	AC-1	600 cycles/h					
	AC-3, AC-3e	1200 cycles/h					
	AC-4	300 cycles/h			150 cycles/h		

(1) For compliance confirmation on applicable parts based on your application and combination, please consult your ABB sales representatives.
(2) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".
(3) For the protection of motor starters against short circuits, see "Coordination with short-circuit protection devices".

AF40B...AF96B 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

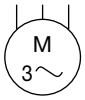
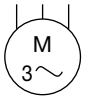
Contactor types		AF40B	AF52B	AF65B	AF80B	AF96B
Standards		IEC/EN 60947-1, IEC/EN 60947-4-1 IEC 60077-1 (applicable parts),IEC 60077-2 (applicable parts), EN 50155 (applicable parts) IEC 61373				
Fire and smoke		EN 45545-2 (HL2, HL3)				
Rated operational voltage Ue max.		690 V			1000 V	
Rated frequency (without derating)		50 / 60 Hz				
Conventional free-air thermal current Ith						
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		105 A	105 A	105 A	130 A	130 A
With conductor cross-sectional area		35 mm²	35 mm²	35 mm²	50 mm²	50 mm²
AC-1 Utilization category						
For air temperature close to contactor						
Ie / Rated operational current AC-1	θ ≤ 40 °C	70 A	100 A	105 A	125 A	130 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 60 °C	60 A	80 A	90 A	100 A	105 A
	θ ≤ 70 °C	50 A	70 A	80 A	85 A	90 A
With conductor cross-sectional area		25 mm²	35 mm²	35 mm²	50 mm²	50 mm²
AC-3, AC-3e Utilization category						
For air temperature close to contactor θ ≤ 60 °C						
Ie / Max. rated operational current AC-3, AC-3e (1)						
AC-3e Ue ≤ 690 V	220-230-240 V	40 A	53 A	65 A	80 A	105 A
	380-400 V	40 A	53 A	65 A	80 A	105 A
 3-phase motors	415 V	40 A	53 A	65 A	80 A	96 A
	440 V	40 A	53 A	65 A	80 A	96 A
	500 V	35 A	45 A	55 A	65 A	80 A
	690 V	25 A	35 A	39 A	49 A	57 A
	1000 V	-	-	-	25 A	30A
Rated operational power AC-3, AC-3e (1)						
AC-3e Ue ≤ 690 V	220-230-240 V	11 kW	15 kW	18.5 kW	22 kW	30 kW
	380-400 V	18.5 kW	22 kW	30 kW	37 kW	55 kW
 1500 r.p.m. 50 Hz 1800 r.p.m. 60 Hz 3-phase motors	415 V	22 kW	30 kW	37 kW	45 kW	55 kW
	440 V	22 kW	30 kW	37 kW	45 kW	55 kW
	500 V	22 kW	30 kW	37 kW	45 kW	55 kW
	690 V	22 kW	30 kW	37 kW	45 kW	55 kW
	1000 V	-	-	-	35 kW	40 kW
Rated making capacity AC-3, AC-3e		10 x Ie AC-3, 12 x Ie AC-3e acc. to IEC 60947-4-1				
Rated breaking capacity AC-3, AC-3e		8 x Ie AC-3, 8.5 x Ie AC-3e acc. to IEC 60947-4-1				
Short-circuit protection device for contactors						
without thermal overload relay - Motor protection excluded (2)						
Ue ≤ 500 V AC - gG type fuse		100 A	125 A	160 A	160 A	200 A
Rated short-time withstand current Icw	1 s	1000 A	1000 A	1000 A	1200 A	1200 A
at 40 °C ambient temperature,	10 s	600 A	600 A	600 A	780 A	780 A
in free air from a cold state	30 s	350 A	350 A	350 A	450 A	450 A
	1 min	250 A	250 A	250 A	300 A	300 A
	15 min	110 A	110 A	110 A	140 A	140 A
Maximum breaking capacity						
cos ϕ = 0.45	at 440 V	950 A	950 A	950 A	1150 A	1150 A
	at 690 V	600 A	600 A	600 A	750 A	750 A
Power dissipation per pole	Ie / AC-1	3 W	6.3 W	7 W	7.6 W	8.2 W
	Ie / AC-3, AC-3e	1 W	1.7 W	2.7 W	3 W	4.5 W
Max. electrical switching frequency	AC-1	600 cycles/h				
	AC-3, AC-3e	1200 cycles/h				
	AC-2, AC-4	150 cycles/h				

(1) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".
(2) For the protection of motor starters against short circuits, see "Coordination with short-circuit protection devices".

AF116B ... AF370B 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types		AF116B	AF140B	AF146B	AF190B	AF205B	AF265B	AF305B	AF370B
Standards (1)		IEC/EN 60947-1, IEC/EN 60947-4-1 IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), EN 50155 (applicable parts), TR CU 001/2011 IEC 61373							
Fire and smoke		EN 45545-2 (HL2)							
Rated operational voltage Ue max.		690 V	690 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V
Rated frequency (without derating)		50 / 60 Hz							
Conventional free-air thermal current Ith									
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		160 A	200 A	225 A	275 A	350 A	400 A	500 A	600 A
With conductor cross-sectional area		70 mm²	95 mm²	95 mm²	150 mm²	240 mm² (4)	240 mm²	300 mm² (5)	2 x 185 mm² (5)
AC-1 Utilization category									
For air temperature close to contactor									
Ie / Rated operational current AC-1	θ ≤ 40 °C	160 A	200 A	225 A	275 A	350 A	400 A	500 A	600 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 60 °C	145 A	175 A	200 A	250 A	300 A	350 A	400 A	500 A
	θ ≤ 70 °C	130 A	160 A	175 A	200 A	240 A	290 A	325 A	400 A
Ie / Rated operational current AC-1	θ ≤ 40 °C	–	–	225 A	250 A	275 A	350 A	375 A	400 A
Ue max. ≤ 1000 V, 50/60 Hz	θ ≤ 60 °C	–	–	200 A	225 A	250 A	300 A	325 A	350 A
	θ ≤ 70 °C	–	–	175 A	185 A	200 A	240 A	260 A	290 A
With conductor cross-sectional area		70 mm²	95 mm²	95 mm²	150 mm²	240 mm² (4)	240 mm²	300 mm² (5)	2 x 185 mm² (5)
AC-3 Utilization category									
For air temperature close to contactor θ ≤ 60 °C									
Ie / Max. rated operational current AC-3 (2)									
	220-230-240 V	116 A	140 A	146 A	190 A	205 A	265 A	305 A	370 A
	380-400 V	116 A	140 A	146 A	190 A	205 A	265 A	305 A	370 A
 3-phase motors	415 V	116 A	140 A	146 A	190 A	205 A	265 A	305 A	370 A
	440 V	116 A	140 A	146 A	190 A	205 A	265 A	305 A	370 A
	500 V	110 A	130 A	130 A	135 A	165 A	250 A	290 A	315 A
	690 V	65 A	80 A	93 A	135 A	165 A	250 A	290 A	315 A
	1000 V	–	–	60 A	85 A	100 A	100 A	100 A	100 A
Rated operational power AC-3 (2)									
	220-230-240 V	30 kW	37 kW	45 kW	55 kW	55 kW	75 kW	90 kW	110 kW
	380-400 V	55 kW	75 kW	75 kW	90 kW	110 kW	132 kW	160 kW	200 kW
 1500 r.p.m. 50 Hz 1800 r.p.m. 60 Hz 3-phase motors	415 V	55 kW	75 kW	75 kW	90 kW	110 kW	132 kW	160 kW	200 kW
	440 V	75 kW	90 kW	90 kW	110 kW	132 kW	160 kW	160 kW	200 kW
	500 V	75 kW	90 kW	90 kW	90 kW	110 kW	200 kW	200 kW	250 kW
	690 V	55 kW	75 kW	90 kW	132 kW	160 kW	200 kW	250 kW	315 kW
	1000 V	–	–	75 kW	110 kW	132 kW	132 kW	132 kW	132 kW
Rated making capacity AC-3		10 x Ie AC-3 acc. to IEC 60947-4-1							
Rated breaking capacity AC-3		8 x Ie AC-3 acc. to IEC 60947-4-1							
Short-circuit protection device for contactors									
without thermal overload relay - Motor protection excluded (3)									
Ue ≤ 500 V AC - gG type fuse		250 A	315 A	315 A	355 A	400 A	500 A	500 A	630 A
Rated short-time withstand current Icw	1 s	1300 A	1460 A	1460 A	1900 A	2050 A	2650 A	3050 A	3700 A
at 40 °C ambient temperature,	10 s	928 A	1168 A	1168 A	1520 A	1640 A	2120 A	2440 A	2960 A
in free air from a cold state	30 s	536 A	674 A	674 A	878 A	947 A	1224 A	1409 A	1709 A
	1 min	379 A	477 A	477 A	621 A	670 A	865 A	996 A	1208 A
	15 min	160 A	200 A	225 A	275 A	350 A	400 A	500 A	600 A
Maximum breaking capacity									
cos θ = 0.45	at 440 V	2000 A	3000 A	3000 A	3300 A	3500 A	3800 A	4600 A	5000 A
(cos θ = 0.35 for Ie > 100 A)	at 690 V	1000 A	1500 A	1500 A	2200 A	2500 A	3300 A	3800 A	4000 A
Power dissipation per pole	Ie / AC-1	12 W	18 W	23 W	15 W	25 W	32 W	50 W	72 W
	Ie / AC-3	6 W	9 W	10 W	7 W	8 W	14 W	19 W	27 W
Maximum electrical switching frequency	AC-1	300 cycles/h							
	AC-3	300 cycles/h							
	AC-4	150 cycles/h							

(1) For compliance confirmation on applicable parts based on your application and combination, please consult your ABB sales representatives.
(2) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents"
For AC-3e utilization category, please consult your ABB local sales organization.
(3) For the protection of motor starters against short-circuits, see "Coordination with short-circuit protection devices".
(4) For currents above 275A use terminal enlargements or terminal extensions.
(5) For currents above 450A use terminal enlargements or terminal extensions.

AF09(Z)B ... AF38(Z)B 3-pole contactors

Technical data

Main pole - Utilization characteristics according to UL / NEMA / CSA

Contactor types		AF09(Z)B	AF12(Z)B	AF16(Z)B	AF26(Z)B	AF30(Z)B	AF38(Z)B
Standards		UL 60947-4-1, CSA C22.2 No. 60947-4-1					
Maximum operational voltage		600 V					
NEMA size		00	0	–	1	–	–
NEMA continuous amp rating	Thermal current	9 A	18 A		27 A		
NEMA maximum horse power ratings							
1-phase, 60 Hz	115 V AC	1/3 hp	1 hp		2 hp		
	230 V AC	1 hp	2 hp		3 hp		
NEMA maximum horse power ratings							
3-phase, 60 Hz	200 V AC	1-1/2 hp	3 hp		7-1/2 hp		
	230 V AC	1-1/2 hp	3 hp		7-1/2 hp		
	460 V AC	2 hp	5 hp		10 hp		
	575 V AC	2 hp	5 hp		10 hp		
UL / CSA general use rating							
600 V AC		25 A	28 A	30 A	45 A	50 A	50 A
With conductor cross-sectional area		AWG 10	AWG 10	AWG 10	AWG 8	AWG 8	AWG 8
UL / CSA maximum 1-phase motor rating							
Full load current	120 V AC	13.8 A	16 A	20 A	24 A	24 A	24 A
	240 V AC	10 A	12 A	17 A	17 A	28 A	28 A
Horse power rating	120 V AC	3/4 hp	1 hp	1-1/2 hp	2 hp	2 hp	2 hp
	240 V AC	1-1/2 hp	2 hp	3 hp	3 hp	5 hp	5 hp
UL / CSA maximum 3-phase motor rating							
Full load current (1)	200-208 V AC	7.8 A	11 A	17.5 A	25.3 A	32.2 A	32.2 A
	220-240 V AC	6.8 A	9.6 A	15.2 A	22 A	28 A	28 A
	440-480 V AC	7.6 A	11 A	14 A	21 A	27 A	34 A
	550-600 V AC	9 A	11 A	17 A	22 A	27 A	32 A
Horse power rating (1)	200-208 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp	10 hp
	220-240 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp	10 hp
	440-480 V AC	5 hp	7-1/2 hp	10 hp	15 hp	20 hp	25 hp
	550-600 V AC	7-1/2 hp	10 hp	15 hp	20 hp	25 hp	30 hp
UL / CSA - DC motor starting - 3 poles in series							
Full load Amps (FLA)	125 V DC	9.5 A	13.2 A	17 A	25 A	25 A	25 A
	250 V DC	8.5 A	12.2 A	12.2 A	20 A	29 A	29 A
Horse power rating	125 V DC	1 hp	1-1/2 hp	2 hp	3 hp	3 hp	3 hp
	250 V DC	2 hp	3 hp	3 hp	5 hp	7-1/2 hp	7-1/2 hp
Short-circuit protection device for contactors without thermal overload relay - Motor protection excluded							
Fuse rating		30	30	60	60	100	100
Fuse type, 600 V		J					
Maximum electrical switching frequency							
For general use		600					
For motor use		1200					

(1) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see “Motor rated operational powers and currents”.

AF40B...AF96B 3-pole contactors

Technical data

Main pole - Utilization characteristics according to UL / NEMA / CSA

Contactor types		AF40B	AF52B	AF65B	AF80B	AF96B
Standards		UL 60947-1, UL 60947-4-1, CSA C22.2 No. 60947-1:22, CSA C22.2 No. 60947-4-1:22				
Maximum operational voltage		600 V				
NEMA size		2	-	-	3	-
NEMA continuous amp rating	Thermal current	45 A	-	-	90 A	-
NEMA maximum horse power ratings						
1-phase, 60 Hz	115 V AC	3 hp	-	-	-	-
	230 V AC	7.5 hp	-	-	-	-
NEMA maximum horse power ratings						
3-phase, 60 Hz	200 V AC	10 hp	-	-	25 hp	-
	230 V AC	15 hp	-	-	30 hp	-
	460 V AC	25 hp	-	-	50 hp	-
	575 V AC	25 hp	-	-	50 hp	-
UL / CSA general use rating						
	600 V AC	60 A	80 A	90 A	105 A	115 A
With conductor cross-sectional area		AWG 6	AWG 4	AWG 3	AWG 2	AWG 2
UL / CSA maximum 1-phase motor rating						
Full load current	120 V AC	34 A	34 A	56 A	80 A	80 A
	240 V AC	40 A	50 A	68 A	68 A	88 A
Horse power rating	120 V AC	3 hp	3 hp	5 hp	7-1/2 hp	7-1/2 hp
	240 V AC	7-1/2 hp	10 hp	15 hp	15 hp	20 hp
UL / CSA maximum 3-phase motor rating						
Full load current (1)	200-208 V AC	32.2 A	48.3 A	62.1 A	78.2 A	96 A
	220-240 V AC	42 A	54 A	68 A	80 A	96 A
	440-480 V AC	40 A	52 A	65 A	77 A	96 A
	550-600 V AC	41 A	52 A	62 A	77 A	77 A
Horse power rating (1)	200-208 V AC	10 hp	15 hp	20 hp	25 hp	30 hp
	220-240 V AC	15 hp	20 hp	25 hp	30 hp	40 hp
	440-480 V AC	30 hp	40 hp	50 hp	60 hp	75 hp
	550-600 V AC	40 hp	50 hp	60 hp	75 hp	75 hp
UL / CSA - DC motor starting - 3 poles in series						
Full load Amps (FLA)	125 V DC	40 A	58 A	76 A	76 A	110 A
	250 V DC	38 A	55 A	72 A	89 A	106 A
Horse power rating	125 V DC	5 hp	7-1/2 hp	10 hp	10 hp	15 hp
	250 V DC	10 hp	15 hp	20 hp	25 hp	30 hp
Short-circuit protection device for contactors without thermal overload relay - Motor protection excluded						
High fault current		100 kA				
Fuse rating		150 A	150 A	150 A	200 A	200 A
Fuse type, 600 V		J				
Maximum electrical switching frequency						
For general use		600 cycles/h				
For motor use		1200 cycles/h				

(1) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".

AF116B ... AF370B 3-pole contactors

Technical data

Main pole - Utilization characteristics according to UL / NEMA / CSA

Contactor types		AF116B	AF140B	AF146B	AF190B	AF205B	AF265B	AF305B	AF370B
Standards		UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A							
Maximum operational voltage		600 V		1000 V					
NEMA size		–	4	–	–	–	5	–	–
NEMA continuous amp rating	Thermal current	–	135 A	–	–	–	270 A	–	–
NEMA maximum horse power ratings									
1-phase, 60 Hz	115 V AC	–	–	–	–	–	–	–	–
	230 V AC	–	–	–	–	–	–	–	–
NEMA maximum horse power ratings									
3-phase, 60 Hz	200 V AC	–	40 hp	–	–	–	75 hp	–	–
	230 V AC	–	50 hp	–	–	–	100 hp	–	–
	460 V AC	–	100 hp	–	–	–	200 hp	–	–
	575 V AC	–	100 hp	–	–	–	200 hp	–	–
UL / CSA general use rating									
600 V AC		160 A	200 A	200 A	250 A	300 A	350 A	400 A	520 A
With conductor cross-sectional area		AWG 2/0	AWG 3/0	AWG 3/0	MCM 250	MCM 350 (2)	MCM 500	2//AWG 3/0	2//MCM 300
1000 V AC		–	–	200 A	250 A	275 A	300 A	350 A	400 A
With conductor cross-sectional area		–	–	AWG 3/0	MCM 250	MCM 350 (2)	MCM 500	2//AWG 3/0	2//MCM 300
UL / CSA maximum 1-phase motor rating									
Full load current	120 V AC	–	–	–	–	–	–	–	–
	240 V AC	–	–	–	–	–	–	–	–
Horse power rating	120 V AC	–	–	–	–	–	–	–	–
	240 V AC	–	–	–	–	–	–	–	–
UL / CSA maximum 3-phase motor rating									
Full load current (1)	200-208 V AC	92 A	120 A	120 A	150 A	177 A	221 A	285 A	359 A
	220-240 V AC	104 A	130 A	130 A	154 A	192 A	248 A	312 A	360 A
	440-480 V AC	96 A	124 A	124 A	156 A	180 A	240 A	302 A	361 A
	550-600 V AC	99 A	125 A	125 A	144 A	192 A	242 A	289 A	336 A
Horse power rating (1)	200-208 V AC	30 hp	40 hp	40 hp	50 hp	60 hp	75 hp	100 hp	125 hp
	220-240 V AC	40 hp	50 hp	50 hp	60 hp	75 hp	100 hp	125 hp	150 hp
	440-480 V AC	75 hp	100 hp	100 hp	125 hp	150 hp	200 hp	250 hp	300 hp
	550-600 V AC	100 hp	125 hp	125 hp	150 hp	200 hp	250 hp	300 hp	350 hp
Short-circuit protection device for contactors without thermal overload relay - Motor protection excluded									
High fault current		100 kA							
Fuse rating		225 A	250 A	250 A	350 A	400 A	500 A	600 A	600 A
Fuse type, 600 V		J							
Maximum electrical switching frequency									
For general use		300 cycles/h							
For motor use		300 cycles/h							

(1) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".
(2) For conductor cross-sectional area above MCM 300 use terminal enlargements LW205.

AF09(Z)B ... AF38(Z)B 3-pole contactors

Technical data

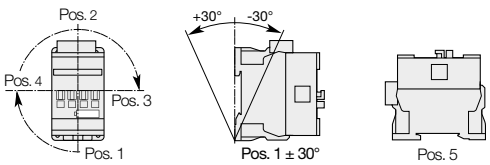
General technical data

Contactor types		AF09(Z)B	AF12(Z)B	AF16(Z)B	AF26(Z)B	AF30(Z)B	AF38(Z)B
Rated insulation voltage Ui							
acc. to IEC 60947-4-1		690 V					
acc. to UL / CSA		600 V					
Rated impulse withstand voltage Uimp.		6 kV					
Electromagnetic compatibility		Devices complying with IEC/EN 60947-1 - Environment A EN 50121-3-2					
Pollution degree		3					
Ambient air temperature close to contactor							
Operation	Fitted with thermal overload relay	-20...+60 °C					
	Without thermal overload relay	-40...+70 °C					
Storage		-60...+80 °C					
Climatic withstand		Category B according to IEC 60947-1 Annex Q					
Maximum operating altitude (without derating)		3000 m					
Mechanical durability							
Number of operating cycles		10 millions operating cycles					
Maximum switching frequency		3600 cycles/h					
Shock and vibration withstand acc. to IEC 61373		Category 1, class B					

Magnet system characteristics

Contactor types		AF09(Z)B	AF12(Z)B	AF16(Z)B	AF26(Z)B	AF30(Z)B	AF38(Z)B
Coil operating limits acc. to IEC 60947-4-1	DC supply	(AF..ZB) at θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max (AF..B) at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max; at θ ≤ 70 °C 0.85 x Uc min ... Uc max					
	AC supply	at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max at θ ≤ 70 °C 0.85 x Uc min ... Uc max					
DC control voltage							
Rated control circuit voltage Uc		20 ... 250 V DC					
Coil consumption	Average pull-in value	(AF..ZB) 12 ... 16 W					
	Average holding value	(AF..ZB) 1.7 W					
PLC-output control		(AF..ZB) ≥ 500 mA 24 V DC					
AC control voltage 50/60 Hz							
Rated control circuit voltage Uc		(AF..ZB) 24 ... 250 V AC - (AF..B) 250 ... 500 V AC					
Coil consumption	Average pull-in value	(AF..ZB) 16 VA - (AF..B) 50 VA					
	Average holding value	(AF..ZB) 1.7 VA / 1.5 W - (AF..B) 2.2 VA / 2 W					
Max. permitted control voltage during voltage fluctuation defined acc. to IEC 60077 / EN 50155		Rated control circuit voltage / Max. permitted control voltage 24 ... 60 V AC 50/60 Hz / 66 V AC 50/60 Hz 48 ... 130 V AC 50/60 Hz / 143 V AC 50/60 Hz 100 ... 250 V AC 50/60 Hz / 275 V AC 50/60 Hz 250 ... 500 V AC 50/60 Hz / 550 V AC 50/60 Hz					
Drop-out voltage		≤ 60 % of Uc min.					
Operating time							
Between coil energization and:	N.O. contact closing	40...95 ms					
	N.C. contact opening	38...90 ms					
Between coil de-energization and:	N.O. contact opening	11...95 ms					
	N.C. contact closing	13...98 ms					

Mounting characteristics and conditions for use

Contactor types	AF09(Z)B	AF12(Z)B	AF16(Z)B	AF26(Z)B	AF30(Z)B	AF38(Z)B
Mounting positions						
	Max. N.C. built-in add add-on N.C. auxiliary contacts: see accessory fitting details for a 3-pole contactor AF09(Z)B ... AF38(Z)B					
Mounting distances	The contactors can be assembled side by side					
Fixing						
On rail according to IEC/EN 60715	35 x 7.5 mm or 35 x 15 mm					
By screws (not supplied)	2 x M4 screws placed diagonally					

AF40B...AF96B 3-pole contactors

Technical data

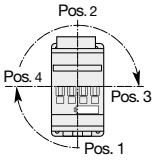
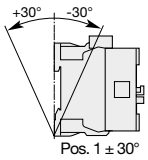
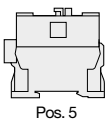
General technical data

Contactor types		AF40B	AF52B	AF65B	AF80B	AF96B
Rated insulation voltage Ui						
acc. to IEC 60947-4-1		690 V			1000 V	
acc. to UL / CSA		600 V				
Rated impulse withstand voltage Uimp.		6 kV			8 kV	
Electromagnetic compatibility		Devices complying with IEC 60947-1 - Environment A EN 50121-3-2				
Pollution degree		3				
Ambient air temperature close to contactor						
Operation	Fitted with thermal overload relay	-40...+70 °C				
	Without thermal overload relay	-40...+70 °C				
Storage		-60...+80 °C				
Climatic withstand		Category B according to IEC 60947-1 Annex Q				
Maximum operating altitude (without derating)		3000 m				
Mechanical durability						
Number of operating cycles		10 millions operating cycles				
Max. switching frequency		3600 cycles/h				
Shock and vibration withstand acc to IEC 61373		Category 1, class B				

Magnet system characteristics

Contactor types		AF40B	AF52B	AF65B	AF80B	AF96B
Coil operating limits	AC supply	At θ ≤ 70 °C 0.85 x Uc min...1.1 x Uc max.				
acc. to IEC 60947-4-1	DC supply	At θ ≤ 70 °C 0.85 x Uc min...1.1 x Uc max.				
DC control voltage						
Rated control circuit voltage Uc		20...500 V DC				
Coil consumption	Average pull-in value	25 W			40 W	
	Average holding value	2 W				
PLC-output control		-				
AC control voltage 50/60 Hz						
Rated control circuit voltage Uc		24...500 V AC				
Coil consumption	Average pull-in value	25 VA			40 VA	
	Average holding value	4 VA / 2 W				
Max. permitted control voltage during voltage fluctuation defined acc. to IEC 60077 / EN 50155		Rated control circuit voltage / Max. permitted control voltage 24 ... 60 V AC 50/60 Hz / 66 V AC 50/60 Hz 48 ... 130 V AC 50/60 Hz / 143 V AC 50/60 Hz 100 ... 250 V AC 50/60 Hz / 275 V AC 50/60 Hz 250 ... 500 V AC 50/60 Hz / 550 V AC 50/60 Hz				
Drop-out voltage		≤ 60 % of Uc min.				
Operating time						
Between coil energization and:	N.O. contact closing	42...100 ms				
	N.C. contact opening	38...95 ms				
Between coil de-energization and:	N.O. contact opening	17...100 ms				
	N.C. contact closing	19...105 ms				

Mounting characteristics and conditions

Contactor types	AF40B	AF52B	AF65B	AF80B	AF96B
Mounting positions	  				
	Max. N.C. built-in and add-on N.C. auxiliary contacts: see accessory fitting details for a 3-pole contactor AF40B ... AF96B				
Mounting distances	The contactors can be assembled side by side				
Fixing					
On rail according to IEC/EN 60715	35 x 7.5 mm or 35 x 15 mm			35 x 15 mm	
By screws (not supplied)	2 x M4 or 2 x M6 screws placed diagonally				

AF116B ... AF370B 3-pole contactors

Technical data

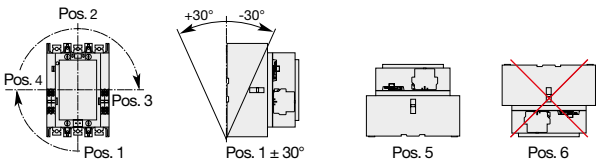
General technical data

Contactor types	AF116B	AF140B	AF146B	AF190B	AF205B	AF265B	AF305B	AF370B
Rated insulation voltage Ui								
acc. to IEC 60947-4-1	1000 V							
acc. to UL / CSA	600 V							
Rated impulse withstand voltage Uimp.	8 kV							
Electromagnetic compatibility	Devices complying with IEC/EN 60947-1 - Environment A							
Pollution degree	3							
Ambient air temperature close to contactor								
Operation Fitted with thermal overload relay	-25 to +55 °C							
Without thermal overload relay	-40 to +70 °C							
Storage	-40 to +70 °C							
Climatic withstand	Category B according to IEC 60947-1 - Annex Q							
Maximum operating altitude (without derating)	3000 m							
Mechanical durability								
Number of operating cycles	5 million operating cycles							
Maximum switching frequency	300 cycles/h							
Shock and vibration withstand acc to IEC 61373	Category 1, class B							

Magnet system characteristics

Contactor types		AF116B	AF140B	AF146B	AF190B	AF205B	AF265B	AF305B	AF370B
Coil operating limits	AC supply	At θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max							
acc. to IEC 60947-4-1	DC supply	At θ ≤ 70 °C 0.80 x Uc min ... 1.1 x Uc max							
Rated control circuit voltage Uc		24...500 V AC, 20...500 V DC							
Coil consumption									
DC control voltage									
20...60 V DC	Average pull-in value	210 W			205 W		400 W		
	Average holding value	2.5 W			2.5 W		3.5 W		
48...130 V DC	Average pull-in value	130 W			130 W		360 W		
	Average holding value	2.5 W			2.5 W		2.5 W		
100...250 V DC	Average pull-in value	135 W			190 W		410 W		
	Average holding value	3 W			2.5 W		4.5 W		
250...500 V DC	Average pull-in value	205 W			190 W		600 W		
	Average holding value	4 W			4 W		4.7 W		
AC control voltage 50/60 Hz									
24...60 V AC	Average pull-in value	225 VA			165 VA		475 VA		
	Average holding value	5.5 VA			6 VA		8.5 VA		
48...130 V AC	Average pull-in value	170 VA			175 VA		340 VA		
	Average holding value	4 VA			4 VA		17 VA		
100...250 V AC	Average pull-in value	130 VA			220 VA		385 VA		
	Average holding value	6 VA			7 VA		17.5 VA		
250...500 V AC	Average pull-in value	205 VA			185 VA		420 VA		
	Average holding value	16 VA			16 VA		21 VA		
Max. permitted control voltage during voltage fluctuation defined acc. to IEC 60077 / EN 50155		Rated control circuit voltage / Max. permitted control voltage 24 ... 60 V AC 50/60 Hz / 66 V AC 50/60 Hz 48 ... 130 V AC 50/60 Hz / 143 V AC 50/60 Hz 100 ... 250 V AC 50/60 Hz / 275 V AC 50/60 Hz 250 ... 500 V AC 50/60 Hz / 550 V AC 50/60 Hz							
Drop-out voltage		55 % of Uc min							
Operating time									
Coil supply between A1 - A2									
Between coil energization and:	N.O. contact closing	20...55 ms			25...60 ms		30...60 ms		
Between coil de-energization and:	N.O. contact opening	40..70 ms			45...80 ms		45...80 ms		

Mounting characteristics and conditions for use

Contactor types	AF116B	AF140B	AF146B	AF190B	AF205B	AF265B	AF305B	AF370B
Mounting positions								
	Max. add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 3-pole contactor AF116B ... AF370B							
Mounting distances	The contactors can be assembled side by side							
Fixing								
On rail acc. to IEC/EN 60715	–							
By screws (not supplied)	4 x M4			4 x M5				

AF09(Z)B ... AF38(Z)B 3-pole contactors

Technical data

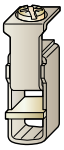
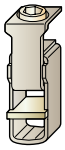
Connecting characteristics

Contactor types			AF09(Z)B	AF12(Z)B	AF16(Z)B	AF26(Z)B	AF30(Z)B	AF38(Z)B
Main terminals			Screw terminals with cable clamp					
Connection capacity (min. ... max.)								
Main conductors (poles)								
Rigid	Solid (≤ 4 mm²)	1 x	1...6 mm²			2.5...10 mm²		
	Stranded (≥ 1 mm²)	2 x	1...6 mm²			2.5...10 mm²		
Flexible with non insulated ferrule		1 x	0.75...6 mm²			1.5...10 mm²		
		2 x	0.75...6 mm²			1.5...10 mm²		
Flexible with insulated ferrule		1 x	0.75...4 mm²			1.5...10 mm²		
		2 x	0.75...2.5 mm²			1.5...4 mm²		
Bars or lugs		L <	9.6 mm			12.5 mm		
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 16...10			AWG 14...8		
Stripping length			10 mm			14 mm		
Tightening torque			1.5 Nm / 13 lb.in			2.5 Nm / 22 lb.in		
Auxiliary conductors (built-in auxiliary terminals + coil terminals)								
Rigid solid/stranded		1 x	1...2.5 mm²					
		2 x	1...2.5 mm²					
Flexible with non insulated ferrule		1 x	0.75...2.5 mm²					
		2 x	0.75...2.5 mm²					
Flexible with insulated ferrule		1 x	0.75...2.5 mm²					
		2 x	0.75...1.5 mm²					
Lugs		L <	8 mm					
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18...14					
Stripping length			10 mm					
Tightening torque								
Coil terminals			1.2 Nm / 11 lb.in					
Built-in auxiliary terminals			1.2 Nm / 11 lb.in			–		
Degree of protection acc. to IEC/EN 60947-1 and IEC/EN 60529								
Main terminals			IP20					
Coil terminals			IP20					
Built-in auxiliary terminals			IP20			–		
Screw terminals			Delivered in open position, screws of unused terminals must be tightened					
Main terminals			M3.5			M4		
	Screwdriver type		Flat Ø 5.5 / Pozidriv 2			Flat Ø 6.5 / Pozidriv 2		
Coil terminals			M3.5					
	Screwdriver type		Flat Ø 5.5 / Pozidriv 2					
Built-in auxiliary terminals			M3.5			–		
	Screwdriver type		Flat Ø 5.5 / Pozidriv 2			–		

AF40B...AF96B 3-pole contactors

Technical data

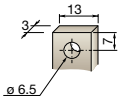
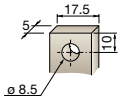
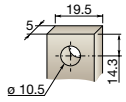
Connecting characteristics

Contactor types			AF40B	AF52B	AF65B	AF80B	AF96B
Main terminals			 Screw terminals with double connector 2 x (9.3 width x 7.9/10.3 depth)			 Screw terminals with double connector 2 x (12.4 width x 9.3/11.1 depth)	
Connection capacity (min. ... max.)							
Main conductors (poles)							
Rigid	Stranded (≥ 6 mm²)	1 x	6...35 mm²			6...70 mm²	
		2 x	6...35 mm²			6...50 mm²	
Flexible with non insulated ferrule		1 x	4...35 mm²			6...50 mm²	
		2 x	4...35 mm²			6...50 mm²	
Flexible with insulated ferrule		1 x	4...35 mm²			6...50 mm²	
		2 x	4...35 mm²			6...50 mm²	
L Bars or lugs		L <	9.2 mm			12.2 mm	
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 10...2			AWG 6...1	
Stripping length			16 mm			17 mm	
Tightening torque			4 Nm / 35 lb.in			6 Nm / 53 lb.in	
Auxiliary conductors (built-in auxiliary terminals + coil terminals)							
Rigid solid/stranded		1 x	1...2.5 mm²				
		2 x	1...2.5 mm²				
Flexible with non insulated ferrule		1 x	0.75...2.5 mm²				
		2 x	0.75...2.5 mm²				
Flexible with insulated ferrule		1 x	0.75...2.5 mm²				
		2 x	0.75...1.5 mm²				
L Lugs		L <	8 mm				
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18...14				
Stripping length			10 mm				
Tightening torque							
Coil terminals			1.2 Nm / 11 lb.in				
Built-in auxiliary terminals			1.2 Nm / 11 lb.in				
Degree of protection acc. to IEC/EN 60947-1 and IEC/EN 60529							
Main terminals			IP10				
Coil terminals			IP20				
Built-in auxiliary terminals			IP20				
Screw terminals			Delivered in open position, screws of unused terminals must be tightened				
Main terminals			M6			M8	
	Screwdriver type		Flat Ø 6.5 / Pozidriv 2			Hexagon socket (s = 4 mm)	
Coil terminals			M3.5				
	Screwdriver type		Flat Ø 5.5 / Pozidriv 2				
Built-in auxiliary terminals			M3.5				
	Screwdriver type		Flat Ø 5.5 / Pozidriv 2				

AF116B ... AF370B 3-pole contactors

Technical data

Connecting characteristics

Contactor types			AF116B	AF140B	AF146B	AF190B	AF205B	AF265B	AF305B	AF370B
Main terminals Flat type										
Connection capacity (min. ... max.)										
Main conductors (poles)										
Cu cable - Stranded		1 x	10...95 mm²			6...150 mm²		16...300 mm²		
Clamp type			LD... included (1)			1SDA066917R1		1SDA055016R1		
Tightening torque			8 Nm			14 Nm		25 Nm		
Cu cable - Stranded		2 x	10...95 mm²			50...120 mm²		70...185 mm²		
Clamp type			LD... included (1)			1SFN074709R1000, LZ185-2C/120		1SCA022194R0890, OZXB4		
Tightening torque			8 Nm			16 Nm		22 Nm		
Al cable - Stranded		1 x	–			95...185 mm²		185...240 mm²		
Clamp type			–			1SDA054988R1		1SDA055020R1		
Tightening torque			–			31 Nm		43 Nm		
Cu cable - Flexible		1 x	10...70 mm²			6...120 mm²		16...240 mm²		
Clamp type			LD... included (1)			1SDA066917R1		1SDA055016R1		
Tightening torque			8 Nm			14 Nm		25 Nm		
Cu cable - Flexible		2 x	10...70 mm²			50...95 mm²		70...185 mm²		
Clamp type			LD... included (1)			1SFN074709R1000, LZ185-2C/120		1SCA022194R0890, OZXB4		
Tightening torque			8 Nm			16 Nm		22 Nm		
Lugs	L ≤		22 mm (.866 in)			24 mm (.945 in)		32 mm (1.260 in)		
	Ø >		6 mm (.236 in)			8 mm (.315 in)		10 mm (.394 in)		
Socket type			LL... included			LL... included		LL... included		
Tightening torque			9 Nm / 80 lb.in			18 Nm / 160 lb.in		28 Nm / 248 lb.in		
Connection capacity acc. to UL / CSA		1 x	AWG 6...3/0			6...300 MCM		4...400 MCM		
Clamp type			LD... included (1)			ATK185 (2)		ATK300 (2)		
Tightening torque			8 Nm / 71 lb.in			34 Nm / 301 lb.in		42 Nm / 372 lb.in		
Connection capacity acc. to UL / CSA		2 x	AWG 6...3/0			–		4...500 MCM		
Clamp type			LD... included (1)			–		ATK300/2 (2)		
Tightening torque			8 Nm / 71 lb.in			–		42 Nm / 372 lb.in		
Auxiliary conductors (coil terminals)										
Rigid Solid/Stranded		1 x	1...4 mm²							
		2 x	1...4 mm²							
Flexible		1 x	0.75...2.5 mm²							
		2 x	0.75...2.5 mm²							
Flexible with non insulated ferrule		1 x	0.75...2.5 mm²							
		2 x	0.75...2.5 mm²							
Flexible with insulated ferrule		1 x	0.75...2.5 mm²							
		2 x	0.75...2.5 mm²							
Lugs	L <		8 mm							
	l >		3.5 mm							
Connection capacity acc. to UL / CSA		1 or 2 x	AWG 18...14							
Stripping length			9 mm							
Tightening torque			1.00 Nm / 9 lb.in							
Degree of protection acc. to IEC/EN 60947-1 and IEC/EN 60529										
Main terminals			IP00							
Coil terminals			IP20							
Screw terminals										
Main terminals			M6			M8		M10		
Screwdriver type			Screws and bolts							
Coil terminals (delivered in open position)			M3.5							
Screwdriver type			Flat Ø 5.5 mm / Pozidriv 2							

(1) LD... not included for AF116B ... AF146B.
(2) Available in North America only.

AF09(Z)B ... AF96B 3-pole contactors
Technical data

Built-in auxiliary contacts according to IEC

Contactor types		AF09(Z)B	AF12(Z)B	AF16(Z)B	AF40B	AF52B	AF65B	AF80B	AF96B
Rated operational voltage Ue max.		690 V							
Rated frequency (without derating)		50 / 60 Hz							
Conventional free air thermal current Ith - θ ≤ 40 °C		16 A							
Ie / Rated operational current AC-15									
acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A							
	220-240 V 50/60 Hz	4 A							
	400-440 V 50/60 Hz	3 A							
	500 V 50/60 Hz	2 A							
	690 V 50/60 Hz	2 A							
Making capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1							
Breaking capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1							
Ie / Rated operational current DC-13									
acc. to IEC 60947-5-1	24 V DC	6 A / 144 W							
	48 V DC	2.8 A / 134 W							
	72 V DC	1 A / 72 W							
	110 V DC	0.55 A / 60 W							
	125 V DC	0.55 A / 69 W							
	220 V DC	0.27 A / 60 W							
	250 V DC	0.27 A / 68 W							
	400 V DC	0.15 A / 60 W							
	500 V DC	0.13 A / 65 W							
	600 V DC	0.1 A / 60 W							
Short-circuit protection device gG type fuse		10 A							
Rated short-time withstand current Icw	for 1.0 s	100 A							
	for 0.1 s	140 A							
Minimum switching capacity		12 V / 3 mA							
with failure rate acc. to IEC 60947-5-4		10^{-7}							
Non-overlapping time between N.O. and N.C. contacts		≥ 2 ms							
Power dissipation per pole at 6 A		0.1 W							
Maximum electrical switching frequency	AC-15	1200 cycles/h							
	DC-13	900 cycles/h							
Mechanically linked contacts acc. to annex L of IEC 60947-5-1		Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts (CA4, CAL4, CAT4 aux. contact blocks) are mechanically linked contacts.							
Mirror contacts acc. to annex F of IEC 60947-4-1		Built-in N.C. auxiliary contacts or additional N.C. auxiliary contacts (CA4, CAL4, CAT4 aux. contact blocks) are mirror contacts.							

Built-in auxiliary contacts according to UL / CSA

Contactor types	AF09(Z)B	AF12(Z)B	AF16(Z)B	AF40B	AF52B	AF65B	AF80B	AF96B
Maximum operational voltage	600 V AC, 600 V DC							
Pilot duty	A600, Q600							
AC thermal rated current	10 A							
AC maximum volt-ampere making	7200 VA							
AC maximum volt-ampere breaking	720 VA							
DC thermal rated current	2.5 A							
DC maximum volt-ampere making-breaking	69 VA							

Notes

AF09(Z)B ... AF370B 3-pole contactors

Electrical durability and utilization categories

General

Utilization categories determine the current making and breaking conditions relating to the characteristics of the loads to be controlled by the contactors. International standard IEC 60947-4-1 and European standard EN 60947-4-1 are the standards to be referred to.
If Ic is the current to be broken by the contactor and Ie the rated operational current normally drawn by the load, then:

- Categories AC-1 and AC-3 Ic = Ie
- Category AC-2 Ic = 2.5 x Ie
- Category AC-4 Ic = 6 x Ie

Generally speaking Ic = m x Ie where m is a multiple of the load operational current.

On next pages, the curves corresponding to categories AC-1, AC-3 and AC-4 represent the electrical durability variation of standard contactors in relation to the breaking current Ic. Electrical durability is expressed in millions of operating cycles.

Curve utilization mode

Electrical durability forecast and contactor selection for categories AC-1, AC-2, AC-3 or AC-4

Characteristics	Load to be controlled
Operational voltage	Ue
Current normally drawn	Ie (Ue / Ie / kW relation for motors, see "Motor rated operational powers and currents")
Utilization category	AC-1, AC-2, AC-3 or AC-4
Breaking current	Ic = Ie for AC-1 and for AC-3 ; Ic = 2.5 x Ie for AC-2 ; Ic = 6 x Ie for AC-4

- Define the number of operating cycles N required.
- On the diagram corresponding to the operational category, select the contactor with the curve immediately above the intersection point (Ic ; N).

Electrical durability forecast and contactor selection for mixed duty motor control: AC-3 (Ic = Ie) type switching off while "motor running" and, occasionally, AC-4 (Ic = 6 x Ie) type switching off while "motor accelerating"

Characteristics	Load to be controlled
Operational voltage	Ue
Current normally drawn while "motor running"	Ie (Ue / Ie / kW relation for motors, see "Motor rated operational powers and currents")
Utilization category	AC-1, AC-2, AC-3 or AC-4
Breaking current for AC-3	Ic = Ie
Breaking current for AC-4 while "motor accelerating"	Ic = 6 x Ie
Percentage of AC-4 operating cycles	K (on the basis of the total number of operating cycles)

- Define the total number of operating cycles N required.
- Note the smallest contactor rating compatible for AC-3 (Ue / Ie) on Main pole utilization characteristic table (see “Technical data”).
- For the selected contactor make a note of the following in relation to the voltage using diagram AC-3 in next pages:
  - The number of operating cycles A for Ic = Ie (AC-3)
  - The number of operating cycles B for Ic = 6 x Ie (AC-4)
- Calculate the estimated number of cycles N’ (N’ is always below A)

$$N' = \frac{A}{1 + 0.01\,K\,(A/B - 1)}$$

- If N' is too low in relation to the target N, calculate the estimated number of cycles for a higher contactor rating.

Case of uninterrupted duty

For uninterrupted duty, some verifications of preventing maintenance are necessary to check the functionality of the concerned product (consult us).
The combinated effect of environmental conditions and the proper temperature of the product may require some disposals. As a matter of fact, for this duty, the use duration prevails over the number of operating cycles.

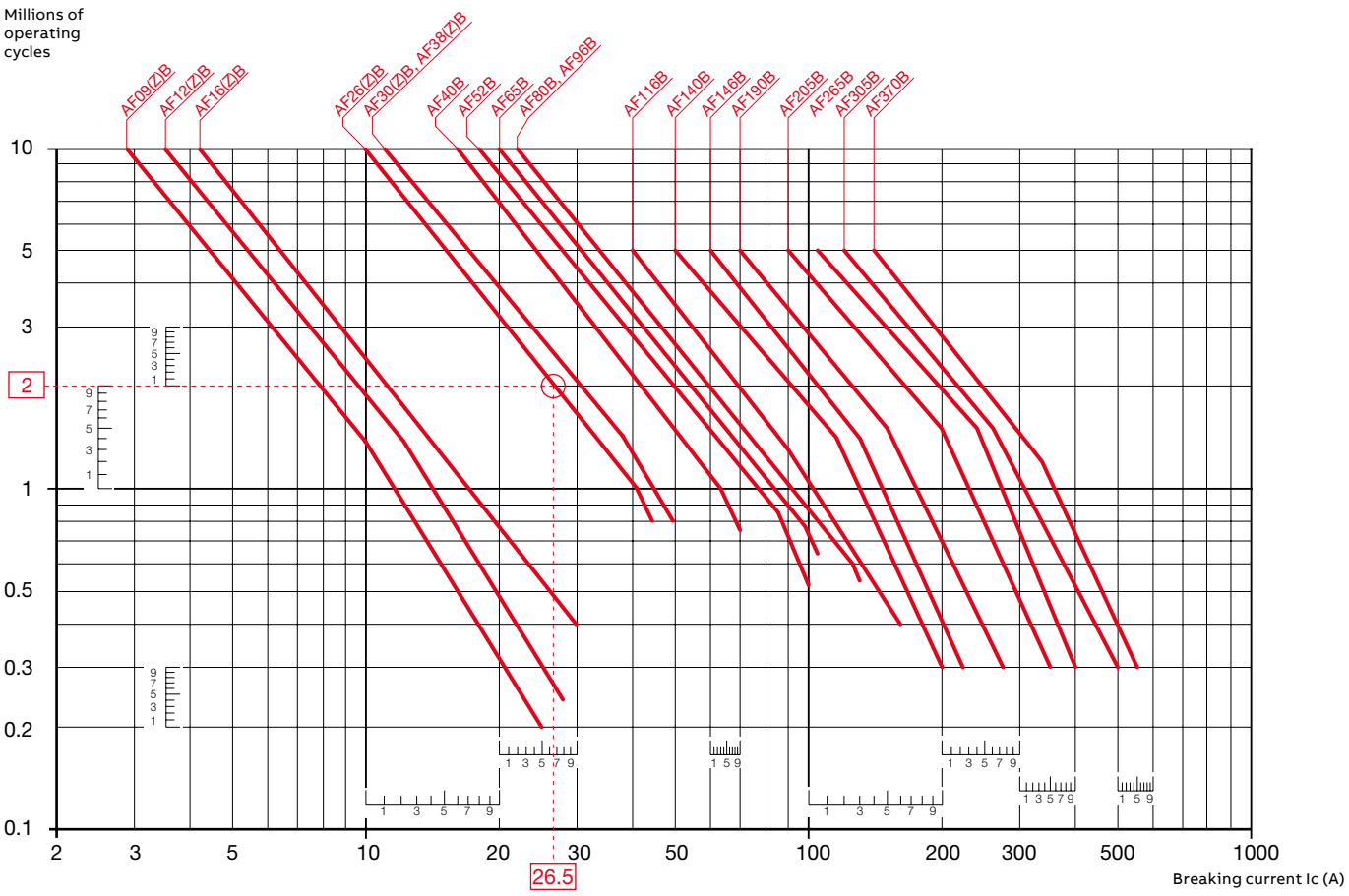
AF09(Z)B ... AF370B 3-pole contactors

Electrical durability

Electrical durability for AC-1 utilization category - Ue ≤ 690 V

Switching non-inductive or slightly inductive loads. The breaking current Ic for AC-1 is equal to the rated operational current of the load.

Ambient temperature and maximum electrical switching frequency: see "Technical data".



Example:

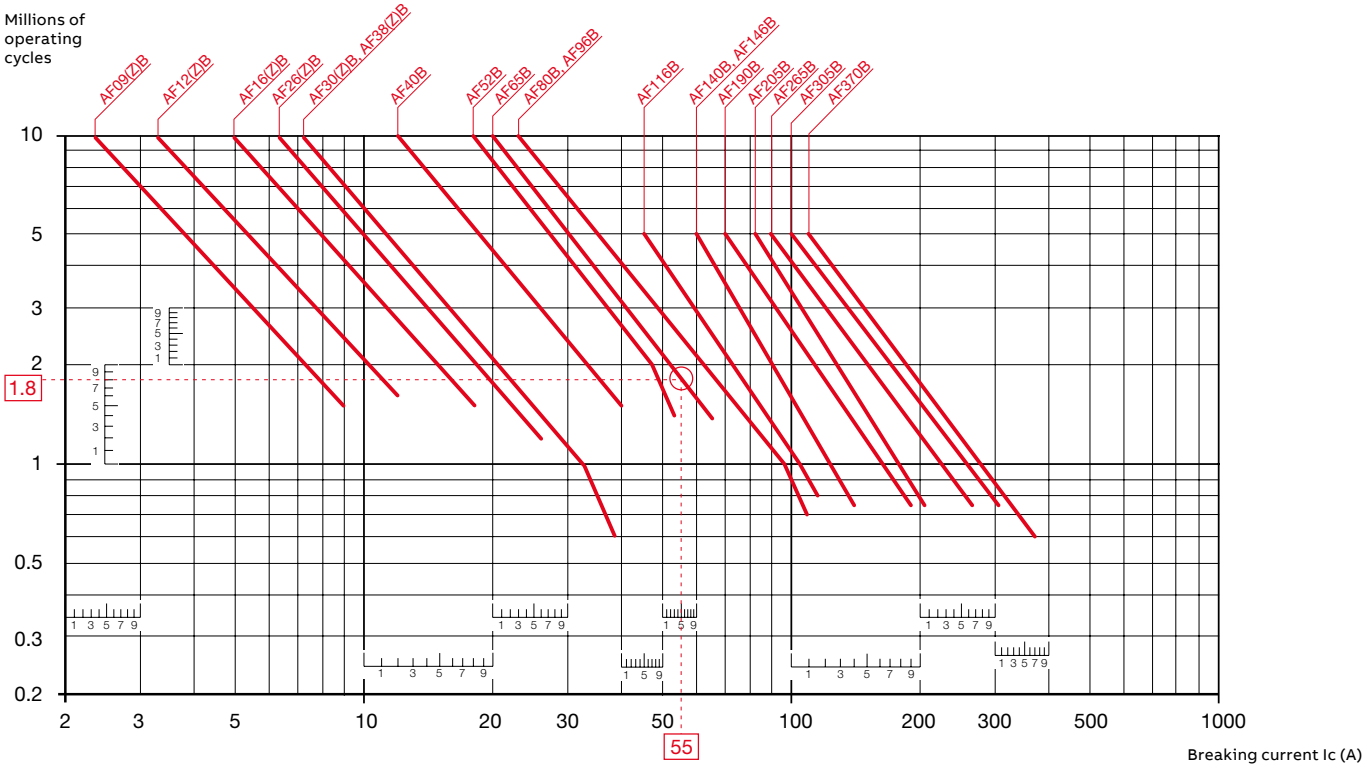
Ic / AC-1 = 26.5 A – Electrical durability required = 2 millions operating cycles.

Using the AC-1 curves above select the AF26(Z)B contactor at intersection "O" (26.5 A / 2 millions operating cycles).

AF09(Z)B ... AF370B 3-pole contactors

Electrical durability

Electrical durability for AC-3 utilization category - Ue ≤ 440 V.
Switching cage motors: starting and switching off running motors. The breaking current Ic for AC-3 is equal to the rated operational current Ie (Ie = motor full load current).
Ambient temperature and maximum electrical switching frequency: see "Technical data".



Example:
Motor power 30 kW for AC-3 - Ue = 400 V and Ie = 55 A utilization – Electrical durability required = 1.8 million operating cycles.
For AC-3: Ic = Ie. Select the AF65B contactor at intersection "O" (55 A / 1.8 million operating cycles) on the curves (AC-3 - Ue ≤ 440 V).

AF..(Z)B..K 3-pole contactors connection with standard ferrules

Push-in Spring terminals

3/38	AF09ZB..K ... AF38ZB..K	DC operated
3/39	AF09(Z)B..K ... AF38(Z)B..K	AC operated
3/41	Technical data	
3/46	Electrical durability	

For direct product details information, use product type or order code, ex:

or www.abb.com/productdetails/**AF09ZB-30-10K-21**
www.abb.com/productdetails/**1SBL136063R2110**

AF09ZB..K ... AF38ZB..K 3-pole contactors - with Push-in Spring terminals

4 to 18.5 kW

DC operated

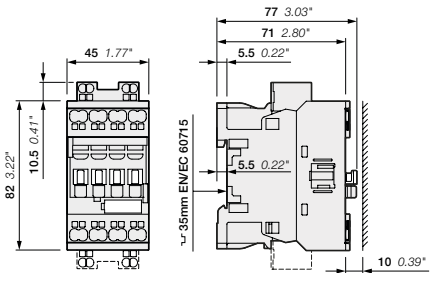
AF09ZB-30-10K

AF26ZB-30-00K

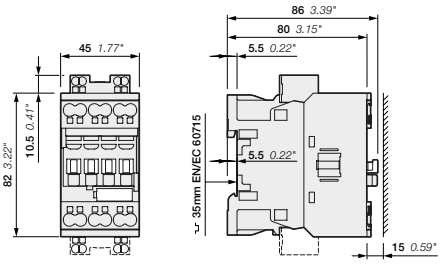
AF09ZB..K ... AF38ZB..K 3-pole contactors with Push-in Spring terminals comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC. These contactors are of the block type design with 3 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (H2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 Uc... 1.25 Uc according to IEC 60077) used for battery supply
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories

IEC		UL/CSA		Rated control circuit voltage Uc (IEC 60077)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power	current θ ≤ 40 °C	3-phase motor rating	General use rating						Pkg (1 pce)
400 V		480 V	600 V AC						
AC-3 kW	AC-1 A	hp	A	V DC	V DC				kg
4	25	5	25	24, 33, 48	20 ... 60	1 0	AF09ZB-30-10K-21	1SBL136063R2110	0.315
						0 1	AF09ZB-30-01K-21	1SBL136063R2101	0.315
				72, 96, 110	48 ... 130	1 0	AF09ZB-30-10K-22	1SBL136063R2210	0.315
						0 1	AF09ZB-30-01K-22	1SBL136063R2201	0.315
				220	100 ... 250	1 0	AF09ZB-30-10K-23	1SBL136063R2310	0.315
						0 1	AF09ZB-30-01K-23	1SBL136063R2301	0.315
5.5	28	7.5	28	24, 33, 48	20 ... 60	1 0	AF12ZB-30-10K-21	1SBL156063R2110	0.315
						0 1	AF12ZB-30-01K-21	1SBL156063R2101	0.315
				72, 96, 110	48 ... 130	1 0	AF12ZB-30-10K-22	1SBL156063R2210	0.315
						0 1	AF12ZB-30-01K-22	1SBL156063R2201	0.315
				220	100 ... 250	1 0	AF12ZB-30-10K-23	1SBL156063R2310	0.315
						0 1	AF12ZB-30-01K-23	1SBL156063R2301	0.315
7.5	30	10	30	24, 33, 48	20 ... 60	1 0	AF16ZB-30-10K-21	1SBL176063R2110	0.315
						0 1	AF16ZB-30-01K-21	1SBL176063R2101	0.315
				72, 96, 110	48 ... 130	1 0	AF16ZB-30-10K-22	1SBL176063R2210	0.315
						0 1	AF16ZB-30-01K-22	1SBL176063R2201	0.315
				220	100 ... 250	1 0	AF16ZB-30-10K-23	1SBL176063R2310	0.315
						0 1	AF16ZB-30-01K-23	1SBL176063R2301	0.315
11	45	15	42	24, 33, 48	20 ... 60	0 0	AF26ZB-30-00K-21	1SBL236063R2100	0.355
				72, 96, 110	48 ... 130	0 0	AF26ZB-30-00K-22	1SBL236063R2200	0.355
				220	100 ... 250	0 0	AF26ZB-30-00K-23	1SBL236063R2300	0.355
15	50	20	45	24, 33, 48	20 ... 60	0 0	AF30ZB-30-00K-21	1SBL276063R2100	0.360
				72, 96, 110	48 ... 130	0 0	AF30ZB-30-00K-22	1SBL276063R2200	0.360
				220	100 ... 250	0 0	AF30ZB-30-00K-23	1SBL276063R2300	0.360
18.5	50	25	45	24, 33, 48	20 ... 60	0 0	AF38ZB-30-00K-21	1SBL296063R2100	0.360
				72, 96, 110	48 ... 130	0 0	AF38ZB-30-00K-22	1SBL296063R2200	0.360
				220	100 ... 250	0 0	AF38ZB-30-00K-23	1SBL296063R2300	0.360



AF09ZB..K, AF12ZB..K, AF16ZB..K



AF26ZB..K, AF30ZB..K, AF38ZB..K

Main dimensions mm, inches

AF09(Z)B..K ... AF38(Z)B..K 3-pole contactors - with Push-in Spring terminals

4 to 18.5 kW

AC operated

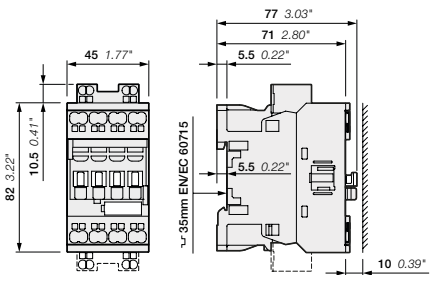
AF09(Z)B-30-10K

AF26(Z)B-30-00K

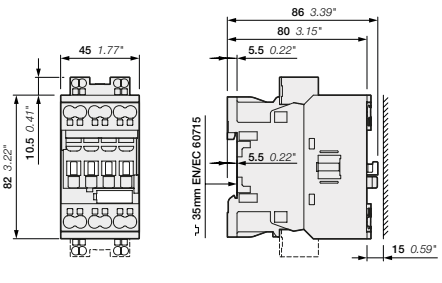
AF09(Z)B..K ... AF38(Z)B..K 3-pole contactors with Push-in Spring terminals comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC. These contactors are of the block type design with 3 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (H2, HL3 hazard levels)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies. Maximum permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories

IEC		UL/CSA		Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
Rated operational power	current θ ≤ 40 °C	3-phase motor rating	General use rating					
400 V		480 V	600 V AC					
AC-3 kW	AC-1 A	hp	A	V AC 50/60 Hz				kg
4	25	5	25	24 ... 60	1 0	AF09ZB-30-10K-21	1SBL136063R2110	0.315
					0 1	AF09ZB-30-01K-21	1SBL136063R2101	0.315
				48 ... 130	1 0	AF09ZB-30-10K-22	1SBL136063R2210	0.315
					0 1	AF09ZB-30-01K-22	1SBL136063R2201	0.315
				100 ... 250	1 0	AF09ZB-30-10K-23	1SBL136063R2310	0.315
					0 1	AF09ZB-30-01K-23	1SBL136063R2301	0.315
				250 ... 500	1 0	AF09B-30-10K-14	1SBL137063R1410	0.325
					0 1	AF09B-30-01K-14	1SBL137063R1401	0.325
5.5	28	7.5	28	24 ... 60	1 0	AF12ZB-30-10K-21	1SBL156063R2110	0.315
					0 1	AF12ZB-30-01K-21	1SBL156063R2101	0.315
				48 ... 130	1 0	AF12ZB-30-10K-22	1SBL156063R2210	0.315
					0 1	AF12ZB-30-01K-22	1SBL156063R2201	0.315
				100 ... 250	1 0	AF12ZB-30-10K-23	1SBL156063R2310	0.315
					0 1	AF12ZB-30-01K-23	1SBL156063R2301	0.315
				250 ... 500	1 0	AF12B-30-10K-14	1SBL157063R1410	0.325
					0 1	AF12B-30-01K-14	1SBL157063R1401	0.325
7.5	30	10	30	24 ... 60	1 0	AF16ZB-30-10K-21	1SBL176063R2110	0.315
					0 1	AF16ZB-30-01K-21	1SBL176063R2101	0.315
				48 ... 130	1 0	AF16ZB-30-10K-22	1SBL176063R2210	0.315
					0 1	AF16ZB-30-01K-22	1SBL176063R2201	0.315
				100 ... 250	1 0	AF16ZB-30-10K-23	1SBL176063R2310	0.315
					0 1	AF16ZB-30-01K-23	1SBL176063R2301	0.315
				250 ... 500	1 0	AF16B-30-10K-14	1SBL177063R1410	0.325
					0 1	AF16B-30-01K-14	1SBL177063R1401	0.325
11	45	15	42	24 ... 60	0 0	AF26ZB-30-00K-21	1SBL236063R2100	0.355
				48 ... 130	0 0	AF26ZB-30-00K-22	1SBL236063R2200	0.355
				100 ... 250	0 0	AF26ZB-30-00K-23	1SBL236063R2300	0.355
				250 ... 500	0 0	AF26B-30-00K-14	1SBL237063R1400	0.365
15	50	20	45	24 ... 60	0 0	AF30ZB-30-00K-21	1SBL276063R2100	0.360
				48 ... 130	0 0	AF30ZB-30-00K-22	1SBL276063R2200	0.360
				100 ... 250	0 0	AF30ZB-30-00K-23	1SBL276063R2300	0.360
				250 ... 500	0 0	AF30B-30-00K-14	1SBL277063R1400	0.370
18.5	50	25	45	24 ... 60	0 0	AF38ZB-30-00K-21	1SBL296063R2100	0.360
				48 ... 130	0 0	AF38ZB-30-00K-22	1SBL296063R2200	0.360
				100 ... 250	0 0	AF38ZB-30-00K-23	1SBL296063R2300	0.360
				250 ... 500	0 0	AF38B-30-00K-14	1SBL297063R1400	0.370



AF09(Z)B..K, AF12(Z)B..K, AF16(Z)B..K



AF26(Z)B..K, AF30(Z)B..K, AF38(Z)B..K

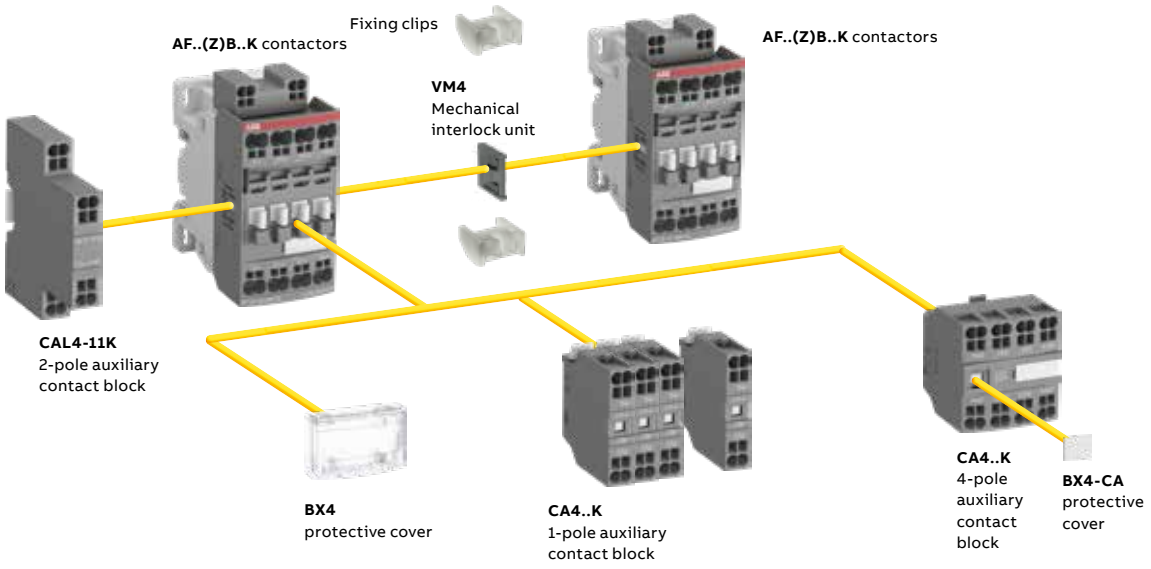
Main dimensions mm, inches

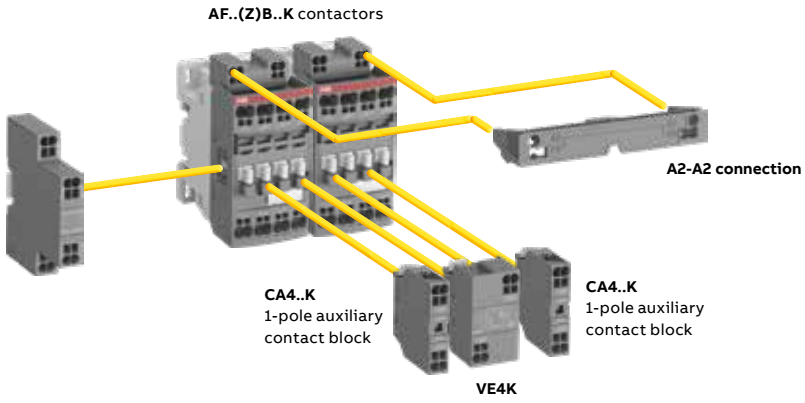
AF09(Z)B..K ... AF38(Z)B..K 3-pole contactors - with Push-in Spring terminals

Contactors and Main accessories

Contactor and main accessories (other accessories available)

AF09(Z)B..K ... AF38(Z)B..K





VEM4K mechanical and electrical interlock set including:
- VM4 mechanical interlock unit with 2 fixing clips
- VE4K electrical inlerlock block with A2-A2 connection

Main accessory fitting details - for ordering details, technical data and other accessories: see section accessories

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

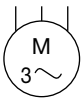
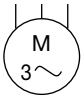
Contactor types	Main poles	Built-in auxiliary contacts	Front-mounted accessories: Auxiliary contact blocks		Electrical and mechanical interlock set		Side-mounted accessories: Auxiliary contact blocks	
					(between 2 contactors)		Left side	Right side
			1-pole CA4..K	4-pole CA4..K	VM4K		2-pole CAL4-11K	
AF09(Z)B..K ... AF38(Z)B..K (1)								
AF09..K ... AF16..K	3 0	0 1	4 max.	**or** 1	–	+	1	–
AF09..K ... AF16..K	3 0	1 0	2 max.	–	–	+	1	+ 1
AF26..K ... AF38..K	3 0	0 0	4 max.	**or** 1	+ 1	+	1	**or** 1

(1) Including add-on and built-in contacts: 4 N.C. auxiliary contacts max. on positions 1, 2, 3, 4 and 3 N.C. auxiliary contacts max. on positions 1 +/- 30°, 5.

AF09(Z)B..K ... AF38(Z)B..K 3-pole contactors - with Push-in Spring terminals

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types		AF09(Z)B..K	AF12(Z)B..K	AF16(Z)B..K	AF26(Z)B..K	AF30(Z)B..K	AF38(Z)B..K
Standards (1)		IEC/EN 60947-1, IEC/EN 60947-4-1, IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), EN 50155 (applicable parts), TR CU 001/2011 IEC 61373					
Rated operational voltage Ue max.		690 V					
Rated frequency (without derating)		50 / 60 Hz					
Conventional free-air thermal current Ith acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		35 A	35 A	35 A	50 A	50 A	50 A
With conductor cross-sectional area		6 mm²	6 mm²	6 mm²	10 mm²	10 mm²	10 mm²
AC-1 Utilization category For air temperature close to contactor Ie / Rated operational current AC-1 Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 40 °C	25 A	28 A	30 A	45 A	50 A	50 A
	θ ≤ 60 °C	25 A	28 A	30 A	40 A	42 A	42 A
	θ ≤ 70 °C	22 A	24 A	26 A	32 A	37 A	37 A
With conductor cross-sectional area		4 mm²	6 mm²	6 mm²	10 mm²	10 mm²	10 mm²
AC-3, AC-3e Utilization category For air temperature close to contactor θ ≤ 60 °C Ie / Max. rated operational current AC-3, AC-3e (2)							
 3-phase motors	220-230-240 V	9 A	12 A	18 A	26 A	33 A	40 A
	380-400 V	9 A	12 A	18 A	26 A	32 A	38 A
	415 V	9 A	12 A	18 A	26 A	32 A	38 A
	440 V	9 A	12 A	18 A	26 A	32 A	38 A
	500 V	9.5 A	12.5 A	15 A	23 A	28 A	33 A
	690 V	7 A	9 A	10.5 A	17 A	21 A	24 A
	1000 V	–					
Rated operational power AC-3, AC-3e (2)							
 1500 r.p.m. 50 Hz 1800 r.p.m. 60 Hz 3-phase motors	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW	11 kW
	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW	18.5 kW
	415 V	4 kW	5.5 kW	9 kW	11 kW	15 kW	18.5 kW
	440 V	4 kW	5.5 kW	9 kW	15 kW	18.5 kW	22 kW
	500 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW	22 kW
	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW	22 kW
	1000 V	–					
Rated making capacity AC-3, AC-3e		10 x Ie AC-3, 12 x Ie AC-3e acc. to IEC 60947-4-1					
Rated breaking capacity AC-3, AC-3e		8 x Ie AC-3, 8.5 x Ie AC-3e acc. to IEC 60947-4-1					
AC-8a Utilization category (without thermal overload relay Ue 400 V 50/60 Hz θ ≤ 40 °C) Ie / Rated operational current AC-8a		12 A	16 A	22 A	30 A	40 A	50 A
Rated operational power AC-8a		5.5 kW	7.5 kW	11 kW	15 kW	20 kW	25 kW
Short-circuit protection device for contactors without thermal overload relay in free air Motor protection excluded (3) Ue ≤ 500 V AC - gG type fuse		25 A	32 A	32 A	50 A	63 A	63 A
Rated short-time withstand current Icw at 40 °C ambient temperature, in free air from a cold state	1 s	300 A	300 A	300 A	700 A	700 A	700 A
	10 s	150 A	150 A	150 A	350 A	350 A	350 A
	30 s	80 A	80 A	80 A	225 A	225 A	225 A
	1 min	60 A	60 A	60 A	150 A	150 A	150 A
	15 min	35 A	35 A	35 A	50 A	50 A	50 A
Maximum breaking capacity cos ϕ = 0.45	at 440 V	250 A	250 A	250 A	500 A	500 A	500 A
	at 690 V	106 A	106 A	106 A	200 A	200 A	200 A
Power dissipation per pole	Ie / AC-1	1.14 W	1.43 W	1.64 W	2 W	2.44 W	2.44 W
	Ie / AC-3, AC-3e	0.15 W	0.26 W	0.6 W	0.66 W	1 W	1.41 W
Max. electrical switching frequency	AC-1	600 cycles/h					
	AC-3, AC-3e	1200 cycles/h					
	AC-2, AC-4	300 cycles/h			150 cycles/h		

(1) For compliance confirmation on applicable parts based on your application and combination, please consult your ABB sales representatives.
(2) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".
(3) For the protection of motor starters against short-circuits, see "Coordination with short-circuit protection devices".

AF09(Z)B..K ... AF38(Z)B..K 3-pole contactors - with Push-in Spring terminals

Technical data

Main pole - Utilization characteristics according to UL / NEMA / CSA

Contactor types		AF09(Z)B..K	AF12(Z)B..K	AF16(Z)B..K	AF26(Z)B..K	AF30(Z)B..K	AF38(Z)B..K
Standards		UL 60947-4-1, CSA-C22.2 No. 60947-4-1					
Maximum operational voltage		600 V					
NEMA size		00	0	-	1	-	-
NEMA continuous amp rating	Thermal current	9 A	18 A		27 A		
NEMA maximum horse power ratings 1-phase, 60 Hz	115 V AC	1/3 hp	1 hp		2 hp		
	230 V AC	1 hp	2 hp		3 hp		
NEMA maximum horse power ratings 3-phase, 60 Hz	200 V AC	1-1/2 hp	3 hp		7-1/2 hp		
	230 V AC	1-1/2 hp	3 hp		7-1/2 hp		
	460 V AC	2 hp	5 hp		10 hp		
	575 V AC	2 hp	5 hp		10 hp		
UL / CSA general use rating							
600 V AC		25 A	28 A	30 A	42 A	45 A	45 A
With conductor cross-sectional area		AWG 10	AWG 10	AWG 10	AWG 8	AWG 8	AWG 8
1 pole	80 V DC	25 A	28 A	30 A	42 A	45 A	45 A
2 poles in serie	160 V DC	25 A	28 A	30 A	42 A	45 A	45 A
3 poles in serie	240 V DC	25 A	28 A	30 A	42 A	45 A	45 A
With conductor cross-sectional area		AWG 10	AWG 10	AWG 10	AWG 8	AWG 8	AWG 8
UL / CSA maximum 1-phase motor rating							
Full load current	120 V AC	13.8 A	16 A	20 A	24 A	24 A	24 A
	240 V AC	10 A	12 A	17 A	17 A	28 A	28 A
Horse power rating	120 V AC	3/4 hp	1 hp	1-1/2 hp	2 hp	2 hp	2 hp
	240 V AC	1-1/2 hp	2 hp	3 hp	3 hp	5 hp	5 hp
UL / CSA maximum 3-phase motor rating							
Full load current (1)	200-208 V AC	7.8 A	11 A	17.5 A	25.3 A	32.2 A	32.2 A
	220-240 V AC	6.8 A	9.6 A	15.2 A	22 A	28 A	28 A
	440-480 V AC	7.6 A	11 A	14 A	21 A	27 A	34 A
	550-600 V AC	9 A	11 A	17 A	22 A	27 A	32 A
Horse power rating (1)	200-208 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp	10 hp
	220-240 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp	10 hp
	440-480 V AC	5 hp	7-1/2 hp	10 hp	15 hp	20 hp	25 hp
	550-600 V AC	7-1/2 hp	10 hp	15 hp	20 hp	25 hp	30 hp
UL / CSA - DC motor starting - 3 poles in series							
Full Load Amps (FLA)	125 V DC	9.5 A	13.2 A	17 A	25 A	25 A	25 A
	250 V DC	8.5 A	12.2 A	12.2 A	20 A	29 A	29 A
Horse power rating	125 V DC	1 hp	1-1/2 hp	2 hp	3 hp	3 hp	3 hp
	250 V DC	2 hp	3 hp	3 hp	5 hp	7-1/2 hp	7-1/2 hp
Short-circuit protection device for contactors without thermal overload relay Motor protection excluded							
Fuse rating		30 A		60 A		100 A	
Fuse type, 600 V		RK5					
Maximum electrical switching frequency							
For general use		600 cycles/h					
For motor use		1200 cycles/h					

(1) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".

AF09(Z)B..K ... AF38(Z)B..K 3-pole contactors - with Push-in Spring terminals

Technical data

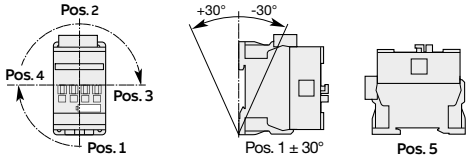
General technical data

Contactor types	AF09(Z)B..K	AF12(Z)B..K	AF16(Z)B..K	AF26(Z)B..K	AF30(Z)B..K	AF38(Z)B..K
Rated insulation voltage Ui						
acc. to IEC 60947-4-1	690 V					
acc. to UL / CSA	600 V					
Rated impulse withstand voltage Uimp.	6 kV					
Electromagnetic compatibility	Devices complying with IEC/EN 60947-1, Environment A EN 50121-3-2					
Pollution degree	3					
Ambient air temperature close to contactor						
Operation Without thermal overload relay	-40 ... +70 °C					
Storage	-60 ... +80 °C					
Climatic withstand	Category B according to IEC 60947-1 Annex Q					
Maximum operating altitude (without derating)	3000 m					
Mechanical durability						
Number of operating cycles	10 million operating cycles					
Maximum switching frequency	3600 cycles/h					
Shock and vibration withstand acc. to IEC 61373	Category 1, class B					

Magnet system characteristics

Contactor types		AF09(Z)B..K	AF12(Z)B..K	AF16(Z)B..K	AF26(Z)B..K	AF30(Z)B..K	AF38(Z)B..K
Coil operating limits acc. to IEC 60947-4-1	DC supply	(AF..ZB..K) at θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max (AF..B..K) at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max; at θ ≤ 70 °C 0.85 x Uc min ... Uc max					
	AC supply	at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max at θ ≤ 70 °C 0.85 x Uc min ... Uc max					
DC control voltage							
Rated control circuit voltage Uc		20 ... 250 V DC					
Coil consumption	Average pull-in value	(AF..ZB..K) 12 ... 16 W					
	Average holding value	(AF..ZB..K) 1.7 W					
PLC-output control		(AF..ZB..K) ≥ 500 mA 24 V DC					
AC control voltage 50/60 Hz							
Rated control circuit voltage Uc		(AF..ZB..K) 24 ... 250 V AC - (AF..B..K) 250 ... 500 V AC					
Coil consumption	Average pull-in value	(AF..ZB..K) 16 VA - (AF..B..K) 50 VA					
	Average holding value	(AF..ZB..K) 1.7 VA / 1.5 W - (AF..B..K) 2.2 VA / 2 W					
Max. permitted control voltage during voltage fluctuation defined acc. to IEC 60077 / EN 50155		Rated control circuit voltage / Max. permitted control voltage 24 ... 60 V AC 50/60 Hz / 66 V AC 50/60 Hz 48 ... 130 V AC 50/60 Hz / 143 V AC 50/60 Hz 100 ... 250 V AC 50/60 Hz / 275 V AC 50/60 Hz 250 ... 500 V AC 50/60 Hz / 550 V AC 50/60 Hz					
Drop-out voltage		≤ 60 % of Uc min.					
Operating time							
Between coil energization and:	N.O. contact closing	40...95 ms					
	N.C. contact opening	38...90 ms					
Between coil de-energization and:	N.O. contact opening	11...95 ms					
	N.C. contact closing	13...98 ms					

Mounting characteristics and conditions for use

Contactor types	AF09(Z)B..K	AF12(Z)B..K	AF16(Z)B..K	AF26(Z)B..K	AF30(Z)B..K	AF38(Z)B..K
Mounting positions	 Max. N.C. built-in and add-on N.C. auxiliary contacts: see accessory fitting details for a 3-pole contactor AF09(Z)B..K ... AF38(Z)B..K					
Mounting distances	The contactors can be assembled side by side					
Fixing						
On rail according to IEC/EN 60715	35 x 7.5 mm or 35 x 15 mm					
By screws (not supplied)	2 x M4 screws placed diagonally					

AF09(Z)B..K ... AF38(Z)B..K 3-pole contactors - with Push-in Spring terminals

Technical data

Connecting characteristics

Contactor types			AF09(Z)B..K	AF12(Z)B..K	AF16(Z)B..K	AF26(Z)B..K	AF30(Z)B..K	AF38(Z)B..K
Main terminals			Push-in Spring terminals					
Connection capacity (min. ... max.)								
Main conductors (poles)								
Rigid	Solid (≤ 2.5 mm²)	1 x	1 ... 6 mm²			1 ... 10 mm²		
	Stranded (≥ 4 mm²)	2 x	1 ... 6 mm²			1 ... 10 mm²		
Flexible		1 x	1 (push-in) / 0.5 (spring) ... 4 mm²			1 ... 6 mm²		
with non insulated ferrule		2 x	1 (push-in) / 0.5 (spring) ... 4 mm²			1 ... 6 mm²		
Flexible with insulated ferrule		1 x	1 (push-in) / 0.5 (spring) ... 4 mm²			1 ... 6 mm²		
		2 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²			1 ... 6 mm²		
Flexible without ferrule		1 x	(spring) 0.5 ... 4 mm²			(spring) 1 ... 6 mm²		
		2 x	(spring) 0.5 ... 4 mm²			(spring) 1 ... 6 mm²		
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18 ... 10			AWG 18 ... 8		
	(Solid ≤ AWG 14)							
Stripping length			12 mm			14 mm		
Auxiliary conductors								
(built-in auxiliary terminals + coil terminals)								
Rigid solid		1 x	1 ... 2.5 mm²					
		2 x	1 ... 2.5 mm²					
Flexible with		1 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²					
non insulated ferrule		2 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²					
Flexible with insulated ferrule		1 x	1 (push-in) / 0.5 (spring) ... 1.5 mm²					
		2 x	1 (push-in) / 0.5 (spring) ... 1.5 mm²					
Flexible without ferrule		1 x	(spring) 0.5 ... 2.5 mm²					
		2 x	(spring) 0.5 ... 2.5 mm²					
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18 ... 14					
Stripping length			10 mm					
Degree of protection								
acc. to IEC/EN 60947-1 and IEC/EN 60529								
Main terminals			IP20					
Coil terminals			IP20					
Built-in auxiliary terminals			IP20					
Screwdriver type	All terminals		Flat Ø 3 mm x 0.5 mm					

AF09(Z)B..K ... AF38(Z)B..K 3-pole contactors - with Push-in Spring terminals

Technical data

Built-in auxiliary contacts according to IEC

Contactor types		AF09(Z)B..K	AF12(Z)B..K	AF16(Z)B..K	AF26(Z)B..K	AF30(Z)B..K	AF38(Z)B..K
Rated operational voltage Ue max.		690 V					
Rated frequency (without derating)		50 / 60 Hz					
Conventional free air thermal current Ith - θ ≤ 40 °C		16 A					
Ie / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A					
	220-240 V 50/60 Hz	4 A					
	400-440 V 50/60 Hz	3 A					
	500 V 50/60 Hz	2 A					
	690 V 50/60 Hz	2 A					
Making capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1					
Breaking capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1					
Ie / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	6 A / 144 W					
	48 V DC	2.8 A / 134 W					
	72 V DC	1 A / 72 W					
	110 V DC	0.55 A / 60 W					
	125 V DC	0.55 A / 69 W					
	220 V DC	0.27 A / 60 W					
	250 V DC	0.27 A / 68 W					
	400 V DC	0.15 A / 60 W					
	500 V DC	0.13 A / 65 W					
	600 V DC	0.1 A / 60 W					
Short-circuit protection device gG type fuse		10 A					
Rated short-time withstand current Icw	for 1.0 s	100 A					
	for 0.1 s	140 A					
Minimum switching capacity		12 V / 3 mA					
with failure rate acc. to IEC 60947-5-4		10^{-7}					
Non-overlapping time between N.O. and N.C. contacts		≥ 2 ms					
Power dissipation per pole at 6 A		0.1 W					
Maximum electrical switching frequency	AC-15	1200 cycles/h					
	DC-13	900 cycles/h					
Mechanically linked contacts acc. to annex L of IEC 60947-5-1		Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts (CA4, CAL4 aux. contact blocks) are mechanically linked contacts.					
Mirror contacts acc. to annex F of IEC 60947-4-1		Built-in N.C. auxiliary contacts or additional N.C. auxiliary contacts (CA4, CAL4 aux. contact blocks) are mirror contacts.					

Built-in auxiliary contacts according to UL / CSA

Contactor types	AF09(Z)B..K	AF12(Z)B..K	AF16(Z)B..K	AF26(Z)B..K	AF30(Z)B..K	AF38(Z)B..K
Maximum operational voltage	600 V AC, 600 V DC					
Pilot duty	A600, Q600					
AC thermal rated current	10 A					
AC maximum volt-ampere making	7200 VA					
AC maximum volt-ampere breaking	720 VA					
DC thermal rated current	2.5 A					
DC maximum volt-ampere making-breaking	69 VA					

AF09(Z)B..K ... AF38(Z)B..K 3-pole contactors with Push-in Spring terminals

Electrical durability and utilization categories

General

Utilization categories determine the current making and breaking conditions relating to the characteristics of the loads to be controlled by the contactors. International standard IEC 60947-4-1 and European standard EN 60947-4-1 are the standards to be referred to.
If Ic is the current to be broken by the contactor and Ie the rated operational current normally drawn by the load, then:

- Categories AC-1 and AC-3 Ic = Ie
- Category AC-2 Ic = 2.5 x Ie
- Category AC-4 Ic = 6 x Ie

Generally speaking Ic = m x Ie where m is a multiple of the load operational current.

On next pages, the curves corresponding to categories AC-1, AC-3 and AC-4 represent the electrical durability variation of standard contactors in relation to the breaking current Ic. Electrical durability is expressed in millions of operating cycles.

Curve utilization mode

Electrical durability forecast and contactor selection for categories AC-1, AC-2, AC-3 or AC-4

Characteristics	Load to be controlled
Operational voltage	Ue
Current normally drawn	Ie (Ue / Ie / kW relation for motors, see "Motor rated operational powers and currents")
Utilization category	AC-1, AC-2, AC-3 or AC-4
Breaking current	Ic = Ie for AC-1 and for AC-3 ; Ic = 2.5 x Ie for AC-2 ; Ic = 6 x Ie for AC-4

- Define the number of operating cycles N required.
- On the diagram corresponding to the operational category, select the contactor with the curve immediately above the intersection point (Ic ; N).

Electrical durability forecast and contactor selection for mixed duty motor control: AC-3 (Ic = Ie) type switching off while "motor running" and, occasionally, AC-4 (Ic = 6 x Ie) type switching off while "motor accelerating"

Characteristics	Load to be controlled
Operational voltage	Ue
Current normally drawn while "motor running"	Ie (Ue / Ie / kW relation for motors, see "Motor rated operational powers and currents")
Utilization category	AC-1, AC-2, AC-3 or AC-4
Breaking current for AC-3	Ic = Ie
Breaking current for AC-4 while "motor accelerating"	Ic = 6 x Ie
Percentage of AC-4 operating cycles	K (on the basis of the total number of operating cycles)

- Define the total number of operating cycles N required.
- Note the smallest contactor rating compatible for AC-3 (Ue / Ie) on Main pole utilization characteristic table (see “Technical data”).
- For the selected contactor make a note of the following in relation to the voltage using diagram AC-3 in next pages:
  - The number of operating cycles A for Ic = Ie (AC-3)
  - The number of operating cycles B for Ic = 6 x Ie (AC-4)
- Calculate the estimated number of cycles N’ (N’ is always below A)

$$N' = \frac{A}{1 + 0.01\ K\ (A/B - 1)}$$

- If N' is too low in relation to the target N, calculate the estimated number of cycles for a higher contactor rating.

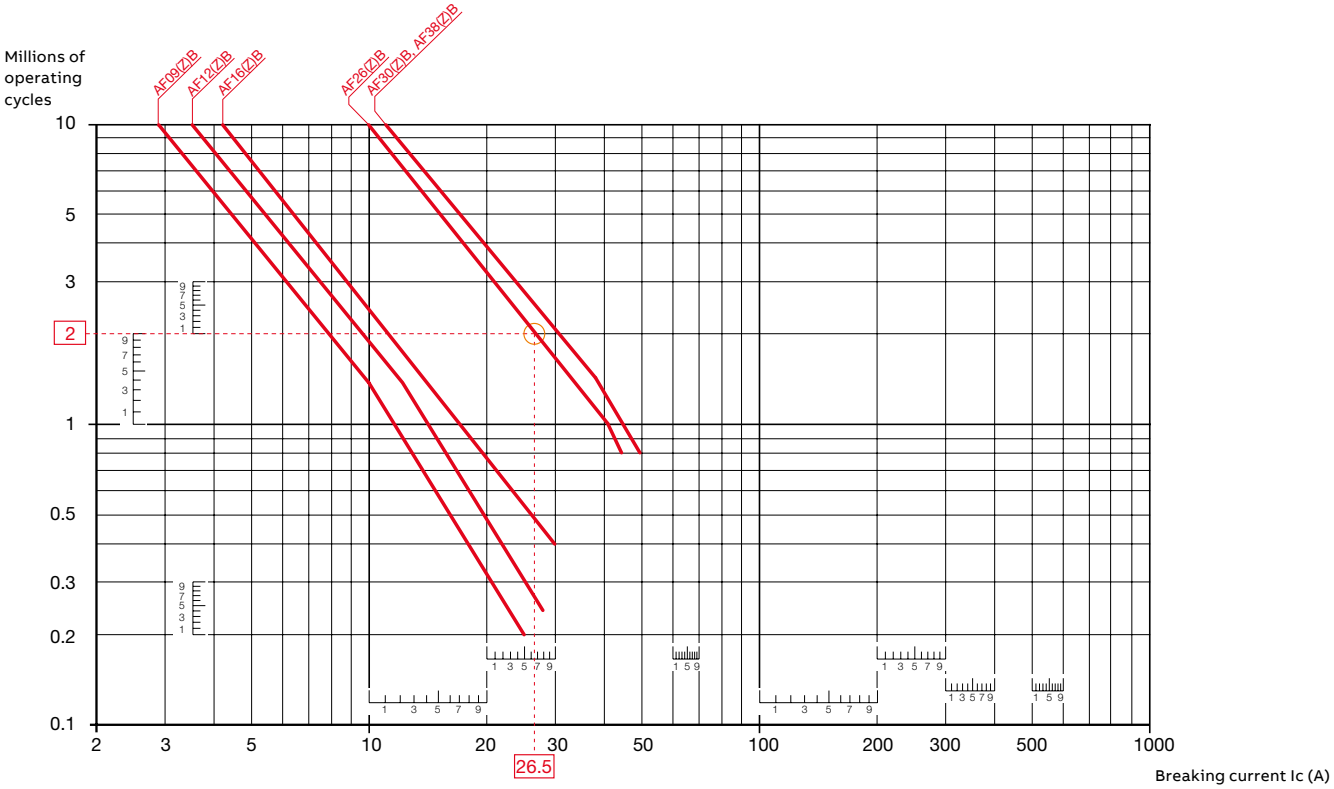
Case of uninterrupted duty

For uninterrupted duty, some verifications of preventing maintenance are necessary to check the functionality of the concerned product (consult us).
The combinated effect of environmental conditions and the proper temperature of the product may require some disposals. As a matter of fact, for this duty, the use duration prevails over the number of operating cycles.

AF09(Z)B..K ... AF38(Z)B..K 3-pole contactors - with Push-in Spring terminals

Electrical durability

Electrical Durability for AC-1 Utilization Category - Ue ≤ 690 V.
Switching non-inductive or slightly inductive loads. The breaking current Ic for AC-1 is equal to the rated operational current of the load.
Ambient temperature and maximum electrical switching frequency: see "Technical Data".



Example:

Ic / AC-1 = 26.5 A – Electrical durability required = 2 millions operating cycles.
Using the AC-1 curves above select the AF26(Z)B contactor at intersection "○" (26.5 A / 2 millions operating cycles).

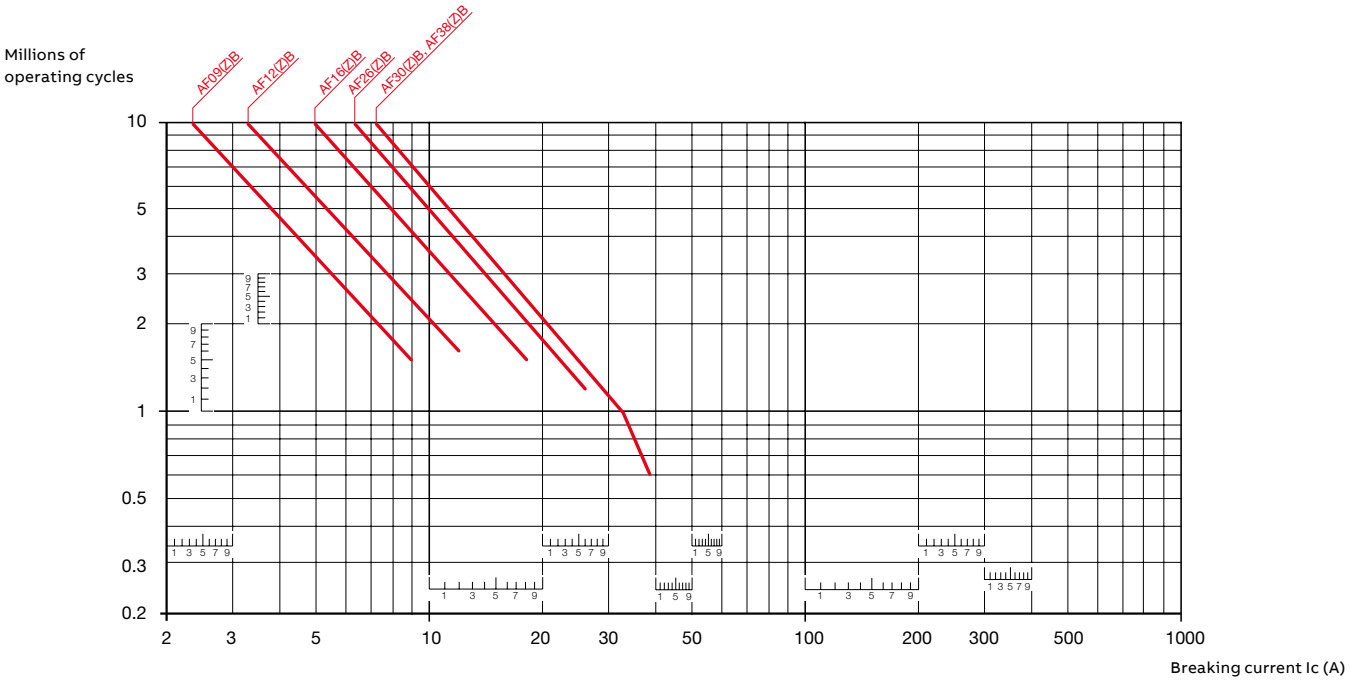
AF09(Z)B..K ... AF38(Z)B..K 3-pole contactors - with Push-in Spring terminals

Electrical durability

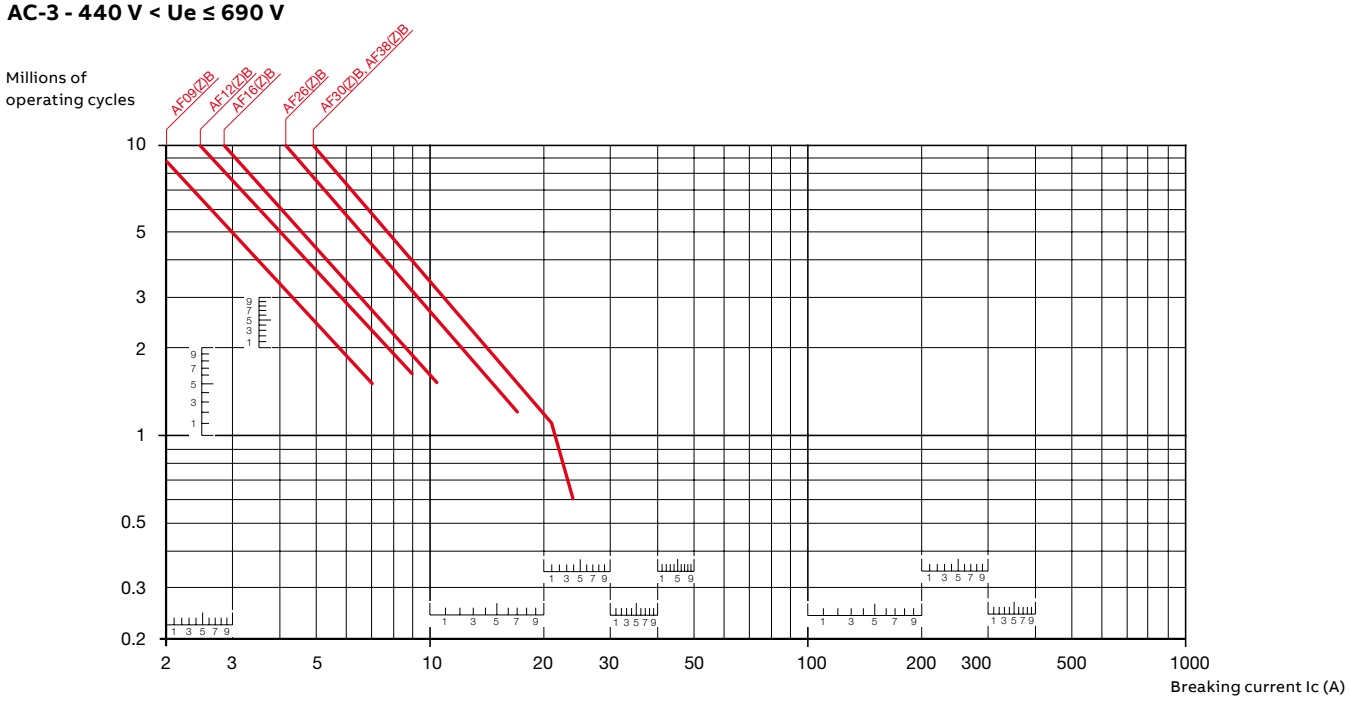
Electrical Durability for AC-3 Utilization Category

Switching cage motors: starting and switching off running motors. The breaking current Ic for AC-3 is equal to the rated operational current Ie (Ie = motor full load current). Ambient temperature and maximum electrical switching frequency: see "Technical Data".

AC-3 - Ue ≤ 440 V



AC-3 - 440 V < Ue ≤ 690 V



AF09(Z)B..K ... AF38(Z)B..K 3-pole contactors - with Push-in Spring terminals

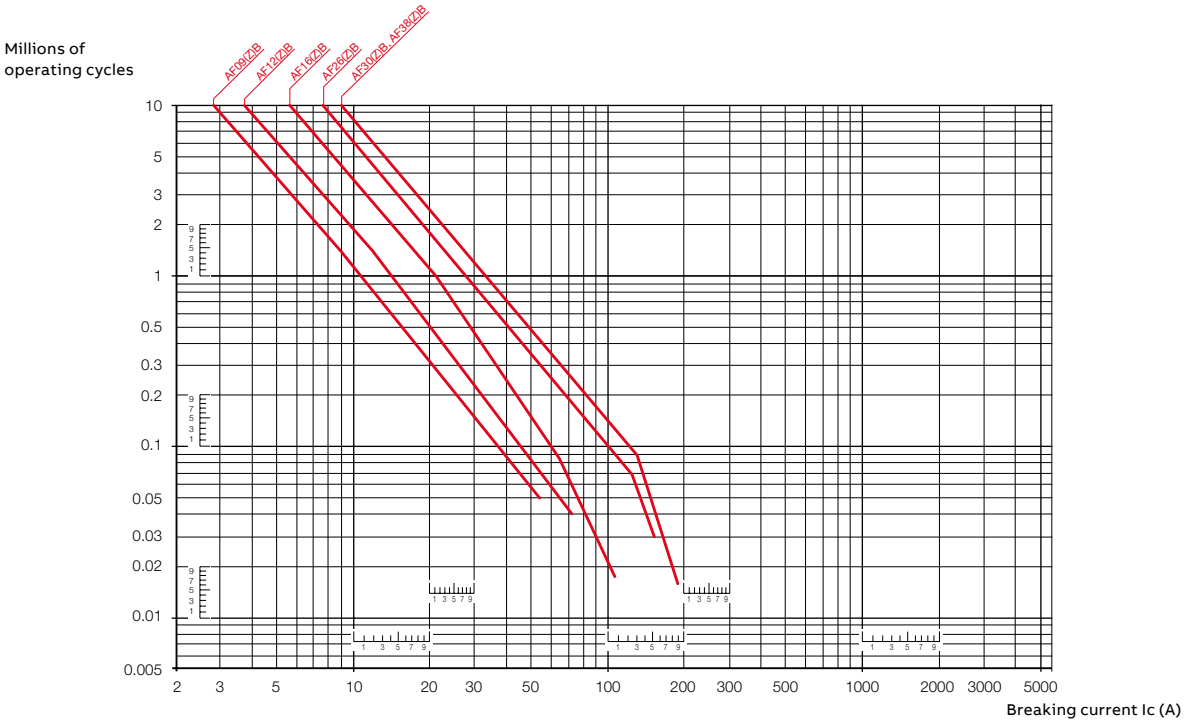
Electrical durability

Electrical Durability for AC-2 or AC-4 Utilization Category

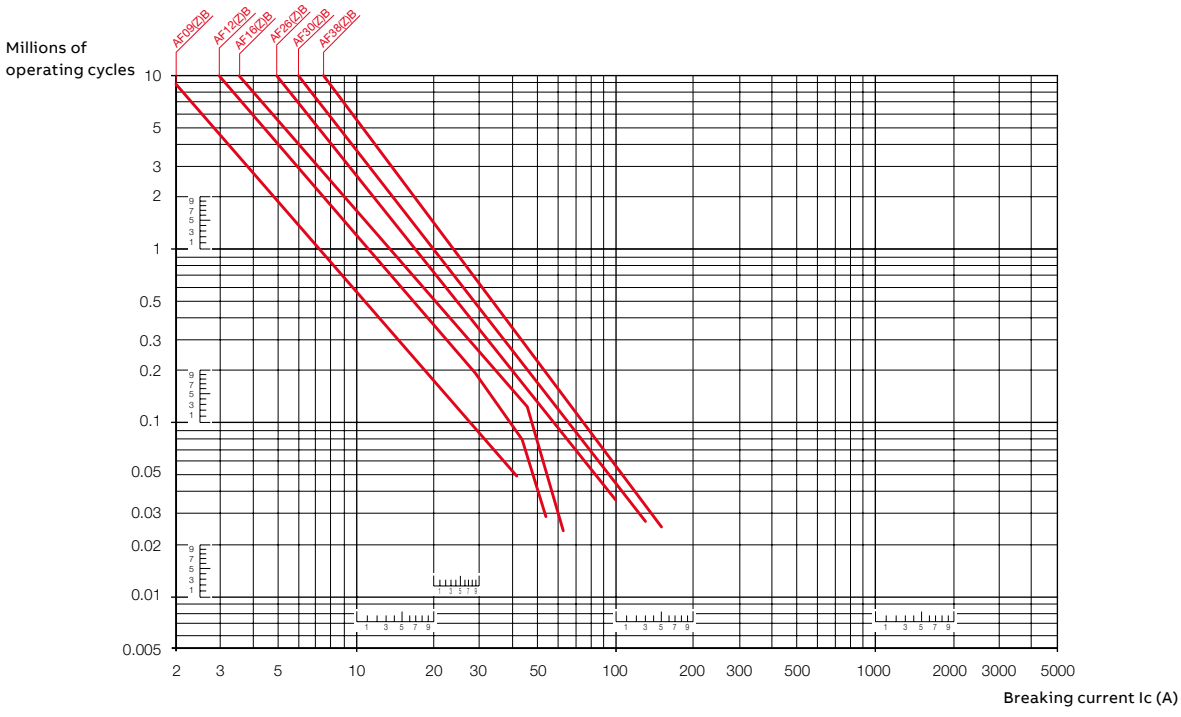
Switching cage motors: starting reverse operation and step-by-step operation. The breaking current Ic is equal to 2.5 x I_e for AC-2 and 6 x I_e for AC-4, keeping in mind that I_e is the motor rated operational current Ie (Ie = motor full load current).

Ambient temperature ≤ 60 °C. Maximum electrical switching frequency: see "Technical Data".

AC-2 or AC-4 - Ue ≤ 440 V



AC-2 or AC-4 - 440 V < Ue ≤ 690 V



AF..B 4-pole contactors connection with standard ferrules

3/52	AF09ZB ... AF38ZB	DC operated
3/53	AF09(Z)B ... AF38(Z)B	AC operated
3/54	AF40B...AF80B	DC operated
3/55	AF40B...AF80B	AC operated
3/57	AF116B ... AF140B	DC operated
3/58	AF116B ... AF140B	AC operated
3/59	AF190B ... AF370B	DC operated
3/60	AF190B ... AF370B	AC operated
3/62	Technical data	
3/71	Electrical durability	
3/73	Contactors for DC switching application	

For direct product details information, use product type or order code, ex:

www.abb.com/productdetails/**AF09ZB-30-10-21**

or

www.abb.com/productdetails/**1SBL136061R2110**

AF09ZB ... AF38ZB 4-pole contactors

25 to 55 A AC-1

DC operated - connection with standard ferrules

AF09ZB-40-00

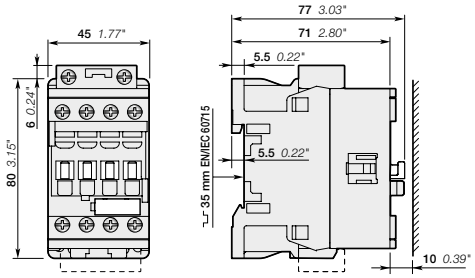
AF26ZB-40-00

AF09ZB ... AF38ZB 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling power circuits up to 690 V AC and 440 V DC. These contactors are of the block type design with 4 main poles.

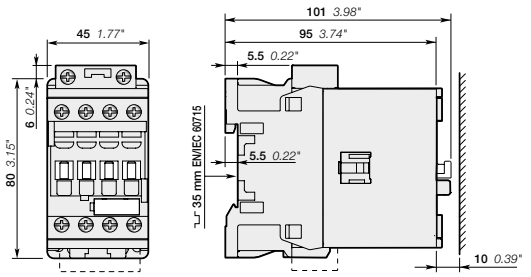
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC Rated operational current θ ≤ 40 °C AC-1	UL / CSA General use rating 600 V AC	Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
A	A	V DC	V DC				kg
4 N.O. main poles							
25	25	24, 33, 48	20...60	0 0	AF09ZB-40-00-21	1SBL136261R2100	0.310
		72, 96, 110	48...130	0 0	AF09ZB-40-00-22	1SBL136261R2200	0.310
		220	100...250	0 0	AF09ZB-40-00-23	1SBL136261R2300	0.310
30	30	24, 33, 48	20...60	0 0	AF16ZB-40-00-21	1SBL176261R2100	0.310
		72, 96, 110	48...130	0 0	AF16ZB-40-00-22	1SBL176261R2200	0.310
		220	100...250	0 0	AF16ZB-40-00-23	1SBL176261R2300	0.310
45	45	24, 33, 48	20...60	0 0	AF26ZB-40-00-21	1SBL236261R2100	0.410
		72, 96, 110	48...130	0 0	AF26ZB-40-00-22	1SBL236261R2200	0.410
		220	100...250	0 0	AF26ZB-40-00-23	1SBL236261R2300	0.410
55	55	24, 33, 48	20...60	0 0	AF38ZB-40-00-21	1SBL296261R2100	0.410
		72, 96, 110	48...130	0 0	AF38ZB-40-00-22	1SBL296261R2200	0.410
		220	100...250	0 0	AF38ZB-40-00-23	1SBL296261R2300	0.410
2 N.O. + 2 N.C. main poles							
25	25	24, 33, 48	20...60	0 0	AF09ZB-22-00-21	1SBL136561R2100	0.310
		72, 96, 110	48...130	0 0	AF09ZB-22-00-22	1SBL136561R2200	0.310
		220	100...250	0 0	AF09ZB-22-00-23	1SBL136561R2300	0.310
30	30	24, 33, 48	20...60	0 0	AF16ZB-22-00-21	1SBL176561R2100	0.310
		72, 96, 110	48...130	0 0	AF16ZB-22-00-22	1SBL176561R2200	0.310
		220	100...250	0 0	AF16ZB-22-00-23	1SBL176561R2300	0.310
45	45	24, 33, 48	20...60	0 0	AF26ZB-22-00-21	1SBL236561R2100	0.410
		72, 96, 110	48...130	0 0	AF26ZB-22-00-22	1SBL236561R2200	0.410
		220	100...250	0 0	AF26ZB-22-00-23	1SBL236561R2300	0.410
55	55	24, 33, 48	20...60	0 0	AF38ZB-22-00-21	1SBL296561R2100	0.410
		72, 96, 110	48...130	0 0	AF38ZB-22-00-22	1SBL296561R2200	0.410
		220	100...250	0 0	AF38ZB-22-00-23	1SBL296561R2300	0.410

(1) Other control voltages, see voltage code table.



AF09ZB, AF16ZB



AF26ZB, AF38ZB

Main dimensions mm, inches

AF09(Z)B ... AF38(Z)B 4-pole contactors

25 to 55 A AC-1

AC operated - connection with standard ferrules

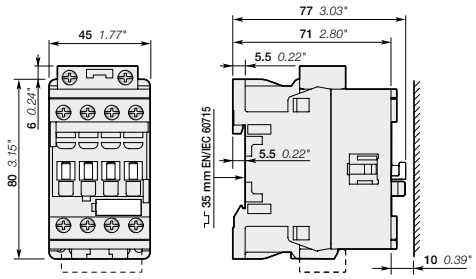
AF09ZB-40-00

AF09(Z)B ... AF38(Z)B 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling power circuits up to 690 V AC and 440 V DC. These contactors are of the block type design with 4 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max. of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression and side by side mounting without restriction from -40° C up to +70° C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

AF26ZB-40-00

IEC Rated operational current θ ≤ 40 °C AC-1 A	UL / CSA General use rating 600 V AC A	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1) V AC 50/60 Hz	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
4 N.O. main poles						
25	25	24...60	0 0	AF09ZB-40-00-21	1SBL136261R2100	0.310
		48...130	0 0	AF09ZB-40-00-22	1SBL136261R2200	0.310
		100...250	0 0	AF09ZB-40-00-23	1SBL136261R2300	0.310
		250...500	0 0	AF09B-40-00-14	1SBL137261R1400	0.310
30	30	24...60	0 0	AF16ZB-40-00-21	1SBL176261R2100	0.310
		48...130	0 0	AF16ZB-40-00-22	1SBL176261R2200	0.310
		100...250	0 0	AF16ZB-40-00-23	1SBL176261R2300	0.310
		250...500	0 0	AF16B-40-00-14	1SBL177261R1400	0.310
45	45	24...60	0 0	AF26ZB-40-00-21	1SBL236261R2100	0.410
		48...130	0 0	AF26ZB-40-00-22	1SBL236261R2200	0.410
		100...250	0 0	AF26ZB-40-00-23	1SBL236261R2300	0.410
		250...500	0 0	AF26B-40-00-14	1SBL237261R1400	0.410
55	55	24...60	0 0	AF38ZB-40-00-21	1SBL296261R2100	0.410
		48...130	0 0	AF38ZB-40-00-22	1SBL296261R2200	0.410
		100...250	0 0	AF38ZB-40-00-23	1SBL296261R2300	0.410
		250...500	0 0	AF38B-40-00-14	1SBL297261R1400	0.410
2 N.O. + 2 N.C. main poles						
25	25	24...60	0 0	AF09ZB-22-00-21	1SBL136561R2100	0.310
		48...130	0 0	AF09ZB-22-00-22	1SBL136561R2200	0.310
		100...250	0 0	AF09ZB-22-00-23	1SBL136561R2300	0.310
		250...500	0 0	AF09B-22-00-14	1SBL137561R1400	0.310
30	30	24...60	0 0	AF16ZB-22-00-21	1SBL176561R2100	0.310
		48...130	0 0	AF16ZB-22-00-22	1SBL176561R2200	0.310
		100...250	0 0	AF16ZB-22-00-23	1SBL176561R2300	0.310
		250...500	0 0	AF16B-22-00-14	1SBL177561R1400	0.310
45	45	24...60	0 0	AF26ZB-22-00-21	1SBL236561R2100	0.410
		48...130	0 0	AF26ZB-22-00-22	1SBL236561R2200	0.410
		100...250	0 0	AF26ZB-22-00-23	1SBL236561R2300	0.410
		250...500	0 0	AF26B-22-00-14	1SBL237561R1400	0.410
55	55	24...60	0 0	AF38ZB-22-00-21	1SBL296561R2100	0.410
		48...130	0 0	AF38ZB-22-00-22	1SBL296561R2200	0.410
		100...250	0 0	AF38ZB-22-00-23	1SBL296561R2300	0.410
		250...500	0 0	AF38B-22-00-14	1SBL297561R1400	0.410



AF09(Z)B, AF16(Z)B

AF26(Z)B, AF38(Z)B

Main dimensions mm, inches

AF40B...AF80B 4-pole contactors

70 to 125 A AC-1

DC operated - connection with standard ferrules

1SBC101045V0014

AF40B-40-00

1SBC101048V0014

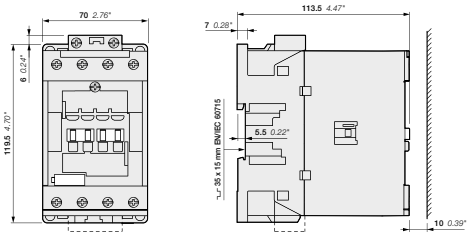
AF80B-40-00

AF40B...AF80B 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling non-iductive or slightly inductive loads and generally for controlling power circuits up to 1000 V AC and up to 440 V DC. These contactors are of the block type design with 4 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front and side mounting and a wide range of accessories.

IEC	UL / CSA	Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current θ ≤ 40 °C AC-1	General use rating 600 V AC						Pkg (1 pce)
A	A	V DC	V DC				kg
4 N.O. main poles							
70	60	24, 33, 48	20...60	0 0	AF40B-40-00-11	1SBL347261R1100	1.210
		72, 96, 110	48...130	0 0	AF40B-40-00-12	1SBL347261R1200	1.210
		220	100...250	0 0	AF40B-40-00-13	1SBL347261R1300	1.160
100	80	24, 33, 48	20...60	0 0	AF52B-40-00-11	1SBL367261R1100	1.210
		72, 96, 110	48...130	0 0	AF52B-40-00-12	1SBL367261R1200	1.210
		220	100...250	0 0	AF52B-40-00-13	1SBL367261R1300	1.160
125	105	24, 33, 48	20...60	0 0	AF80B-40-00-11	1SBL397261R1100	1.490
		72, 96, 110	48...130	0 0	AF80B-40-00-12	1SBL397261R1200	1.490
		220	100...250	0 0	AF80B-40-00-13	1SBL397261R1300	1.440
2 N.O. + 2 N.C. main poles (2)							
70	60	24, 33, 48	20...60	0 0	AF40B-22-00-11	1SBL347561R1100	1.210
		72, 96, 110	48...130	0 0	AF40B-22-00-12	1SBL347561R1200	1.210
		220	100...250	0 0	AF40B-22-00-13	1SBL347561R1300	1.160
-	-	24, 33, 48	20...60	0 0	AF52B-22-00-11	1SBL367561R1100	1.210
		72, 96, 110	48...130	0 0	AF52B-22-00-12	1SBL367561R1200	1.210
		220	100...250	0 0	AF52B-22-00-13	1SBL367561R1300	1.160
125	105	24, 33, 48	20...60	0 0	AF80B-22-00-11	1SBL397561R1100	1.490
		72, 96, 110	48...130	0 0	AF80B-22-00-12	1SBL397561R1200	1.490
		220	100...250	0 0	AF80B-22-00-13	1SBL397561R1300	1.440

(1) Other control voltages, see voltage code table.
(2) For AF52B-22-00 availability: please consult your ABB sales representative.



AF40B, AF52B

AF80B

Main dimensions mm, inches

AF40B...AF80B 4-pole contactors

70 to 125 A AC-1

AC operated - connection with standard ferrules

1SBC101048V0014

AF80B-40-00

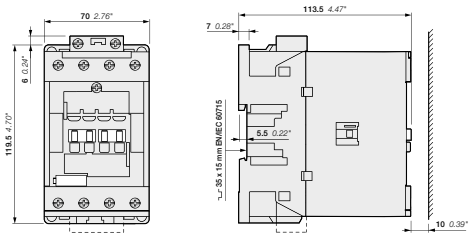
AF40B...AF80B 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly
used for controlling non-iductive or slightly inductive loads and generally for controlling power circuits up to 1000 V AC and up to 440 V DC.

These contactors are of the block type design with 4 main poles.

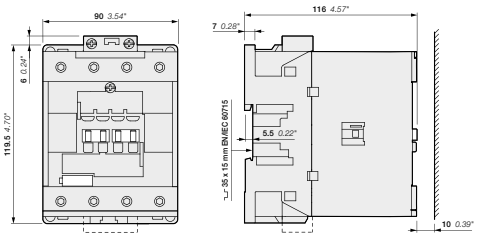
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting sinusoïdal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC	UL / CSA	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current θ ≤ 40 °C AC-1	General use rating 600 V AC					Pkg (1 pce)
A	A	V AC 50/60 Hz				kg
4 N.O. main poles						
70	60	24...60	0 0	AF40B-40-00-11	1SBL347261R1100	1.210
		48...130	0 0	AF40B-40-00-12	1SBL347261R1200	1.210
		100...250	0 0	AF40B-40-00-13	1SBL347261R1300	1.160
		250...500	0 0	AF40B-40-00-14	1SBL347261R1400	1.160
100	80	20...60	0 0	AF52B-40-00-11	1SBL367261R1100	1.210
		48...130	0 0	AF52B-40-00-12	1SBL367261R1200	1.210
		100...250	0 0	AF52B-40-00-13	1SBL367261R1300	1.160
		250...500	0 0	AF52B-40-00-14	1SBL367261R1400	1.160
125	105	20...60	0 0	AF80B-40-00-11	1SBL397261R1100	1.490
		48...130	0 0	AF80B-40-00-12	1SBL397261R1200	1.490
		100...250	0 0	AF80B-40-00-13	1SBL397261R1300	1.440
		250...500	0 0	AF80B-40-00-14	1SBL397261R1400	1.440
2 N.O. + 2 N.C. main poles (1)						
70	60	20...60	0 0	AF40B-22-00-11	1SBL347561R1100	1.210
		48...130	0 0	AF40B-22-00-12	1SBL347561R1200	1.210
		100...250	0 0	AF40B-22-00-13	1SBL347561R1300	1.160
		250...500	0 0	AF40B-22-00-14	1SBL347561R1400	1.160
-	-	20...60	0 0	AF52B-22-00-11	1SBL367561R1100	1.210
		48...130	0 0	AF52B-22-00-12	1SBL367561R1200	1.210
		100...250	0 0	AF52B-22-00-13	1SBL367561R1300	1.160
		250...500	0 0	AF52B-22-00-14	1SBL367561R1400	1.160
125	105	20...60	0 0	AF80B-22-00-11	1SBL397561R1100	1.490
		48...130	0 0	AF80B-22-00-12	1SBL397561R1200	1.490
		100...250	0 0	AF80B-22-00-13	1SBL397561R1300	1.440
		250...500	0 0	AF80B-22-00-14	1SBL397561R1400	1.440

(1) For AF52B-22-00 availability: please consult your ABB sales representative.



AF40B, AF52B

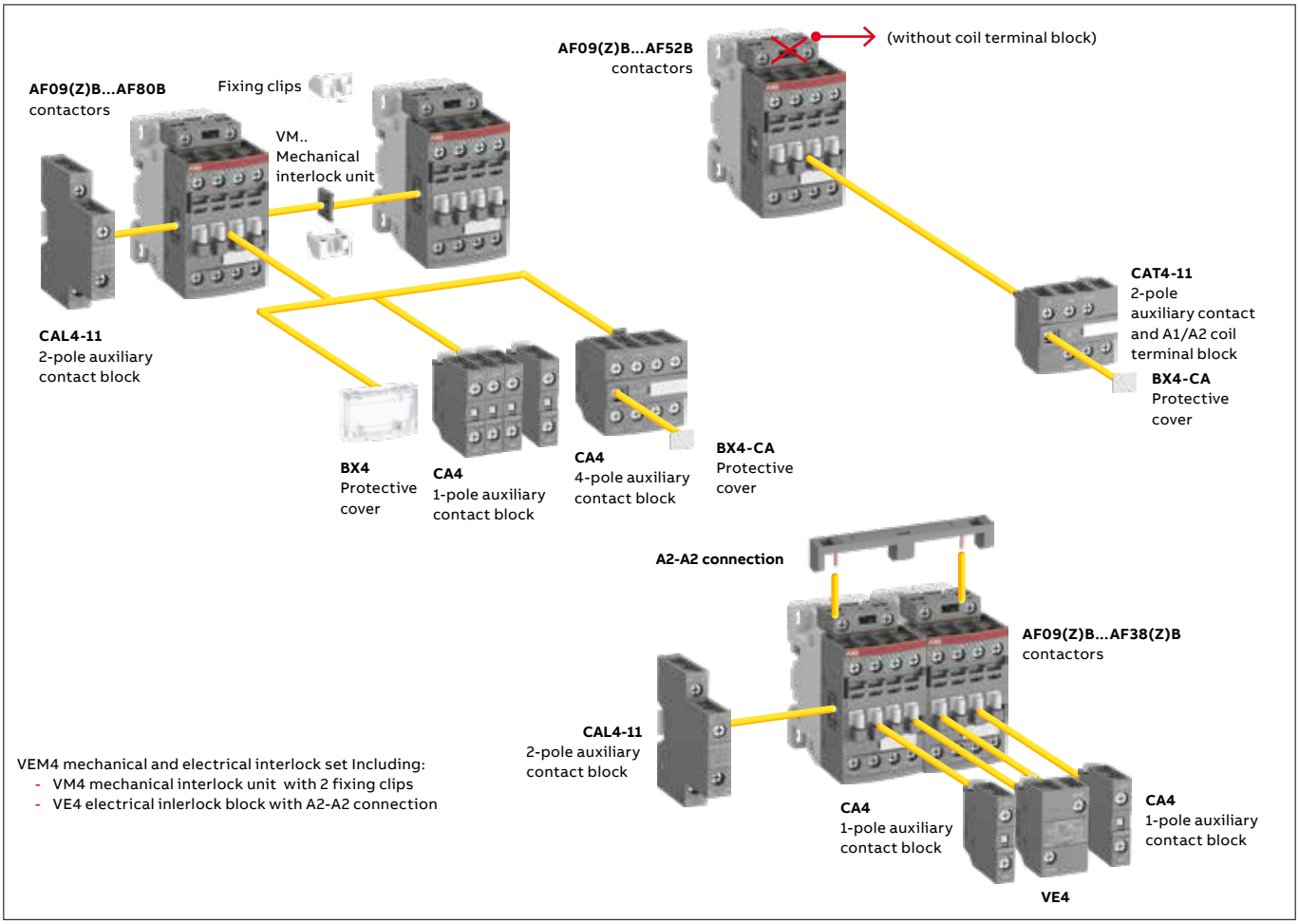


AF80B

Main dimensions mm, inches

AF09(Z)B ... AF80B 4-pole contactors

Contactors and main accessories



VEM4 mechanical and electrical interlock set Including:
- VM4 mechanical interlock unit with 2 fixing clips
- VE4 electrical inlerlock block with A2-A2 connection

Main accessory fitting details - for ordering details, technical data and other accessories: see section accessories

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor types	Main poles	Built-in auxiliary contacts	Front-mounted accessories Auxiliary contact blocks 1-pole CA4	2-pole CAT4-11	4-pole CA4	Electrical and mechanical interlock set (between 2 contactors) VEM4		Side-mounted accessories Auxiliary contact blocks Left side 2-pole CAL4-11	Right side
AF09(Z)B ... AF16(Z)B									
AF09(Z)B ... AF16(Z)B	4 0	0 0 (1)	4 max.	**or** 1	**or** 1	–	+	1	–
AF26(Z)B ... AF38(Z)B	4 0	0 0 (2)	2 max.	**or** 1	–	–	+	1	+ 1
			3 max.	–	–	+ 1	+	1	or 1
AF09(Z)B ... AF38(Z)B	2 2	0 0 (2)	4 max.	**or** 1	**or** 1	–	+	1	–
			2 max.	**or** 1	–	–	+	1	+ 1
AF40B ... AF80B									
AF40B, AF52B	4 0	0 0	4 max.	**or** 1	**or** 1	–	+	1	+ 1
AF80B	4 0	0 0	4 max.	–	**or** 1	–	+	1	+ 1
AF40B	2 2	0 0 (3)	4 max.	**or** 1	**or** 1	–	+	1	–
			4 max.	–	**or** 1	–	+	1	+ 1
AF80B	2 2	0 0 (3)	4 max.	–	**or** 1	–	+	1	+ 1

(1) Including add-on contacts: 4 N.C. auxiliary contacts max. on positions 1, 2, 3, 4 and 3 N.C. auxiliary contacts max. on positions 1 ±30°, 5.
(2) Including add-on contacts: 3 N.C. auxiliary contacts max. on positions 1, 2, 3, 4 and 2 N.C. auxiliary contacts max. on positions 1 ±30°, 5.
(3) Including add-on contacts: 2 N.C. auxiliary contacts max. on positions 1, 1 ±30°, 2, 3, 4, 5.

AF116B ... AF140B 4-pole contactors

160 to 200 A AC-1

DC operated - connection with standard ferrules

1SFC101217V0002

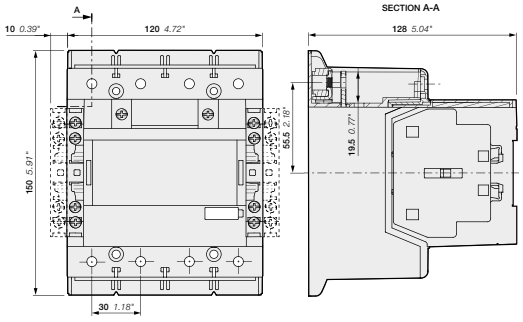
AF140B-40-22

AF116B ... AF140B 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling power circuits up to 690 V AC and up to 220 V DC. These contactors are of the block type design with 4 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC	UL / CSA	Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current θ ≤ 40 °C AC-1	General use rating 600 V AC						Pkg (1 pce)
A	A	V DC	V DC				kg
4 N.O. main poles							
160	160	24, 33, 48	20...60	2 2	AF116B-40-22-11	1SFL427263R1122	2.190
		72, 96, 110	48...130	2 2	AF116B-40-22-12	1SFL427263R1222	2.190
		220	100...250	2 2	AF116B-40-22-13	1SFL427263R1322	2.190
200	175	24, 33, 48	20...60	2 2	AF140B-40-22-11	1SFL447263R1122	2.190
		72, 96, 110	48...130	2 2	AF140B-40-22-12	1SFL447263R1222	2.190
		220	100...250	2 2	AF140B-40-22-13	1SFL447263R1322	2.190

(1) Other control voltages, see voltage code table.



AF116B, AF140B-40-22

Main dimensions mm, inches

AF116B ... AF140B 4-pole contactors

160 to 200 A AC-1

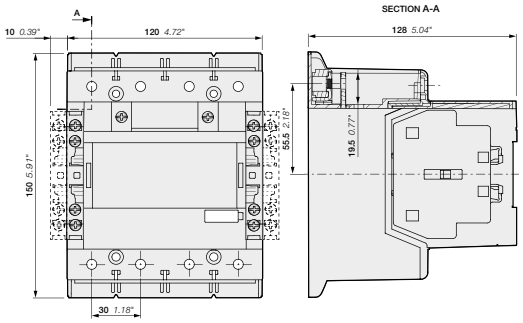
AC operated - connection with standard ferrules

AF140B-40-22

AF116B ... AF140B 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling power circuits up to 690 V AC and up to 220 V DC. These contactors are of the block type design with 4 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max. of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC	UL / CSA	Rated control circuit voltage	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current θ ≤ 40 °C AC-1	General use rating 600 V AC	Uc min. ... Uc max. (IEC 60947-4-1)				Pkg (1 pce)
A	A	V AC 50/60 Hz				kg
4 N.O. main poles						
160	160	24...60	2 2	AF116B-40-22-11	1SFL427263R1122	2.190
		48...130	2 2	AF116B-40-22-12	1SFL427263R1222	2.190
		100...250	2 2	AF116B-40-22-13	1SFL427263R1322	2.190
		250...500	2 2	AF116B-40-22-14	1SFL427263R1422	2.190
200	175	24...60	2 2	AF140B-40-22-11	1SFL447263R1122	2.190
		48...130	2 2	AF140B-40-22-12	1SFL447263R1222	2.190
		100...250	2 2	AF140B-40-22-13	1SFL447263R1322	2.190
		250...500	2 2	AF140B-40-22-14	1SFL447263R1422	2.190



AF116B, AF140B-40-22

Main dimensions mm, inches

AF190B ... AF370B 4-pole contactors

275 to 525 A AC-1

DC operated - connection with standard ferrules

1SFC101220V0001

AF205B-40-22

AF190B ... AF370B 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling power circuits up to 1000 V AC and up to 220 V DC. These contactors are of the block type design with 4 main poles.

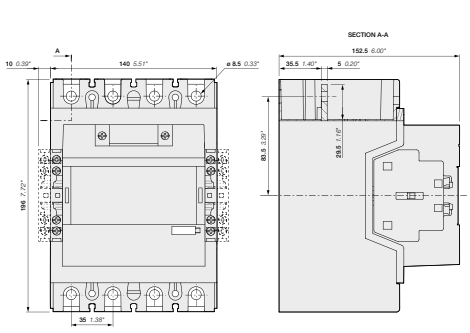
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

1SFC101222V0001

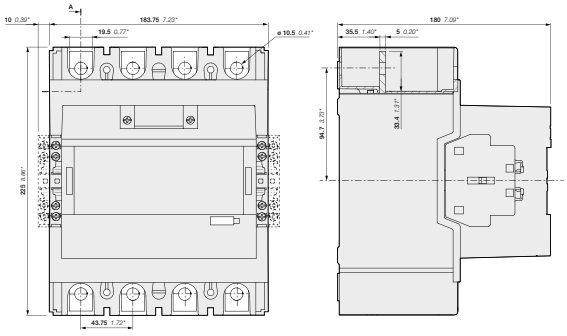
AF370B-40-22

IEC	UL / CSA	Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
Rated operational current θ ≤ 40 °C AC-1	General use rating 600 V AC						
A	A	V DC	V DC				kg
4 N.O. main poles							
275	230	24, 33, 48	20...60	2 2	AF190B-40-22-11	1SFL487263R1122	3.940
		72, 96, 110	48...130	2 2	AF190B-40-22-12	1SFL487263R1222	3.940
		220	100...250	2 2	AF190B-40-22-13	1SFL487263R1322	3.940
350	250	24, 33, 48	20...60	2 2	AF205B-40-22-11	1SFL527263R1122	3.940
		72, 96, 110	48...130	2 2	AF205B-40-22-12	1SFL527263R1222	3.940
		220	100...250	2 2	AF205B-40-22-13	1SFL527263R1322	3.940
400	300	24, 33, 48	20...60	2 2	AF265B-40-22-11	1SFL547263R1122	6.400
		72, 96, 110	48...130	2 2	AF265B-40-22-12	1SFL547263R1222	6.400
		220	100...250	2 2	AF265B-40-22-13	1SFL547263R1322	6.400
500	350	24, 33, 48	20...60	2 2	AF305B-40-22-11	1SFL587263R1122	6.400
		72, 96, 110	48...130	2 2	AF305B-40-22-12	1SFL587263R1222	6.400
		220	100...250	2 2	AF305B-40-22-13	1SFL587263R1322	6.400
525	420	24, 33, 48	20...60	2 2	AF370B-40-22-11	1SFL607263R1122	6.400
		72, 96, 110	48...130	2 2	AF370B-40-22-12	1SFL607263R1222	6.400
		220	100...250	2 2	AF370B-40-22-13	1SFL607263R1322	6.400

(1) Other control voltages, see voltage code table.



AF190B, AF205B-40-22



AF265B, AF305B, AF370B-40-22

Main dimensions mm, inches

AF190B ... AF370B 4-pole contactors

275 to 525 A AC-1

AC operated - connection with standard ferrules

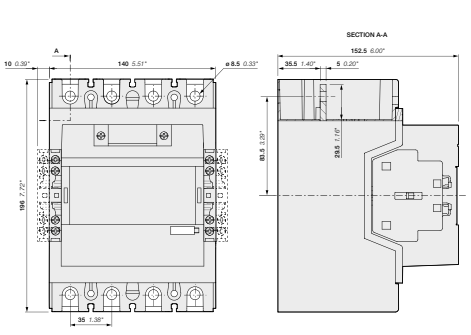
AF205B-40-22

AF190B ... AF370B 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling power circuits up to 690 V AC and up to 220 V DC. These contactors are of the block type design with 4 main poles.

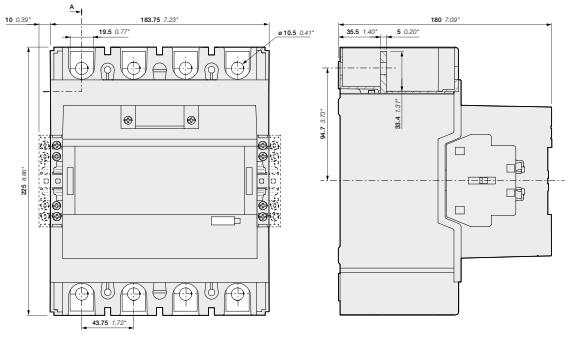
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

AF370B-40-22

IEC Rated operational current θ ≤ 40 °C AC-1 A	UL / CSA General use rating 600 V AC A	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1) V AC 50/60 Hz	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
4 N.O. main poles						
275	230	24...60	2 2	AF190B-40-22-11	1SFL487263R1122	3.940
		48...130	2 2	AF190B-40-22-12	1SFL487263R1222	3.940
		100...250	2 2	AF190B-40-22-13	1SFL487263R1322	3.940
		250...500	2 2	AF190B-40-22-14	1SFL487263R1422	3.940
350	250	24...60	2 2	AF205B-40-22-11	1SFL527263R1122	3.940
		48...130	2 2	AF205B-40-22-12	1SFL527263R1222	3.940
		100...250	2 2	AF205B-40-22-13	1SFL527263R1322	3.940
		250...500	2 2	AF205B-40-22-14	1SFL527263R1422	3.940
400	300	24...60	2 2	AF265B-40-22-11	1SFL547263R1122	6.400
		48...130	2 2	AF265B-40-22-12	1SFL547263R1222	6.400
		100...250	2 2	AF265B-40-22-13	1SFL547263R1322	6.400
		250...500	2 2	AF265B-40-22-14	1SFL547263R1422	6.400
500	350	24...60	2 2	AF305B-40-22-11	1SFL587263R1122	6.400
		48...130	2 2	AF305B-40-22-12	1SFL587263R1222	6.400
		100...250	2 2	AF305B-40-22-13	1SFL587263R1322	6.400
		250...500	2 2	AF305B-40-22-14	1SFL587263R1422	6.400
525	420	24...60	2 2	AF370B-40-22-11	1SFL607263R1122	6.400
		48...130	2 2	AF370B-40-22-12	1SFL607263R1222	6.400
		100...250	2 2	AF370B-40-22-13	1SFL607263R1322	6.400
		250...500	2 2	AF370B-40-22-14	1SFL607263R1422	6.400



AF190B, AF205B-40-22

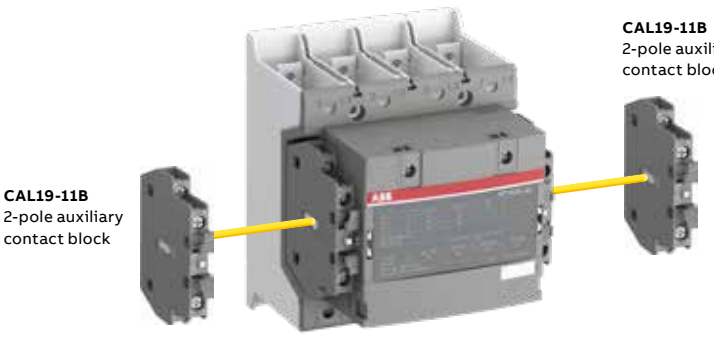


AF265B, AF305B, AF370B-40-22

Main dimensions mm, inches

AF116B ... AF370B 4-pole contactors

Contactors and main accessories



Main accessory fitting details - for ordering details, technical data and other accessories: see section accessories

Contactor types	Main poles	Available auxiliary contacts	Side-mounted accessories Auxiliary contact blocks		
			CAL19-11		CAL19-11B
AF116B ... AF370B	4 0	2 2	2 x CAL19-11 included	+	2 x CAL19-11B

AF09(Z)B ... AF80B 4-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types			AF09(Z)B	AF16(Z)B	AF26(Z)B	AF38(Z)B	AF40B	AF52B	AF80B
Standards (1)			EC/EN 60947-1, IEC/EN 60947-4-1 IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), EN 50155 (applicable parts), TR CU 001/2011 (2) IEC 61373						
Fire and smoke			EN 45545-2 (HL2, HL3)						
Rated operational voltage Ue max.			690 V						1000 V
Rated frequency (without derating)			50 / 60 Hz						
Conventional free-air thermal current Ith									
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C			35 A	35 A	55 A	55 A	105 A	105 A	125 A
With conductor cross-sectional area			6 mm²	6 mm²	16 mm²	16 mm²	35 mm²	35 mm²	50 mm²
AC-1 Utilization category									
For air temperature close to contactor									
Ie / Rated operational current AC-1		θ ≤ 40 °C	25 A	30 A	45 A	55 A	70 A	100 A	125 A
Ue max. ≤ 690 V, 50/60 Hz		θ ≤ 60 °C	25 A	30 A	40 A	45 A	60 A	80 A	105 A
		θ ≤ 70 °C	22 A	26 A	32 A	37 A	50 A	70 A	90 A
With conductor cross-sectional area			4 mm²	6 mm²	10 mm²	16 mm²	25 mm²	35 mm²	50 mm²
1 pole		80 V DC	25 A (5)	30 A (5)	45 A	55 A	60 A	80 A	105 A
2 poles in serie		160 V DC	25 A (5)	30 A (5)	45 A	55 A	60 A	80 A	105 A
3 poles in serie		240 V DC	25 A	30 A	45 A	55 A	60 A	80 A	105 A
4 poles in serie		320 V DC	25 A	30 A	45 A	55 A	60 A	80 A	105 A
With conductor cross-sectional area			AWG 10	AWG 10	AWG 8	AWG 8	AWG 6	AWG 4	AWG 2
AC-3 Utilization category									
For air temperature close to contactor θ ≤ 60 °C									
Ie / Max. rated operational current AC-3 (3)									
3-phase motors		220-230-240 V	9 A	18 A	23.2 A	23.2 A	40 A	53 A	80 A
		380-400 V	9 A	18 A	22 A	22 A	40 A	53 A	80 A
		415 V	9 A	18 A	21.2 A	21.2 A	40 A	53 A	80 A
		440 V	9 A	18 A	20 A	20 A	40 A	53 A	80 A
		500 V	9.5 A	15 A	17.6 A	17.6 A	35 A	45 A	65 A
		690 V	7 A	10.5 A	10.5 A	10.5 A	25 A	35 A	49 A
		1000 V	–	–	–	–	–	–	25 A
Rated operational power AC-3 (3)									
1500 r.p.m. 50 Hz 1800 r.p.m. 60 Hz 3-phase motors		220-230-240 V	2.2 kW	4 kW	5.5 kW	5.5 kW	11 kW	15 kW	22 kW
		380-400 V	4 kW	7.5 kW	11 kW (4)	11 kW (4)	18.5 kW	22 kW	37 kW
		415 V	4 kW	9 kW	11 kW	11 kW	22 kW	30 kW	45 kW
		440 V	4 kW	9 kW	11 kW	11 kW	22 kW	30 kW	45 kW
		500 V	5.5 kW	9 kW	11 kW	11 kW	22 kW	30 kW	45 kW
		690 V	5.5 kW	9 kW	9 kW	9 kW	22 kW	30 kW	45 kW
		1000 V	–	–	–	–	–	–	35 kW
Rated making capacity AC-3			10 x Ie AC-3 acc. to IEC 60947-4-1						
Rated breaking capacity AC-3			8 x Ie AC-3 acc. to IEC 60947-4-1						
Short-circuit protection device for contactors									
without thermal overload relay - Motor protection excluded									
Ue ≤ 500 V AC - gG type fuse			25 A	32 A	50 A	63 A	80 A	110 A	160 A
Rated short-time withstand current Icw		1 s	300 A	300 A	450 A	450 A	1000 A	1000 A	1200 A
at 40 °C ambient temperature,		10 s	150 A	150 A	300 A	300 A	600 A	600 A	780 A
in free air from a cold state		30 s	80 A	80 A	225 A	225 A	350 A	350 A	450 A
		1 min	60 A	60 A	150 A	150 A	250 A	250 A	300 A
		15 min	35 A	35 A	55 A	55 A	110 A	110 A	140 A
Maximum breaking capacity cos ϕ = 0.45	N.O. main pole	at 440 V	250 A	250 A	–	–	950 A	950 A	1100 A
		at 690 V	106 A	106 A	–	–	600 A	600 A	750 A
	N.C. Main pole	at 440 V	–	–	–	–	600 A	–	900 A
		at 690 V	–	–	–	–	300 A	–	750 A
Power dissipation per pole		Ie / AC-1	0.8 W	1.2 W	1.6 W	2.3 W	3 W	6.3 W	8 W
		Ie / AC-3	0.1 W	0.35 W	0.42 W	0.42 W	1 W	1.7 W	3.2 W
Max. electrical switching frequency		AC-1	600 cycles/h						

(1) For compliance confirmation on applicable parts based on your application and combination, please consult your ABB sales representatives.
(2) TR CU 001/2011: AF09(Z)B ... AF38(Z)B only
(3) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 1-phase or 3-phase motors, see "Motor rated operational powers and currents".
(4) 400 V 3-phase motor only.
(5) 20 A for AF09(Z)B-22-00 and AF16(Z)B-22-00.
Note: 4-pole contactors fitted with 2 N.O. + 2 N.C. main poles, see "General technical data"

Main pole - Utilization characteristics according to UL / NEMA / CSA

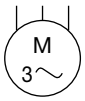
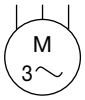
Contactor types		**AF09(Z)B**	**AF16(Z)B**	**AF26(Z)B**	**AF38(Z)B**	**AF40B**	**AF52B**	**AF80B**
Standards		UL 508 CSA C22.2 No. 60947-1-13, CSA C22.2 No. 60947-4-1				**UL 60947-1, UL 60947-4-1 CSA C22.2 No. 60947-1:22 CSA C22.2 No. 60947-4-1:22**		
Maximum operational voltage		600 V						
UL / CSA general use rating								
600 V AC		25 A	30 A	45 A	55 A	60 A	80 A	105 A
With conductor cross-sectional area		AWG 10	AWG 10	AWG 8	AWG 6	AWG 6	AWG 4	AWG 2
1 pole	80 V DC	25 A (1)	30 A (1)	45 A	55 A	60 A	80 A	105 A
2 poles in serie	160 V DC	25 A (1)	30 A (1)	45 A	55 A	60 A	80 A	105 A
3 poles in serie	240 V DC	25 A	30 A	45 A	55 A	60 A	80 A	105 A
4 poles in serie	320 V DC	25 A	30 A	45 A	55 A	60 A	80 A	105 A
With conductor cross-sectional area		AWG 10	AWG 10	AWG 8	AWG 8	AWG 6	AWG 4	AWG 2
Maximum electrical switching frequency								
For general use		600						

Note: 4-pole contactors fitted with 2 N.O. + 2 N.C. main poles, see "General technical data"
(1) 20 A for AF09(Z)B-22-00 and AF16(Z)B-22-00.

AF116B ... AF370B 4-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types		AF116B	AF140B	AF190B	AF205B	AF265B	AF305B	AF370B
Standards (1)		IEC/EN 60947-1, IEC/EN 60947-4-1, IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), EN 50155 (applicable parts), TR CU 001/2011 IEC 61373						
Fire and smoke		EN 45545-2 (HL2)						
Rated operational voltage Ue max.		690 V		1000 V				
Rated frequency (without derating)		50 / 60 Hz						
Conventional free-air thermal current Ith								
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		160 A	200 A	275 A	350 A	400 A	500 A	525 A
With conductor cross-sectional area		70 mm²	95 mm²	150 mm²	240 mm² (3)	240 mm²	300 mm² (4)	2x 185 mm² (4)
AC-1 Utilization category								
For air temperature close to contactor								
Ie / Rated operational current AC-1	θ ≤ 40 °C	160 A	200 A	275 A	350 A	400 A	500 A	525 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 60 °C	145 A	175 A	250 A	300 A	350 A	400 A	425 A
	θ ≤ 70 °C	130 A	160 A	200 A	240 A	290 A	325 A	350 A
Ie / Rated operational current AC-1	θ ≤ 40 °C	–	–	250 A	275 A	350 A	375 A	400 A
Ue max. ≤ 1000 V, 50/60 Hz	θ ≤ 60 °C	–	–	225 A	250 A	300 A	325 A	350 A
	θ ≤ 70 °C	–	–	185 A	200 A	240 A	260 A	290 A
With conductor cross-sectional area		70 mm²	95 mm²	150 mm²	240 mm² (3)	240 mm²	300 mm² (4)	2x 185 mm² (4)
AC-3 Utilization category								
For air temperature close to contactor θ ≤ 60 °C (3)								
Ie / Max. rated operational current AC-3 (2)								
 3-phase motors	220-230-240 V	116 A	140 A	190 A	205 A	265 A	305 A	370 A
	380-400 V	116 A	140 A	190 A	205 A	265 A	305 A	370 A
	415 V	116 A	140 A	190 A	205 A	265 A	305 A	370 A
	440 V	116 A	140 A	190 A	205 A	265 A	305 A	370 A
	500 V	–	–	–	–	–	–	–
	690 V	–	–	–	–	–	–	–
	1000 V	–	–	–	–	–	–	–
Rated operational power AC-3 (2)								
 1500 r.p.m. 50 Hz	220-230-240 V	30 kW	37 kW	55 kW	55 kW	75 kW	90 kW	110 kW
1800 r.p.m. 60 Hz	380-400 V	55 kW	75 kW	90 kW	110 kW	132 kW	160 kW	200 kW
3-phase motors	415 V	55 kW	75 kW	90 kW	110 kW	132 kW	160 kW	200 kW
	440 V	75 kW	90 kW	110 kW	132 kW	160 kW	160 kW	200 kW
	500 V	–	–	–	–	–	–	–
	690 V	–	–	–	–	–	–	–
	1000 V	–	–	–	–	–	–	–
Rated making capacity AC-3		10 x Ie AC-3 acc. to IEC 60947-4-1						
Rated breaking capacity AC-3		8 x Ie AC-3 acc. to IEC 60947-4-1						
Short-circuit protection device for contactors Without thermal overload relay - Motor protection excluded								
Ue ≤ 500 V AC - gG type fuse		200 A	250 A	355 A	400 A	630 A	630 A	630 A
Rated short-time withstand current Icw	1 s	1300 A	1460 A	1900 A	2050 A	2650 A	3050 A	3700 A
At 40 °C ambient temperature,	10 s	928 A	1168 A	1520 A	1640 A	2120 A	2440 A	2960 A
in free air from a cold state	30 s	536 A	674 A	878 A	947 A	1224 A	1409 A	1709 A
	1 min	379 A	477 A	621 A	670 A	865 A	996 A	1208 A
	15 min	160 A	200 A	275 A	350 A	400 A	500 A	525 A
Maximum breaking capacity	at 440 V	2000 A	3000 A	3300 A	3500 A	3800 A	4600 A	5000 A
cos θ = 0.45	at 690 V	–	–	–	–	–	–	–
Power dissipation per pole	Ie / AC-1	12 W	18 W	15 W	25 W	32 W	50 W	72 W
Max. electrical switching frequency	AC-1	300 cycles/h						

(1) For compliance confirmation on applicable parts based on your application and combination, please consult your ABB sales representatives.
(2) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".
(3) For currents above 275 A use terminal enlargements or terminal extensions.
(4) For currents above 450 A use terminal enlargements or terminal extensions.

Main pole - Utilization characteristics according to UL / CSA

Contactor types	AF116B	AF140B	AF190B	AF205B	AF265B	AF305B	AF370B
Standards	UL 60947-4-1						
Max. operational voltage	600 V						
UL / CSA general use rating							
600 V AC	160 A	175 A	230 A	250 A	300 A	350 A	420 A
With conductor cross-sectional area	AWG 2/0	AWG 3/0	MCM 250	MCM 250	MCM 400	MCM 500	2//MCM 300
Max. electrical switching frequency							
For general use	300 cycles/h						

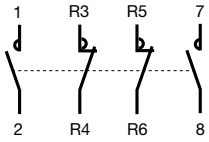
AF09(Z)B ... AF80B 4-pole contactors

Technical data

General technical data

Contactor types	AF09(Z)B	AF16(Z)B	AF26(Z)B	AF38(Z)B	AF40B	AF52B	AF80B
Rated insulation voltage Ui							
acc. to IEC 60947-4-1	690 V						1000 V
acc. to UL / CSA	600 V						
Rated impulse withstand voltage Uimp.	6 kV						8 kV
Electromagnetic compatibility	Devices complying with IEC/EN 60947-1 - Environment A EN 50121-3-2						
Ambient air temperature							
Operation in free air	-40...+70 °C						
Storage	-60...+80 °C						
Climatic withstand	Category B according to IEC 60947-1 Annex Q						
Maximum operating altitude (without derating)	3000 m						
Mechanical durability							
Number of operating cycles	10 millions operating cycles						
Maximum switching frequency	3600 cycles/h						
Shock and vibration withstand acc. to IEC 61373	Category 1, class B						

Remark for 4-pole contactors fitted with 2 N.O. + 2 N.C. main poles

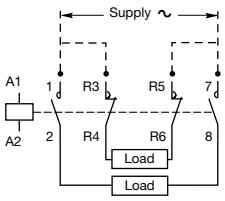


These contactors are suitable for controlling 2 separate circuits, i.e. 2 loads with 2 separate supplies, or 1 circuit comprising 2 separate loads with a single supply (see diagrams below). When the contactor operates there is no mechanical overlapping between the N.O. poles and the N.C. poles: BREAK before MAKE.

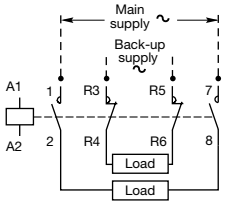
These contactors are not suitable for a reversing starter or for controlling a single load from 2 separate supplies.

Block diagrams

– Single supply and 2 separate loads



– 2 separate supplies and 2 separate loads



AF116B ... AF370B 4-pole contactors

Technical data

General technical data

Contactor types	AF116B	AF140B	AF190B	AF205B	AF265B	AF305B	AF370B
Rated insulation voltage Ui							
acc. to IEC 60947-4-1	1000 V						
acc. to UL / CSA	600 V						
Rated impulse withstand voltage Uimp.	8 kV						
Electromagnetic compatibility	Devices complying with IEC/EN 60947-1 - Environment A						
Ambient air temperature close to contactor							
Operation	-40 to +70 °C						
Storage	-40 to +70 °C						
Climatic withstand	Category B according to IEC 60947-1 Annex Q						
Maximum operating altitude (without derating)	3000 m						
Mechanical durability							
Number of operating cycles	5 million operating cycles						
Maximum switching frequency	300 cycles/h						
Shock and vibration withstand acc to IEC 61373	Category 1, class B						

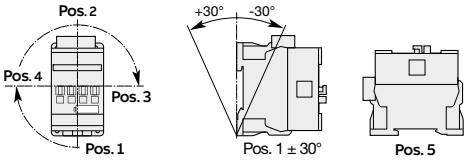
AF09(Z)B ... AF80B 4-pole contactors

Technical data

Magnet system characteristics

Contactor types		AF09(Z)B	AF16(Z)B	AF26(Z)B	AF38(Z)B	AF40B	AF52B	AF80B
Coil operating limits acc. to IEC 60947-4-1	DC supply	At θ ≤ 70 °C 0.85 x Uc min...1.1 x Uc max.				at θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max		
	AC supply	at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max at θ ≤ 70 °C 0.85 x Uc min ... Uc max				at θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max		
DC control voltage								
Rated control circuit voltage Uc		20...250 V DC				20...500 V DC		
Coil consumption	Average pull-in value	(AF..ZB) 12...16 W				40 W		
	Average holding value	(AF..ZB) 1.7 W				2 W		
PLC-output control		(AF..ZB) ≥ 500 mA 24 V DC				-		
AC control voltage 50/60 Hz								
Rated control circuit voltage Uc		(AF..ZB) 24 ... 250 V AC - (AF..B) 250 ... 500 V AC				24...500 V AC		
Coil consumption	Average pull-in value	(AF..ZB) 16 VA - (AF..B) 50 VA				40 VA		
	Average holding value	(AF..ZB) 1.7 VA / 1.5 W - (AF..B) 2.2 VA / 2 W				4 VA / 2 W		
Max. permitted control voltage during voltage fluctuation defined acc. to IEC 60077 / EN 50155		Rated control circuit voltage / Max. permitted control voltage 24 ... 60 V AC 50/60 Hz / 66 V AC 50/60 Hz 48 ... 130 V AC 50/60 Hz / 143 V AC 50/60 Hz 100 ... 250 V AC 50/60 Hz / 275 V AC 50/60 Hz 250 ... 500 V AC 50/60 Hz / 550 V AC 50/60 Hz						
Drop-out voltage		≤ 60 % of Uc min.						
Operating time								
Between coil energization and:	N.O. contact closing	40...95 ms				48...120 ms		
	N.C. contact opening	38...90 ms				44...115 ms		
Between coil de-energization and:	N.O. contact opening	11...95 ms				16...110 ms		
	N.C. contact closing	13...98 ms				18...113 ms		

Mounting characteristics and conditions for use

Contactor types	AF09(Z)B	AF16(Z)B	AF26(Z)B	AF38(Z)B	AF40B	AF52B	AF80B
Mounting positions							
	Max. add-on N.C. auxiliary contacts: see accessory fitting details for a 4-pole contactor AF09(Z)B ... AF80B						
Mounting distances	The contactors can be assembled side by side						
Fixing							
On rail according to IEC/EN 60715	35 x 7.5 mm or 35 x 15 mm				35 x 15 mm		
By screws (not supplied)	2 x M4 screws placed diagonally				2 x M4 or 2 x M6 screws placed diagonally		

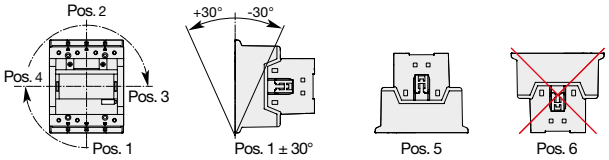
AF116B ... AF370B 4-pole contactors

Technical data

Magnet system characteristics

Contactor types		AF116B	AF140B	AF190B	AF205B	AF265B	AF305B	AF370B
Coil operating limits	AC supply	At θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max						
acc. to IEC 60947-4-1	DC supply	At θ ≤ 70 °C 0.80 x Uc min ... 1.1 x Uc max						
Rated control circuit voltage Uc								
Coil consumption		24...500 V AC, 20...500 V DC						
DC control voltage								
20...60 V DC	Average pull-in value	210 W		205 W		400 W		
	Average holding value	2.5 W		2.5 W		3.5 W		
48...130 V DC	Average pull-in value	130 W		130 W		360 W		
	Average holding value	2.5 W		2.5 W		2.5 W		
100...250 V DC	Average pull-in value	135 W		190 W		410 W		
	Average holding value	3 W		2.5 W		4.5 W		
250...500 V DC	Average pull-in value	205 W		190 W		600 W		
	Average holding value	4 W		4 W		4.7 W		
AC control voltage 50/60 Hz								
24...60 V AC	Average pull-in value	225 VA		165 VA		475 VA		
	Average holding value	5.5 VA		6 VA		8.5 VA		
48...130 V AC	Average pull-in value	170 VA		175 VA		340 VA		
	Average holding value	4 VA		4 VA		17 VA		
100...250 V AC	Average pull-in value	130 VA		220 VA		385 VA		
	Average holding value	6 VA		7 VA		17.5 VA		
250...500 V AC	Average pull-in value	205 VA		185 VA		420 VA		
	Average holding value	16 VA		16 VA		21 VA		
Max. permitted control voltage during voltage fluctuation defined acc. to IEC 60077 / EN 50155		Rated control circuit voltage / Max. permitted control voltage 24 ... 60 V AC 50/60 Hz / 66 V AC 50/60 Hz 48 ... 130 V AC 50/60 Hz / 143 V AC 50/60 Hz 100 ... 250 V AC 50/60 Hz / 275 V AC 50/60 Hz 250 ... 500 V AC 50/60 Hz / 550 V AC 50/60 Hz						
Drop-out voltage		55 % of Uc min						
Operating time								
Coil supply between A1 - A2								
Between coil energization and:	N.O. contact closing	20...55 ms		25...60 ms		30...60 ms		
Between coil de-energization and:	N.O. contact opening	40..70 ms		45...80 ms		45...80 ms		

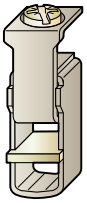
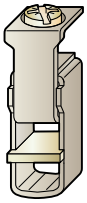
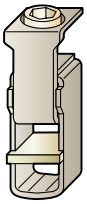
Mounting characteristics and conditions for use

Contactor types	AF116B	AF140B	AF190B	AF205B	AF265B	AF305B	AF370B
Mounting positions							
	Max. add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 4-pole contactor AF116B ... AF370B						
Mounting distances	The contactors can be assembled side by side						
Fixing							
On rail acc. to IEC/EN 60715	–						
By screws (not supplied)	4 x M4		4 x M5				

AF09(Z)B ... AF80B 4-pole contactors

Technical data

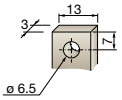
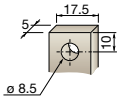
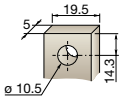
Connecting characteristics

Contactor types			AF09(Z)B	AF16(Z)B	AF26(Z)B	AF38(Z)B	AF40B	AF52B	AF80B
Main terminals			Screw terminals with cable clamp		 Screw terminals with double connector 2 x (5.5 width x 6.8 depth)		 Screw terminals with double connector 2 x (9.3 width x 7.9/10.3 depth)		 Screw terminals with double connector 2 x (12.4 width x 9.3/11.1 depth)
Connection capacity (min. ... max.)									
Main conductors (poles)									
Rigid	Solid (≤ 4 mm²)	1 x	1...6 mm²		1.5...16 mm²		6...35 mm²		6...70 mm²
	Stranded (≥ 1 mm²)	2 x	1...6 mm²		1.5...16 mm²		6...35 mm²		6...50 mm²
Flexible with non insulated ferrule		1 x	0.75...6 mm²		1.5...16 mm²		4...35 mm²		6...50 mm²
		2 x	0.75...6 mm²		1.5...16 mm²		4...35 mm²		6...50 mm²
Flexible with insulated ferrule		1 x	0.75...4 mm²		1.5...16 mm²		4...35 mm²		6...50 mm²
		2 x	0.75...2.5 mm²		1.5...16 mm²		4...35 mm²		6...50 mm²
L Bars or lugs		L <	9.6 mm				9.2 mm		12.2 mm
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 16...10		AWG 16...6		AWG 10...2		AWG 6...1
Stripping length			10 mm		12 mm		16 mm		17 mm
Tightening torque			1.5 Nm / 13 lb.in		2.5 Nm / 22 lb.in		4 Nm / 35 lb.in		6 Nm / 53 lb.in
Auxiliary conductors (coil terminals)									
Rigid solid/stranded		1 x	1...2.5 mm²						
		2 x	1...2.5 mm²						
Flexible with non insulated ferrule		1 x	0.75...2.5 mm²						
		2 x	0.75...2.5 mm²						
Flexible with insulated ferrule		1 x	0.75...2.5 mm²						
		2 x	0.75...1.5 mm²						
L Lugs		L <	8 mm						
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18...14						
Stripping length			10 mm						
Tightening torque			1.2 Nm / 11 lb.in						
Degree of protection acc. to IEC/EN 60947-1 and IEC/EN 60529									
Main terminals			IP20				IP10 *		
Coil terminals			IP20						
Screw terminals			Delivered in open position, screws of unused terminals must be tightened						
Main terminals			M3.5		M4.5		M6		M8
	Screwdriver type		Flat Ø 5.5 / Pozidriv 2				Flat Ø 6.5 / Pozidriv 2		hexagon socket (s = 4 mm)
Coil terminals			M3.5						
	Screwdriver type		Flat Ø 5.5 / Pozidriv 2						

AF116B ... AF370B 4-pole contactors

Technical data

Connecting characteristics

Contactor types			AF116B	AF140B	AF190B	AF205B	AF265B	AF305B	AF370B
Main terminals Flat type									
Connection capacity (min. ... max.)									
Main conductors (poles)									
Cu cable - Stranded		1 x	10...95 mm²		6...150 mm²		16...300 mm²		
Clamp type			LD... included (1)		1SDA066917R1		1SDA055016R1		
Tightening torque			8 Nm		14 Nm		25 Nm		
Cu cable - Stranded		2 x	10...95 mm²		50...120 mm²		70...185 mm²		
Clamp type			LD... included (1)		1SFN074709R1000, LZ185-2C/120		1SCA022194R0890, OZXB4		
Tightening torque			8 Nm		16 Nm		22 Nm		
Al cable - Stranded		1 x	–		95...185 mm²		185...240 mm²		
Clamp type			–		1SDA054988R1		1SDA055020R1		
Tightening torque			–		31 Nm		43 Nm		
Cu cable - Flexible		1 x	10...70 mm²		6...120 mm²		16...240 mm²		
Clamp type			LD... included (1)		1SDA066917R1		1SDA055016R1		
Tightening torque			8 Nm		14 Nm		25 Nm		
Cu cable - Flexible		2 x	10...70 mm²		50...95 mm²		70...185 mm²		
Clamp type			LD... included (1)		1SFN074709R1000, LZ185-2C/120		1SCA022194R0890, OZXB4		
Tightening torque			8 Nm		16 Nm		22 Nm		
Lugs		L ≤	22 mm (.866 in)		24 mm (.945 in)		32 mm (1.260 in)		
		Ø >	6 mm (.236 in)		8 mm (.315 in)		10 mm (.394 in)		
Socket type			LL... included		LL... included		LL... included		
Tightening torque			9 Nm / 80 lb.in		18 Nm / 160 lb.in		28 Nm / 248 lb.in		
Connection capacity acc. to UL / CSA		1 x	AWG 6...3/0		6...300 MCM		4...400 MCM		
Clamp type			LD... included (1)		ATK185 (2)		ATK300 (2)		
Tightening torque			8 Nm / 71 lb.in		34 Nm / 301 lb.in		42 Nm / 372 lb.in		
Connection capacity acc. to UL / CSA		2 x	AWG 6...3/0		–		4...500 MCM		
Clamp type			LD... included (1)		–		ATK300/2 (2)		
Tightening torque			8 Nm / 71 lb.in		–		42 Nm / 372 lb.in		
Auxiliary conductors (coil terminals)									
Rigid Solid/Stranded		1 x	1...4 mm²						
		2 x	1...4 mm²						
Flexible		1 x	0.75...2.5 mm²						
		2 x	0.75...2.5 mm²						
Flexible with non insulated ferrule		1 x	0.75...2.5 mm²						
		2 x	0.75...2.5 mm²						
Flexible with insulated ferrule		1 x	0.75...2.5 mm²						
		2 x	0.75...2.5 mm²						
Lugs		L <	8 mm						
		I >	3.5 mm						
Connection capacity acc. to UL / CSA		1 or 2 x	AWG 18...14						
Stripping length			9 mm						
Tightening torque			1.00 Nm / 9 lb.in						
Degree of protection acc. to IEC/EN 60947-1 and IEC/EN 60529									
Main terminals			IP00						
Coil terminals			IP20						
Screw terminals									
Main terminals			M6		M8		M10		
Screwdriver type			Screws and bolts						
Coil terminals (delivered in open position)			M3.5						
Screwdriver type			Flat Ø 5.5 mm / Pozidriv 2						

(1) LD... not included for AF116B, AF140B
(2) Available in North America only.

AF09(Z)B ... AF370B 4-pole contactors

Electrical durability and utilization categories

General

Utilization categories determine the current making and breaking conditions relating to the characteristics of the loads to be controlled by the contactors. International standard IEC 60947-4-1 and European standard EN 60947-4-1 are the standards to be referred to. If Ic is the current to be broken by the contactor and Ie the rated operational current normally drawn by the load, then Ic = Ie for category AC-1. The curve corresponding to category AC-1 represents the electrical durability variation of standard contactors in relation to the breaking current Ic.
Electrical durability is expressed in millions of operating cycles.

Curve utilization mode
Electrical durability forecast and contactor selection for category AC-1
Note the characteristics of the load to be controlled:

- Operational voltage ..... Ue
- Current normally drawn ..... Ie
- Utilization category AC-1
- Breaking current ..... Ic = Ie for AC-1

Define the number of operating cycles N required.
On the diagram corresponding to the operational category, select the contactor with the curve immediately above the intersection point (Ic ; N).

Case of uninterrupted duty
For uninterrupted duty, some verifications of preventing maintenance are necessary to check the functionality of the concerned product (consult us). The combinated effect of environmental conditions and the proper temperature of the product may require some disposals. As a matter of fact, for this duty, the use duration prevails over the number of operating cycles.

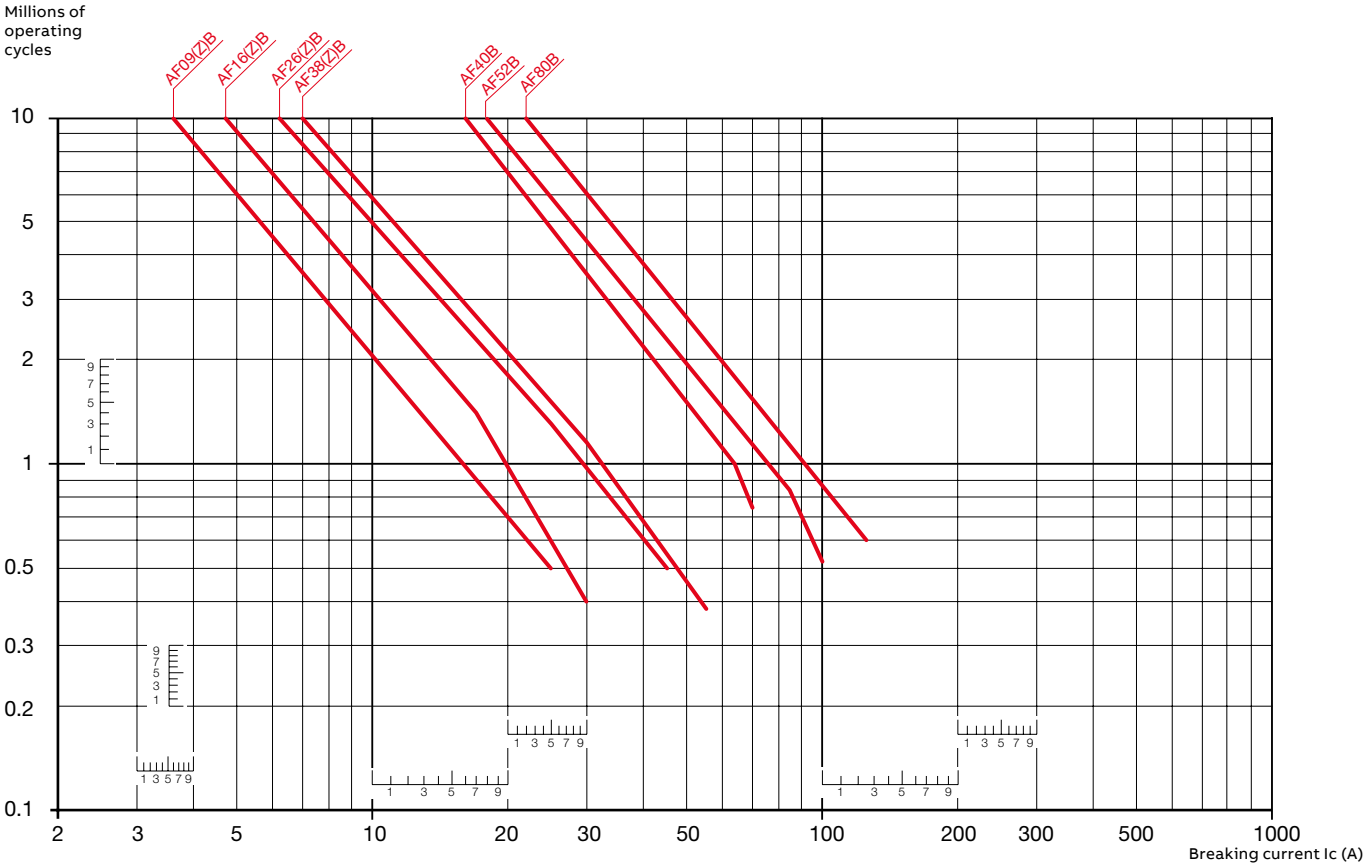
AF09(Z)B ... AF370B 4-pole contactors

Electrical durability

Electrical durability for AC-1 utilization category - Ue ≤ 690 V

Switching non-inductive or slightly inductive loads. The breaking current Ic for AC-1 is equal to the rated operational current of the load.

Ambient temperature and maximum electrical switching frequency: see "Technical data".



Contactors for DC switching applications

DC-1, DC-3, DC-5 applications according to IEC 60947-4-1

The circuit switching on DC is more difficult than on AC, as alternating current go to zero according to the frequency of the supply source while DC current has a continuous value.
The main parameters to be considered for selecting a contactor are the current, the voltage and the L/R time constant of the controlled load.

Time constant and utilization categories
In DC applications, the nature of load to switch (resistor, inductance or a combination) is characterized by the ratio of the inductance to the resistance (L (inductance of operated circuit) / R (resistance of operated circuit) = mH/Ω = ms)
This ratio L/R is called the time constant of the circuit.

DC current utilization categories are defined according to IEC 60947-4-1:
- DC-1 non inductive or slightly inductive loads, resistance furnaces (L/R ≤ 1 ms)
- DC-3 shunt motors: starting, plugging, inching, dynamic breaking of DC motors (L/R ≤ 2 ms)
- DC-5 series motors: starting, plugging, inching, dynamic breaking of DC motors (L/R ≤ 7.5 ms).

The higher the time constant value is, the more difficult it is to break the arc.
The addition of a resistor in parallel with an inductive winding helps in the elimination of the arcs, by reducing the time constant.

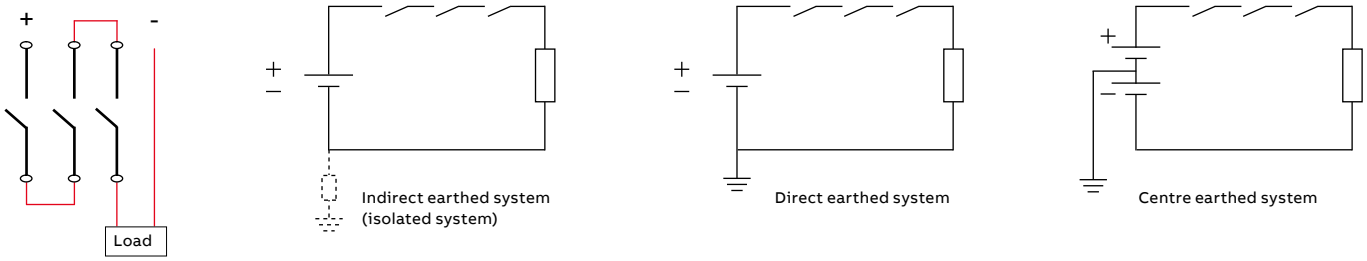
Operational voltage
- The higher the operational voltage value is, the more difficult it is to break the arc.
- The use of main poles connected in series will allow to increase the value of switched voltage.
  However, the maximum switched voltage must be within the max operational voltage of the contactor.
  All the poles required for breaking must be connected in series between the load and the source polarity not linked to earth (or chassis) (see recommended connection diagrams).

ABB offer a large choice of possibilities for DC switching applications (see selection tables):
AF..(Z)B 3-pole or 4-pole contactors with either 1- pole breaking or breaking with poles connected in series.

Selection tables
The enclosed selection tables will guide your choice through all contactor variants according to utilization category, for operational voltage up to 1000 V DC-1 and operational current up to 520 A in ambient temperatures from -25 °C up to 40 °C.

Connection diagrams

Recommended connection
In the example below, the 3 poles are connected in series without the load in between.
This connection is recommended in systems according to the following configurations.



Points to consider

The above relates to power circuit switching. The SCPD (Short-Circuit Protection Device) must comply with applicable protection rules.

AF09(Z)B ... AF96B contactors

DC circuit switching

General

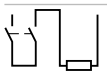
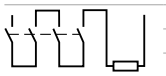
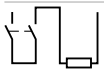
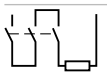
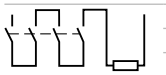
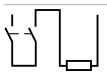
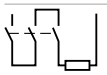
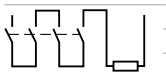
The arc switching on DC is more difficult than on AC.

- For selecting a contactor it is essential to determine the current, the voltage and the L/R time constant of the controlled load
- For information, typical time constant values are quoted hereafter: non inductive loads such as resistance furnaces (L/R ≈ 1 ms), inductive loads such as shunt motors (L/R ≈ 2 ms) or series motors (L/R ≈ 7.5 ms)
- The addition of a resistor in parallel with an inductive winding helps in the elimination of the arcs
- All the poles required for breaking must be connected in series between the load and the source polarity not linked to earth (or chassis).

Technical data

- The tables indicate for the standard contactors the Ie max. operating currents depending on: the utilization category (i.e. L/R) DC-1, DC-3, DC-5 as defined in the IEC 60947-4-1 publication, the operating voltage Ue and the pole coupling details. Ampere values quoted in these tables are valid for a -25...+70 °C temperature close to the contactors, as long as these values do not exceed the AC-1 Ampere values for the corresponding ambient temperature
- Max. switching frequency: 300 cycles/h.

Selection table

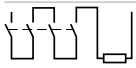
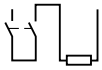
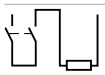
Contactor types		AF09	AF12	AF16	AF26		AF30	AF38		AF40	AF52	AF65	AF80	AF96
		3 or 4-pole			3-pole	4-pole	3-pole	3-pole	4-pole	3-pole	3-pole	3-pole	3-pole	3-pole
Utilization category DC-1, L/R ≤ 1 ms														
	≤ 72 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	105 A	125 A	130 A
	110 V	10 A	15 A	20 A	-	-	-	-	-	-	-	-	-	-
	220 V	-	-	-	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	105 A	125 A	130 A
	110 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	105 A	125 A	130 A
	220 V	10 A	15 A	20 A	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	105 A	125 A	130 A
	110 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	105 A	125 A	130 A
	220 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	105 A	125 A	130 A
	≤ 72 V	25 A	-	30 A	-	45 A	-	-	55 A	-	-	-	-	-
	110 V	25 A	-	30 A	-	45 A	-	-	55 A	-	-	-	-	-
	220 V	25 A	-	30 A	-	45 A	-	-	55 A	-	-	-	-	-
	440 V	10 A	-	20 A	-	-	-	-	-	-	-	-	-	-
Utilization category DC-3, L/R ≤ 2 ms														
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	6 A	7 A	8 A	-	-	-	-	-	-	-	-	-	-
	220 V	-	-	-	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	220 V	6 A	7 A	8 A	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	220 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	≤ 72 V	25 A	-	30 A	-	-	-	-	-	-	-	-	-	-
	110 V	25 A	-	30 A	-	-	-	-	-	-	-	-	-	-
	220 V	25 A	-	30 A	-	-	-	-	-	-	-	-	-	-
	440 V	6 A	-	8 A	-	-	-	-	-	-	-	-	-	-
Utilization category DC-5, L/R ≤ 7.5 ms														
	≤ 72 V	9 A	12 A	16 A	20 A	-	25 A	25 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	4 A	4 A	4 A	-	-	-	-	-	-	-	-	-	-
	220 V	-	-	-	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	10 A	15 A	20 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	220 V	4 A	4 A	4 A	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	220 V	9 A	12 A	16 A	20 A	-	25 A	25 A	-	70 A	100 A	105 A	125 A	130 A
	≤ 72 V	25 A	-	30 A	-	-	-	-	-	-	-	-	-	-
	110 V	25 A	-	30 A	-	-	-	-	-	-	-	-	-	-
	220 V	10 A	-	20 A	-	-	-	-	-	-	-	-	-	-
	440 V	4 A	-	4 A	-	-	-	-	-	-	-	-	-	-

For additional ratings ≥ 440 V, please consult us.

AF116B ... AF370B contactors

DC circuit switching

Selection table

Contactor types		AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
		3 or 4-pole		3-pole	3 or 4-pole				
Utilization category DC-1, L/R ≤ 1 ms									
	≤ 72 V	160 A	200 A	200 A	250 A	350 A	400 A	500 A	520 A
	90 V	160 A	200 A	200 A	250 A	350 A	400 A	500 A	520 A
	100 V	-	-	-	250 A	350 A	400 A	500 A	520 A
	110 V	-	-	-	-	-	400 A	500 A	520 A
	≤ 72 V	160 A	200 A	200 A	250 A	350 A	400 A	500 A	520 A
	110 V	160 A	200 A	200 A	250 A	350 A	400 A	500 A	520 A
	175 V	160 A	200 A	200 A	250 A	350 A	400 A	500 A	520 A
	200 V	-	-	-	250 A	350 A	400 A	500 A	520 A
	220 V	-	-	-	-	-	400 A	500 A	520 A
	≤ 72 V	160 A	200 A	200 A	250 A	350 A	400 A	500 A	520 A
	110 V	160 A	200 A	200 A	250 A	350 A	400 A	500 A	520 A
	220 V	160 A	200 A	200 A	250 A	350 A	400 A	500 A	520 A
	260 V	160 A	200 A	200 A	250 A	350 A	400 A	500 A	520 A
	300 V	-	-	-	250 A	350 A	400 A	500 A	520 A
	340 V	-	-	-	-	-	400 A	500 A	520 A
	440 V	-	-	-	-	-	-	-	-
	600 V	-	-	-	-	-	-	-	-
	850 V	-	-	-	-	-	-	-	-
	< 350 V	200 A	200 A	-	250 A	350 A	400 A	500 A	520 A
	400 V	-	-	-	250 A	350 A	400 A	500 A	520 A
	440 V	-	-	-	-	-	400 A	500 A	520 A
Utilization category DC-3, L/R ≤ 2 ms									
	≤ 72 V	-	-		-	-	-	-	-
	110 V	-	-		-	-	-	-	-
	≤ 72 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	110 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	220 V	-	-		-	-	-	-	-
	≤ 72 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	110 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	220 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	440 V	-	-		-	-	-	-	-
	600 V	-	-		-	-	-	-	-
Utilization category DC-5, L/R ≤ 7.5 ms									
	≤ 72 V	-	-		-	-	-	-	-
	110 V	-	-		-	-	-	-	-
	≤ 72 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	110 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	220 V	-	-		-	-	-	-	-
	≤ 72 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	110 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	220 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	440 V	-	-		-	-	-	-	-
	600 V	-	-		-	-	-	-	-

For additional ratings ≥ 440 V, please consult us.

NF(Z)B(..K) contactor relays connection with standard ferrules

Screw terminals

3/78 NFZB 4-pole and 8-pole DC operated
3/79 NF(Z)B 4-pole and 8-pole AC operated
3/81 Technical data

Push-in Spring terminals

3/84 NFZB..K 4-pole and 8-pole DC operated
3/85 NF(Z)B..K 4-pole and 8-pole AC operated
3/87 Technical data

For direct product details information, use product type or order code, ex:

www.abb.com/productdetails/**NFZB22EK-21**
www.abb.com/productdetails/**1SBH136063R2122**

NFZB 4 and 8-pole contactor relays

DC operated - connection with standard ferrules

1SBC101024V0014

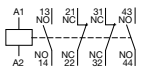
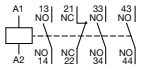
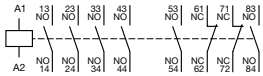
NFZB22E

1SBC101029V0014

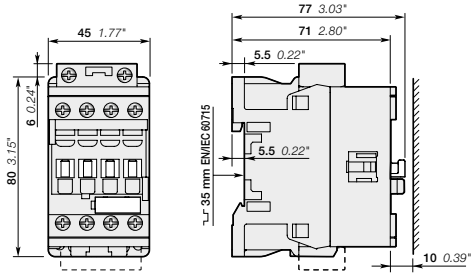
NFZB44E

NFZB contactor relays comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are used for switching auxiliary and control circuits. These contactor relays are of the block type design with 4 or 8 main poles.

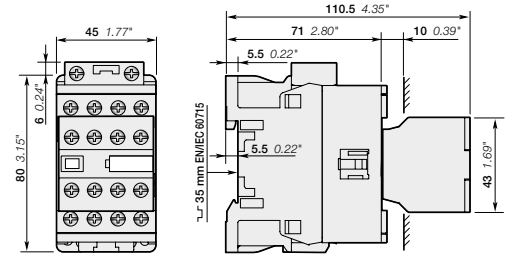
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40° C up to +70° C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Number of contacts	Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Type	Order code	Weight Pkg (1 pce)
	V DC	V DC			kg
	24, 33, 48	20...60	NFZB22E-21	1SBH136061R2122	0.310
	72, 96, 110	48...130	NFZB22E-22	1SBH136061R2222	0.310
	220	100...250	NFZB22E-23	1SBH136061R2322	0.310
	24, 33, 48	20...60	NFZB31E-21	1SBH136061R2131	0.310
	72, 96, 110	48...130	NFZB31E-22	1SBH136061R2231	0.310
	220	100...250	NFZB31E-23	1SBH136061R2331	0.310
	24, 33, 48	20...60	NFZB40E-21	1SBH136061R2140	0.310
	72, 96, 110	48...130	NFZB40E-22	1SBH136061R2240	0.310
	220	100...250	NFZB40E-23	1SBH136061R2340	0.310
	24, 33, 48	20...60	NFZB44E-21	1SBH136061R2144	0.370
	72, 96, 110	48...130	NFZB44E-22	1SBH136061R2244	0.370
	220	100...250	NFZB44E-23	1SBH136061R2344	0.370
	24, 33, 48	20...60	NFZB62E-21	1SBH136061R2162	0.370
	72, 96, 110	48...130	NFZB62E-22	1SBH136061R2262	0.370
	220	100...250	NFZB62E-23	1SBH136061R2362	0.370
	24, 33, 48	20...60	NFZB80E-21	1SBH136061R2180	0.370
	72, 96, 110	48...130	NFZB80E-22	1SBH136061R2280	0.370
	220	100...250	NFZB80E-23	1SBH136061R2380	0.370

(1) Other control voltages, see voltage code table.



NFZB22E, NFZB31E, NFZB40E



NFZB44E, NFZB62E, NFZB80E

Main dimensions mm, inches

NF(Z)B 4 and 8-pole contactor relays

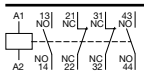
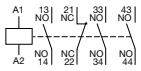
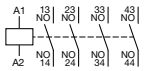
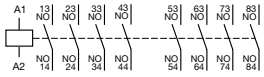
AC operated - connection with standard ferrules

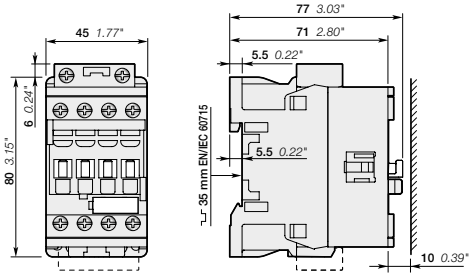
NFZB22E

NFZB44E

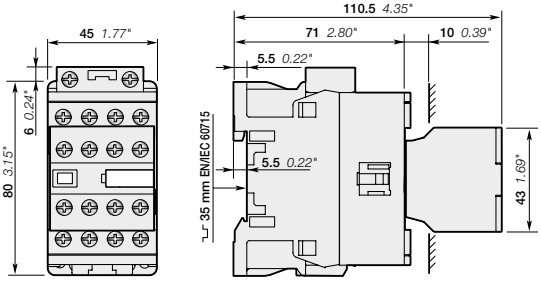
NF(Z)B contactor relays comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are used for switching auxiliary and control circuits. These contactor relays are of the block type design with 4 or 8 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max. of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40° C up to +70° C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Number of contacts	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1) V AC 50/60 Hz	Type	Order code	Weight Pkg (1 pce) kg
	24...60	NFZB22E-21	1SBH136061R2122	0.310
	48...130	NFZB22E-22	1SBH136061R2222	0.310
	100...250	NFZB22E-23	1SBH136061R2322	0.310
	250...500	NFB22E-14	1SBH137061R1422	0.310
	24...60	NFZB31E-21	1SBH136061R2131	0.310
	48...130	NFZB31E-22	1SBH136061R2231	0.310
	100...250	NFZB31E-23	1SBH136061R2331	0.310
	250...500	NFB31E-14	1SBH137061R1431	0.310
	24...60	NFZB40E-21	1SBH136061R2140	0.310
	48...130	NFZB40E-22	1SBH136061R2240	0.310
	100...250	NFZB40E-23	1SBH136061R2340	0.310
	250...500	NFB40E-14	1SBH137061R1440	0.310
	24...60	NFZB44E-21	1SBH136061R2144	0.370
	48...130	NFZB44E-22	1SBH136061R2244	0.370
	100...250	NFZB44E-23	1SBH136061R2344	0.370
	250...500	NFB44E-14	1SBH137061R1444	0.370
	24...60	NFZB62E-21	1SBH136061R2162	0.370
	48...130	NFZB62E-22	1SBH136061R2262	0.370
	100...250	NFZB62E-23	1SBH136061R2362	0.370
	250...500	NFB62E-14	1SBH137061R1462	0.370
	24...60	NFZB80E-21	1SBH136061R2180	0.370
	48...130	NFZB80E-22	1SBH136061R2280	0.370
	100...250	NFZB80E-23	1SBH136061R2380	0.370
	250...500	NFB80E-14	1SBH137061R1480	0.370



NF(Z)B22E, NF(Z)B31E, NF(Z)B40E

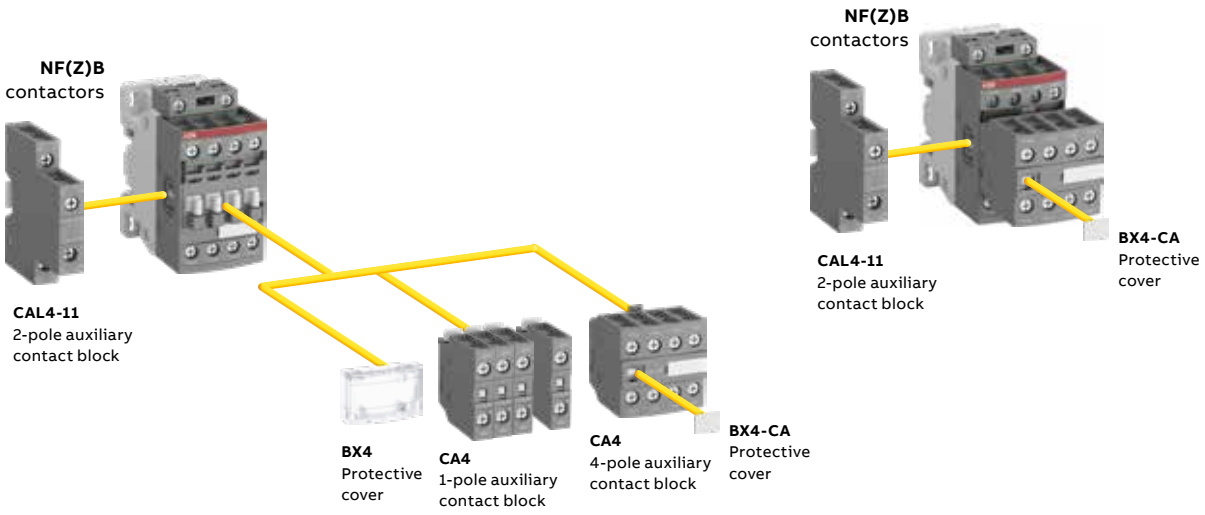


NF(Z)B44E, NF(Z)B62E, NF(Z)B80E

Main dimensions mm, inches

NF(Z)B 4 and 8-pole contactor relays

Contactors and main accessories



Main accessory fitting details - for ordering details, technical data and other accessories: see section accessories

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor relay types	Main poles	Front-mounted accessories Auxiliary contact blocks				Side-mounted accessories Auxiliary contact blocks	
		1-pole CA4		4-pole CA4		Left side 2-pole CAL4-11	Right side
NF(Z)B 4-pole contactor relays							
NF(Z)B	2 2 E (1)	4 max.	**or** 1	**or** 1	**or** 1	+ 1	–
	3 1 E (1)	2 max.	–	**or** 1	**or** 1	+ 1	+ 1
	4 0 E (2)						

(1) Including add-on contacts: 3 N.C. auxiliary contacts max. on positions 1, 2, 3, 4 and 2 N.C. max on positions 1+/-30°, 5.
(2) Including add-on contacts: 4 N.C. auxiliary contacts max. on positions 1, 2, 3, 4 and 3 N.C. max on positions 1+/-30°, 5.

NF(Z)B 8-pole contactor relays

Contactor relay types	Main poles	Side-mounted accessories Auxiliary contact blocks 2-pole CAL4-11	
		Left side	Right side
NF(Z)B	5 3 E 7 1 E 3 3 / 1 1 5 1 / 1 1	1	–

NF(Z)B 4 and 8-pole contactor relays

Technical data

Contact utilization characteristics according to IEC

Contactor relay types		**NF(Z)B**
Standards (1)		IEC/EN 60947-1, IEC/EN 60947-5-1 IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), EN 50155 (applicable parts), TR CU 001/2011 IEC 61373
Fire and smoke		EN 45545-2 (HL2, HL3)
Rated operational voltage Ue max.		690 V
Rated frequency (without derating)		50 / 60 Hz
Conventional free-air thermal current - Ith θ ≤ 40 °C		16 A
Ie / Rated operational current AC-15		
acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A
	220-240 V 50/60 Hz	4 A
	400-440 V 50/60 Hz	3 A
	500 V 50/60 Hz	2 A
	690 V 50/60 Hz	2 A
Making capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1
Breaking capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1
Ie / Rated operational current DC-13		
acc. to IEC 60947-5-1	24 V DC	6 A / 144 W
	48 V DC	2.8 A / 134 W
	72 V DC	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.27 A / 60 W
	250 V DC	0.27 A / 68 W
	400 V DC	0.15 A / 60 W
	500 V DC	0.13 A / 65 W
	600 V DC	0.1 A / 60 W
Short-circuit protection device gG type fuse		10 A
Rated short-time withstand current Icw	for 1.0 s	100 A
at 40 °C ambient temperature, in free air from a cold state	for 0.1 s	140 A
Minimum switching capacity		12 V / 3 mA
with failure rate acc. to IEC 60947-5-4		10^{-7}
Non-overlapping time between N.O. and N.C. contacts		≥ 2 ms
Power dissipation per pole at 6 A		0.1 W
Maximum electrical switching frequency	AC-15	1200 cycles/h
	DC-13	900 cycles/h
Mechanically linked contacts acc. to annex L of IEC 60947-5-1		Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts (CA4, CAL4 aux. contact blocks) are mechanically linked contacts

(1) For compliance confirmation on applicable parts based on your application and combination, please consult your ABB sales representatives.

Contact utilization characteristics according to UL / CSA

Contactor relay types	**NF(Z)B**
Standards	UL 508, CSA C22.2 No. 14-13
Maximum operational voltage	600 V AC, 600 V DC
Pilot duty	A600, Q600
AC thermal rated current	10 A
AC maximum volt-ampere making	7200 VA
AC maximum volt-ampere breaking	720 VA
DC thermal rated current	2.5 A
DC maximum volt-ampere making-breaking	69 VA

NF(Z)B 4 and 8-pole contactor relays

Technical data

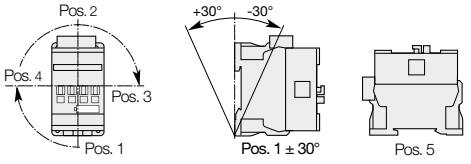
General technical data

Contactor relay types	**NF(Z)B**
Rated insulation voltage Ui	
acc. to IEC 60947-5-1	690 V
acc. to UL / CSA	600 V
Rated impulse withstand voltage Uimp.	6 kV
Electromagnetic compatibility	Devices complying with IEC/EN 60947-1 - Environment A EN 50121-3-2
Ambient air temperature close to contactor relay	
Operation in free air	-40...+70 °C
Storage	-60...+80 °C
Climatic withstand	Category B according to IEC 60947-1 Annex Q
Maximum operating altitude (without derating)	3000 m
Mechanical durability	
Number of operating cycles	20 millions operating cycles
Maximum switching frequency	6000 cycles/h
Shock and vibration withstand acc. to IEC 61373	Category 1, class B

Magnet system characteristics

Contactor types		**NF(Z)B**
Coil operating limits acc. to IEC 60947-5-1	DC supply	At θ ≤ 70 °C 0.85 x Uc min...1.1 x Uc max.
	AC supply	at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max at θ ≤ 70 °C 0.85 x Uc min ... Uc max
DC control voltage		
Rated control circuit voltage Uc		20 ... 250 V DC
Coil consumption	Average pull-in value	(NF..ZB) 12 ... 16 W
	Average holding value	(NF..ZB) 1.7 W
PLC-output control		(NF..ZB) ≥ 500 mA 24 V DC
AC control voltage 50/60 Hz		
Rated control circuit voltage Uc		(NF..ZB) 24 ... 250 V AC - (NF..B) 250 ... 500 V AC
Coil consumption	Average pull-in value	(NF..ZB) 16 VA - (NF..B) 50 VA
	Average holding value	(NF..ZB) 1.7 VA / 1.5 W - (NF..B) 2.2 VA / 2 W
Max. permitted control voltage during voltage fluctuation defined acc. to IEC 60077 / EN 50155		Rated control circuit voltage / Max. permitted control voltage 24 ... 60 V AC 50/60 Hz / 66 V AC 50/60 Hz 48 ... 130 V AC 50/60 Hz / 143 V AC 50/60 Hz 100 ... 250 V AC 50/60 Hz / 275 V AC 50/60 Hz 250 ... 500 V AC 50/60 Hz / 550 V AC 50/60 Hz
Drop-out voltage		≤ 60 % of Uc min.
Operating time		
Between coil energization and:	N.O. contact closing	40...95 ms
	N.C. contact opening	38...90 ms
Between coil de-energization and:	N.O. contact opening	11...95 ms
	N.C. contact closing	13...98 ms

Mounting characteristics

Contactor types	**NF(Z)B**
Mounting positions	 Max. add-on N.C. auxiliary contacts: see accessory fitting details for a NF(Z)B contactor relay
Mounting distances	The contactor relays can be assembled side by side
Fixing	
On rail according to IEC/EN 60715	35 x 7.5 mm or 35 x 15 mm
By screws (not supplied)	2 x M4 screws placed diagonally

NF(Z)B 4 and 8-pole contactor relays

Technical data

Connecting characteristics

Contactor types		NF(Z)B
Main terminals		Screw terminals with cable clamp
Connection capacity (min. ... max.)		
Pole and coil terminals		
Rigid Solid/Stranded	1 x	1...2.5 mm²
	2 x	1...2.5 mm²
Flexible with non insulated ferrule	1 x	0.75...2.5 mm²
	2 x	0.75...2.5 mm²
Flexible with insulated ferrule	1 x	0.75...2.5 mm²
	2 x	0.75...1.5 mm²
Lugs	L <	8 mm
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...14
Stripping length		10 mm
Tightening torque		
Coil terminals		1.2 Nm / 11 lb.in
Built-in auxiliary terminals		1.2 Nm / 11 lb.in
Degree of protection acc. to IEC/EN 60947-1 and IEC/EN 60529		
All terminals		IP20
Screwdriver type		Delivered in open position, screws of unused terminals must be tightened
Main terminals		M3.5
	Screwdriver type	Flat Ø 5.5 / Pozidriv 2

NFZB..K contactor relays - with Push-in Spring terminals

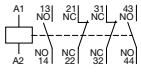
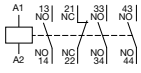
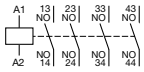
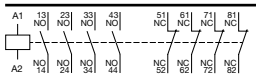
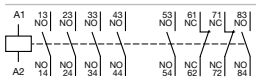
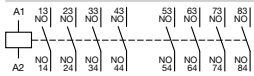
DC operated

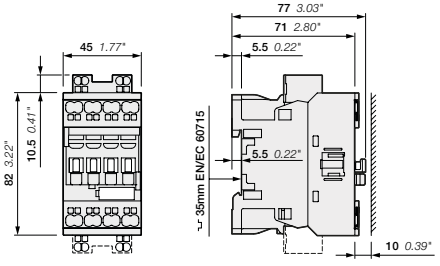
NFZ22EK

NFZ44EK

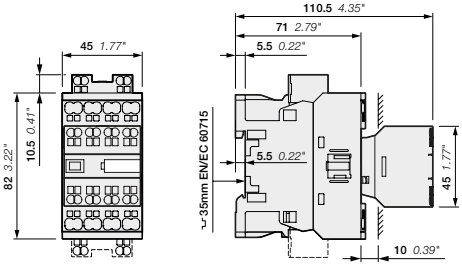
NFZB..K contactor relays comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are used for switching auxiliary and control circuits. These contactor relays are of the block type design with 4 or 8 main poles:

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (H2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 Uc... 1.25 Uc according to IEC 60077) used for battery supply
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Number of contacts	Supply control voltage Uc (IEC 60077) V DC	Rated control circuit voltage Uc min. ... Uc max V DC	Type	Order code	Weight Pkg (1 pce) kg
4-pole contactor relays					
	24, 33, 48	20...60	NFZB22EK-21	1SBH136063R2122	0.315
	72, 96, 110	48...130	NFZB22EK-22	1SBH136063R2222	0.315
	220	100...250	NFZB22EK-23	1SBH136063R2322	0.315
	24, 33, 48	20...60	NFZB31EK-21	1SBH136063R2131	0.315
	72, 96, 110	48...130	NFZB31EK-22	1SBH136063R2231	0.315
	220	100...250	NFZB31EK-23	1SBH136063R2331	0.315
	24, 33, 48	20...60	NFZB40EK-21	1SBH136063R2140	0.315
	72, 96, 110	48...130	NFZB40EK-22	1SBH136063R2240	0.315
	220	100...250	NFZB40EK-23	1SBH136063R2340	0.315
8-pole contactor relays					
	24, 33, 48	20...60	NFZB44EK-21	1SBH136063R2144	0.360
	72, 96, 110	48...130	NFZB44EK-22	1SBH136063R2244	0.360
	220	100...250	NFZB44EK-23	1SBH136063R2344	0.360
	24, 33, 48	20...60	NFZB62EK-21	1SBH136063R2162	0.360
	72, 96, 110	48...130	NFZB62EK-22	1SBH136063R2262	0.360
	220	100...250	NFZB62EK-23	1SBH136063R2362	0.360
	24, 33, 48	20...60	NFZB80EK-21	1SBH136063R2180	0.360
	72, 96, 110	48...130	NFZB80EK-22	1SBH136063R2280	0.360
	220	100...250	NFZB80EK-23	1SBH136063R2380	0.360



NFZ22EK, NFZ31EK, NFZ40EK



NFZ44EK, NFZ62EK, NFZ80EK

Main dimensions mm, inches

NF(Z)B..K contactor relays - with Push-in Spring terminals

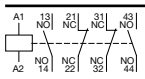
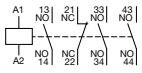
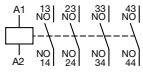
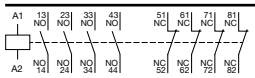
AC operated

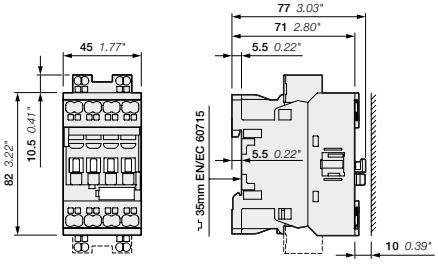
NF(Z)B22EK

NF(Z)B44EK

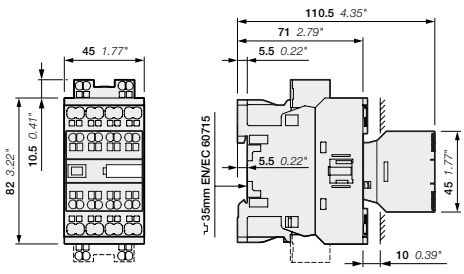
NF(Z)B..K contactor relays comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are used for switching auxiliary and control circuits. These contactor relays are of the block type design with 4 or 8 main poles:

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (H2, HL3 hazard levels)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies. Maximum permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Number of contacts	Rated control circuit voltage Uc min. ... Uc max. V AC 50/60 Hz	Type	Order code	Weight Pkg (1 pce) kg
4-pole contactor relays				
	24...60	NFZB22EK-21	1SBH136063R2122	0.315
	48...130	NFZB22EK-22	1SBH136063R2222	0.315
	100...250	NFZB22EK-23	1SBH136063R2322	0.315
	250...500	NFB22EK-14	1SBH137063R1422	0.325
	24...60	NFZB31EK-21	1SBH136063R2131	0.315
	48...130	NFZB31EK-22	1SBH136063R2231	0.315
	100...250	NFZB31EK-23	1SBH136063R2331	0.315
	250...500	NFB31EK-14	1SBH137063R1431	0.325
	24...60	NFZB40EK-21	1SBH136063R2140	0.315
	48...130	NFZB40EK-22	1SBH136063R2240	0.315
	100...250	NFZB40EK-23	1SBH136063R2340	0.315
	250...500	NFB40EK-14	1SBH137063R1440	0.325
8-pole contactor relays				
	24...60	NFZB44EK-21	1SBH136063R2144	0.360
	48...130	NFZB44EK-22	1SBH136063R2244	0.360
	100...250	NFZB44EK-23	1SBH136063R2344	0.360
	250...500	NFB44EK-14	1SBH137063R1444	0.370
	24...60	NFZB62EK-21	1SBH136063R2162	0.360
	48...130	NFZB62EK-22	1SBH136063R2262	0.360
	100...250	NFZB62EK-23	1SBH136063R2362	0.360
	250...500	NFB62EK-14	1SBH137063R1462	0.370
	24...60	NFZB80EK-21	1SBH136063R2180	0.360
	48...130	NFZB80EK-22	1SBH136063R2280	0.360
	100...250	NFZB80EK-23	1SBH136063R2380	0.360
	250...500	NFB80EK-14	1SBH137063R1480	0.370



NF(Z)B22EK, NF(Z)B31EK, NF(Z)B40EK

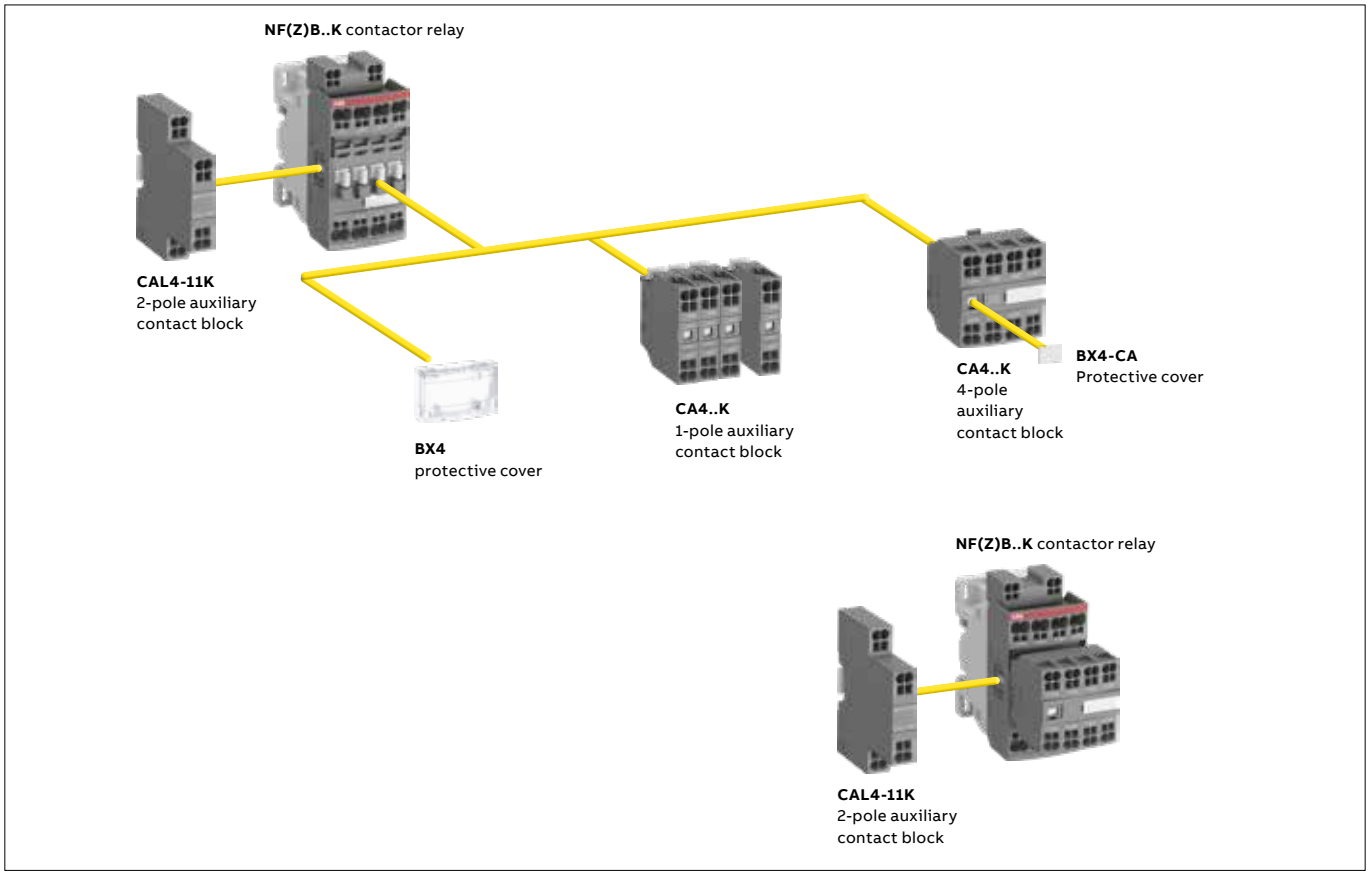


NF(Z)B44EK, NF(Z)B62EK, NF(Z)B80EK

Main dimensions mm, inches

NF(Z)B..K contactor relays - with Push-in Spring terminals

Contactor relays and main accessories



Main accessory fitting details - for ordering details, technical data and other accessories: see section accessories
Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor relay types	Main poles			Front-mounted accessories Auxiliary contact blocks 1-pole CA4..K	Front-mounted accessories Auxiliary contact blocks 4-pole CA4..K		Side-mounted accessories Auxiliary contact blocks 2-pole CAL4-11K Left side	Side-mounted accessories Auxiliary contact blocks 2-pole CAL4-11K Right side
NF(Z)B..K								
NF(Z)B..K	2	2	EK (1)	4 max.	or 1	+	1	-
	3	1	EK (1)	2 max.	-	+	1	+ 1
	4	0	EK (2)					
NF(Z)B..K	4	4	EK	-	-	+	1	-
	5	3	EK					
	6	2	EK					
	7	1	EK					
	8	0	EK					

(1) Including add-on contacts: 3 N.C. max. on positions 1, 2, 3, 4 and 2 N.C. max. on positions1+/-30°, 5
(2) Including add-on contacts: 4 N.C. max. on positions 1, 2, 3, 4 and 3 N.C. max. on positions 1+/-30°, 5

NF(Z)B..K contactor relays - with Push-in Spring terminals

Technical data

Contact utilization characteristics according to IEC

Contactor relay types			**NF(Z)B..K**
Standards (1)			IEC/EN 60947-1, IEC/EN 60947-5-1, IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), EN 50155 (applicable parts), TR CU 001/2011 IEC 61373
Rated operational voltage Ue max.			690 V
Rated frequency (without derating)			50 / 60 Hz
Conventional free air thermal current Ith - θ ≤ 40 °C			16 A
Ie / Rated operational current AC-15 acc. to IEC 60947-5-1		24-127 V 50/60 Hz	6 A
		220-240 V 50/60 Hz	4 A
		400-440 V 50/60 Hz	3 A
		500 V 50/60 Hz	2 A
		690 V 50/60 Hz	2 A
Making capacity AC-15			10 x Ie AC-15 acc. to IEC 60947-5-1
Breaking capacity AC-15			10 x Ie AC-15 acc. to IEC 60947-5-1
Ie / Rated operational current DC-13 acc. to IEC 60947-5-1		24 V DC	6 A / 144 W
		48 V DC	2.8 A / 134 W
		72 V DC	1 A / 72 W
		110 V DC	0.55 A / 60 W
		125 V DC	0.55 A / 69 W
		220 V DC	0.27 A / 60 W
		250 V DC	0.27 A / 68 W
		400 V DC	0.15 A / 60 W
		500 V DC	0.13 A / 65 W
		600 V DC	0.1 A / 60 W
Short-circuit protection device gG type fuse			10 A
Conditional short-circuit current			1 kA
Rated short-time withstand current Icw		for 1.0 s	100 A
		for 0.1 s	140 A
Minimum switching capacity			12 V / 3 mA
with failure rate acc. to IEC 60947-5-4			10^{-7}
Non-overlapping time between N.O. and N.C. contacts			≥ 2 ms
Power dissipation per pole at 6 A			0.1 W
Maximum electrical switching frequency		AC-15	1200 cycles/h
		DC-13	900 cycles/h
Mechanically linked contacts acc. to annex L of IEC 60947-5-1			Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts (CA4, CAL4 aux. contact blocks) are mechanically linked contacts

(1) For compliance confirmation on applicable parts based on your application and combination, please consult your ABB sales representatives.

Contact utilization characteristics according to UL / CSA

Contactor relay types	**NF(Z)B..K**
Standards	UL 508, CSA C22.2 No 14-13
Maximum operational voltage	600 V AC, 600 V DC
Pilot duty	A600, Q600
AC thermal rated current	10 A
AC maximum volt-ampere making	7200 VA
AC maximum volt-ampere breaking	720 VA
DC thermal rated current	2.5 A
DC maximum volt-ampere making-breaking	69 VA

NF(Z)B..K contactor relays - with Push-in Spring terminals

Technical data

General technical data

Contactor relay types	**NF(Z)B..K**
Rated insulation voltage Ui	
acc. to IEC 60947-5-1	690 V
acc. to UL / CSA	600 V
Rated impulse withstand voltage Uimp.	6 kV
Electromagnetic compatibility	Devices complying with IEC/EN 60947-1 - Environment A EN 50121-3-2
Ambient air temperature close to contactor relay	
Operation in free air	-40 ... +70 °C
Storage	-60 ... +80 °C
Climatic withstand	Category B according to IEC 60947-1 Annex Q
Maximum operating altitude (without derating)	3000 m
Mechanical durability	
Number of operating cycles	20 million operating cycles
Maximum switching frequency	6000 cycles/h
Shock and vibration withstand acc. to IEC 61373	Category 1, class B

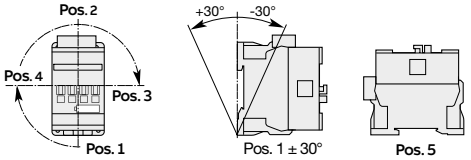
Magnet system characteristics

Contactor types		**NF(Z)B ..K**
Coil operating limits acc. to IEC 60947-5-1	DC supply	At θ ≤ 70 °C 0.85 x Uc min...1.1 x Uc max.
	AC supply	at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max at θ ≤ 70 °C 0.85 x Uc min ... Uc max
DC control voltage		
Rated control circuit voltage Uc		20 ... 250 V DC
Coil consumption	Average pull-in value	(NF..ZB..K) 12 ... 16 W
	Average holding value	(NF..ZB..K) 1.7 W
PLC-output control		(NF..ZB..K) ≥ 500 mA 24 V DC
AC control voltage 50/60 Hz		
Rated control circuit voltage Uc		(NF..ZB..K) 24 ... 250 V AC - (NF..B..K) 250 ... 500 V AC
Coil consumption	Average pull-in value	(NF..ZB..K) 16 VA - (NF..B..K) 50 VA
	Average holding value	(NF..ZB..K) 1.7 VA / 1.5 W - (NF..B..K) 2.2 VA / 2 W
Max. permitted control voltage during voltage fluctuation defined acc. to IEC 60077 / EN 50155		Rated control circuit voltage / Max. permitted control voltage 24 ... 60 V AC 50/60 Hz / 66 V AC 50/60 Hz 48 ... 130 V AC 50/60 Hz / 143 V AC 50/60 Hz 100 ... 250 V AC 50/60 Hz / 275 V AC 50/60 Hz 250 ... 500 V AC 50/60 Hz / 550 V AC 50/60 Hz
Drop-out voltage		≤ 60 % of Uc min.
Operating time		
Between coil energization and:	N.O. contact closing	40...95 ms
	N.C. contact opening	38...90 ms
Between coil de-energization and:	N.O. contact opening	11...95 ms
	N.C. contact closing	13...98 ms

NF(Z)B..K contactor relays - with Push-in Spring terminals

Technical data

Mounting characteristics

Contactor relay types	**NF(Z)B..K**
Mounting positions	 Max. add-on N.C. auxiliary contacts: see accessory fitting details for a NF(Z)B..K contactor relay
Mounting distances	The contactor relays can be assembled side by side
Fixing	
On rail according to IEC/EN 60715	35 x 7.5 mm or 35 x 15 mm
By screws (not supplied)	2 x M4 screws placed diagonally

Connecting characteristics

Contactor relay types	AC / DC operated	**NF(Z)B..K**
Main terminals		 Push-in Spring terminals
Connection capacity (min. ... max.)		
Pole and coil terminals		
Rigid Solid	1 x	1 ... 2.5 mm²
	2 x	1 ... 2.5 mm²
Flexible with non insulated ferrule	1 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²
	2 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²
Flexible with insulated ferrule	1 x	1 (push-in) / 0.5 (spring) ... 1.5 mm²
	2 x	1 (push-in) / 0.5 (spring) ... 1.5 mm²
Flexible without ferrule	1 x	(spring) 0.5 ... 2.5 mm²
	2 x	(spring) 0.5 ... 2.5 mm²
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18 ... 14
Stripping length		10 mm
Degree of protection acc. to IEC/EN 60947-1 and IEC/EN 60529		IP20
Screwdriver type	All terminals	Flat Ø 3 mm x 0.5 mm

Accessories for AF..B contactors and NF..B contactor relays Connection with standard ferrules

3/92 Auxiliary contact blocks with screw terminals
3/94 Auxiliary contact blocks with Push-in Spring terminals
3/99 Interlocks
3/101 Connection set
3/102 Other accessories
3/105 Spare parts for AF116B..(RT) ... AF146B..(RT) contactors

For direct product details information, use product type or order code, ex:

www.abb.com/productdetails/**CA4-10-T**
www.abb.com/productdetails/**1SBN010110T1010**

Auxiliary contact blocks for AF09(Z)B ... AF370B contactors

Connection with standard ferrules

CA4-10-T

CA4-22E

CAL4-11-T

CAT4-11E

The auxiliary contact blocks are used for the operation of auxiliary circuits and control circuits for standard industrial environments.

Types of auxiliary contact blocks for front mounting:

- Screw terminals
- Select the 4-pole auxiliary contact blocks CA4-..E, CA4-..M, CA4-..U or CA4-..N type, according to the contactor or contactor relay type for compliance with the standard requirements (see "Terminal marking and positioning").

Types of auxiliary contact blocks for side mounting:

- Screw terminals
- For clipping onto the right- and/or left-hand side of the contactors.
- The CAL ...-11B is a second block for mounting in addition to a first CAL ...-11 block, right- and/or left-hand of the AF116B ... AF370B contactors.

The auxiliary contact blocks are equipped with screw type connecting terminals delivered open, protected against accidental direct contact and bear the corresponding function marking.

For contactors		Auxiliary contacts		Type	Order code	Pkg qty	Weight (1 pce) kg
Front-mounted instantaneous auxiliary contact blocks							
AF09(Z)B ... AF96(Z)B		1 0	– –	CA4-10-T	1SBN010110T1010	10	0.014
4-pole NF(Z)B		0 1	– –	CA4-01-T	1SBN010110T1001	10	0.014
AF09(Z)B ... AF16(Z)B-30-10		2 2	– –	CA4-22M	1SBN010140R1122	1	0.055
		3 1	– –	CA4-31M	1SBN010140R1131	1	0.055
		1 3	– –	CA4-13M	1SBN010140R1113	1	0.055
		0 4	– –	CA4-04M	1SBN010140R1104	1	0.055
AF26(Z)B ... AF96(Z)B-30-00		2 2	– –	CA4-22E	1SBN010140R1022	1	0.055
AF09(Z)B ... AF80(Z)B-40-00		3 1	– –	CA4-31E	1SBN010140R1031	1	0.055
AF09(Z)B ... AF80(Z)B-22-00		4 0	– –	CA4-40E	1SBN010140R1040	1	0.055
AF26(Z)B ... AF96(Z)B-30-00 AF09(Z)B ... AF16(Z)B-40-00 AF40B...AF80B-40-00		0 4	– –	CA4-04E	1SBN010140R1004	1	0.055
AF09(Z)B ... AF16(Z)B-30-01		2 2	– –	CA4-22U	1SBN010140R1322	1	0.055
		3 1	– –	CA4-31U	1SBN010140R1331	1	0.055
		4 0	– –	CA4-40U	1SBN010140R1340	1	0.055
4-pole NF(Z)B		4 0	– –	CA4-40N	1SBN010140R1240	1	0.055
		3 1	– –	CA4-31N	1SBN010140R1231	1	0.055
		2 2	– –	CA4-22N	1SBN010140R1222	1	0.055
		1 3	– –	CA4-13N	1SBN010140R1213	1	0.055
NF(Z)B40E		0 4	– –	CA4-04N	1SBN010140R1204	1	0.055
Side-mounted instantaneous auxiliary contact blocks							
AF09(Z)B ... AF96(Z)B NF(Z)B		1 1	– –	CAL4-11-T	1SBN010120T1011	10	0.040
AF116B ... AF370B	1st block	1 1	– –	CAL19-11	1SFN010820R1011	2	0.040
	2nd block	1 1	– –	CAL19-11B	1SFN010820R3311	2	0.040
Front-mounted instantaneous auxiliary contact and A1/A2 coil terminal blocks							
AF09(Z)B ... AF16(Z)B-30-10		1 1	– –	CAT4-11M	1SBN010151R1111	1	0.040
AF09(Z)B ... AF52(Z)B-40-00 AF09(Z)B ... AF40(Z)B-22-00 AF26(Z)B ... AF38(Z)B-30-00		1 1	– –	CAT4-11E	1SBN010151R1011	1	0.040
AF09(Z)B ... AF16(Z)B-30-01		1 1	– –	CAT4-11U	1SBN010151R1311	1	0.040

(1) For each contactor or contactor relay type, refer to "Accessory fitting details" table.

CA4, CAT4, CAL4 auxiliary contact blocks for AF09(Z)B ... AF96B

Connection with standard ferrules

Contact utilization characteristics according to IEC

Types		1-pole CA4, 4-pole CA4, 2-pole CAT4, 2-pole CAL4
Standards		IEC/EN 60947-5-1
Rated insulation voltage Ui acc. to IEC 60947-5-1		690 V
Rated impulse withstand voltage Uimp		6 kV
Rated operational voltage Ue max.		24 ... 690 V
Conventional thermal current Ith - θ ≤ 40 °C		16 A
Rated frequency (without derating)		50 / 60 Hz
Ie / Rated operational current AC-15		
acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A
	220-240 V 50/60 Hz	4 A
	400-440 V 50/60 Hz	3 A
	500 V 50/60 Hz	2 A
	690 V 50/60 Hz	2 A
Making capacity		10 x Ie AC-15 acc. to IEC 60947-5-1
Breaking capacity		10 x Ie AC-15 acc. to IEC 60947-5-1
Ie / Rated operational current DC-13		
acc. to IEC 60947-5-1	24 V DC	6 A / 144 W
	48 V DC	2.8 A / 134 W
	72 V DC	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.27 A / 60 W
	250 V DC	0.27 A / 68 W
	400 V DC	0.15 A / 60 W
	500 V DC	0.13 A / 65 W
	600 V DC	0.1 A / 60 W
Short-circuit protection device gG type fuse		10 A
Rated short-time withstand current Icw	for 1.0 s	100 A
θ ≤ 40 °C	for 0.1 s	140 A
Minimum switching capacity		12 V / 3 mA
with failure rate acc. to IEC 60947-5-4		10^{-7}
Power dissipation per pole at 6 A		0.1 W
Mechanical durability Number of operating cycles		10 millions operating cycles
Max. switching frequency		3600 cycles/h
Max. electrical switching frequency	AC-15	1200 cycles/h
	DC-13	900 cycles/h
Mechanically linked contacts acc. to annex L of IEC 60947-5-1		Additional N.O. or N.C. auxiliary contacts (CA4, CAL4, CAT4) are mechanically linked contacts.
Mirror contacts acc. to annex F of IEC 60947-4-1		Additional N.C. auxiliary contacts (CA4, CAL4, CAT4) are mirror contacts.

Contact utilization characteristics according to UL / CSA

Types	1-pole CA4, 4-pole CA4, 2-pole CAT4, 2-pole CAL4
Standards	UL 60947-1, UL 60947-5-1, CSA C22.2 No. 60947-5-1-14
Max. operational voltage	600 V AC, 600 V DC
Pilot duty	A600, Q600
AC thermal rated current	10 A
AC maximum volt-ampere making	7200 VA
AC maximum volt-ampere breaking	720 VA
DC thermal rated current	2.5 A
DC maximum volt-ampere making-breaking	69 VA

Connecting characteristics

Types		1-pole CA4, 4-pole CA4, 2-pole CAT4, 2-pole CAL4
Connection capacity (min. ... max.)		
Rigid Solid/Stranded	1 x	1...2.5 mm²
	2 x	1...2.5 mm²
Flexible with non insulated ferrule	1 x	0.75...2.5 mm²
	2 x	0.75...2.5 mm²
Flexible with insulated ferrule	1 x	0.75...2.5 mm²
	2 x	0.75...1.5 mm²
Lugs	L <	8 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14
Stripping length		10 mm
Tightening torque		1.2 Nm / 11 lb.in
Degree of protection		
acc. to IEC/EN 60947-1 and IEC/EN 60529		IP20
Screw terminals		Delivered in open position, screws of unused terminals must be tightened
All terminals		M3.5
Screwdriver type		Flat Ø 5.5 / Pozidriv 2

Auxiliary contact blocks with Push-in Spring terminals

CA4-10K

CA4-22EK

CAL4-11K

The auxiliary contact blocks are used for the operation of auxiliary circuits and control circuits for standard industrial environments.

Types of auxiliary contact blocks for front mounting:

- CA4..K 1 or 4-pole block, with instantaneous N.O., N.C. contacts

Select the 4-pole auxiliary contact blocks CA4-..EK, CA4-..MK or CA4-..NK type, according to the contactor or contactor relay type for compliance with the standard requirements (see "Terminal marking and positioning").

Types of auxiliary contact blocks for side mounting:

- CAL4..K 2-pole block, with instantaneous N.O. + N.C. contacts.

For clipping onto the right- and/or left-hand side of the contactors.

The auxiliary contact blocks are equipped with push-in spring terminals protected against accidental direct contact and bear the corresponding function marking.

For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce) kg
Front-mounted instantaneous auxiliary contact blocks					
AF09(Z)B..K ... AF96B 4-pole NF(Z)B..K	1 0	CA4-10K-T	1SBN010160T1010	10	0.012
	0 1	CA4-01K-T	1SBN010160T1001	10	0.012
AF09(Z)B ... AF16(Z)B-30-10K	2 2	CA4-22MK	1SBN010146R1122	1	0.050
	3 1	CA4-31MK	1SBN010146R1131	1	0.050
	1 3	CA4-13MK	1SBN010146R1113	1	0.050
	0 4	CA4-04MK	1SBN010146R1104	1	0.050
AF26(Z)B..K ... AF96B-30-00 AF09(Z)B ... AF80B-40-00 AF09(Z)B ... AF80B-22-00	2 2	CA4-22EK	1SBN010146R1022	1	0.050
	3 1	CA4-31EK	1SBN010146R1031	1	0.050
	4 0	CA4-40EK	1SBN010146R1040	1	0.050
4-pole NF(Z)B..K	1 3	CA4-13NK	1SBN010146R1213	1	0.050
	2 2	CA4-22NK	1SBN010146R1222	1	0.050
	3 1	CA4-31NK	1SBN010146R1231	1	0.050
	4 0	CA4-40NK	1SBN010146R1240	1	0.050
NF(Z)B40EK	0 4	CA4-04NK	1SBN010146R1204	1	0.050
Side-mounted instantaneous auxiliary contact blocks					
3-pole					
AF09(Z)B..K ... AF96B NF(Z)B..K	1 1	CAL4-11K	1SBN010134R1011	1	0.030

Note: for each contactor or contactor relay type, refer to "Accessory fitting details" table.

Auxiliary contact blocks for AF09(Z)B..K ... AF96B contactors and NF(Z)B..K contactor relays with Push-in Spring terminals

Technical data

Contact utilization characteristics according to IEC

Contactor relay types			1-pole CA4..K, 4-pole CA4..K, 2-pole CAL4..K
Standards			IEC/EN 60947-5-1
Rated insulation voltage Ui acc. to IEC 60947-5-1			690 V
Rated impulse withstand voltage Uimp.			6 kV
Rated operational voltage Ue max.			690 V
Conventional thermal current Ith - θ ≤ 40 °C			16 A
Rated frequency (without derating)			50 / 60 Hz
Ie / Rated operational current AC-15 acc. to IEC 60947-5-1		24-127 V 50/60 Hz	6 A
		220-240 V 50/60 Hz	4 A
		400-440 V 50/60 Hz	3 A
		500 V 50/60 Hz	2 A
		690 V 50/60 Hz	2 A
Making capacity acc. to IEC 60947-5-1			10 x Ie AC-15
Breaking capacity acc. to IEC 60947-5-1			10 x Ie AC-15
Ie / Rated operational current DC-13 acc. to IEC 60947-5-1		24 V DC	6 A / 144 W
		48 V DC	2.8 A / 134 W
		72 V DC	1 A / 72 W
		110 V DC	0.55 A / 60 W
		125 V DC	0.55 A / 69 W
		220 V DC	0.27 A / 60 W
		250 V DC	0.27 A / 68 W
		400 V DC	0.15 A / 60 W
		500 V DC	0.13 A / 65 W
		600 V DC	0.1 A / 60 W
Short-circuit protection device gG type fuse			10 A
Conditional short-circuit current			1 kA
Rated short-time withstand current Icw		for 1.0 s	100 A
θ = 40 °C		for 0.1 s	140 A
Minimum switching capacity with failure rate acc. to IEC 60947-5-4			12 V / 3 mA 10^{-7}
Power dissipation per pole at 6 A			0.1 W
Mechanical durability	Number of operating cycles		10 million operating cycles
	Max. switching frequency		3600 cycles/h
Max. electrical switching frequency		AC-15	1200 cycles/h
		DC-13	900 cycles/h
Mechanically linked contacts acc. to annex L of IEC 60947-5-1			Additional N.O. or N.C. auxiliary contacts (CA4, CAL4) are mechanically linked contacts.
Mirror contacts acc. to annex F of IEC 60947-4-1			Additional N.C. auxiliary contacts (CA4, CAL4) are mirror contacts.

Contact utilization characteristics according to UL / CSA

Standards	UL 60947-1, UL 60947-5-1, CSA C22.2 No. 14-13
Max. operational voltage	600 V AC, 600 V DC
Pilot duty	A600, Q600
AC thermal rated current	10 A
AC maximum volt-ampere making	7200 VA
AC maximum volt-ampere breaking	720 VA
DC thermal rated current	2.5 A
DC maximum volt-ampere making-breaking	69 VA

Connecting characteristics

Connection capacity (min. ... max.)			
	Rigid solid	1 x	1 ... 2.5 mm²
		2 x	1 ... 2.5 mm²
	Flexible with ferrule	1 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²
		2 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²
	Flexible with insulated ferrule	1 x	1 (push-in) / 0.5 (spring) ... 1.5 mm²
		2 x	1 (push-in) / 0.5 (spring) ... 1.5 mm²
	Flexible without ferrule	1 x	(spring) 0.5 ... 2.5 mm²
		2 x	(spring) 0.5 ... 2.5 mm²
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18 ... 14
Stripping length			10 mm
Degree of protection acc. to IEC/EN 60947-1 and IEC/EN 60529			IP20
Screwdriver type			Flat Ø 3 mm x 0.5 mm

CAL19 auxiliary contact blocks for AF116B ... AF370B contactors

Connection with standard ferrules

Technical data

Types			**CAL19**
Contact utilization characteristics according to IEC			
Standards			IEC/EN 60947-5-1
Rated insulation voltage Ui acc. to IEC 60947-5-1			690 V
Rated impulse withstand voltage Uimp.			6 kV
Rated operational voltage Ue max.			24...690 V AC
Conventional thermal current Ith - θ ≤ 40 °C			16 A
Rated frequency (without derating)			50/60 Hz
Ie / Rated operational current AC-15			
acc. to IEC 60947-5-1	24-127 V 50/60 Hz		6 A
	220-240 V 50/60 Hz		4 A
	380-440 V 50/60 Hz		3 A
	500-690 V 50/60 Hz		2 A
Making capacity acc. to IEC 60947-5-1			10 x Ie AC-15
Breaking capacity acc. to IEC 60947-5-1			10 x Ie AC-15
Ie / Rated operational current DC-13			
acc. to IEC 60947-5-1		24 V DC	3 A / 72 W
		48 V DC	1.5 A / 72 W
		72 V DC	1 A / 72 W
		110 V DC	0.55 A / 60 W
		125 V DC	0.55 A / 69 W
		220 V DC	0.3 A / 69 W
		250 V DC	0.3 A / 75 W
Short-circuit protection device gG type fuse			10 A
Rated short-time withstand current Icw		for 1.0 s	100 A
θ = 40 °C		for 0.1 s	140 A
Minimum switching capacity			24 V / 50 mA
with failure rate acc. to IEC 60947-5-4			≤ 10-6
Power dissipation per pole at 6 A			0.15 W
Mechanical durability			
	Number of operating cycles		5 millions operating cycles
	Max. switching frequency		300 cycles/h
Max. electrical switching frequency		AC-15	300 cycles/h
		DC-13	300 cycles/h
Mirror contacts acc. to annex F of IEC 60947-4-1			N.C. auxiliary contacts are mirror contacts

Contact utilization characteristics according to UL / CSA

Standards			UL 508, CSA C22.2 No. 14
Max. operational voltage			600 V AC, 250 V DC
Pilot duty			A600, Q300
AC thermal rated current			10 A
AC maximum volt-ampere making			7200 V A
AC maximum volt-ampere breaking			720 V A
DC thermal rated current			2.5 A
DC maximum volt-ampere making-breaking			69 V A

Connecting characteristics

Connection capacity (min. ... max.)			
	Rigid Solid/Stranded	1 x	1...4 mm²
		2 x	1...4 mm²
	Flexible with non insulated ferrule	1 x	0.75...2.5 mm²
		2 x	0.75...2.5 mm²
	Flexible with insulated ferrule	1 x	0.75...2.5 mm²
		2 x	0.75...2.5 mm²
	Lugs	L ≤	8 mm
		l >	3.7 mm
Connection capacity acc. to UL/CSA		1 or 2 x	AWG18...14
Stripping length			9 mm
Tightening torque			1 Nm
Degree of protection			
acc. to IEC/EN 60947-1 and IEC/EN 60529			IP20
Screw terminals			Delivered in open position, screws of unused terminals must be tightened
All terminals			M3.5
Screwdriver type			Flat Ø 5.5 / Pozidriv 2

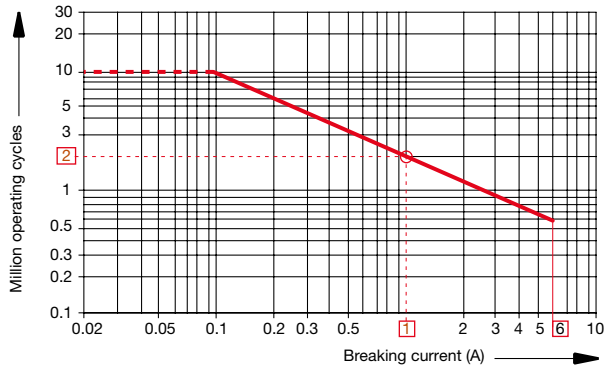
Auxiliary contacts for AF09(Z)B ... AF96(Z)B and NF(Z)B contactor relays

Electrical durability

Electrical durability for AC-15 utilization category

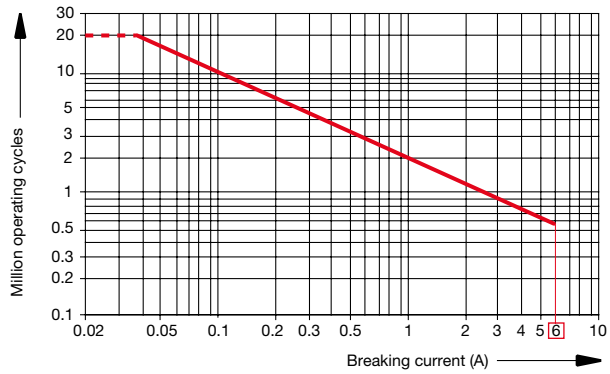
AC-15 utilization category according to IEC/EN 60947-5-1:
- making current: 10 x Ie with cos ϕ = 0.7 and Ue
- breaking current: Ie with cos ϕ = 0.4 and Ue.

These curves represent the electrical durability of the built-in or add-on auxiliary contacts in relation to the breaking current. The curves have been drawn for resistive and inductive loads up to 690 V, 40...60 Hz.



- AF09(Z)B ... AF96(Z)B contactor built-in auxiliary contacts
- CA4, CAT4 and CAL4 add-on auxiliary contacts.

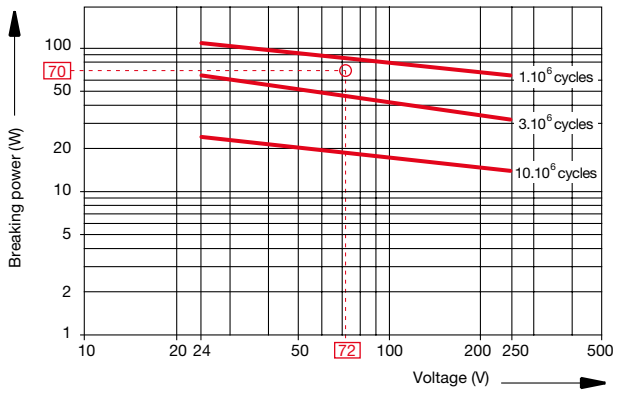
Example:
Breaking current = 1 A
On the opposite curve at intersection "O" 1 A the corresponding value for the electrical durability is approximately 2 millions operating cycles.



NF(Z)B contactor relays.
(For add on auxiliary contacts see curve above).

Electrical durability for DC-13 utilization category

DC-13 utilization category according to IEC/EN 60947-5-1: making and breaking current Ie and Ue.



- AF09(Z)B ... AF96(Z)B contactor built-in auxiliary contacts
- CA4, CAT4 and CAL4 add-on auxiliary contacts
- NF(Z)B contactor relays.

Example:
Control of DC electro-magnet:
Ue voltage = 72 V DC and breaking power = 70 W.
On the opposite curve at intersection "O" 72 V / 70 W the corresponding value for the electrical durability is approximately 2 millions operating cycles.

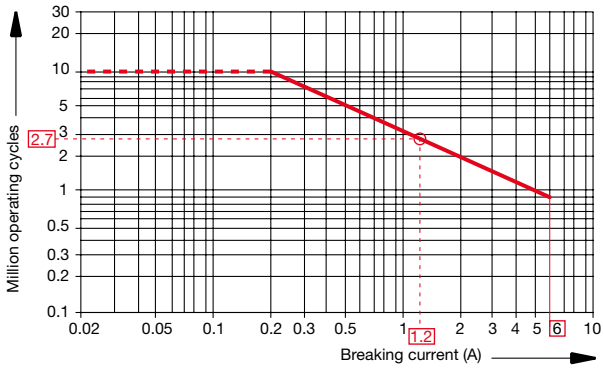
Auxiliary contacts for AF116B ... AF370B contactors

Electrical durability

Electrical durability for AC-15 utilization category

AC-15 utilization category according to IEC/EN 60947-5-1:
- making current: 10 x Ie with cos ϕ = 0.7 and Ue
- breaking current: Ie with cos ϕ = 0.4 and Ue.

This curves represent the electrical durability of the add-on auxiliary contacts, in relation to the breaking current.
The curves have been drawn for resistive and inductive loads up to 690 V, 40...60 Hz.



- AF116B ... AF370B contactors auxiliary contacts
- 2-pole CAL19 add-on auxiliary contacts

Example:
Breaking current = 1.2 A
On the opposite curve at intersection "O" 1.2 A the corresponding value for the electrical durability is approximately 2.7 millions operating cycles.

Interlocks

Connection with standard ferrules

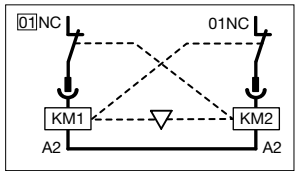
VM4

VM19

Mechanical interlock units

The VM mechanical interlock units are designed for the interlocking of two AF contactors.
When mounted between two contactors, the VM mechanical interlock unit prevents one of the contactors from closing as long as the other contactor is closed.
The VM4 and VM96-4 mechanical interlock units include 2 fixing clips (BB4).

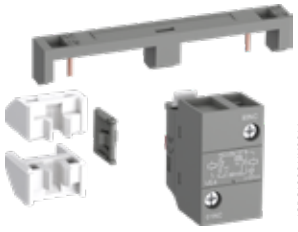
For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AF09(Z)B ... AF38(Z)B-30 AF09(Z)B ... AF38(Z)B-40-00	VM4	1SBN030105T1000	10	0.005
AF40B ... AF96B-30 AF40B ... AF80B-40-00	VM96-4	1SBN033405T1000	1	0.006
AF116(Z)B ... AF370(Z)B	VM19	1SFN030300R1000	1	0.054
AF116(Z)B ... AF146(Z)B and AF190(Z)B, AF205(Z)B	VM140/190	1SFN034403R1000	1	0.088
AF190(Z)B ... AF205(Z)B and AF265(Z)B ... AF370(Z)B	VM205/265	1SFN035203R1000	1	0.090



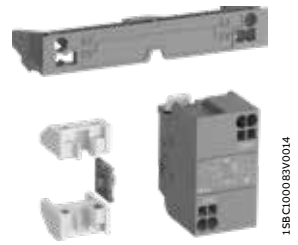
Mechanical and electrical interlock sets

VEM4 and VEM4K mechanical and electrical interlock sets for the respective interlocking of two AF..(Z)B and AF..(Z)B..K contactors.
VEM4(K) set includes a mechanical interlock unit VM4 with 2 fixing clips (BB4) and a VE4(K) electrical interlock block with A2-A2 connection.
Fixing the electrical interlock block to the contactor front face connects the 2 built-in N.C. interlocking contacts with the two coils. VE4(K) block must be used with A2-A2 connection to respect the electrical connection diagram.

For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce) kg
Mechanical and electrical interlock set for AFC with screw terminals					
For same size contactors: AF09(Z)B ... AF16(Z)B-30-.. AF26(Z)B ... AF38(Z)B-30-00 AF09(Z)B, AF16(Z)B-40-00 AF26(Z)B, AF38(Z)B-40-00	0 2	VEM4	1SBN030111R1000	1	0.035
Mechanical and electrical interlock set for AFC...K with Push-in Spring terminals					
For same size contactors: AF09(Z)B..K ... AF16(Z)B..K AF26(Z)B..K ... AF38(Z)B..K	02	VEM4K	1SBN030113R1000	1	0.030



VEM4



VEM4K

BB4

Fixing clips

AF09(Z)B ... AF38(Z)B..(K), AF40B ... AF96B	BB4	1SBN110120W1000	50	0.002

VM4 mechanical interlock unit, VEM4 mechanical and electrical interlock set

Technical data

Mechanical interlock unit

Types		VM4, VM96-4	VM19, VM140/190, VM205/265
Mechanical durability	Number of operating cycles	5 millions operating cycles	1 million operating cycles
	Max. mechanical switching frequency	1800 cycles/h	300 cycles/h

Mechanical and electrical interlock set

Contact utilization characteristics according to IEC

Types		VEM4, VEM4K
Standards		IEC/EN 60947-5-1
Rated insulation voltage Ui acc. to IEC 60947-5-1		690 V
Rated impulse withstand voltage Uimp		6 kV
Rated control voltage Uc		
	DC control voltage	20...500 V DC
Conventional thermal current Ith - θ ≤ 40 °C		16 A
Mechanical durability	Number of operating cycles	5 millions operating cycles
	Max. mechanical switching frequency	1800 cycles/h
Electrical durability	Max. electrical switching frequency	1200 cycles/h

Contact utilization characteristics according to UL / CSA

Types	VEM4, VEM4K
Standards	UL 60947-1, UL 60947-4-1, CSA C22.2 No. 60947-4-1
Max. operational voltage	500 V AC, 500 V DC

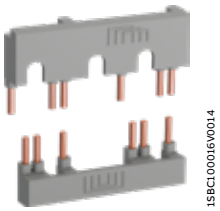
Connecting characteristics

Types		VEM4
Connection capacity (min. ... max.)		
Rigid Solid/Stranded	1 x	1...2.5 mm²
	2 x	1...2.5 mm²
Flexible with non insulated ferrule	1 x	0.75...2.5 mm²
	2 x	0.75...2.5 mm²
Flexible with insulated ferrule	1 x	0.75...2.5 mm²
	2 x	0.75...1.5 mm²
Lugs	L <	8 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14
Stripping length		10 mm
Tightening torque		1.2 Nm / 11 lb.in
Degree of protection acc. to IEC/EN 60947-1 and IEC/EN 60529		IP20
Screw terminals		Delivered in open position, screws of unused terminals must be tightened
All terminals		M3.5
Screwdriver type		Flat Ø 5.5 / Pozidriv 2

Types		VEM4K
Connection capacity (min. ... max.)		
Rigid solid	1 x	1...2.5 mm²
	2 x	1...2.5 mm²
Flexible with ferrule	1 x	1 (push-in) / 0.5 (spring) ...2.5 mm²
	2 x	1 (push-in) / 0.5 (spring) ...2.5 mm²
Flexible with insulated ferrule	1 x	1 (push-in) / 0.5 (spring) ...1.5 mm²
	2 x	1 (push-in) / 0.5 (spring) ...1.5 mm²
Flexible without ferrule	1 x	(spring) 0.5 ...2.5 mm²
	2 x	(spring) 0.5 ...2.5 mm²
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14
Stripping length		10 mm
Degree of protection acc. to IEC/EN 60947-1 and IEC/EN 60529		IP20
Screwdriver type		Flat Ø 3 mm x 0.5 mm

Connection sets for reversing contactors

Connection with standard ferrules

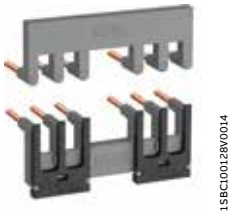


BER16-4

Connection sets for reversing contactors with screw terminals

The BER connection sets are used to connect the main poles of two 3-pole contactors with screw terminals mounted side by side.
The BER connection sets are made up of 1 upstream and 1 downstream connections.
BER connection sets are insulated and made of solid copper bars.

For 3-pole contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AF09(Z)B ... AF16(Z)B	BER16-4	1SBN081311R1000	1	0.045
AF26(Z)B ... AF38(Z)B	BER38-4	1SBN082311R1000	1	0.100
AF40B ... AF65B	BER65-4	1SBN083411R1000	1	0.175
AF80B, AF96B	BER96-4	1SBN083911R1000	1	0.250
AF116B ... AF146B	BER140-4	1SFN084211R1000	1	0.615
AF190B, AF205B	BER205-4	1SFN084811R1000	1	1.237
AF265B ... AF370B	BER370-4	1SFN085411R1000	1	2.140



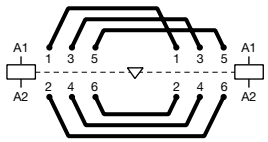
BER16-4KF

Connection sets for reversing contactors with Push-in Spring terminals

The BER..-4KF connection sets are used to connect the main poles of two 3-pole AF09(Z)B..K ... AF38(Z)B..K contactors mounted side by side.
The connection sets are made up of:

- 1 upstream and 1 downstream connections
- Insulated, solid copper bars
- Black fork pieces for a quick dismounting of reversing contactors.

AF09(Z)B..K ... AF16(Z)B..K	BER16-4KF	1SBN081322R1000	1	0.050
AF26(Z)B..K ... AF38(Z)B..K	BER38-4KF	1SBN082322R1000	1	0.080



BER
Reversing connections

Other accessories

Connection with standard ferrules

LDC4

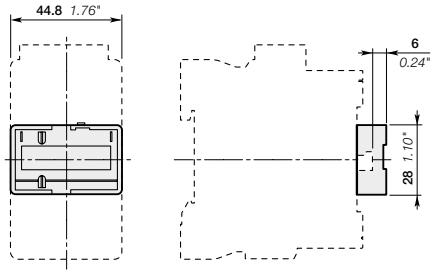
LDC4K

BX4

BX4-CA

BA4

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
Additional coil terminal blocks				
Additional coil terminal blocks for a bottom access to the coil terminals of contactors or contactor relays.				
With screw terminals				
AF09(Z)B ... AF96(Z)B NF(Z)B	LDC4	1SBN070156T1000	10	0.010
With Push-in Spring terminals				
AF09(Z)B ... AF96B NF(Z)B	LDC4K	1SBN070159T1000	10	0.010
Protective covers				
Sealable and transparent protective covers BX4 and non-removable BX4-CA to protect the devices against accidental contact.				
AF09(Z)B ... AF96B 1-stack contactors and NF(Z)B contactor relays	BX4	1SBN110108T1000	10	0.006
For 4-pole CA4 and 2-pole CAT4 auxiliary contact blocks	BX4-CA	1SBN110109W1000	50	0.001
Note: BX4 produced since 13045 (day 045 - year 2013) are suitable for AF40B ... AF96B.				
Function markers AF09(Z)B ... AF96B and AF116B ... AF370B				
Box of 16 blank cards (16 markers by card) printable on HTP500 thermal transfer printer and AMS 500 marking table to identify your contactors, overload relays or manual motor starters. Marker dimensions: 7 x 20 mm (.276" x .787").				
AF09(Z)B ... AF96B and AF116B ... AF370B contactors	BA4	1SNA235156R2700	16	0.011



BX4

Main dimensions mm, inches

Other accessories

Connection with standard ferrules

BP38-4

Mounting pieces

Mounting piece for replacing TAL26 ... TAL40, TAE50 ... TAE110; AF50 ... AF110B contactors fixed by screws by AF09(Z)B ... AF96B contactors.

For contactors		Type	Order code	Pkg qty	Weight (1 pce) kg
Mounting piece for replacing installed contactors fixed by screws by AF contactors.					
From contactor	**To contactor**				
A26 ... A40, TAL26 ... TAL40	AF09(Z)B ... AF38(Z)B	BP38-4	1SBN112303T1000	10	0.003
A50 ... A75, TAE50, TAE75, AF50 ... AF75	AF40B ... AF65B	BP65-4	1SBN113403T1000	10	0.004
A95, A110, TAE95, TAE110, AF95B, AF110B	AF80B, AF96B	BP96-4	1SBN113903T1000	10	0.005

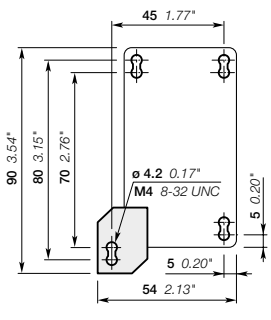
BDT4
For AF09(Z)(B) ... AF65(B), NF(Z)(B)

BDT4
For AF80(B), AF96(B)

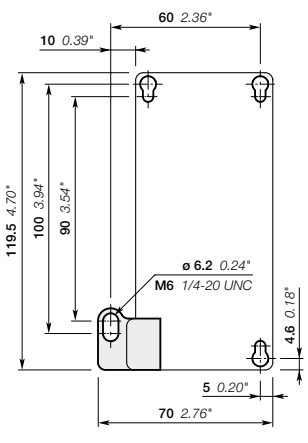
Test block

BDT4 test block is suitable for switching on contactor off-load.
Marking on the block indicates the contactor type to fit with.

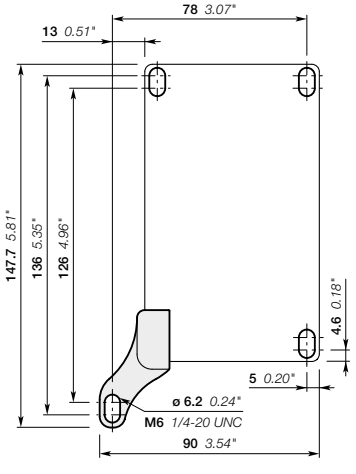
AF09(Z)(B) ... AF96(B), NF(Z)(B)	BDT4	1SBN110122T1000	10	0.007



BP38-4



BP65-4



BP96-4

Main dimensions mm, inches

Other accessories

Connection with standard ferrules

LT370-30C

LX140

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
Terminal shrouds				
AF116B ... AF146B, with compression lugs	LT140-30L	1SFN124203R1000	2	0.070
AF190B, AF205B, with cable clamps	LT205-30C	1SFN124801R1000	2	0.050
AF190B, AF205B, with compression lugs	LT205-30L	1SFN124803R1000	2	0.220
AF190B, AF205B, with shorting bar or between contactor and TOL/EOL in DOL-starters	LT205-30Y	1SFN124804R1000	1	0.050
AF265B ... AF370B, with cable clamps	LT370-30C	1SFN125401R1000	2	0.035
AF265B ... AF370B, with compression lugs	LT370-30L	1SFN125403R1000	2	0.280
AF265B ... AF370B, with shorting bar or between contactor and TOL/EOL in DOL-starters	LT370-30Y	1SFN125404R1000	1	0.075
AF265B ... AF370B, for use with extending cable clamps, ATK300/2 and OZXB4	LT370-30D	1SFN125406R1000	1	0.150

For contactors	Dimensions hole Ø mm	bar mm	Type	Order code	Pkg qty	Weight (1 pce) kg
Terminal enlargements						
AF116B ... AF146B	6.5	13 x 3	LW140	1SFN074207R1000	1	0.115
AF190B ... AF205B	10.5	17.5 x 5	LW205	1SFN074807R1000	1	0.260
AF265B ... AF370B	10.5	20 x 5	LW370	1SFN075407R1000	1	0.340
Terminal extension						
AF116B ... AF146B	6.5	13 x 3	LX140	1SFN074210R1000	1	0.072
AF190B ... AF205B	8.5	17.5 x 5	LX205	1SFN074810R1000	1	0.180
AF265B ... AF370B	10.5	20 x 5	LX370	1SFN075410R1000	1	0.234

(1) For more information, refer to "Accessories" section.

Spare parts for AF116B ... AF146B contactors

Coil module, electronic module

Coil Modules

Coil modules replacement kit for 3 and 4-pole contactors. Includes coil, electronic module, fasteners, damping and terminal cover.

	Rated contol circuit Voltage Uc		Type	Order code	Pkg qty	Weight (1 pce)
	V 50/60Hz	V DC				kg
3-pole contactors with standard ferrules connection						
AF116B	24...60	20...60	ZAF116B-11	1SFN154272R1106	1	0.324
	48...130	48...130	ZAF116B-12	1SFN154272R1206	1	0.313
	100...250	100...250	ZAF116B-13	1SFN154272R1306	1	0.288
	250...500	250...500	ZAF116B-14	1SFN154272R1406	1	0.298
AF140B	24...60	20...60	ZAF140B-11	1SFN154472R1106	1	0.324
	48...130	48...130	ZAF140B-12	1SFN154472R1206	1	0.313
	100...250	100...250	ZAF140B-13	1SFN154472R1306	1	0.288
	250...500	250...500	ZAF140B-14	1SFN154472R1406	1	0.298
AF146B	24...60	20...60	ZAF146B-11	1SFN154672R1106	1	0.324
	48...130	48...130	ZAF146B-12	1SFN154672R1206	1	0.313
	100...250	100...250	ZAF146B-13	1SFN154672R1306	1	0.288
	250...500	250...500	ZAF146B-14	1SFN154672R1406	1	0.298
AF116B	24...60	20...60	ZAF116B-40-11	1SFN154272R1146	1	0.340
	48...130	48...130	ZAF116B-40-12	1SFN154272R1246	1	0.331
	100...250	100...250	ZAF116B-40-13	1SFN154272R1346	1	0.308
	250...500	250...500	ZAF116B-40-14	1SFN154272R1446	1	0.320
AF140B	24...60	20...60	ZAF140B-40-11	1SFN154472R1146	1	0.340
	48...130	48...130	ZAF140B-40-12	1SFN154472R1246	1	0.331
	100...250	100...250	ZAF140B-40-13	1SFN154472R1346	1	0.308
	250...500	250...500	ZAF140B-40-14	1SFN154472R1446	1	0.320

Electronic Module

Coil modules replacement kit for 4-pole contactors. Includes coil, electronic module, fasteners, damping and terminal cover.

For contactors	Rated contol circuit Voltage Uc		Type	Order code	Pkg qty	Weight (1 pce)
	V 50/60Hz	V DC				kg
3-pole contactors with standard ferrules connection						
AF116B	24...60	20...60	ZP116B-11	1SFN164223R1211	1	0.133
	48...130	48...130	ZP116B-12	1SFN164223R1212	1	0.131
	100...250	100...250	ZP116B-13	1SFN164223R1213	1	0.133
	250...500	250...500	ZP116B-14	1SFN164223R1214	1	0.143
AF140B	24...60	20...60	ZP140B-11	1SFN164423R1211	1	0.133
	48...130	48...130	ZP140B-12	1SFN164423R1212	1	0.131
	100...250	100...250	ZP140B-13	1SFN164423R1213	1	0.133
	250...500	250...500	ZP140B-14	1SFN164423R1214	1	0.143
AF146B	24...60	20...60	ZP146B-11	1SFN164623R1211	1	0.133
	48...130	48...130	ZP146B-12	1SFN164623R1212	1	0.131
	100...250	100...250	ZP146B-13	1SFN164623R1213	1	0.133
	250...500	250...500	ZP146B-14	1SFN164623R1214	1	0.143
4-pole contactors with standard ferrules connection						
AF116B	24...60	20...60	ZPT116B-11	1SFN164224R1211	1	0.149
	48...130	48...130	ZPT116B-12	1SFN164224R1212	1	0.149
	100...250	100...250	ZPT116B-13	1SFN164224R1213	1	0.153
	250...500	250...500	ZPT116B-14	1SFN164224R1214	1	0.165
AF140B	24...60	20...60	ZPT140B-11	1SFN164424R1211	1	0.149
	48...130	48...130	ZPT140B-12	1SFN164424R1212	1	0.149
	100...250	100...250	ZPT140B-13	1SFN164424R1213	1	0.153
	250...500	250...500	ZPT140B-14	1SFN164424R1214	1	0.165

Terminal marking and positioning, dimensions AF..B contactors and NF..B contactor relays Connection with standard ferrules

Terminal marking and positioning
3/108 AF..B 3-pole contactors
3/109 AF..B 4-pole contactors
3/110 NF..B contactor relays
3/111 Add-on auxiliary contacts

Dimensions
3/112 AF..B 3-pole contactors
3/129 AF..B 4-pole contactors
3/138 NF..B contactor relays

3/140 **Voltage code table**

For direct product details information, use product type or order code, ex:

www.abb.com/productdetails/**CA4-10-T**
www.abb.com/productdetails/**1SBN010110T1010**

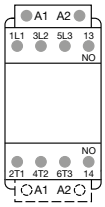
03

AF09(Z)B ... AF370B 3-pole contactors

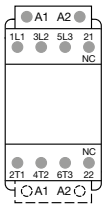
Terminal marking and positioning

AF09(Z)B ... AF96B contactors

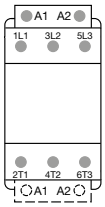
Standard devices without addition of auxiliary contacts



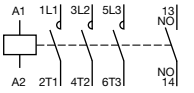
AF09(Z)B ... AF16(Z)B-30-10



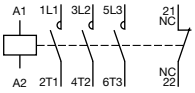
AF09(Z)B ... AF16(Z)B-30-01



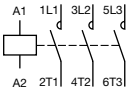
AF26(Z)B ... AF96B-30-00



AF09(Z)B ... AF16(Z)B-30-10

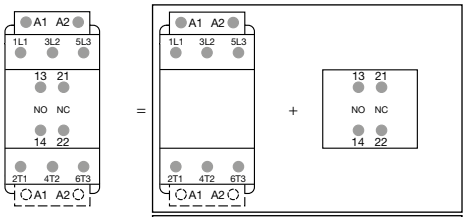


AF09(Z)B ... AF16(Z)B-30-01

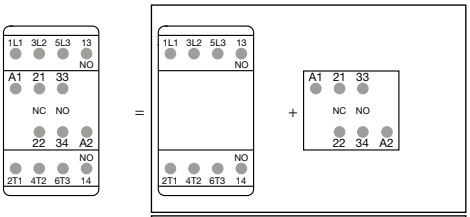


AF26(Z)B ... AF96B-30-00

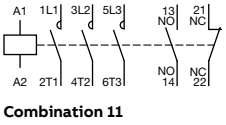
Other possible contact combinations with auxiliary contacts added by the user



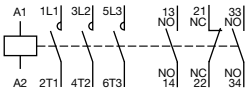
Combination 11 = AF26(Z)B ... AF38(Z)B-30-00 + CA4-11E



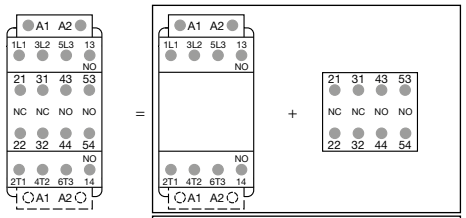
Combination 21 = AF09(Z)B ... AF16(Z)B-30-10 + CAT4-11M



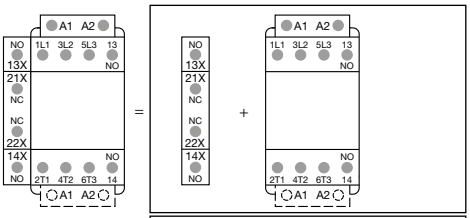
Combination 11



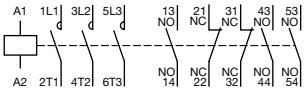
Combination 21



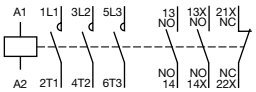
Combination 32 = AF09(Z)B ... AF16(Z)B-30-10 + CA4-22M



Combination 21 = CAL4-11 + AF09(Z)B ... AF16(Z)B-30-10



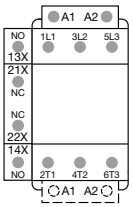
Combination 32



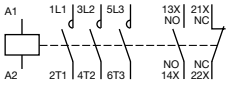
Combination 21

AF40B...AF96B contactors

Standard devices with factory mounted auxiliary contacts



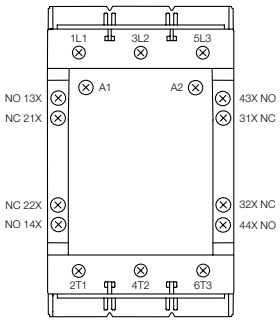
AF40B...AF96B-30-11



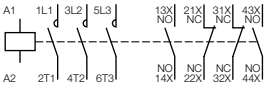
AF40B...AF96B-30-11

AF116B ... AF370B contactors

Standard devices with factory mounted auxiliary contacts



AF116B ... AF370B-30-22



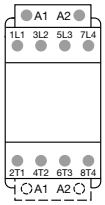
AF116B ... AF370B-30-22

AF09(Z)B ... AF370B 4-pole contactors

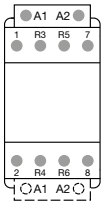
Terminal marking and positioning

AF09(Z)B ... AF80B contactors

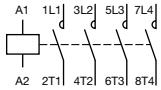
Standard devices without addition of auxiliary contacts



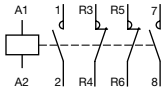
AF09(Z)B ... AF80B-40-00



AF09(Z)B ... AF80B-22-00

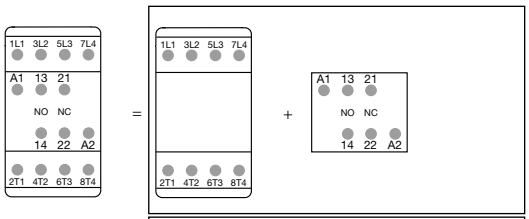


AF09(Z)B ... AF80B-40-00

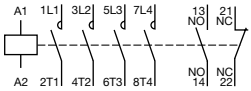


AF09(Z)B ... AF80B-22-00

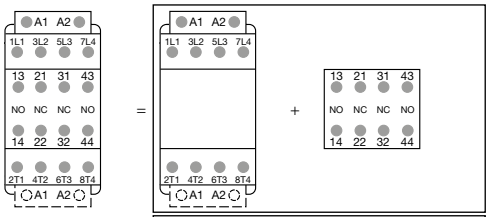
Other possible contact combinations with auxiliary contacts added by the user



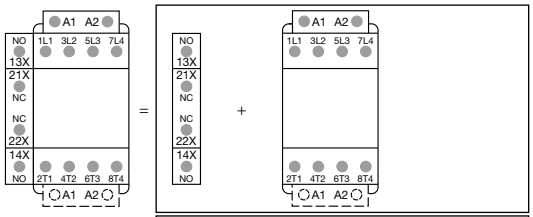
Combination 11 = AF09(Z)B ... AF52B-40-00 + CAT4-11E



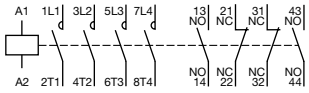
Combination 11



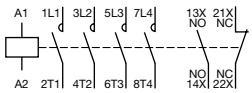
Combination 22 = AF09(Z)B ... AF80)B-40-00 + CA4-22E



Combination 11 = CAL4-11 + AF09(Z)B ... AF80B-40-00



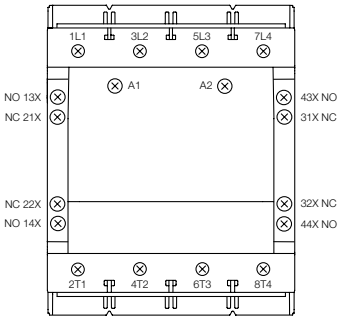
Combination 22



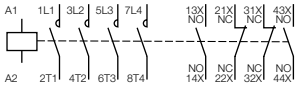
Combination 11

AF116B ... AF370B contactors

Standard devices with factory mounted auxiliary contacts



AF116B ... AF370B-40-22



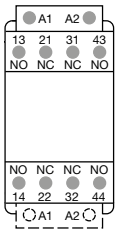
AF116B ... AF370B-40-22

NF(Z)B contactor relays

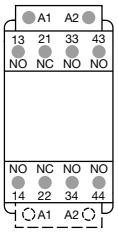
Terminal marking and positioning

NF(Z)B contactors

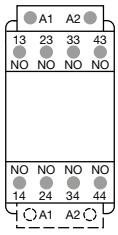
Standard devices without addition of auxiliary contacts



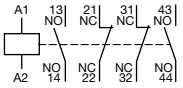
NF(Z)B22E



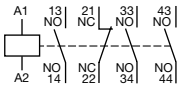
NF(Z)B31E



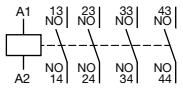
NF(Z)B40E



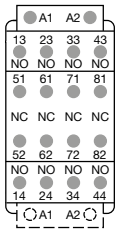
NF(Z)B22E



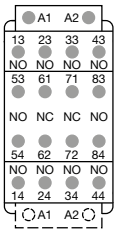
NF(Z)B31E



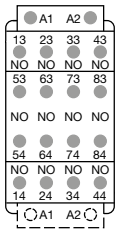
NF(Z)B40E



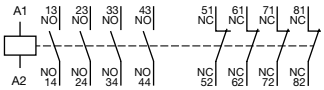
NF(Z)B44E



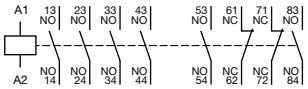
NF(Z)B62E



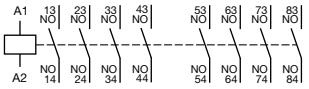
NF(Z)B80E



NF(Z)B44E

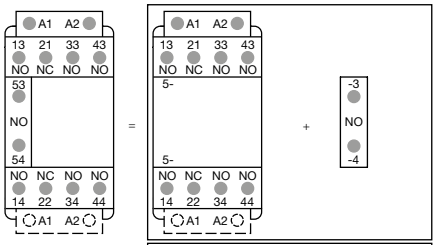


NF(Z)B62E

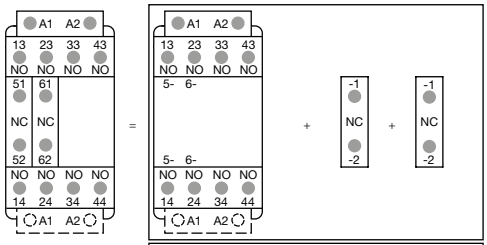


NF(Z)B80E

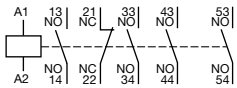
Other possible contact combinations with auxiliary contacts added by the user



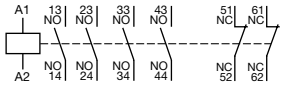
Combination 41 = **NF(Z)B31E + CA4-10**



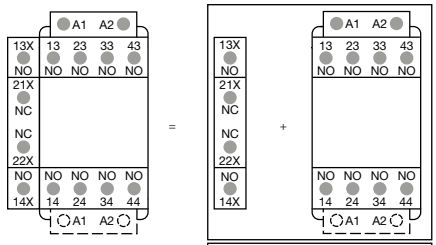
Combination 42= **NF(Z)B40E + CA4-01+CA4-01**



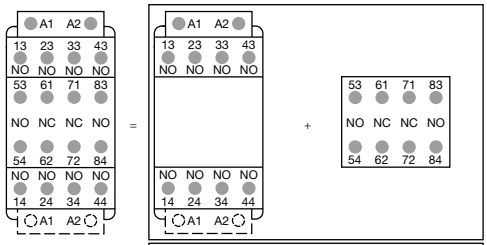
Combination 41E



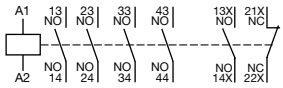
Combination 42E



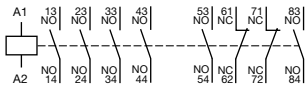
Combination 51 **=** **CAL4-11 + NF(Z)B40E**



Combination 62= **NF(Z)B40E + CA4-22N**



Combination 51E



Combination 62E

Add-on auxiliary contacts

Terminal marking and positioning

1-pole auxiliary contacts

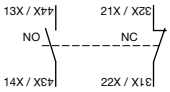
CA4-01

CA4-10

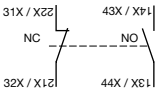
CA5-01

CA5-10

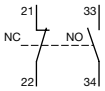
2-pole auxiliary contacts



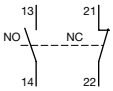
CAL4-11
(Left-side mounted)



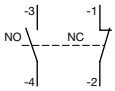
CAL4-11
(Right-side mounted)



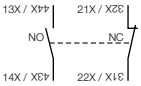
CAT4-11M



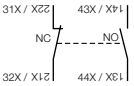
CAT4-11E



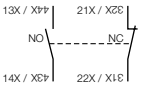
CAT4-11U



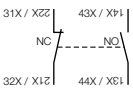
CAL18-11
(Left-side mounted)



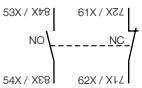
CAL18-11
(Right-side mounted)



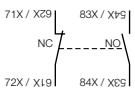
CAL19-11
(Left-side mounted)



CAL19-11
(Right-side mounted)

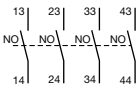


CAL19-11B
(Left-side mounted)

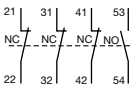


CAL19-11B
(Right-side mounted)

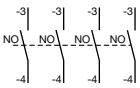
4-pole auxiliary contacts



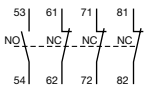
CA4-40E



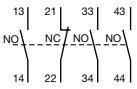
CA4-13M



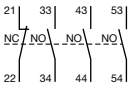
CA4-40U



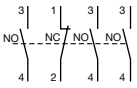
CA4-13N



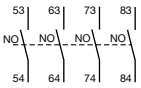
CA4-31E



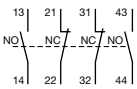
CA4-31M



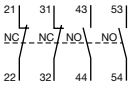
CA4-31U



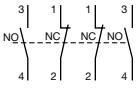
CA4-40N



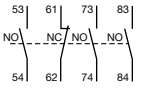
CA4-22E



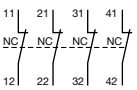
CA4-22M



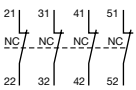
CA4-22U



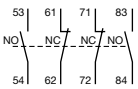
CA4-31N



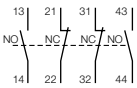
CA4-04E



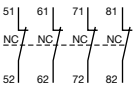
CA4-04M



CA4-22N



CA5-22E

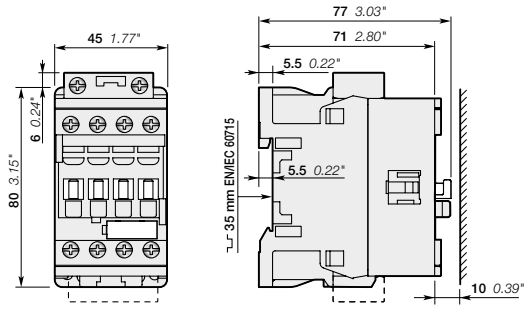


CA4-04N

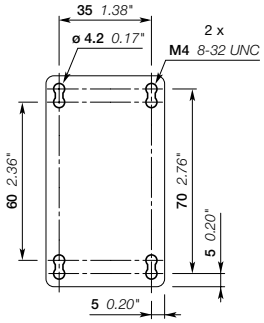
CA5-31E

AF09(Z)B, AF12(Z)B, AF16(Z)B 3-pole contactors

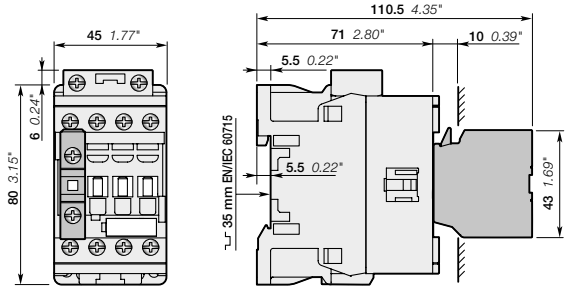
Dimensions



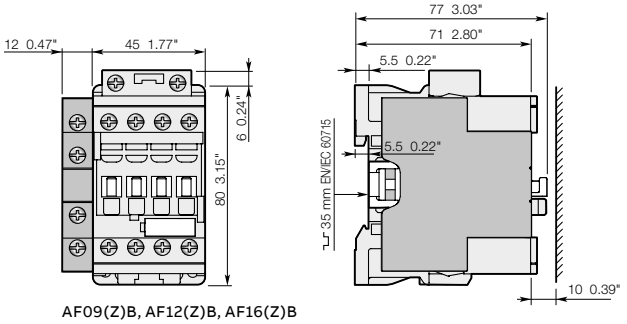
AF09(Z)B, AF12(Z)B, AF16(Z)B



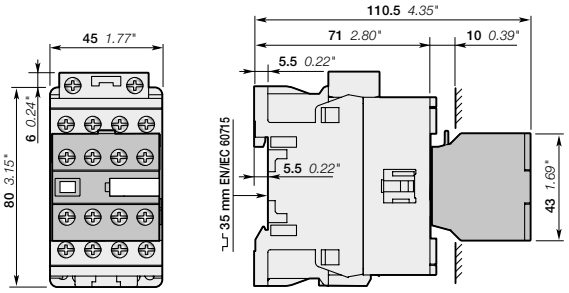
AF09(Z)B, AF12(Z)B, AF16(Z)B



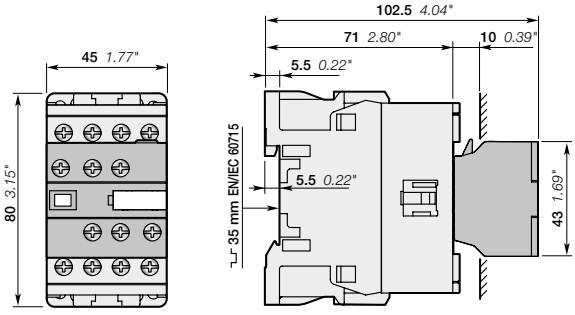
AF09(Z)B, AF12(Z)B, AF16(Z)B
+ CA4 1-pole auxiliary contact block



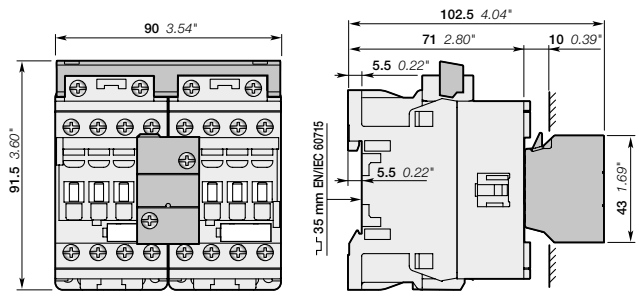
AF09(Z)B, AF12(Z)B, AF16(Z)B
+ CAL4-11 2-pole auxiliary contact block



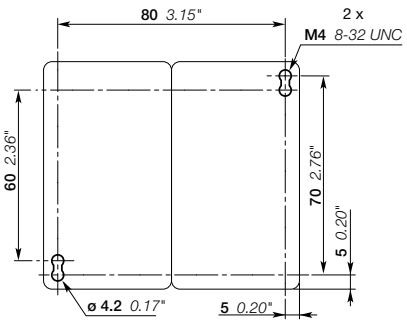
AF09(Z)B, AF12(Z)B, AF16(Z)B
+ CA4 4-pole auxiliary contact block



AF09(Z)B, AF12(Z)B, AF16(Z)B
+ CAT4 2-pole auxiliary contact and coil terminal block



AF09(Z)B, AF12(Z)B, AF16(Z)B
+ VEM4 mechanical and electrical interlock set



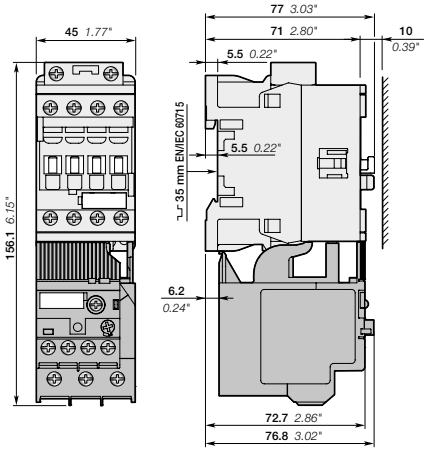
AF09(Z)B, AF12(Z)B, AF16(Z)B
+ VEM4 mechanical and electrical interlock set

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

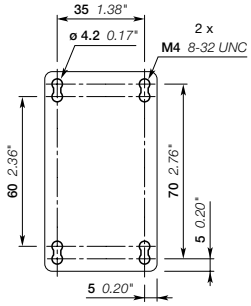
Main dimensions mm, inches

AF09(Z)B, AF12(Z)B, AF16(Z)B 3-pole contactors

Dimensions



AF09(Z)B, AF12(Z)B, AF16(Z)B
+ TF42B thermal overload relay



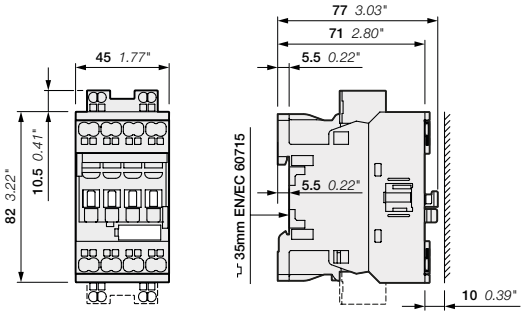
AF09(Z)B, AF12(Z)B, AF16(Z)B
+ TF42B

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

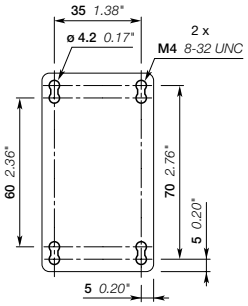
Main dimensions mm, inches

AF09(Z)B..K, AF12(Z)B..K, AF16(Z)B..K 3-pole contactors with Push-in Spring terminals

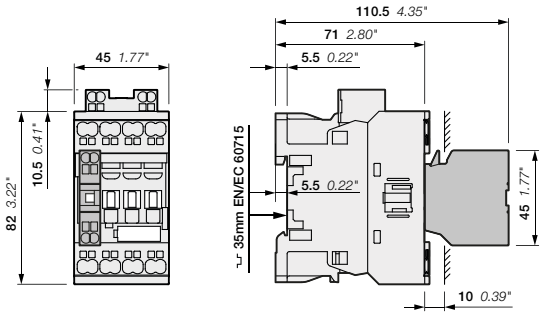
Dimensions



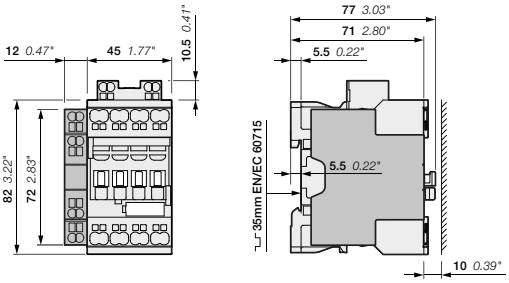
AF09(Z)B..K, AF12(Z)B..K, AF16(Z)B..K



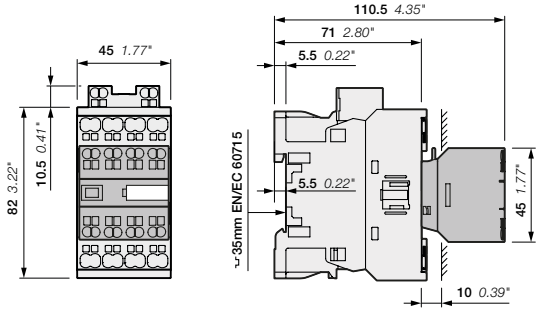
AF09(Z)B..K, AF12(Z)B..K, AF16(Z)B..K



AF09(Z)B..K, AF12(Z)B..K, AF16(Z)B..K
+ CA4..K 1-pole auxiliary contact block



AF09(Z)B..K, AF12(Z)B..K, AF16(Z)B..K
+ CAL4-11K 2-pole auxiliary contact block



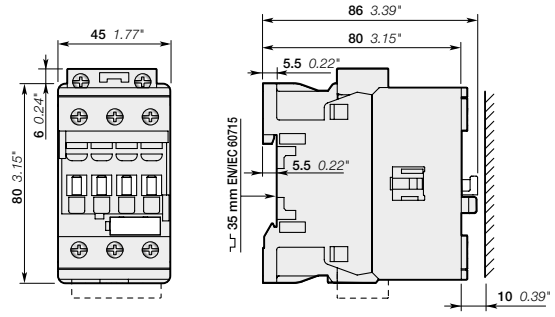
AF09(Z)B..K, AF12(Z)B..K, AF16(Z)B..K
+ CA4..K 4-pole auxiliary contact block

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

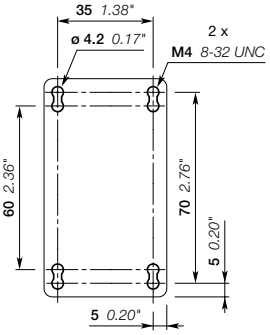
Main dimensions mm, inches

AF26(Z)B, AF30(Z)B, AF38(Z)B 3-pole contactors

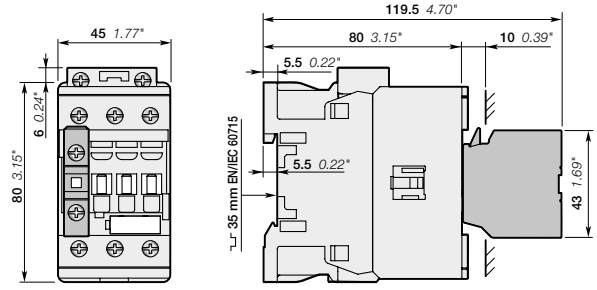
Dimensions



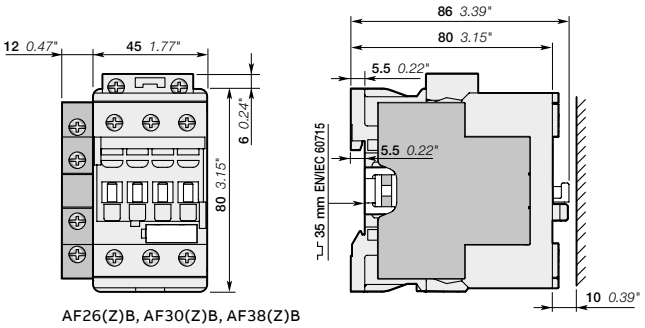
AF26(Z)B, AF30(Z)B, AF38(Z)B



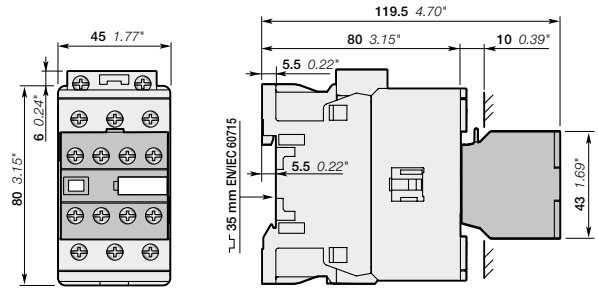
AF26(Z)B, AF30(Z)B, AF38(Z)B



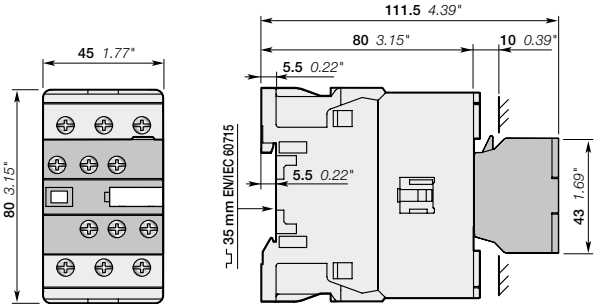
AF26(Z)B, AF30(Z)B, AF38(Z)B
+ CA4 1-pole auxiliary contact block



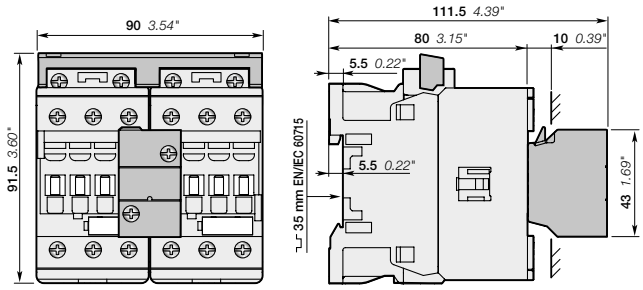
AF26(Z)B, AF30(Z)B, AF38(Z)B
+ CAL4-11 2-pole auxiliary contact block



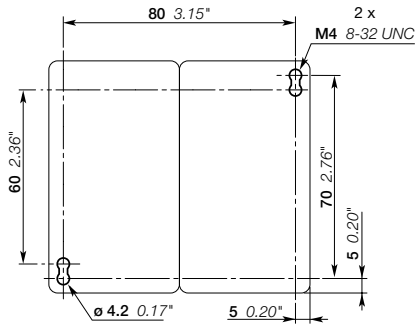
AF26(Z)B, AF30(Z)B, AF38(Z)B
+ CA4 4-pole auxiliary contact block



AF26(Z)B, AF30(Z)B, AF38(Z)B
+ CAT4 2-pole auxiliary contact and coil terminal block



AF26(Z)B, AF30(Z)B, AF38(Z)B
+ VEM4 mechanical and electrical interlock set



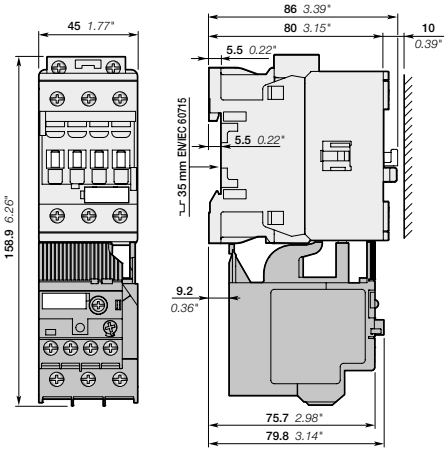
AF26(Z)B, AF30(Z)B, AF38(Z)B
+ VEM4 mechanical and electrical interlock set

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

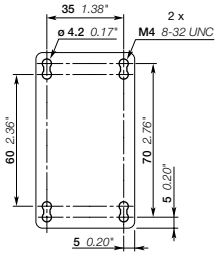
Main dimensions mm, inches

AF26(Z)B, AF30(Z)B, AF38(Z)B 3-pole contactors

Dimensions



AF26(Z)B, AF30(Z)B, AF38(Z)B
+ TF42B thermal overload relay



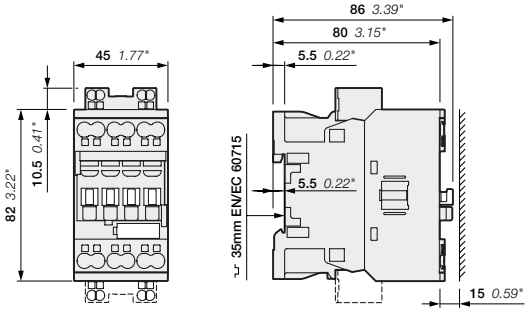
AF26(Z)B, AF30(Z)B, AF38(Z)B
+ TF42B

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

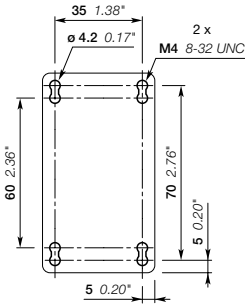
Main dimensions mm, inches

AF26(Z)B..K, AF30(Z)B..K, AF38(Z)B..K 3-pole contactors with Push-in Spring terminals

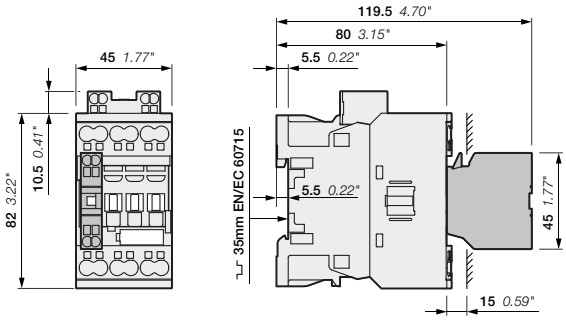
Dimensions



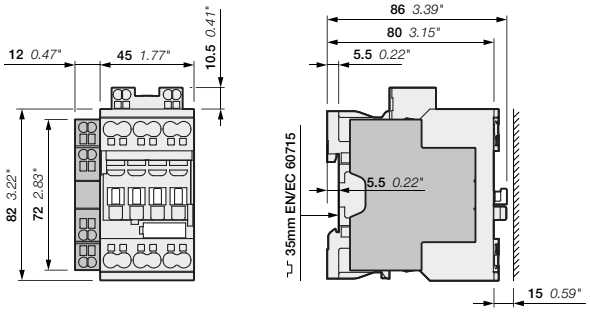
AF26(Z)B..K, AF30(Z)B..K, AF38(Z)B..K



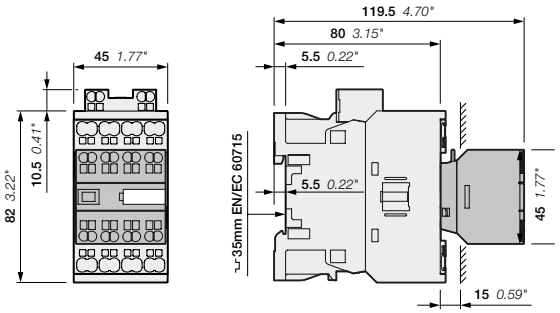
AF26(Z)B..K, AF30(Z)B..K, AF38(Z)B..K



AF26(Z)B..K, AF30(Z)B..K, AF38(Z)B..K
+ CA4..K 1-pole auxiliary contact block



AF26(Z)B..K, AF30(Z)B..K, AF38(Z)B..K
+ CAL4-11K 2-pole auxiliary contact block



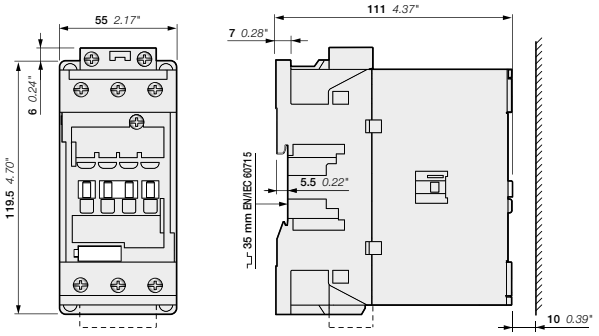
AF26(Z)B..K, AF30(Z)B..K, AF38(Z)B..K
+ CA4..K 4-pole auxiliary contact block

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

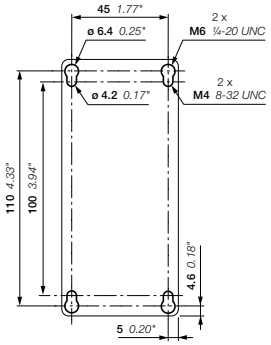
Main dimensions mm, inches

AF40B ... AF65B 3-pole contactors

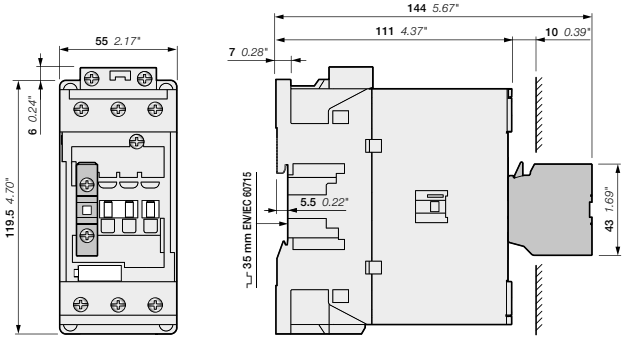
Dimensions



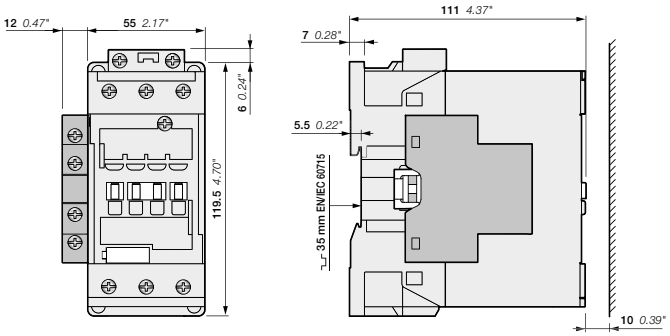
AF40B, AF52B, AF65B



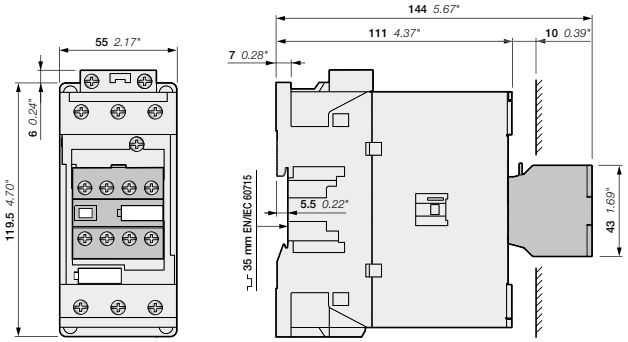
AF40B, AF52B, AF65B



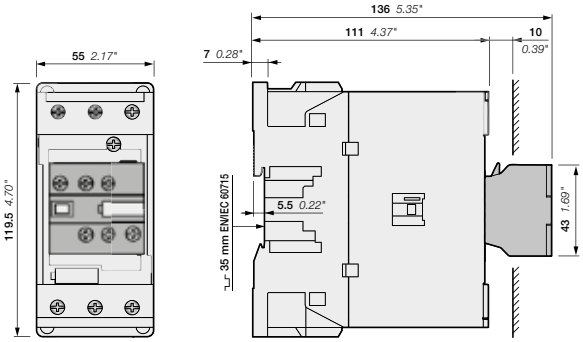
AF40B, AF52B, AF65B
+ CA4 1-pole auxiliary contact block



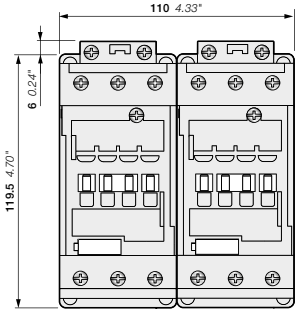
AF40B, AF52B, AF65B-30-00 + CAL4-11 2-pole auxiliary contact block
AF40B, AF52B, AF65B-30-11

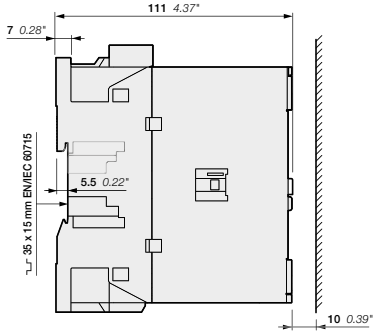


AF40B, AF52B, AF65B
+ CA4 4-pole auxiliary contact block

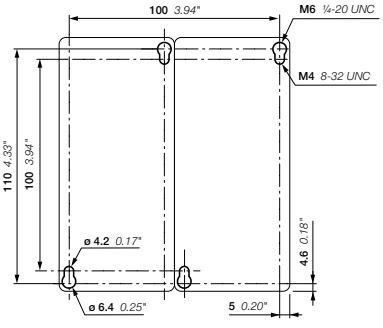


AF40B, AF52B, AF65B
+ CAT4 2-pole auxiliary contact and coil terminal block





AF40B, AF52B, AF65B
+ VM96-4 mechanical interlock unit



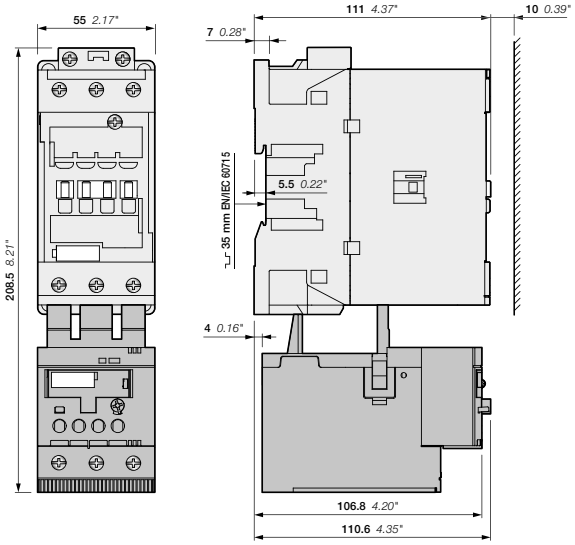
AF40B, AF52B, AF65B
+ VM96-4 mechanical interlock unit

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

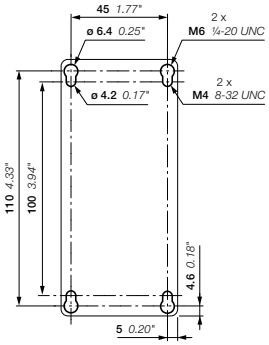
Main dimensions mm, inches

AF40B ... AF65B 3-pole contactors

Dimensions



AF40B, AF52B, AF65B
+ TF65B thermal overload relay



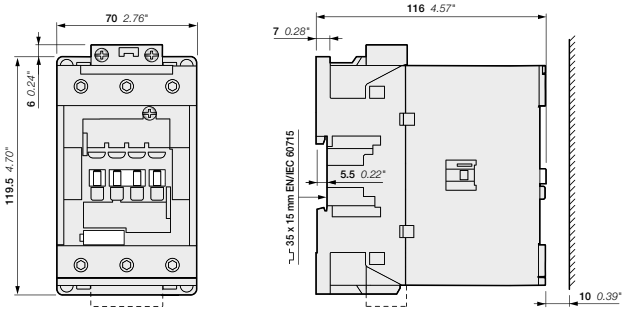
AF40B, AF52B, AF65B
+ TF65B

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

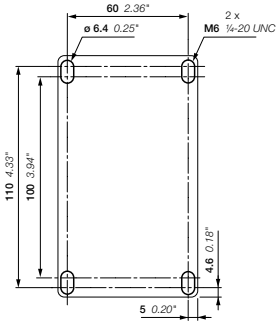
Main dimensions mm, inches

AF80B ... AF96B 3-pole contactors

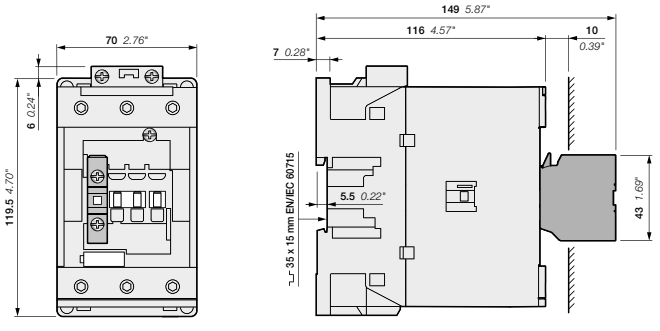
Dimensions



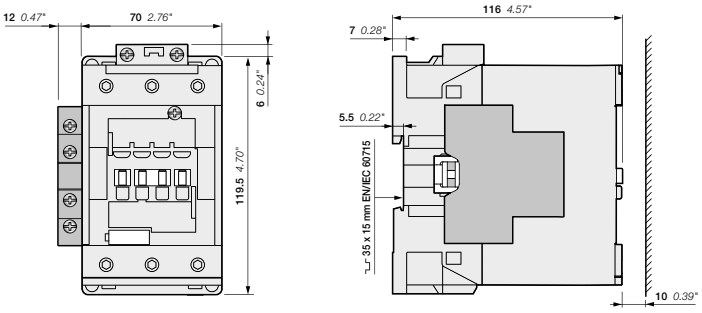
AF80B, AF96B



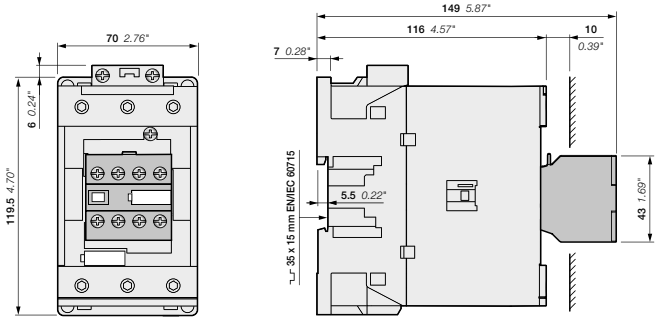
AF80B, AF96B



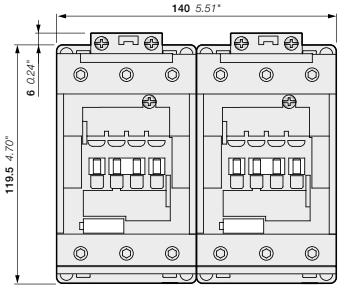
AF80B, AF96B
+ CA4 1-pole auxiliary contact block

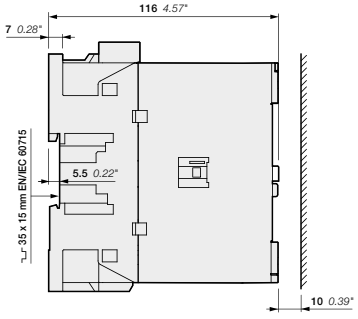


AF80B, AF96B-30-00 + CAL4-11 2-pole auxiliary contact block
AF80B, AF96B-30-11

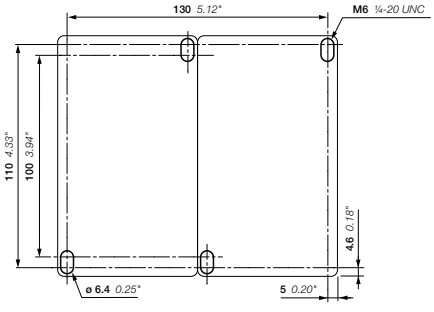


AF80B, AF96B
+ CA4 4-pole auxiliary contact block





AF80B, AF96B
+ VM96-4 mechanical interlock unit



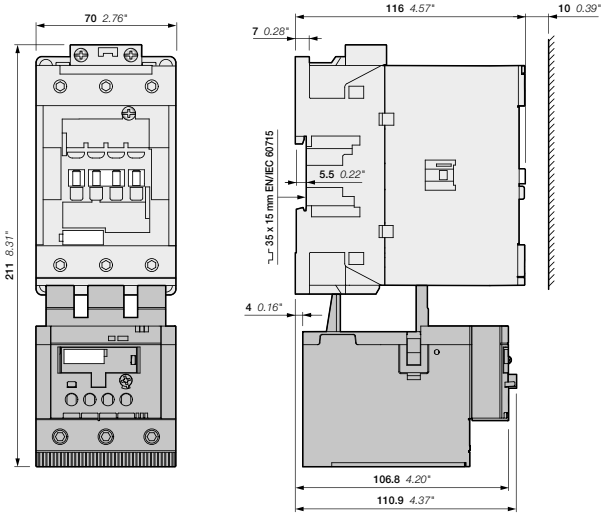
AF80B, AF96B
+ VM96-4 mechanical interlock unit

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

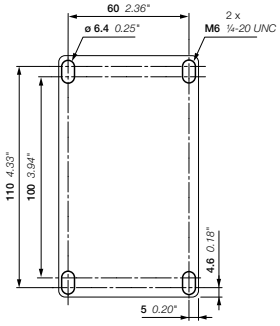
Main dimensions mm, inches

AF80B ... AF96B 3-pole contactors

Dimensions



AF80B, AF96B
+ TF96B thermal overload relay



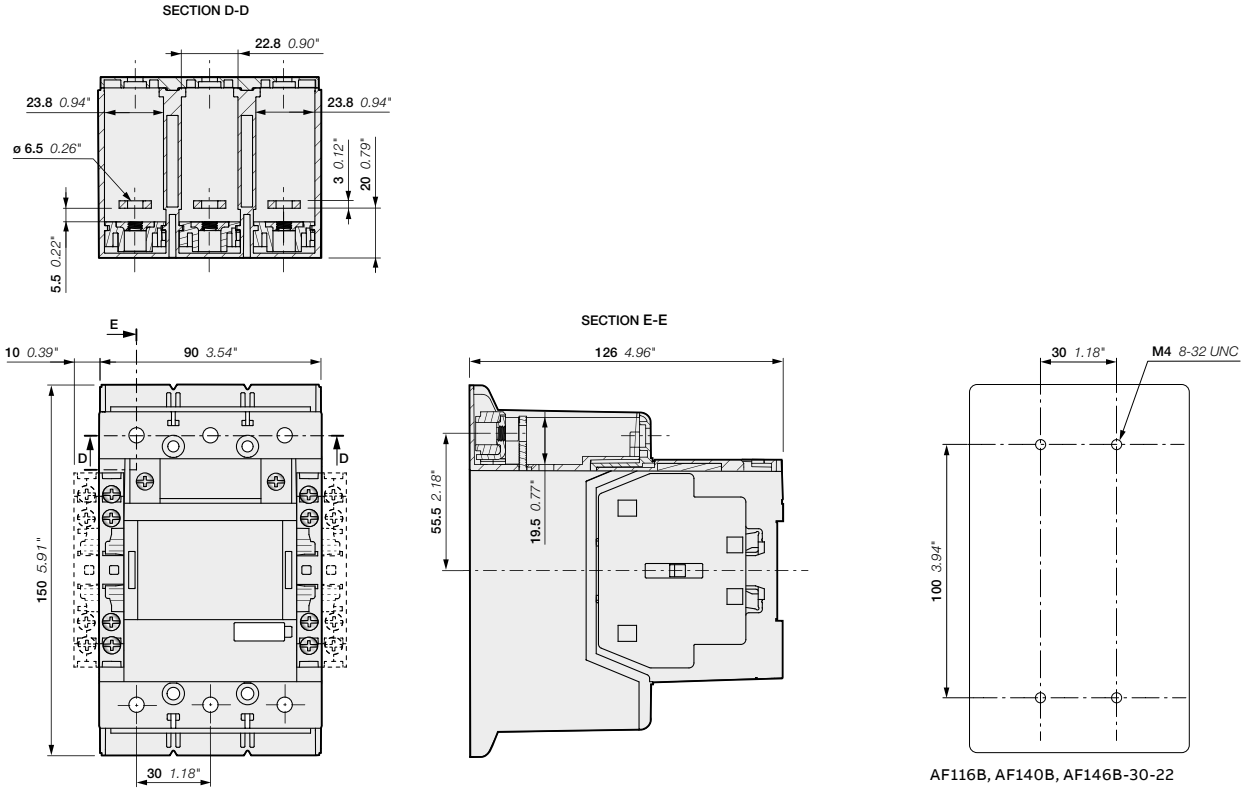
AF80B, AF96B
+ TF96B

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

Main dimensions mm, inches

AF116B, AF140B, AF146B 3-pole contactors

Dimensions



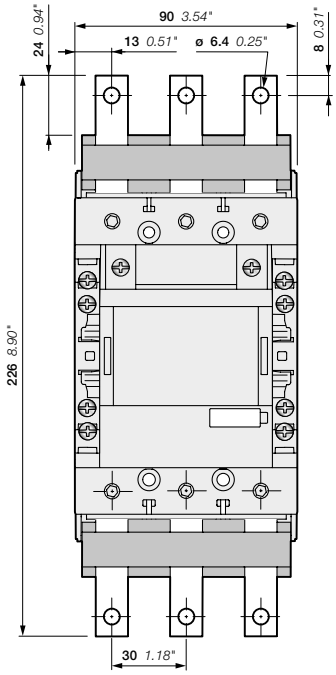
AF116B, AF140B, AF146B-30-22

AF116B, AF140B, AF146B-30-22

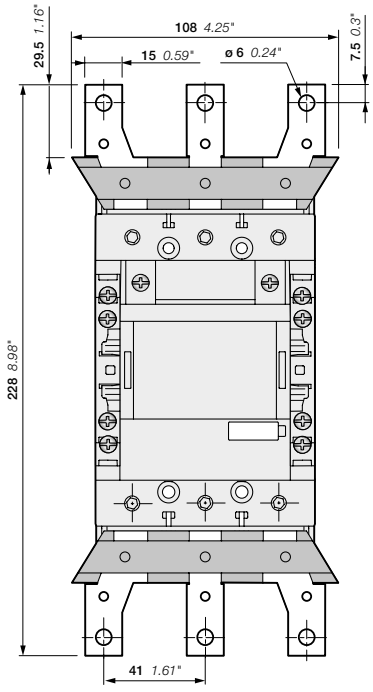
Main dimensions mm, inches

AF116B, AF140B, AF146B 3-pole contactors

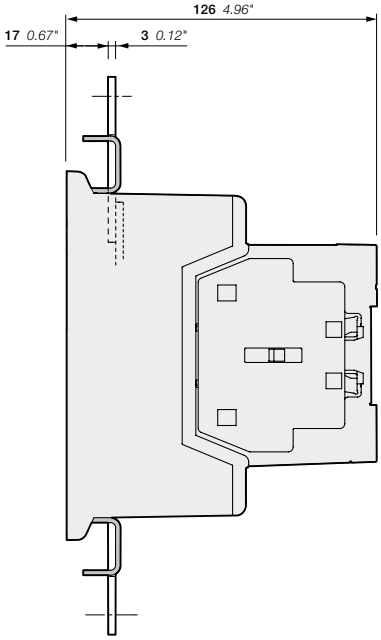
Dimensions

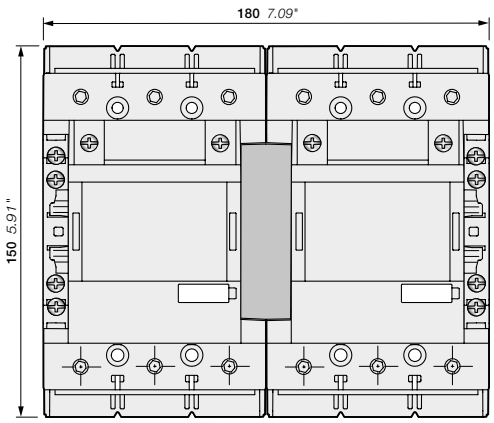


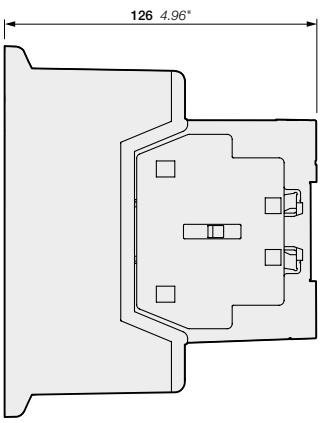
AF116B, AF140B, AF146B-30-22
+ LX140 terminal extension



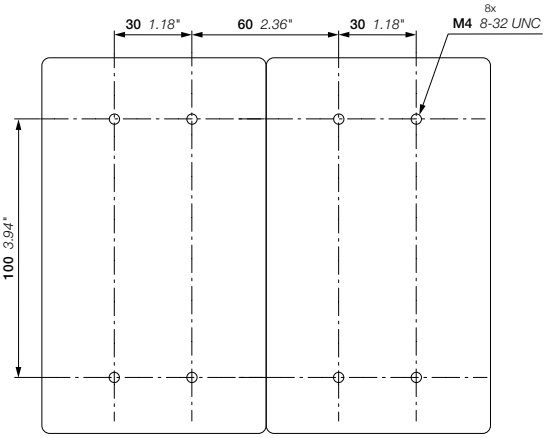
AF116B, AF140B, AF146B-30-22
+ LW140 terminal enlargement







AF116B, AF140B, AF146B-30-22
+ VM19 mechanical interlocking unit

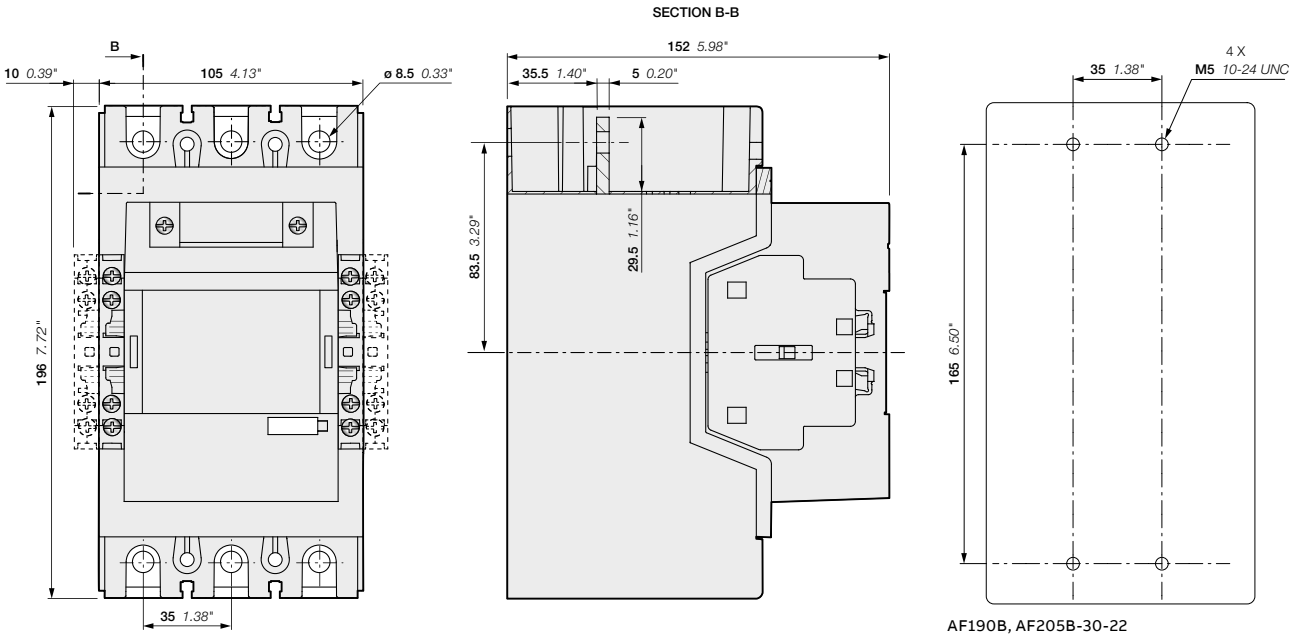


AF116B, AF140B, AF146B-30-22
+ VM19 mechanical interlocking unit

Main dimensions mm, inches

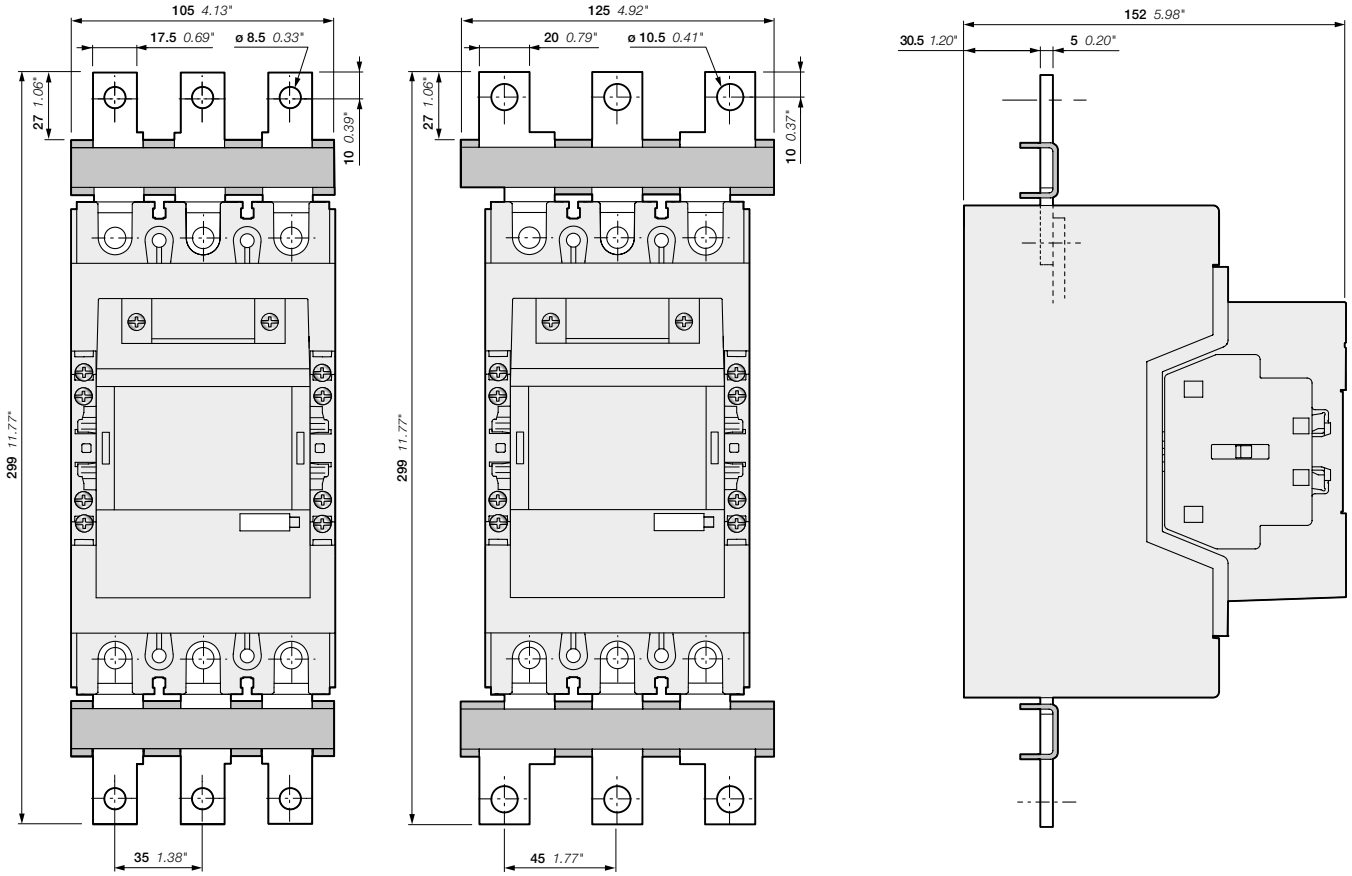
AF190B, AF205B 3-pole contactors

Dimensions



AF190B, AF205B-30-22

AF190B, AF205B-30-22



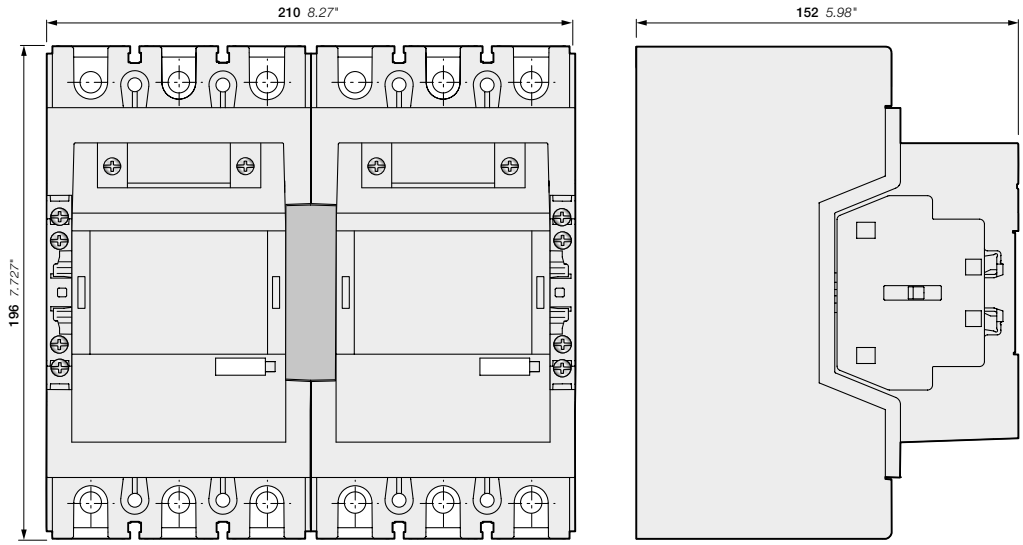
AF190B, AF205B-30-22
+ LX205 terminal extension

AF190B, AF205B-30-22
+ LW205 terminal enlargement

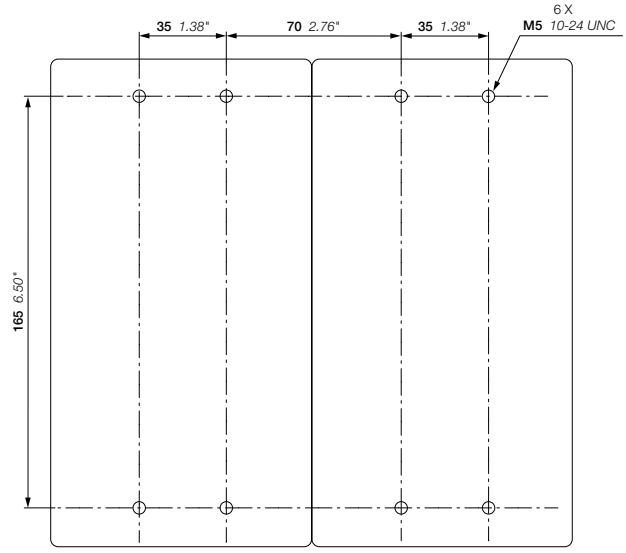
Main dimensions mm, inches

AF190B, AF205B 3-pole contactors

Dimensions



AF190B, AF205B-30-22
+ VM19 mechanical interlocking unit

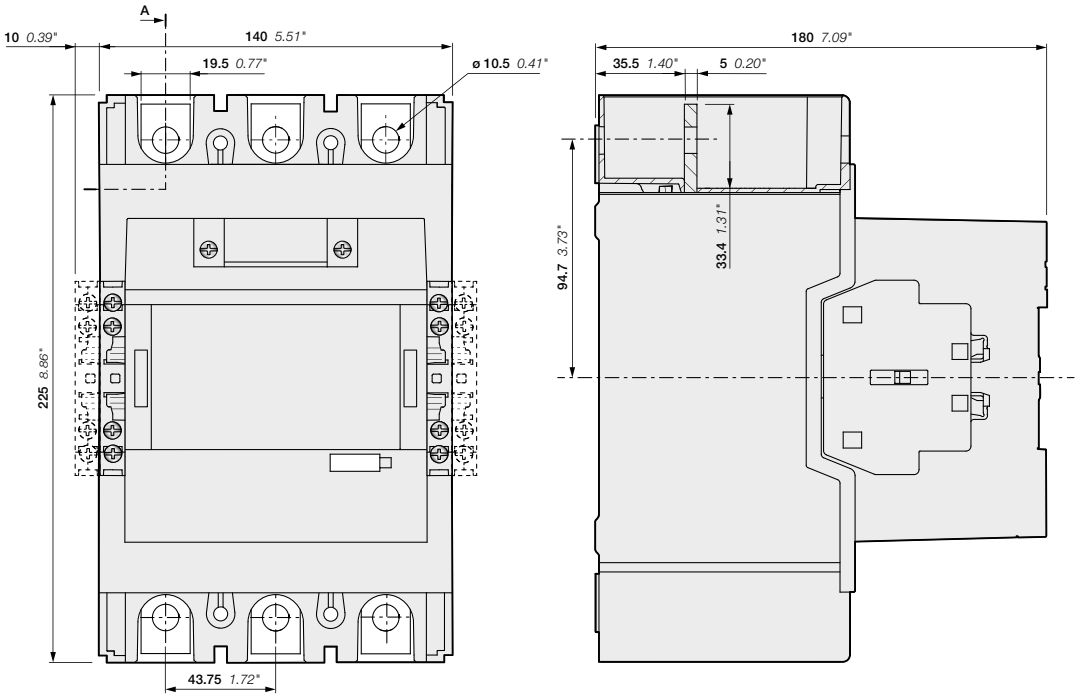


AF190B, AF205B-30-22
+ VM19 mechanical interlocking unit

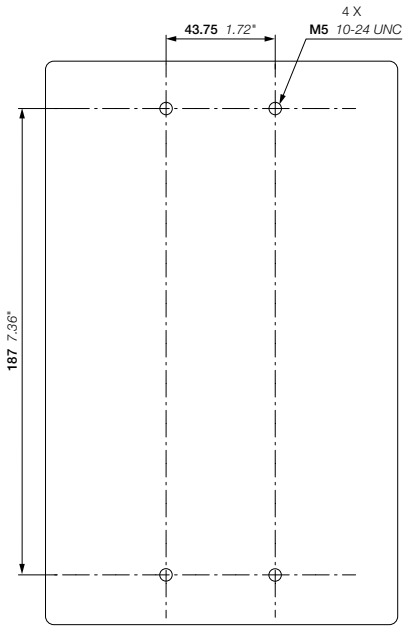
Main dimensions mm, inches

AF265B, AF305B, AF370B 3-pole contactors

Dimensions



AF265B, AF305B, AF370B-30-22

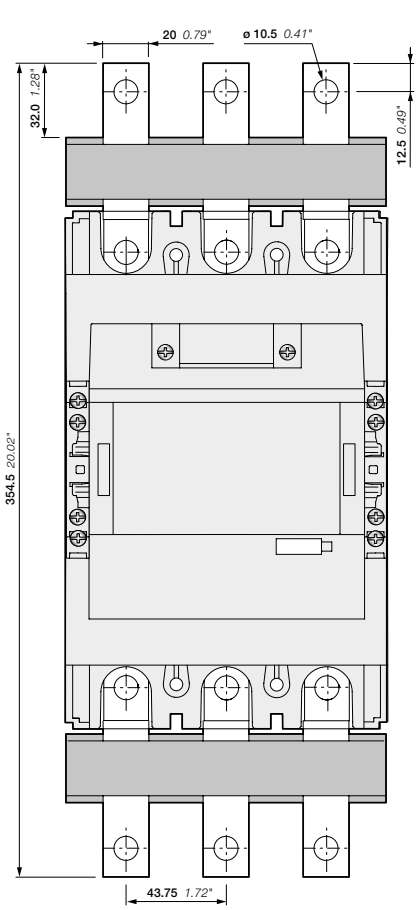


AF265B, AF305B, AF370B-30-22

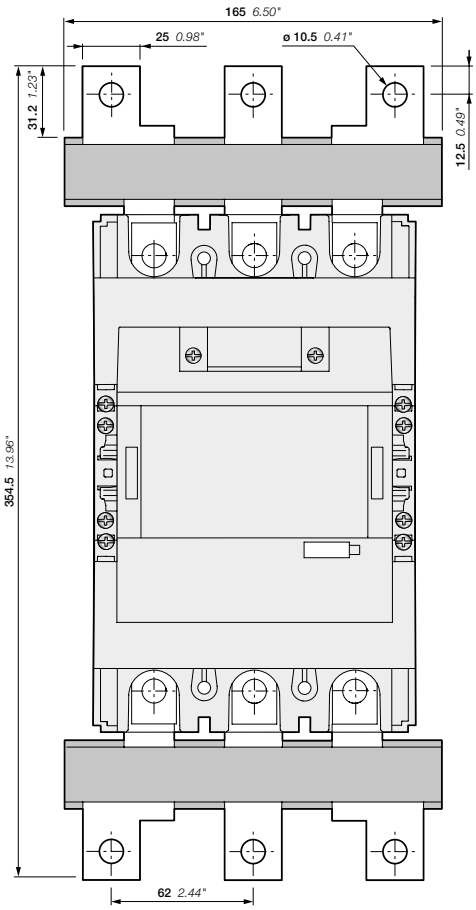
Main dimensions mm, inches

AF265B, AF305B, AF370B 3-pole contactors

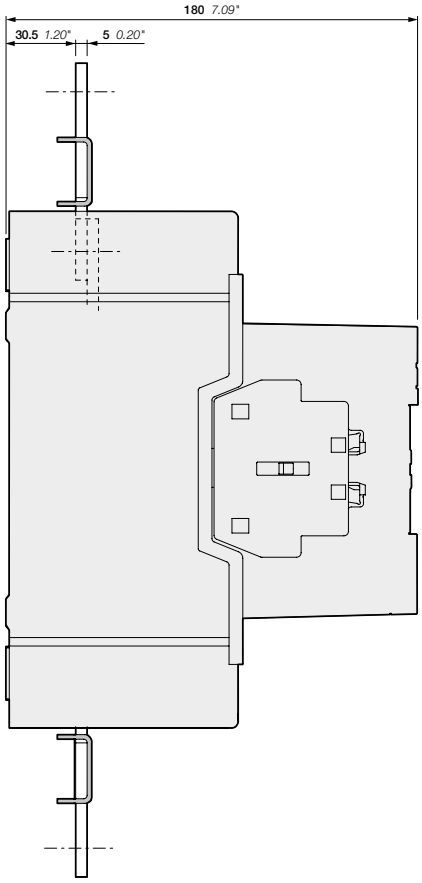
Dimensions



AF265B, AF305B, AF370B-30-22
+ LX370 terminal extension



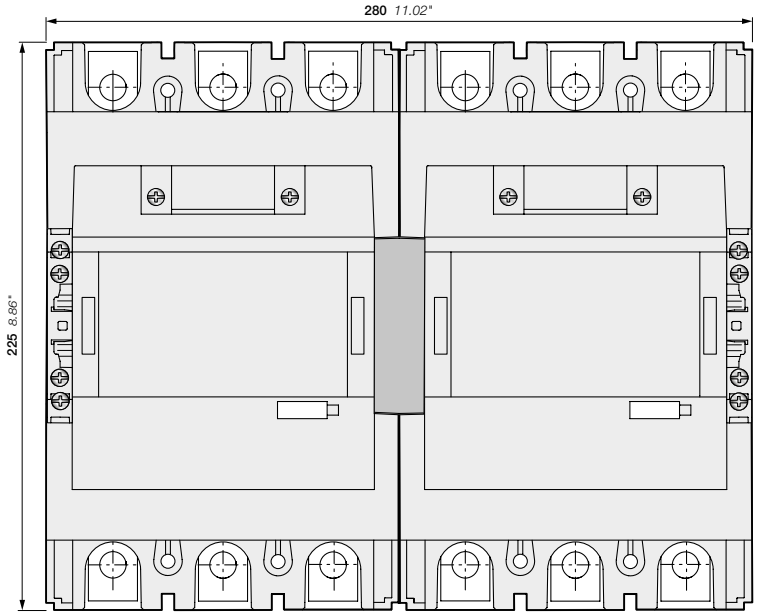
AF265B, AF305B, AF370B-30-22
+ LW370 terminal enlargement

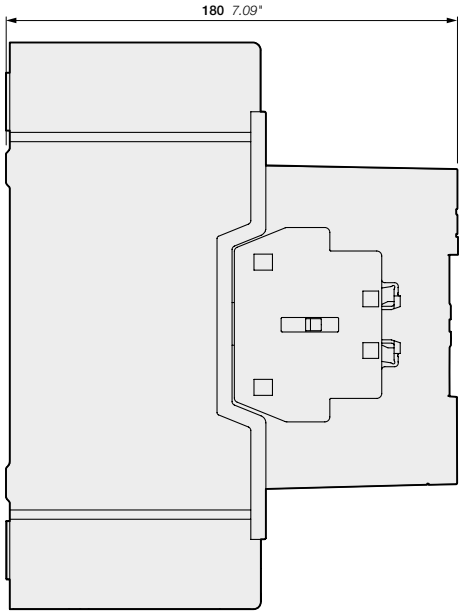


Main dimensions mm, inches

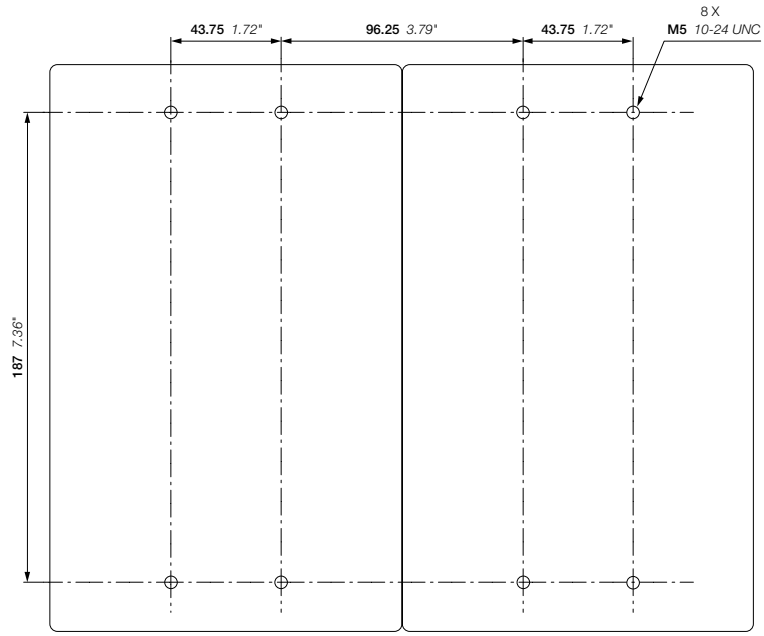
AF265B, AF305B, AF370B 3-pole contactors

Dimensions





AF265B, AF305B, AF370B-30-22
+ VM19 mechanical interlocking unit

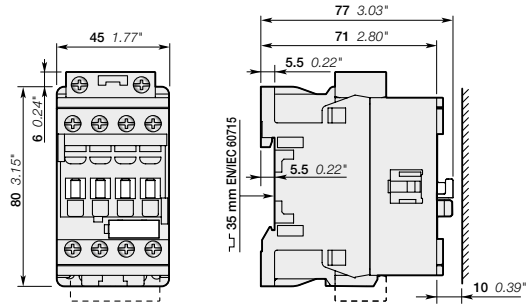


AF265B, AF305B, AF370B-30-22
+ VM19 mechanical interlocking unit

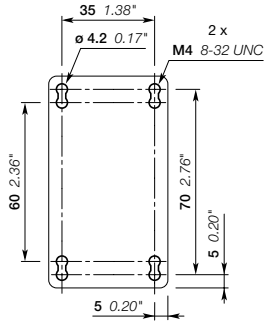
Main dimensions mm, inches

AF09(Z)B, AF16(Z)B 4-pole contactors

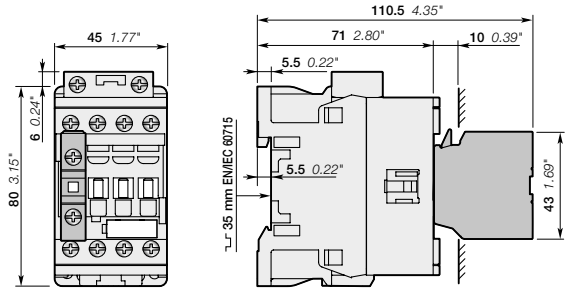
Dimensions



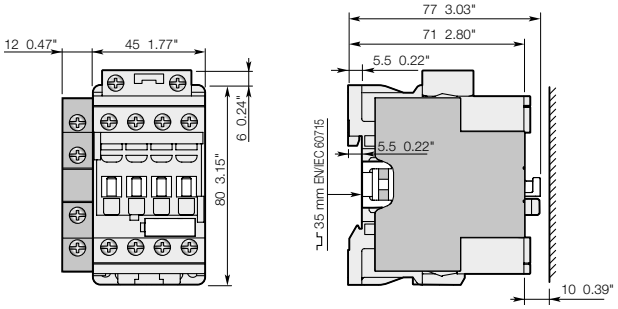
AF09(Z)B, AF16(Z)B



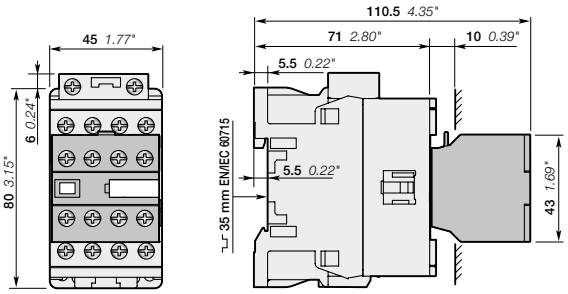
AF09(Z)B, AF16(Z)B



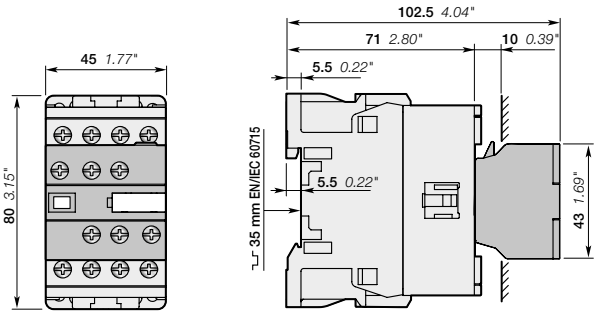
AF09(Z)B, AF16(Z)B
+ CA4 1-pole auxiliary contact block



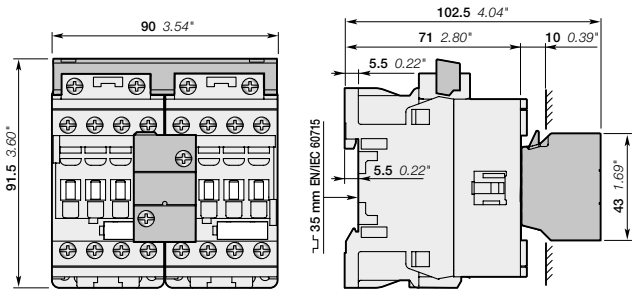
AF09(Z)B, AF16(Z)B
+ CAL4-11 2-pole auxiliary contact block



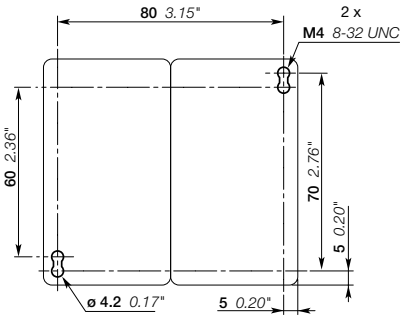
AF09(Z)B, AF16(Z)B
+ CA4 4-pole auxiliary contact block



AF09(Z)B, AF16(Z)B
+ CAT4 2-pole auxiliary contact and coil terminal block



AF09(Z)B-40-00, AF16(Z)B-40-00
+ VEM4 mechanical and electrical interlock set



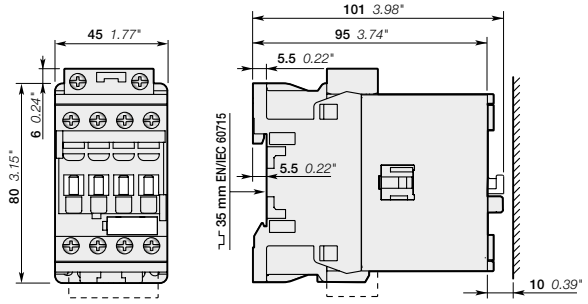
AF09(Z)B-40-00, AF16(Z)B-40-00
+ VEM4 mechanical and electrical interlock set

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

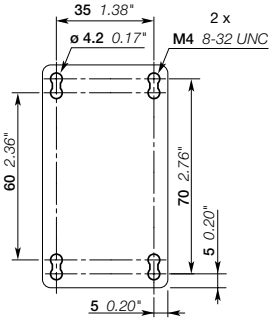
Main dimensions mm, inches

AF26(Z)B, AF38(Z)B 4-pole contactors

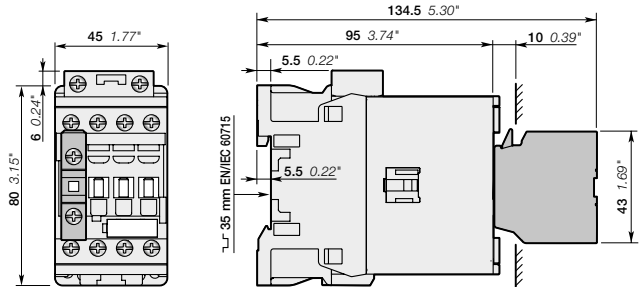
Dimensions



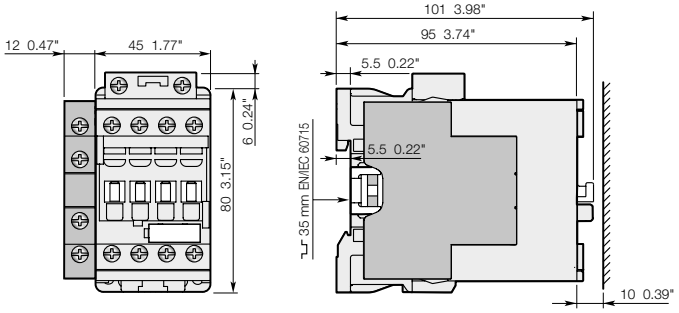
AF26(Z)B, AF38(Z)B



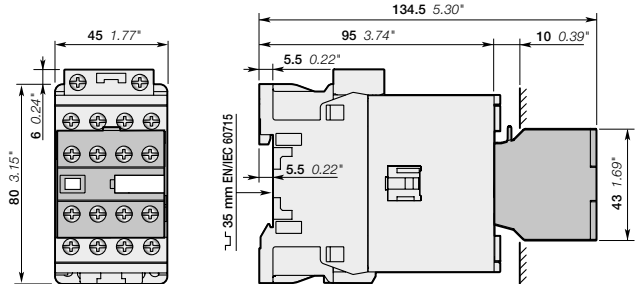
AF26(Z)B, AF38(Z)B



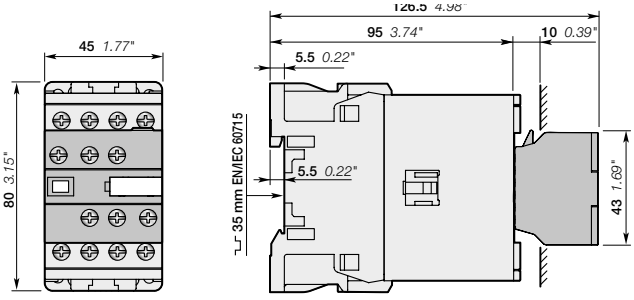
AF26(Z)B, AF38(Z)B
+ CA4 1-pole auxiliary contact block



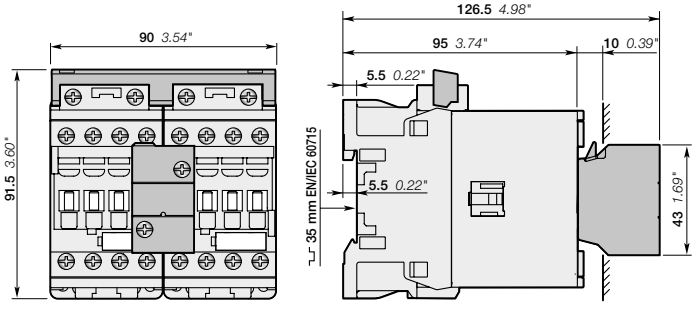
AF26(Z)B, AF38(Z)B
+ CAL4-11 2-pole auxiliary contact block



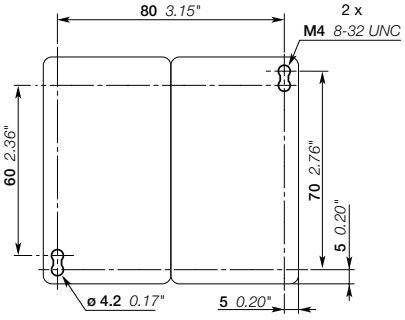
AF26(Z)B, AF38(Z)B
+ CA4 4-pole auxiliary contact block



AF26(Z)B, AF38(Z)B
+ CAT4 2-pole auxiliary contact and coil terminal block



AF26(Z)B-40-00, AF38(Z)B-40-00
+ VEM4 mechanical and electrical interlock set



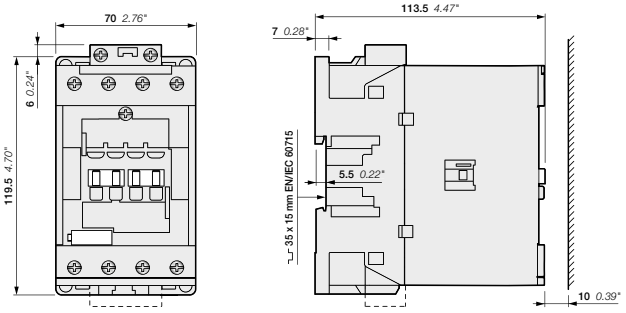
AF26(Z)B-40-00, AF38(Z)B-40-00
+ VEM4 mechanical and electrical interlock set

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

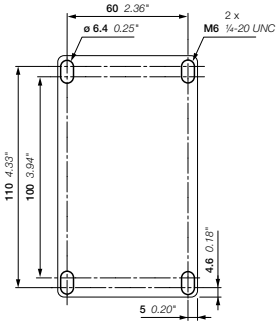
Main dimensions mm, inches

AF40B, AF52B 4-pole contactors

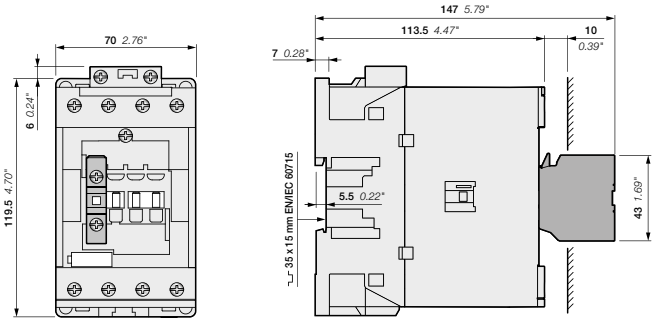
Dimensions



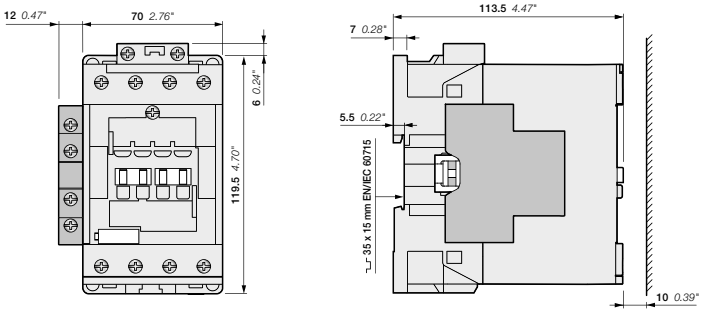
AF40B, AF52B



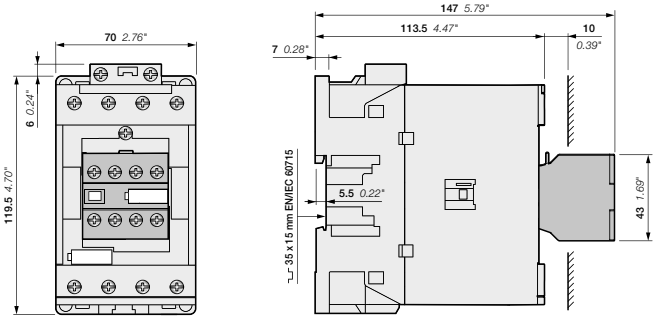
AF40B, AF52B



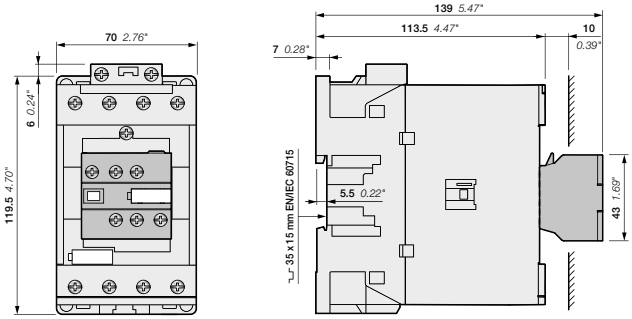
AF40B, AF52B
+ CA4 1-pole auxiliary contact block



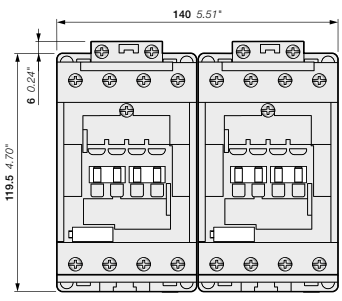
AF40B, AF52B
+ CAL4-11 2-pole auxiliary contact block

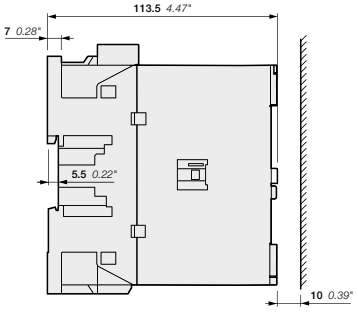


AF40B, AF52B
+ CA4 4-pole auxiliary contact block

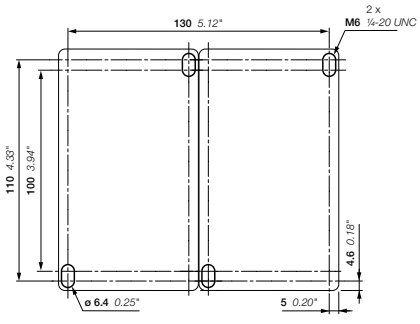


AF40B, AF52B
+ CAT4 2-pole auxiliary contact and coil terminal block





AF40B, AF52B
+ VM96-4 mechanical interlock unit



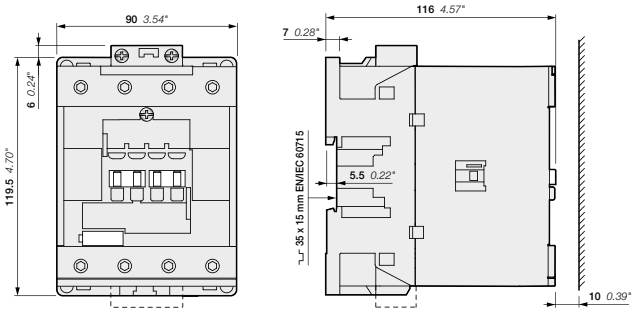
AF40B, AF52B
+ VM96-4 mechanical interlock unit

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

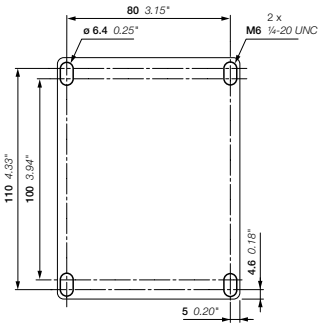
Main dimensions mm, inches

AF80B 4-pole contactors

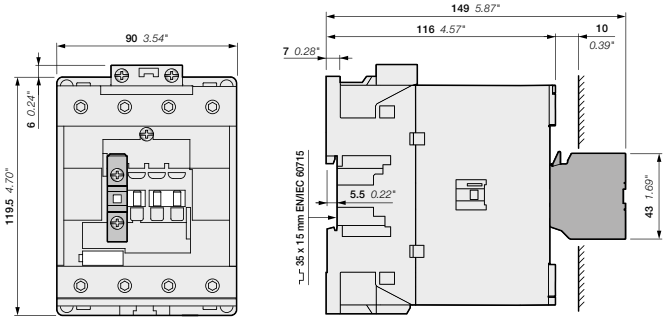
Dimensions



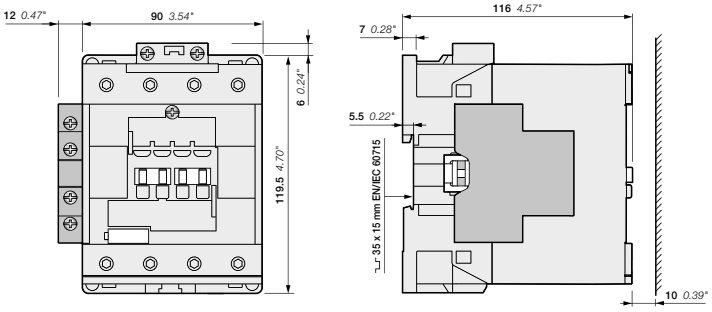
AF80B



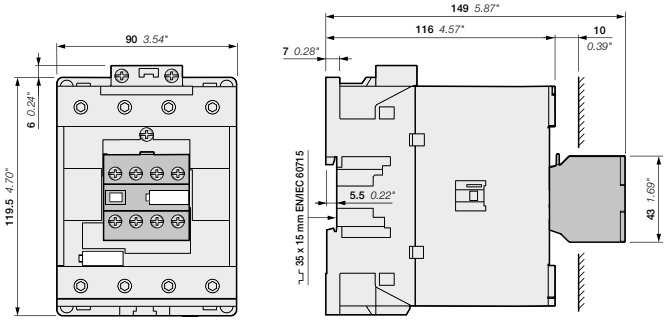
AF80B



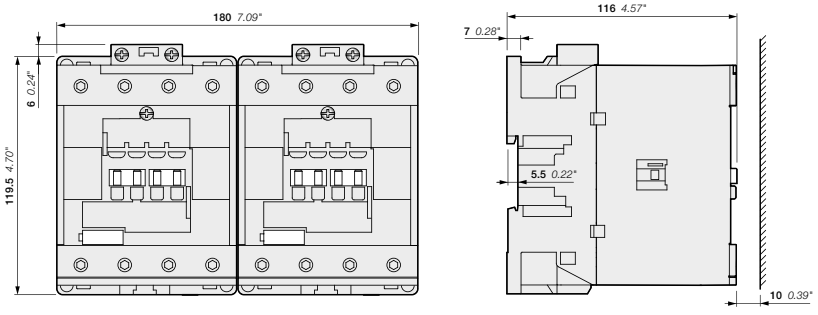
AF80B
+ CA4, CC4 1-pole auxiliary contact block



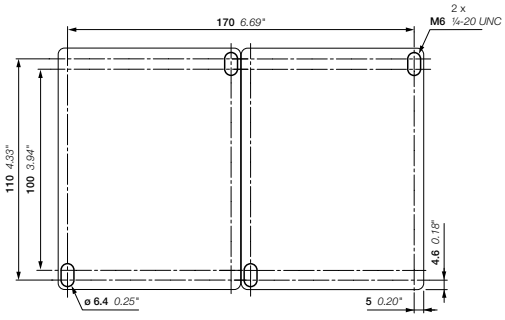
AF80B
+ CAL4-11 2-pole auxiliary contact block



AF80B
+ CA4 4-pole auxiliary contact block



AF80B
+ VM96-4 mechanical interlock unit



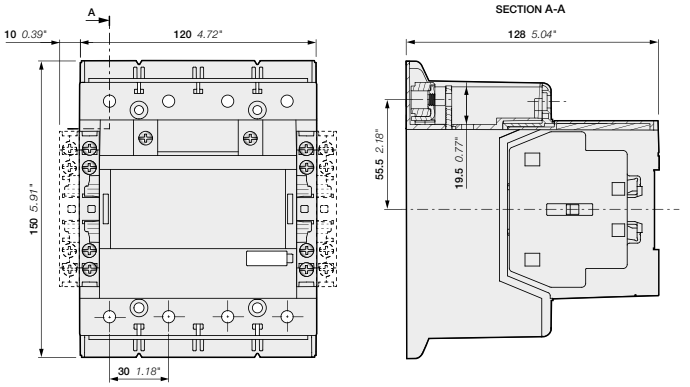
AF80B
+ VM96-4 mechanical interlock unit

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

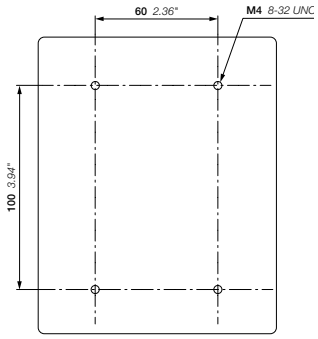
Main dimensions mm, inches

AF116B, AF140B 4-pole contactors

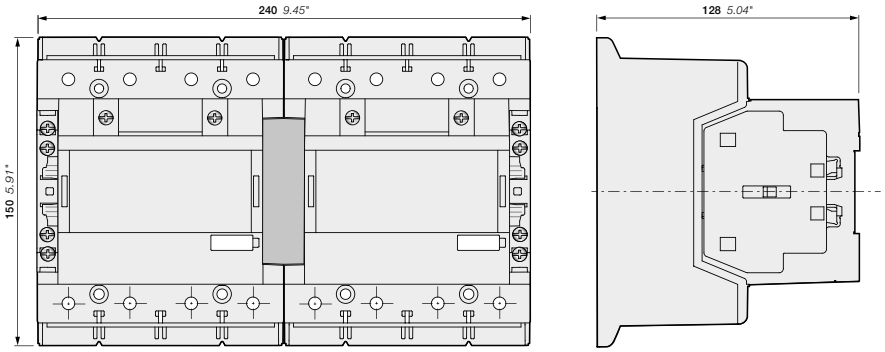
Dimensions



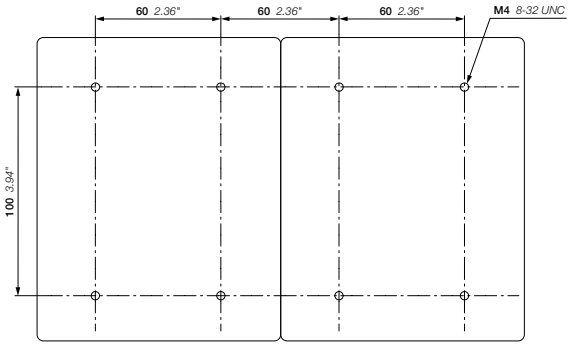
AF116B, AF140B-40-22



AF116B, AF140B-40-22



AF116B, AF140B-40-22
+ VM19 mechanical interlocking unit

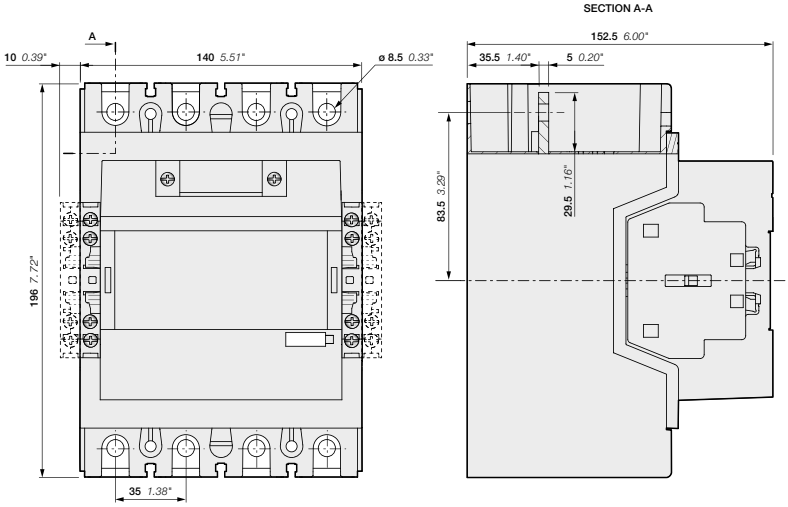


AF116B, AF140B-40-22
+ VM19 mechanical interlocking unit

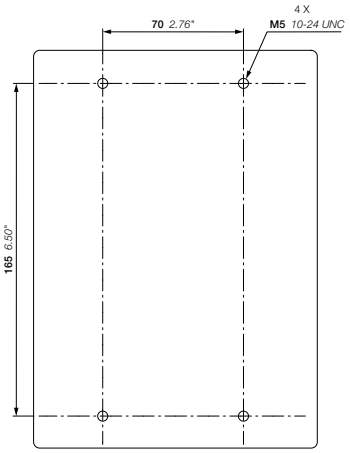
Main dimensions mm, inches

AF190B, AF205B 4-pole contactors

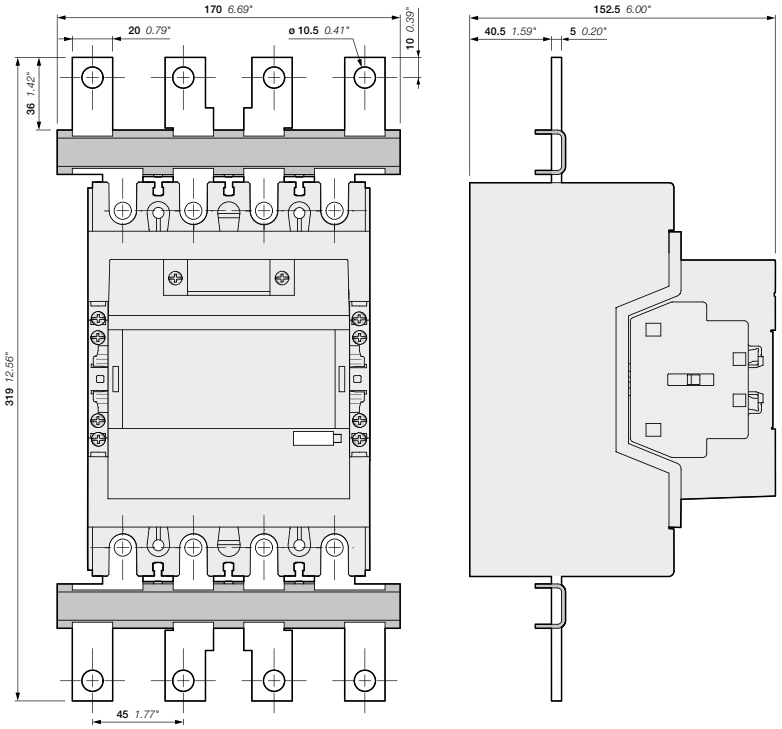
Dimensions



AF190B, AF205B-40-22



AF190B, AF205B-40-22

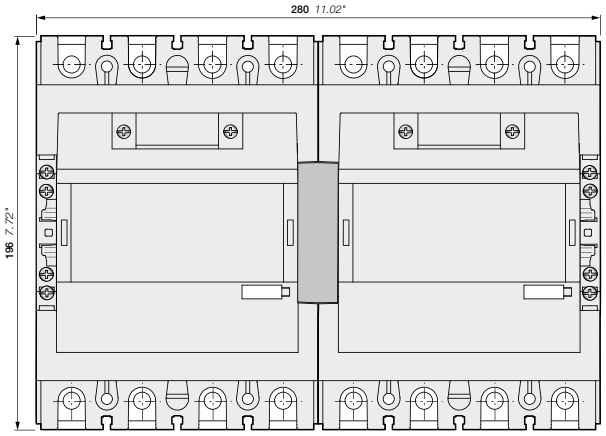


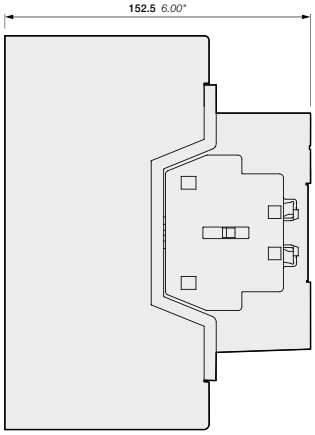
AF190B, AF205B-40-22
+ LW205-40 terminal enlargement

Main dimensions mm, inches

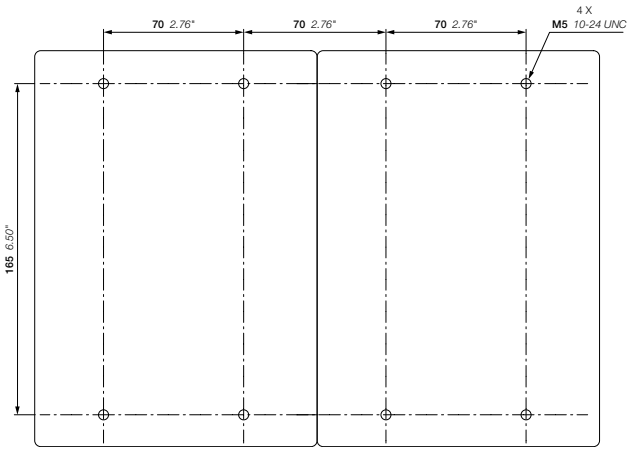
AF190B, AF205B 4-pole contactors

Dimensions





AF190B, AF205B-40-22
+ VM19 mechanical interlocking unit

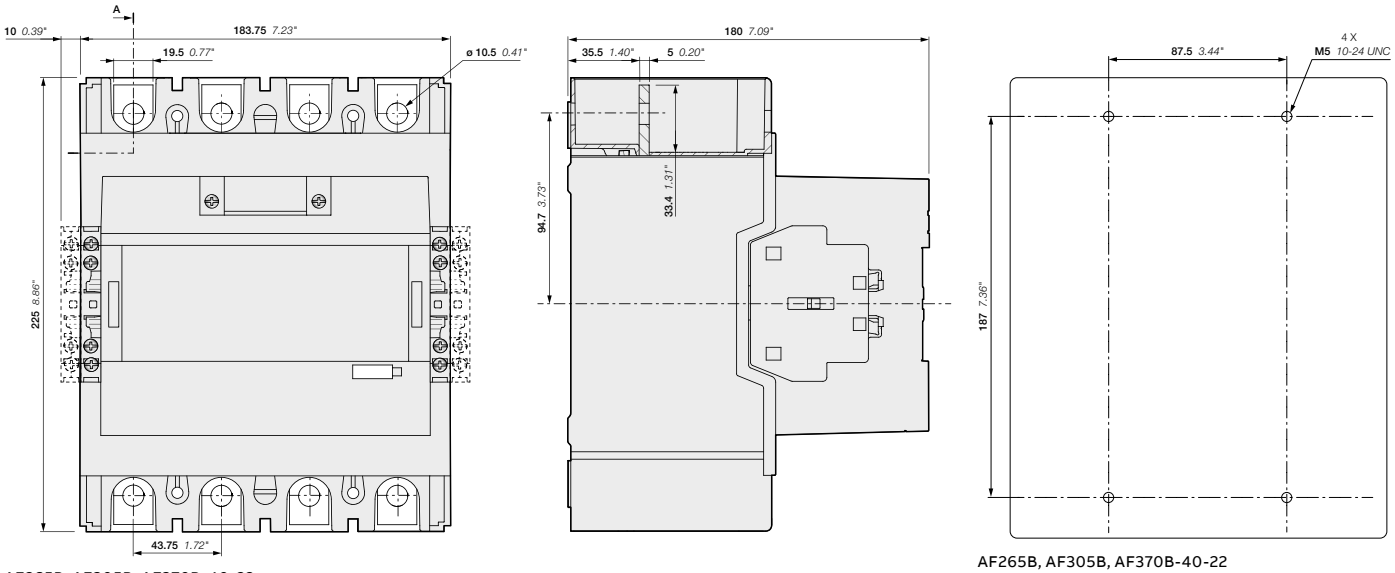


AF190B, AF205B-40-22
+ VM19 mechanical interlocking unit

Main dimensions mm, inches

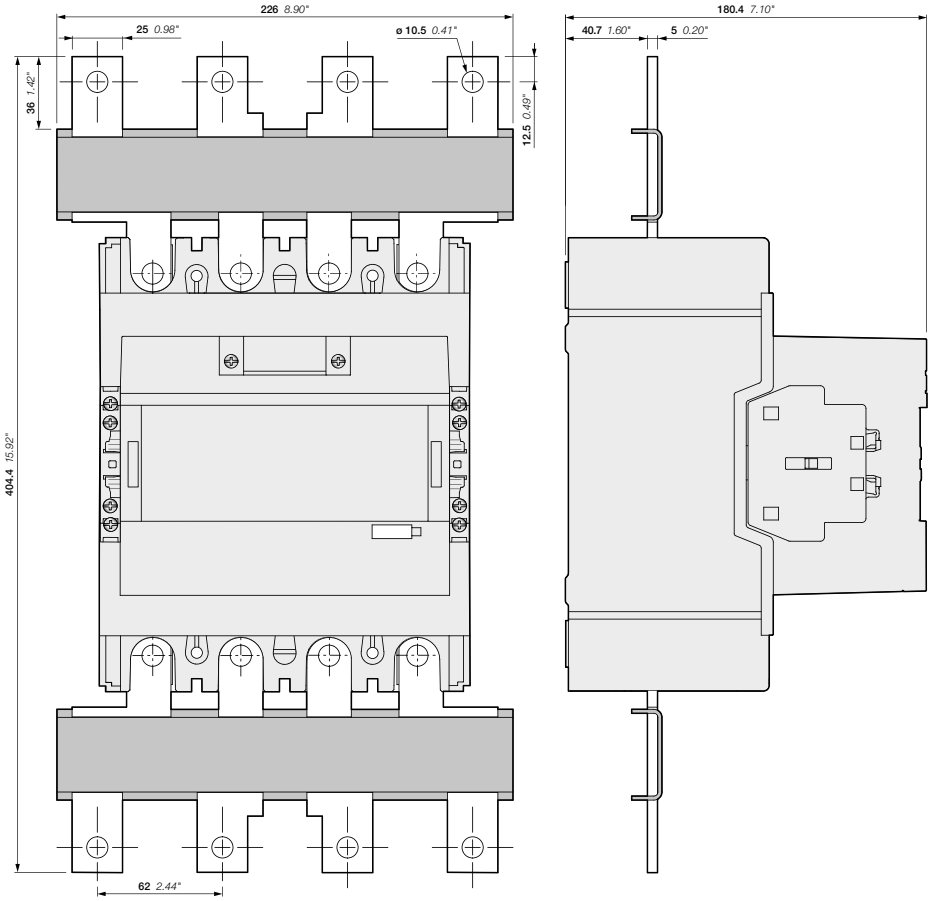
AF265B, AF305B, AF370B 4-pole contactors

Dimensions



AF265B, AF305B, AF370B-40-22

AF265B, AF305B, AF370B-40-22

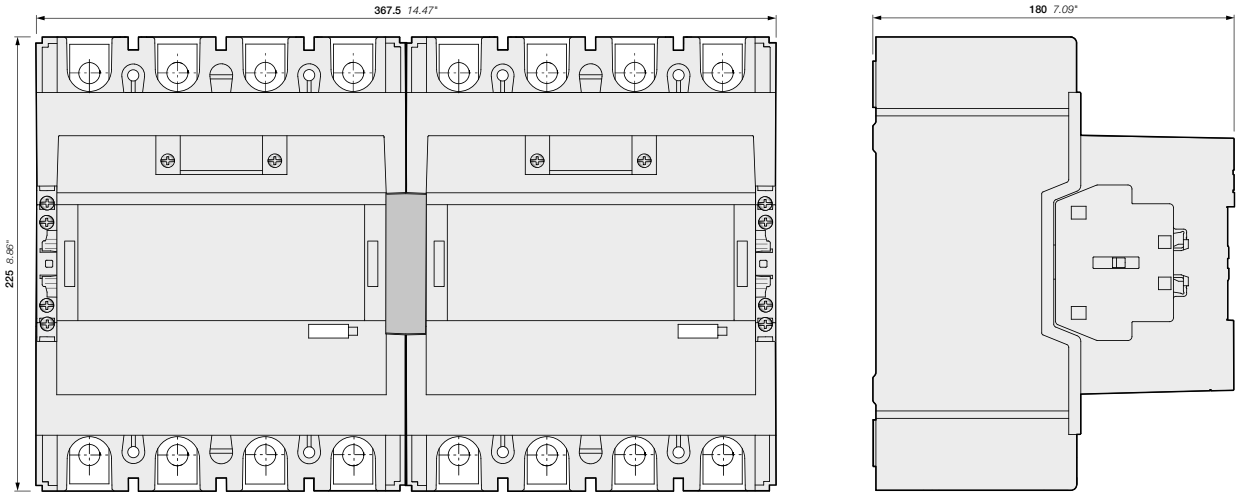


AF265B, AF305B, AF370B-40-22
+ LW370-40 terminal enlargement

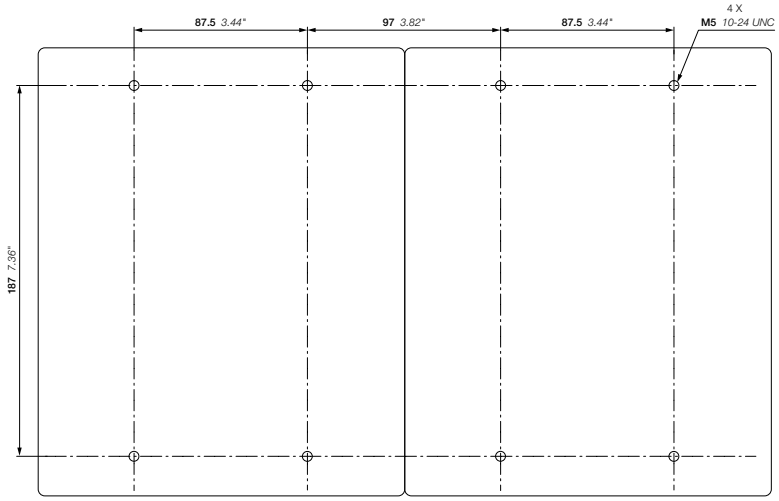
Main dimensions mm, inches

AF265B, AF305B, AF370B 4-pole contactors

Dimensions



AF265B, AF305B, AF370B-40-22
+ VM19 mechanical interlocking unit

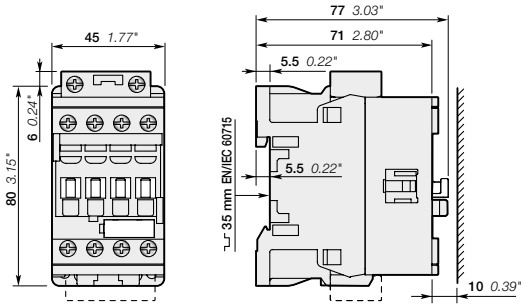


AF265B, AF305B, AF370B-40-22
+ VM19 mechanical interlocking unit

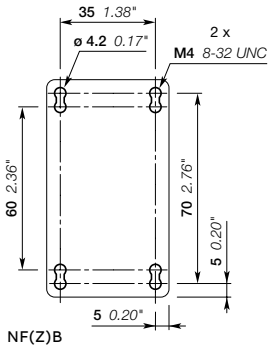
Main dimensions mm, inches

NF(Z)B contactor relays

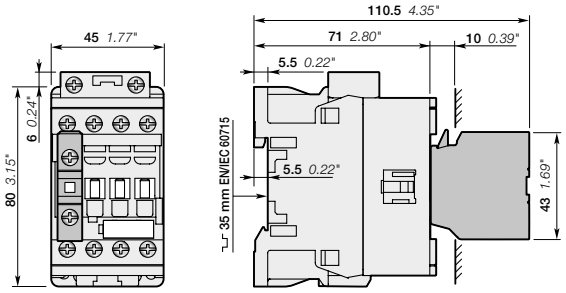
Dimensions



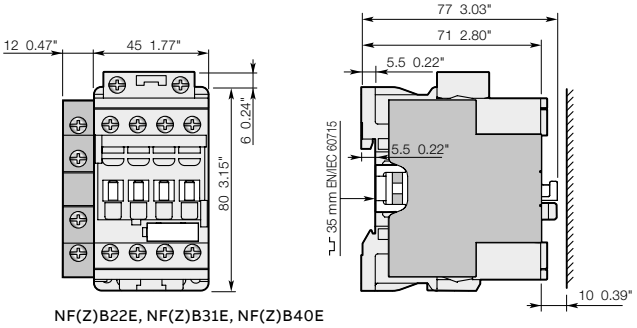
NF(Z)B22E, NF(Z)B31E, NF(Z)B40E



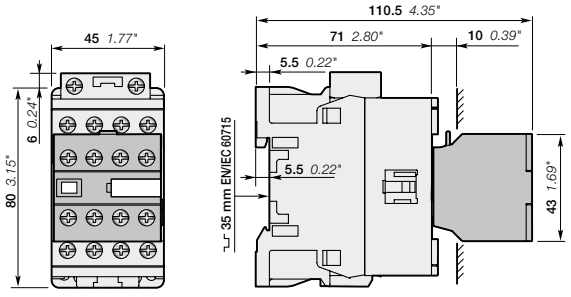
NF(Z)B



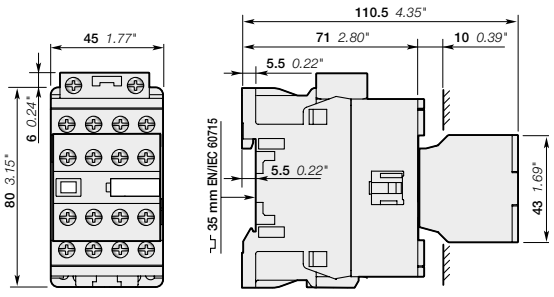
NF(Z)B22E, NF(Z)B31E, NF(Z)B40E
+ CA4 1-pole auxiliary contact block



NF(Z)B22E, NF(Z)B31E, NF(Z)B40E
+ CAL4-11 2-pole auxiliary contact block



NF(Z)B22E, NF(Z)B31E, NF(Z)B40E
+ CA4 4-pole auxiliary contact block



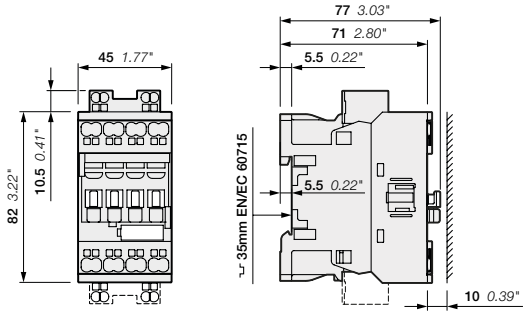
NF(Z)B44E, NF(Z)B62E, NF(Z)B80E

Note: Contactor relay lateral distance to grounded component 2 mm 0.08" min.

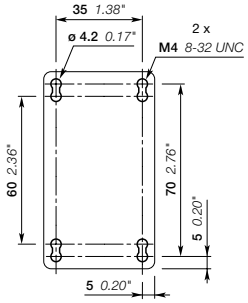
Main dimensions mm, inches

NF(Z)B..K contactor relays - with Push-in Spring terminals

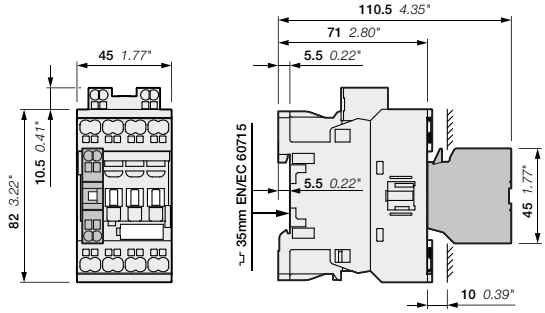
Dimensions



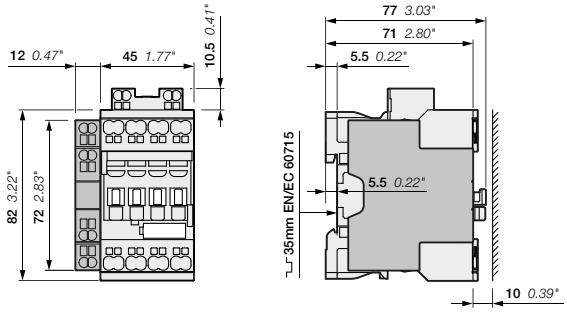
NFZ22EK, NFZ31EK, NFZ40EK



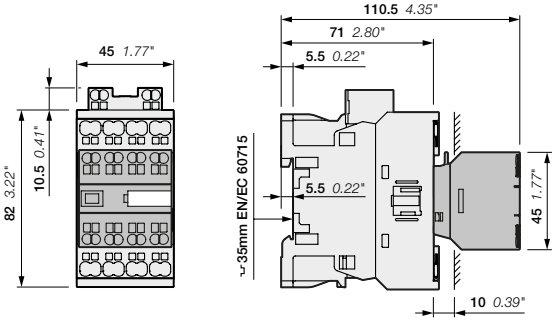
NFZ22EK, NFZ31EK, NFZ40EK



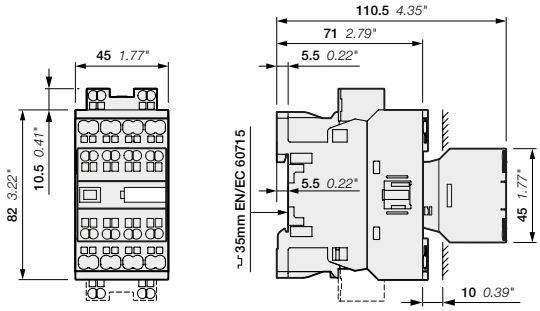
NFZ22EK, NFZ31EK, NFZ40EK
+ CA4..K 1-pole auxiliary contact block



NFZ22EK, NFZ31EK, NFZ40EK
+ CAL4-11K 2-pole auxiliary contact block



NFZ22EK, NFZ31EK, NFZ40EK
+ CA4..K 4-pole auxiliary contact block



NFZ44EK, NFZ53EK, NFZ62EK, NFZ71EK, NFZ80EK

Note: contactor relay lateral distance to grounded component 2 mm 0.08" min.

Main dimensions mm, inches

Voltage code table

The below tables indicate the available voltage ranges Uc min. ... Uc max. usually used in rolling stock application according to IEC 60077 standard. When placing an order, please check the required control supply and select the corresponding AF..(Z)B / NF(Z)B control voltage range. Select a standard contactor from ordering detail pages. Change the coil voltage code in the order code according to the table below. Example: for contactor AF09ZB-30-10 and coil 48 ...130 V DC, type is AF09ZB-30-10-22 and order code is 1SBL136061R2210.

DC operated

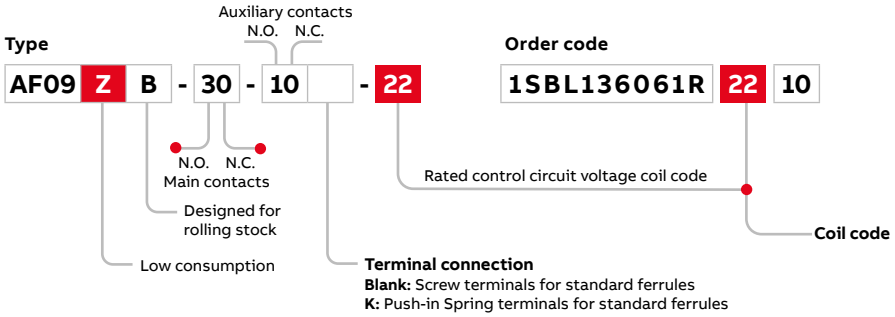
Control supply Uc min. ... Uc max. acc. to IEC 60077 **V DC**	**Rated control circuit voltage** Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max. **V DC**	**Coil code** AF09..ZB(..K) ...AF38..ZB(..K) NFZB(..K)	AF40B ... AF96B	AF116B ... AF370B
17...32 23...42.5 23...44.5 25...45 33...60 36...65	20...60	21	11	11
42...78 50...90 55...96 63...113 67...120 77...143	48...130	22	12	12
87.5...162.5 90...150 105...183 120...167 152...264 187...253	100...250	23	13	13

AC operated

Rated control circuit voltage Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max. **V AC 50/60 Hz**	**Coil code** AF09..(Z)B(..K) ...AF38..(Z)B(..K) NF(Z)B(..K)	AF40B ... AF96B	AF116B ... AF370B
24...60	21	11	11
48...130	22	12	12
100...250	23	13	13
250...500	14	14	14

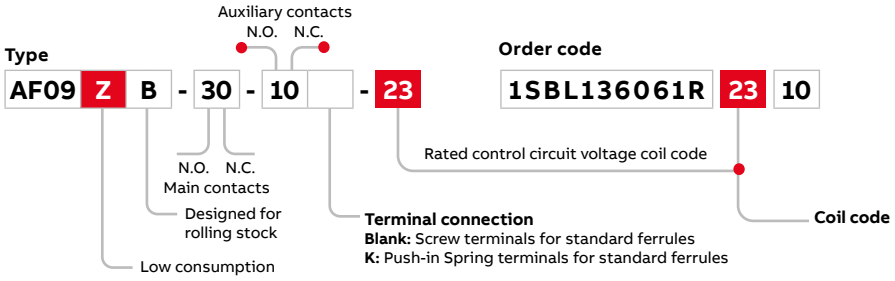
AF09(Z)B ... AF38(Z)B 3 and 4-pole contactors

DC operated



	Rated control circuit voltage Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max.	Supply control voltage Uc acc. to IEC 60077
	DC	**DC**
21	20...60 V	24 V 33 V 48 V
22	**48...130 V**	**72 V** **96 V** **110 V**
23	100...250 V	220 V

AC operated

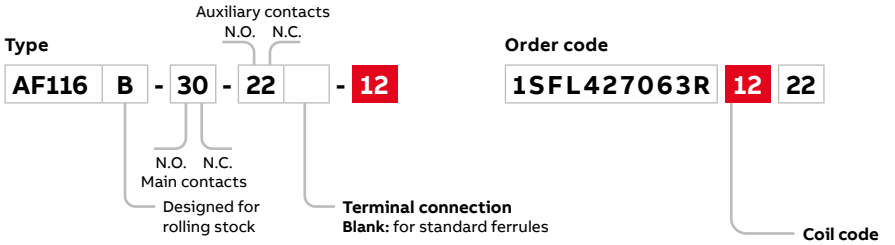


	Rated control circuit voltage Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max.
	AC 50/60 Hz
21	24...60 V
22	48...130 V
23	**100...250 V**
14	250...500 V

Note: For AC 50/60 Hz sinusoïdal control supply in rolling stock application, max. permitted control voltage must not be exceeded during voltage fluctuation defined acc. to IEC 60077 or EN 50155 (see technical data).

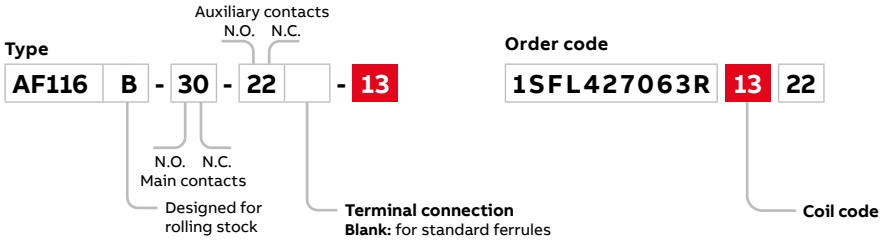
AF40B ... AF370B 3 and 4-pole contactors

DC operated



	Rated control circuit voltage Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max.	Supply control voltage Uc acc. to IEC 60077
	DC	**DC**
11	20...60 V	24 V 33 V 48 V
12	**48...130 V**	**72 V** **96 V** **110 V**
13	100...250 V	220 V

AC operated



	Rated control circuit voltage Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max.
	AC 50/60 Hz
11	24...60 V
12	48...130 V
13	**100...250 V**
14	250...500 V

Note: For AC 50/60 Hz sinusoïdal control supply in rolling stock application, max. permitted control voltage must not be exceeded during voltage fluctuation defined acc. to IEC 60077 or EN 50155 (see technical data).

Voltage code table

NF(Z)B contactor relays

DC operated

Type

NF	Z	B	-	22	- E		-	22

- Z: Low consumption
- B: Designed for rolling stock
- 22: N.O. N.C. Auxiliary contacts
- (blank): **Terminal connection** — **Blank:** Screw terminals for standard ferrules; **K:** Push-in Spring terminals for standard ferrules
- 22: Rated control circuit voltage coil code

Order code

1SBH136061R	22	22

- 22: Coil code

Rated control circuit voltage Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max.		Supply control voltage Uc acc. to IEC 60077
DC		**DC**
21	20...60 V	24 V 33 V 48 V
22	**48...130 V**	**72 V** **96 V** **110 V**
23	100...250 V	220 V

AC operated

Type

NF	Z	B	-	22	- E		-	23

- Z: Low consumption
- B: Designed for rolling stock
- 22: N.O. N.C. Auxiliary contacts
- (blank): **Terminal connection** — **Blank:** Screw terminals for standard ferrules; **K:** Push-in Spring terminals for standard ferrules
- 23: Rated control circuit voltage coil code

Order code

1SBH136061R	23	22

- 22: Coil code

Rated control circuit voltage Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max.	
AC 50/60 Hz	
21	24...60 V
22	48...130 V
23	**100...250 V**
14	250...500 V

Note: For AC 50/60 Hz sinusoïdal control supply in rolling stock application, max. permitted control voltage must not be exceeded during voltage fluctuation defined acc. to IEC 60077 or EN 50155 (see technical data).

AF..B..RT contactors and NF..B..RT contactor relays Connection with ring tongue ferrules

4/2 **Overview**

4/5 **AF..(Z)B..RT 3-pole contactors**

4/35 **AF..(Z)B..RT 4-pole contactors**

4/65 **NF(Z)B..RT contactor relays**

4/73 **Accessories**

4/87 **Terminal marking and positioning**

4/92 **Dimensions**

4/113 **Voltage code table**

AF..(Z)B..RT contactors and NF(Z)B..RT contactor relays

Connection with ring tongue ferrules

AF..(Z)B..RT 3-pole contactors

IEC	**AC-3 Rated operational power**	θ ≤ 60 °C, 400 V (1)	**kW**	4	5.5	7.5	11	15	18.5
UL/CSA	**3-phase motor rating**	480 V	**hp**	5	7.5	10	15	20	25
Contactor type				**AF09(Z)B..RT**	**AF12(Z)B..RT**	**AF16(Z)B..RT**	**AF26(Z)B..RT**	**AF30(Z)B..RT**	**AF38(Z)B..RT**
IEC	**AC-3 Rated operational current**	θ ≤ 60 °C, 400 V	**A**	9	12	18	26	32	38
	AC-1 Rated operational current	θ ≤ 40 °C, 690 V	**A**	25	28	30	45	50	50
		θ ≤ 60 °C, 690 V (1)	**A**	25	28	30	40	42	42
		θ ≤ 70 °C, 690 V	**A**	22	24	26	32	37	37
UL/CSA	**General use rating**	600 V	**A**	25	28	30	45	50	50
NEMA	**NEMA Size**			**00**	**0**	–	**1**	–	–

(1) θ ≤ 55 °C for AF50..RT ... AF95B..RT contactors.

Main accessories

Auxiliary contact blocks	Front mounting	**CA4..RT, CAT4..RT**
	Side mounting	**CAL4-11RT**
Interlocking units	Mechanical	**VM4**
Surge suppressors		Built-in surge protection

AF..(Z)B..RT 4-pole contactors

Contactor type				**AF09(Z)B..RT**	**AF16(Z)B..RT**	**AF26(Z)B..RT**	**AF38(Z)B..RT**	**AF45..RT**	**AF75..RT**
IEC	**AC-1 Rated operational current**	θ ≤ 40 °C, 690 V	**A**	25	30	45	55	100	125
		θ ≤ 60 °C, 690 V (1)	**A**	25	30	40	45	85	105
	Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 70 °C, 690 V	**A**	22	26	32	37	70	85
UL/CSA	**General use rating**	600 V	**A**	25	30	45	55	80	105

(1) θ ≤ 55 °C for AF45..RT ... AF75..RT contactors.

Main accessories

Auxiliary contact blocks	Front mounting	**CA4..RT, CAT4..RT**	**CA5..RT**
	Side mounting	**CAL4-11RT**	–
Interlocking units	Mechanical	**VM4**	–
Surge suppressors		Built-in surge protection	

NF(Z)B..RT Contactors relays

Number of contacts				2 2	3 1	4 0	4 4	6 2	8 0
IEC	**AC-15 Rated operational current**	400 V	**A**	**3**	**3**	**3**	**3**	**3**	**3**
UL/CSA	**Pilot Duty**			**A600, Q600**			**A600, Q600**		
Contactor relays type				**NF(Z)B22ERT**	**NF(Z)B31ERT**	**NF(Z)B40ERT**	**NF(Z)B44ERT**	**NF(Z)B62ERT**	**NF(Z)B80ERT**

Main accessories

Auxiliary contact blocks	Front mounting	**CA4..RT**
	Side mounting	**CAL4-11RT**
Surge suppressors		Built-in surge protection

	22	30	37	45	55	75	75	90	110	132	160	200
	40	60	60	60	75	100	100	125	150	200	250	300
	AF50..RT	**AF63..RT**	**AF75..RT**	**AF95B..RT**	**AF116B..RT**	**AF140B..RT**	**AF146B..RT**	**AF190B..RT**	**AF205B..RT**	**AF265B..RT**	**AF305B..RT**	**AF370B..RT**
	50	65	75	96	116	140	146	190	205	265	305	370
	100	115	125	145	160	200	225	275	350	400	500	600
	85	95	105	135	145	175	200	250	300	350	400	500
	70	80	85	115	130	160	175	200	240	290	325	400
	80	90	105	125	160	200	200	250	300	350	400	520
	2	**–**	**3**	**–**	**–**	**4**	**–**	**–**	**–**	**5**	**–**	**–**

	CA5..RT		**–**
	–	**CAL18-11RT**	**CAL19B..RT**
	–		**VM19** (for same size contactors)

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

	–
	CAL19B..RT
	VM19 (for same size contactors)

AF..(Z)B..RT 3-pole contactors connection with ring tongue ferrules

4/6	AF09ZB..RT ... AF38ZB..RT	DC operated
4/7	AF09(Z)B..RT ... AF38(Z)B..RT	AC operated
4/9	AF50..RT ... AF95B..RT	DC operated
4/10	AF50..RT ... AF95B..RT	AC operated
4/12	AF116B..RT ... AF146B..RT	DC operated
4/13	AF116B..RT ... AF146B..RT	AC operated
4/14	AF190B..RT ... AF370B..RT	DC operated
4/15	AF190B..RT ... AF370B..RT	AC operated
4/17	Technical data	
4/30	Electrical durability	

For direct product details information, use product type or order code, ex:

or www.abb.com/productdetails/**AF09ZB-30-10RT-21**
www.abb.com/productdetails/**1SBL136060R2110**

AF09ZB..RT ... AF38ZB..RT 3-pole contactors

4 to 18.5 kW

DC operated - connection with ring tongue ferrules

AF09ZB-30-10RT

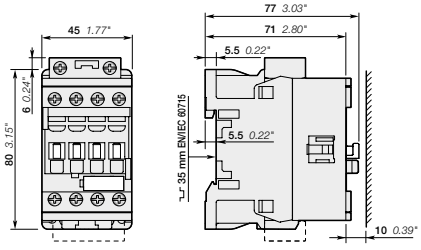
AF26ZB-30-00RT

AF09ZB..RT ... AF38ZB..RT 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.
These contactors are of the block type design with 3 main poles.

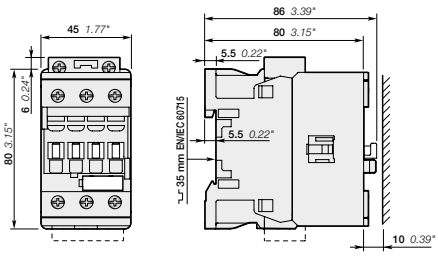
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC		UL / CSA		Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V DC	V DC				kg
4	25	5	25	24, 33, 48	20...60	1 0	AF09ZB-30-10RT-21	1SBL136060R2110	0.320
						0 1	AF09ZB-30-01RT-21	1SBL136060R2101	0.320
				72, 96, 110	48...130	1 0	AF09ZB-30-10RT-22	1SBL136060R2210	0.320
						0 1	AF09ZB-30-01RT-22	1SBL136060R2201	0.320
				220	100...250	1 0	AF09ZB-30-10RT-23	1SBL136060R2310	0.320
						0 1	AF09ZB-30-01RT-23	1SBL136060R2301	0.320
5.5	28	7.5	28	24, 33, 48	20...60	1 0	AF12ZB-30-10RT-21	1SBL156060R2110	0.320
						0 1	AF12ZB-30-01RT-21	1SBL156060R2101	0.320
				72, 96, 110	48...130	1 0	AF12ZB-30-10RT-22	1SBL156060R2210	0.320
						0 1	AF12ZB-30-01RT-22	1SBL156060R2201	0.320
				220	100...250	1 0	AF12ZB-30-10RT-23	1SBL156060R2310	0.320
						0 1	AF12ZB-30-01RT-23	1SBL156060R2301	0.320
7.5	30	10	30	24, 33, 48	20...60	1 0	AF16ZB-30-10RT-21	1SBL176060R2110	0.320
						0 1	AF16ZB-30-01RT-21	1SBL176060R2101	0.320
				72, 96, 110	48...130	1 0	AF16ZB-30-10RT-22	1SBL176060R2210	0.320
						0 1	AF16ZB-30-01RT-22	1SBL176060R2201	0.320
				220	100...250	1 0	AF16ZB-30-10RT-23	1SBL176060R2310	0.320
						0 1	AF16ZB-30-01RT-23	1SBL176060R2301	0.320
11	45	15	45	24, 33, 48	20...60	0 0	AF26ZB-30-00RT-21	1SBL236060R2100	0.360
				72, 96, 110	48...130	0 0	AF26ZB-30-00RT-22	1SBL236060R2200	0.360
				220	100...250	0 0	AF26ZB-30-00RT-23	1SBL236060R2300	0.360
15	50	20	50	24, 33, 48	20...60	0 0	AF30ZB-30-00RT-21	1SBL276060R2100	0.360
				72, 96, 110	48...130	0 0	AF30ZB-30-00RT-22	1SBL276060R2200	0.360
				220	100...250	0 0	AF30ZB-30-00RT-23	1SBL276060R2300	0.360
18.5	50	25	50	24, 33, 48	20...60	0 0	AF38ZB-30-00RT-21	1SBL296060R2100	0.360
				72, 96, 110	48...130	0 0	AF38ZB-30-00RT-22	1SBL296060R2200	0.360
				220	100...250	0 0	AF38ZB-30-00RT-23	1SBL296060R2300	0.360

(1) Other control voltages, see voltage code table.



AF09ZB..RT, AF12ZB..RT, AF16ZB..RT



AF26ZB..RT, AF30ZB..RT, AF38ZB..RT

Main dimensions mm, inches

AF09(Z)B..RT ... AF38(Z)B..RT 3-pole contactors

4 to 18.5 kW

AC operated - connection with ring tongue ferrules

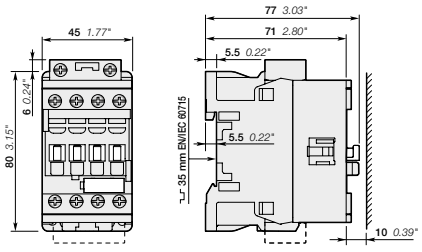
AF09(Z)B-30-10RT

AF26(Z)B-30-00RT

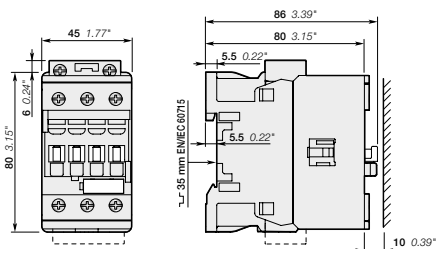
AF09(Z)B..RT ... AF38(Z)B..RT 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.
These contactors are of the block type design with 3 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max. of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression and side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
kW	A	hp	A	V AC 50/60 Hz				kg
4	25	5	25	24...60	1 0	AF09ZB-30-10RT-21	1SBL136060R2110	0.320
					0 1	AF09ZB-30-01RT-21	1SBL136060R2101	0.320
				48...130	1 0	AF09ZB-30-10RT-22	1SBL136060R2210	0.320
					0 1	AF09ZB-30-01RT-22	1SBL136060R2201	0.320
				100...250	1 0	AF09ZB-30-10RT-23	1SBL136060R2310	0.320
					0 1	AF09ZB-30-01RT-23	1SBL136060R2301	0.320
				250...500	1 0	AF09B-30-10RT-14	1SBL137060R1410	0.320
					0 1	AF09B-30-01RT-14	1SBL137060R1401	0.320
5.5	28	7.5	28	24...60	1 0	AF12ZB-30-10RT-21	1SBL156060R2110	0.320
					0 1	AF12ZB-30-01RT-21	1SBL156060R2101	0.320
				48...130	1 0	AF12ZB-30-10RT-22	1SBL156060R2210	0.320
					0 1	AF12ZB-30-01RT-22	1SBL156060R2201	0.320
				100...250	1 0	AF12ZB-30-10RT-23	1SBL156060R2310	0.320
					0 1	AF12ZB-30-01RT-23	1SBL156060R2301	0.320
				250...500	1 0	AF12B-30-10RT-14	1SBL157060R1410	0.320
					0 1	AF12B-30-01RT-14	1SBL157060R1401	0.320
7.5	30	10	30	24...60	1 0	AF16ZB-30-10RT-21	1SBL176060R2110	0.320
					0 1	AF16ZB-30-01RT-21	1SBL176060R2101	0.320
				48...130	1 0	AF16ZB-30-10RT-22	1SBL176060R2210	0.320
					0 1	AF16ZB-30-01RT-22	1SBL176060R2201	0.320
				100...250	1 0	AF16ZB-30-10RT-23	1SBL176060R2310	0.320
					0 1	AF16ZB-30-01RT-23	1SBL176060R2301	0.320
				250...500	1 0	AF16B-30-10RT-14	1SBL177060R1410	0.320
					0 1	AF16B-30-01RT-14	1SBL177060R1401	0.320
11	45	15	45	24...60	0 0	AF26ZB-30-00RT-21	1SBL236060R2100	0.360
				48...130	0 0	AF26ZB-30-00RT-22	1SBL236060R2200	0.360
				100...250	0 0	AF26ZB-30-00RT-23	1SBL236060R2300	0.360
				250...500	0 0	AF26B-30-00RT-14	1SBL237060R1400	0.360
15	50	20	50	24...60	0 0	AF30ZB-30-00RT-21	1SBL276060R2100	0.360
				48...130	0 0	AF30ZB-30-00RT-22	1SBL276060R2200	0.360
				100...250	0 0	AF30ZB-30-00RT-23	1SBL276060R2300	0.360
				250...500	0 0	AF30B-30-00RT-14	1SBL277060R1400	0.360
18.5	50	25	50	24...60	0 0	AF38ZB-30-00RT-21	1SBL296060R2100	0.360
				48...130	0 0	AF38ZB-30-00RT-22	1SBL296060R2200	0.360
				100...250	0 0	AF38ZB-30-00RT-23	1SBL296060R2300	0.360
				250...500	0 0	AF38B-30-00RT-14	1SBL297060R1400	0.360



AF09(Z)B..RT, AF12(Z)B..RT, AF16(Z)B..RT

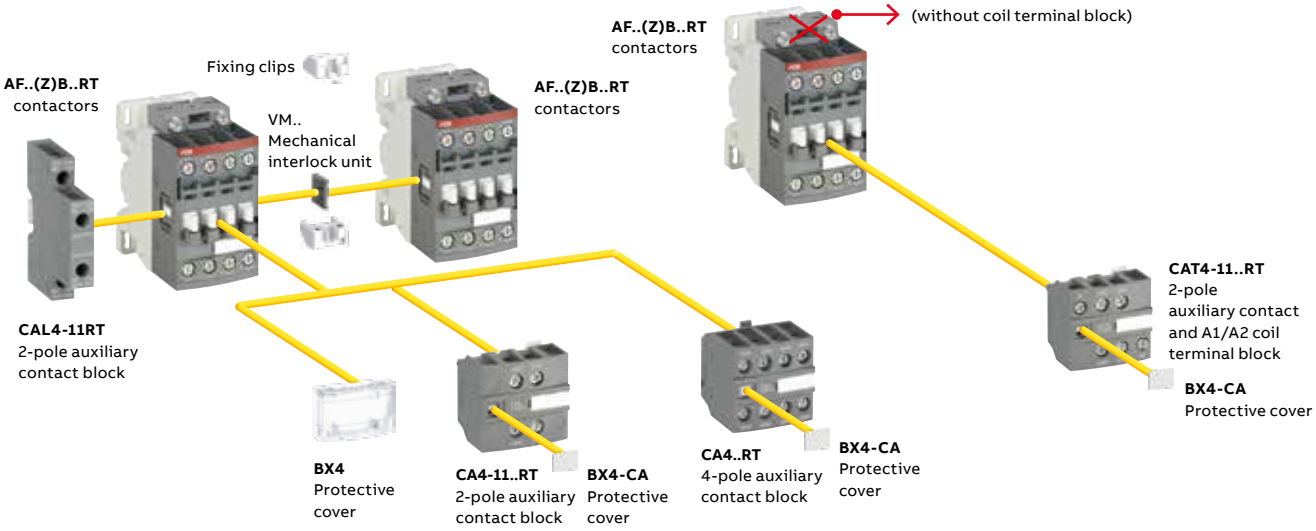


AF26(Z)B..RT, AF30(Z)B..RT, AF38(Z)B..RT

Main dimensions mm, inches

AF09(Z)B..RT ... AF38(Z)B..RT 3-pole contactors

Contactors and Main accessories



Main accessory fitting details

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor types	Main poles	Built-in auxiliary contacts	Front-mounted accessories Auxiliary contact blocks 2-pole CA4-11..RT		2-pole CAT4-11..RT		4-pole CA4..RT		Mechanical interlocking unit (between 2 contactors) VM4		Side-mounted accessories Auxiliary contact blocks Left side 2-pole CAL4-11RT		Right side
AF09(Z)B..RT ... AF16(Z)B..RT	3 0	0 1	1	or	1	or	1		–	+	1		–
			–		–		–		–	+	1	+	1
			1	or	1	or	1	+	1	+	1	or	1
AF09(Z)B..RT ... AF16(Z)B..RT	3 0	1 0	1	or	1	or	1		–	+	1		–
AF26(Z)B..RT ... AF38(Z)B..RT	3 0	0 0	1	or	1		–		–	+	1	+	1
			1	or	1	or	1	+	1	+	1	or	1

Note: Including add-on and built-in contacts : 4 N.C. auxiliary contacts max on positions 1, 2, 3, 4 and 3 N.C. auxiliary contacts max on positions 1+/-30°, 5.

AF50..RT ... AF95B..RT 3-pole contactors

22 to 45 kW

DC operated - connection with ring tongue ferrules

AF50-30-00RT

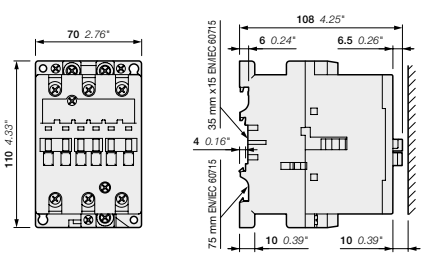
AF95B-30-11RT

AF50..RT ... AF95B..RT 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC (AF95B up to 1000 V AC) and 220 V DC. These contactors are of the block type design with 3 main poles.

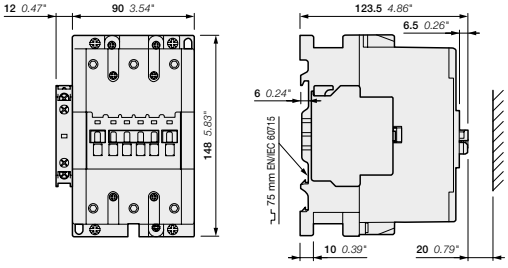
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard (3)
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B) (4)
- fire and smoke safety compliance to european standard EN 45545 (AF50 ... AF75: HL2, HL3; AF95B: HL2 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC		UL / CSA		Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V DC	V DC				kg
22	100	40	80	24, 33, 48	20...60	0 0	AF50-30-00RT (2)	1SBL357010R7200	1.180
				72, 96, 110	48...130	0 0	AF50-30-00RT	1SBL357010R6900	1.180
				220	100...250	0 0	AF50-30-00RT	1SBL357010R7000	1.180
30	115	60	90	24, 33, 48	20...60	0 0	AF63-30-00RT (2)	1SBL377010R7200	1.180
				72, 96, 110	48...130	0 0	AF63-30-00RT	1SBL377010R6900	1.180
				220	100...250	0 0	AF63-30-00RT	1SBL377010R7000	1.180
37	125	60	105	24, 33, 48	20...60	0 0	AF75-30-00RT (2)	1SBL417010R7200	1.180
				72, 96, 110	48...130	0 0	AF75-30-00RT	1SBL417010R6900	1.180
				220	100...250	0 0	AF75-30-00RT	1SBL417010R7000	1.180
45	145	60	125	24, 33, 48	20...60	1 1	AF95B-30-11RT (2)	1SFL437062R7211	2.070
				72, 96, 110	48...130	1 1	AF95B-30-11RT	1SFL437062R6911	2.070
				220	100...250	1 1	AF95B-30-11RT	1SFL437062R7011	2.070

(1) Other control voltages, see voltage code table.
(2) The connection polarities indicated close to the coil terminals must be respected: A1 for the positive pole and A2 for the negative pole.
(3) AF95B: please consult us.
(4) AF95B: shocks and vibration withstand conforming to IEC 61373:1999 (tables 2 and 3, category 1).



AF50..RT, AF63..RT, AF75..RT



AF95B..RT

Main dimensions mm, inches

AF50..RT ... AF95B..RT 3-pole contactors

22 to 45 kW

AC operated - connection with ring tongue ferrules

AF50-30-00RT

AF95B-30-11RT

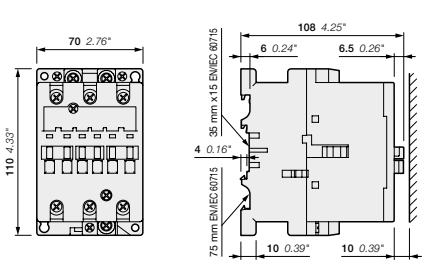
AF50..RT ... AF95B..RT 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC (AF95B up to 1000 V AC) and 220 V DC.

These contactors are of the block type design with 3 main poles.

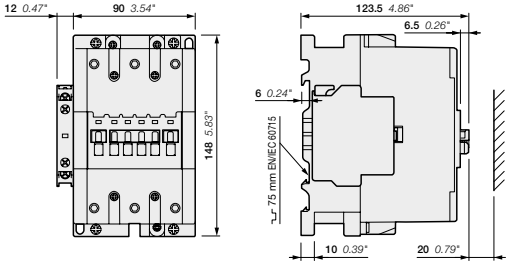
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard (2)
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B) (1)
- fire and smoke safety compliance to european standard EN 45545 (AF50 ... AF75: HL2, HL3; AF95B: HL2 hazard levels)
- electronic coil interface accepting sinusoïdal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data) (2)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code		Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V AC 50/60 Hz					kg
22	100	40	80	48...130	0 0	AF50-30-00RT	1SBL357010R6900		1.180
				100...250	0 0	AF50-30-00RT	1SBL357010R7000		1.180
30	115	60	90	48...130	0 0	AF63-30-00RT	1SBL377010R6900		1.180
				100...250	0 0	AF63-30-00RT	1SBL377010R7000		1.180
37	125	60	105	48...130	0 0	AF75-30-00RT	1SBL417010R6900		1.180
				100...250	0 0	AF75-30-00RT	1SBL417010R7000		1.180
45	145	60	125	48...130	1 1	AF95B-30-11RT	1SFL437062R6911		2.070
				100...250	1 1	AF95B-30-11RT	1SFL437062R7011		2.070

(1) AF95B: shocks and vibration withstand conforming to IEC 61373:1999 (tables 2 and 3, category 1).
(2) AF95B: please consult us.



AF50..RT, AF63..RT, AF75..RT

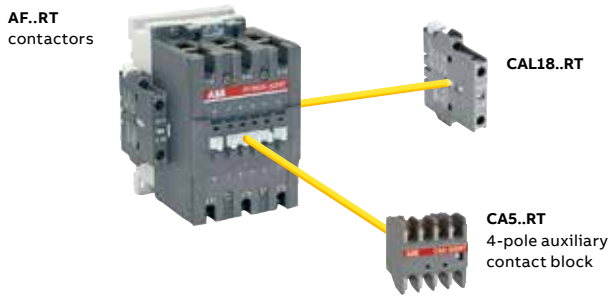


AF95B..RT

Main dimensions mm, inches

AF50..RT ... AF95B..RT 3-pole contactors

Contactors and main accessories



Main accessory fitting details - for ordering details, technical data and other accessories: see section accessories

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor types	Main poles	Available auxiliary contacts	Front-mounted accessories Auxiliary contact blocks 4-pole CA5..RT	Side-mounted accessories Auxiliary contact blocks 2-pole CAL18-11RT
AF50..RT ... AF75..RT	3 0	0 0	1 x CA5..RT (4-pole)	-
AF95B..RT	3 0	1 1	1 x CA5..RT (4-pole) +	1 x CAL18-11RT

AF116B..RT ... AF146B..RT 3-pole contactors

55 to 75 kW

DC operated - connection with ring tongue ferrules

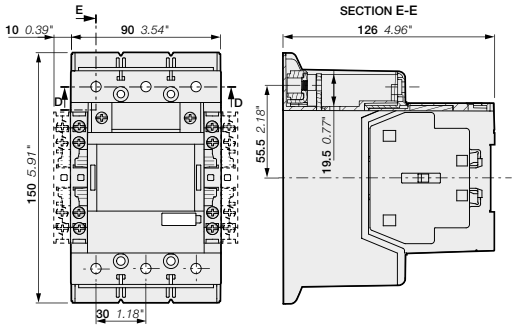
AF146B-30-22RT

AF116B..RT ... AF146B..RT 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. AF116B..RT ... AF140B..RT are mainly used for controlling 3-phase motors and power circuits up to 690 V AC, AF146B..RT up to 1000 V AC and AF116B..RT ... AF146B..RT up to 220 V DC. These contactors are of the block type design with 3 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC		UL / CSA		Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V DC	V DC				kg
55	160	75	160	24, 33, 48	20...60	2 2	AF116B-30-22RT-11	1SFL427062R1122	1.500
				72, 96, 110	48...130	2 2	AF116B-30-22RT-12	1SFL427062R1222	1.500
				220	100...250	2 2	AF116B-30-22RT-13	1SFL427062R1322	1.500
75	200	100	200	24, 33, 48	20...60	2 2	AF140B-30-22RT-11	1SFL447062R1122	1.500
				72, 96, 110	48...130	2 2	AF140B-30-22RT-12	1SFL447062R1222	1.500
				220	100...250	2 2	AF140B-30-22RT-13	1SFL447062R1322	1.500
75	225	100	200	24, 33, 48	20...60	2 2	AF146B-30-22RT-11	1SFL467062R1122	1.500
				72, 96, 110	48...130	2 2	AF146B-30-22RT-12	1SFL467062R1222	1.500
				220	100...250	2 2	AF146B-30-22RT-13	1SFL467062R1322	1.500

(1) Other control voltages, see voltage code table.



AF116B, AF140B, AF146B-30-22RT

Main dimensions mm, inches

AF116B..RT ... AF146B..RT 3-pole contactors

55 to 75 kW

AC operated - connection with ring tongue ferrules

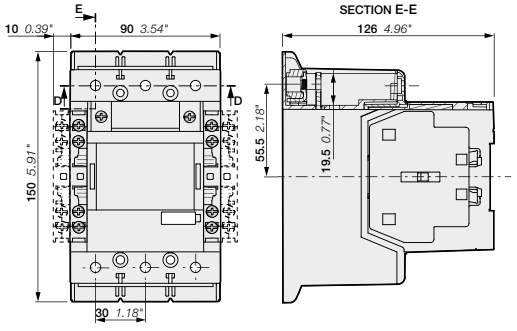
AF146B-30-22RT

AF116B..RT ... AF146B..RT 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. AF116B..RT ... AF140B..RT are mainly used for controlling 3-phase motors and power circuits up to 690 V AC, AF146B..RT up to 1000 V AC and AF116B..RT ... AF146B..RT up to 220 V DC.

These contactors are of the block type design with 3 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max. of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
kW	A	hp	A	V AC 50/60 Hz				kg
55	160	75	160	24...60	2 2	AF116B-30-22RT-11	1SFL427062R1122	1.500
				48...130	2 2	AF116B-30-22RT-12	1SFL427062R1222	1.500
				100...250	2 2	AF116B-30-22RT-13	1SFL427062R1322	1.500
				250...500	2 2	AF116B-30-22RT-14	1SFL427062R1422	1.500
75	200	100	200	24...60	2 2	AF140B-30-22RT-11	1SFL447062R1122	1.500
				48...130	2 2	AF140B-30-22RT-12	1SFL447062R1222	1.500
				100...250	2 2	AF140B-30-22RT-13	1SFL447062R1322	1.500
				250...500	2 2	AF140B-30-22RT-14	1SFL447062R1422	1.500
75	225	100	200	24...60	2 2	AF146B-30-22RT-11	1SFL467062R1122	1.500
				48...130	2 2	AF146B-30-22RT-12	1SFL467062R1222	1.500
				100...250	2 2	AF146B-30-22RT-13	1SFL467062R1322	1.500
				250...500	2 2	AF146B-30-22RT-14	1SFL467062R1422	1.500



AF116B, AF140B, AF146B-30-22RT

Main dimensions mm, inches

AF190B..RT ... AF370B..RT 3-pole contactors

90 to 200 kW

DC operated - connection with ring tongue ferrules

1SFC101205V0001

AF205B-30-22RT

1SFC101207V0001

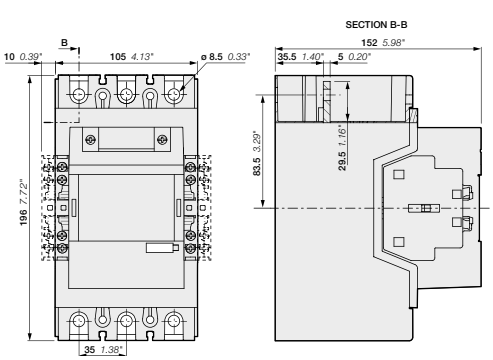
AF370B-30-22RT

AF190B..RT ... AF370B..RT 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC and up to 220 V DC.
These contactors are of the block type design with 3 main poles.

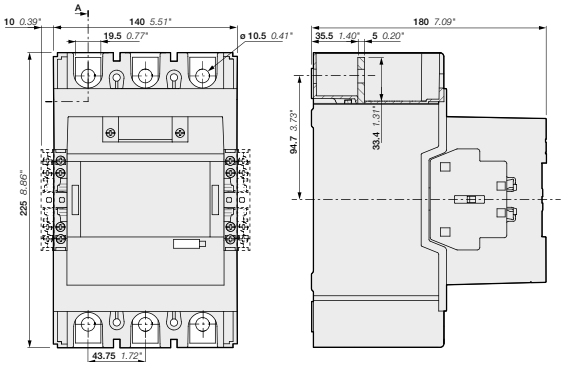
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC		UL / CSA		Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V DC	V DC				kg
90	275	125	250	24, 33, 48	20...60	2 2	AF190B-30-22RT-11	1SFL487062R1122	3.000
				72, 96, 110	48...130	2 2	AF190B-30-22RT-12	1SFL487062R1222	3.000
				220	100...250	2 2	AF190B-30-22RT-13	1SFL487062R1322	3.000
110	350	150	300	24, 33, 48	20...60	2 2	AF205B-30-22RT-11	1SFL527062R1122	3.000
				72, 96, 110	48...130	2 2	AF205B-30-22RT-12	1SFL527062R1222	3.000
				220	100...250	2 2	AF205B-30-22RT-13	1SFL527062R1322	3.000
132	400	200	350	24, 33, 48	20...60	2 2	AF265B-30-22RT-11	1SFL547062R1122	4.675
				72, 96, 110	48...130	2 2	AF265B-30-22RT-12	1SFL547062R1222	4.675
				220	100...250	2 2	AF265B-30-22RT-13	1SFL547062R1322	4.675
160	500	250	400	24, 33, 48	20...60	2 2	AF305B-30-22RT-11	1SFL587062R1122	4.675
				72, 96, 110	48...130	2 2	AF305B-30-22RT-12	1SFL587062R1222	4.675
				220	100...250	2 2	AF305B-30-22RT-13	1SFL587062R1322	4.675
200	600	300	520	24, 33, 48	20...60	2 2	AF370B-30-22RT-11	1SFL607062R1122	4.675
				72, 96, 110	48...130	2 2	AF370B-30-22RT-12	1SFL607062R1222	4.675
				220	100...250	2 2	AF370B-30-22RT-13	1SFL607062R1322	4.675

(1) Other control voltages, see voltage code table.



AF190B, AF205B-30-22RT



AF265B, AF305B, AF370B-30-22RT

Main dimensions mm, inches

AF190B..RT ... AF370B..RT 3-pole contactors

90 to 200 kW

AC operated - connection with ring tongue ferrules

1SFC101205V0001

AF205B-30-22RT

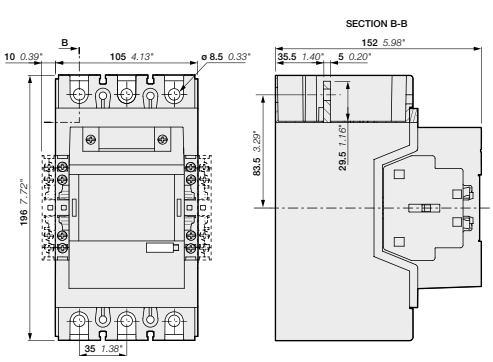
1SFC101207V0001

AF370B-30-22RT

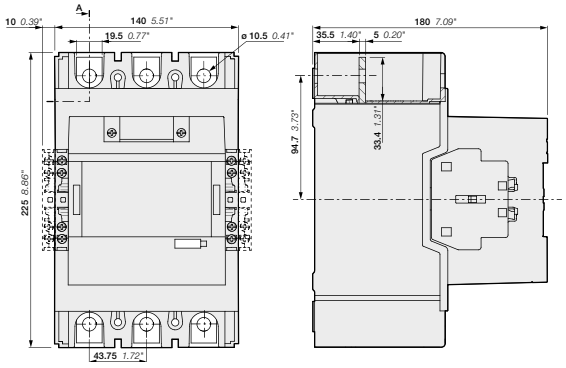
AF190B..RT ... AF370B..RT 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC and up to 220 V DC.
These contactors are of the block type design with 3 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
kW	A	hp	A	V AC 50/60 Hz				kg
90	275	125	250	24...60	2 2	AF190B-30-22RT-11	1SFL487062R1122	3.000
				48...130	2 2	AF190B-30-22RT-12	1SFL487062R1222	3.000
				100...250	2 2	AF190B-30-22RT-13	1SFL487062R1322	3.000
				250...500	2 2	AF190B-30-22RT-14	1SFL487062R1422	3.000
110	350	150	300	24...60	2 2	AF205B-30-22RT-11	1SFL527062R1122	3.000
				48...130	2 2	AF205B-30-22RT-12	1SFL527062R1222	3.000
				100...250	2 2	AF205B-30-22RT-13	1SFL527062R1322	3.000
				250...500	2 2	AF205B-30-22RT-14	1SFL527062R1422	3.000
132	400	200	350	24...60	2 2	AF265B-30-22RT-11	1SFL547062R1122	4.675
				48...130	2 2	AF265B-30-22RT-12	1SFL547062R1222	4.675
				100...250	2 2	AF265B-30-22RT-13	1SFL547062R1322	4.675
				250...500	2 2	AF265B-30-22RT-14	1SFL547062R1422	4.675
160	500	250	400	24...60	2 2	AF305B-30-22RT-11	1SFL587062R1122	4.675
				48...130	2 2	AF305B-30-22RT-12	1SFL587062R1222	4.675
				100...250	2 2	AF305B-30-22RT-13	1SFL587062R1322	4.675
				250...500	2 2	AF305B-30-22RT-14	1SFL587062R1422	4.675
200	600	300	520	24...60	2 2	AF370B-30-22RT-11	1SFL607062R1122	4.675
				48...130	2 2	AF370B-30-22RT-12	1SFL607062R1222	4.675
				100...250	2 2	AF370B-30-22RT-13	1SFL607062R1322	4.675
				250...500	2 2	AF370B-30-22RT-14	1SFL607062R1422	4.675



AF190B, AF205B-30-22RT

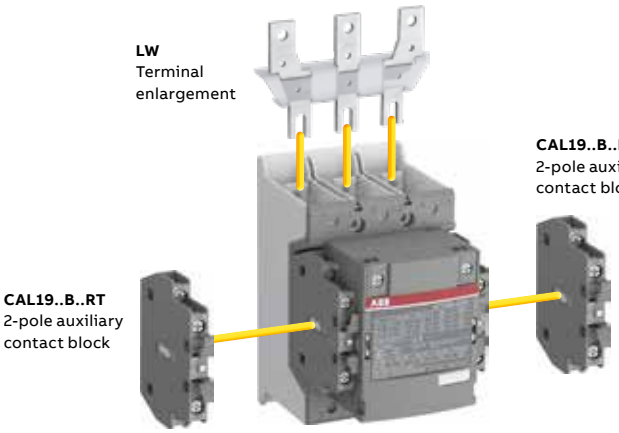


AF265B, AF305B, AF370B-30-22RT

Main dimensions mm, inches

AF116B..RT ... AF370B..RT 3-pole contactors

Contactors and main accessories



Main accessory fitting details - for ordering details, technical data and other accessories: see section accessories

Contactor types	Main poles	Available auxiliary contacts	**Side-mounted accessories** Auxiliary contact blocks			Mechanical interlock units (between two contactors)
			CAL19-11-RT		CAL19-11B-RT	
AF116B..RT ... AF370B..RT	3 0	2 2	2 x CAL19-11-RT included	+	2 x CAL19-11B-RT	-

AF09(Z)B..RT ... AF38(Z)B..RT 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

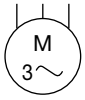
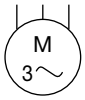
Contactor types		AF09(Z)B..RT	AF12(Z)B..RT	AF16(Z)B..RT	AF26(Z)B..RT	AF30(Z)B..RT	AF38(Z)B..RT
Standards (1)		IEC/EN 60947-1, IEC/EN 60947-4-1 IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), EN 50155 (applicable parts), TR CU 001/2011 IEC 61373					
Fire and smoke		EN 45545-2 (HL2, HL3)					
Rated operational voltage Ue max.		690 V					
Rated frequency (without derating)		50 / 60 Hz					
Conventional free-air thermal current Ith							
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		35 A	35 A	35 A	50 A	50 A	50 A
With conductor cross-sectional area		6 mm²	6 mm²	6 mm²	10 mm²	10 mm²	10 mm²
AC-1 Utilization category							
For air temperature close to contactor							
Ie / Rated operational current AC-1	θ ≤ 40 °C	25 A	28 A	30 A	45 A	50 A	50 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 60 °C	25 A	28 A	30 A	40 A	42 A	42 A
	θ ≤ 70 °C	22 A	24 A	26 A	32 A	37 A	37 A
With conductor cross-sectional area		4 mm²	6 mm²	6 mm²	10 mm²	10 mm²	10 mm²
AC-3, AC-3e Utilization category							
For air temperature close to contactor θ ≤ 60 °C							
Ie / Max. rated operational current AC-3, AC-3e (2)							
3-phase motors	220-230-240 V	9 A	12 A	18 A	26 A	33 A	40 A
	380-400 V	9 A	12 A	18 A	26 A	32 A	38 A
	415 V	9 A	12 A	18 A	26 A	32 A	38 A
	440 V	9 A	12 A	18 A	26 A	32 A	38 A
	500 V	9.5 A	12.5 A	15 A	23 A	28 A	33 A
	690 V	7 A	9 A	10.5 A	17 A	21 A	24 A
Rated operational power AC-3, AC-3e (2)							
1500 r.p.m. 50 Hz 1800 r.p.m. 60 Hz 3-phase motors	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW	11 kW
	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW	18.5 kW
	415 V	4 kW	5.5 kW	9 kW	11 kW	15 kW	18.5 kW
	440 V	4 kW	5.5 kW	9 kW	15 kW	18.5 kW	22 kW
	500 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW	22 kW
	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW	22 kW
Rated making capacity AC-3, AC-3e		10 x Ie AC-3, 12 x Ie AC-3e acc. to IEC 60947-4-1					
Rated breaking capacity AC-3, AC-3e		8 x Ie AC-3, 8.5 x Ie AC-3e acc. to IEC 60947-4-1					
Short-circuit protection device for contactors							
without thermal overload relay - Motor protection excluded (3)							
Ue ≤ 500 V AC - gG type fuse		25 A	32 A	32 A	50 A	63 A	63 A
Rated short-time withstand current Icw	1 s	300 A	300 A	300 A	700 A	700 A	700 A
at 40 °C ambient temperature,	10 s	150 A	150 A	150 A	350 A	350 A	350 A
in free air from a cold state	30 s	80 A	80 A	80 A	225 A	225 A	225 A
	1 min	60 A	60 A	60 A	150 A	150 A	150 A
	15 min	35 A	35 A	35 A	50 A	50 A	50 A
Maximum breaking capacity							
cos φ = 0.45	at 440 V	250 A	250 A	250 A	500 A	500 A	500 A
	at 690 V	106 A	106 A	106 A	200 A	200 A	200 A
Power dissipation per pole	Ie / AC-1	0.8 W	1 W	1.2 W	1.8 W	2.4 W	2.4 W
	Ie / AC-3, AC-3e	0.1 W	0.2 W	0.35 W	0.6 W	0.9 W	1.3 W
Max. electrical switching frequency	AC-1	600 cycles/h					
	AC-3, AC-3e	1200 cycles/h					
	AC-4	300 cycles/h			150 cycles/h		

(1) For compliance confirmation on applicable parts based on your application and combination, please consult your ABB sales representatives.
(2) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".
(3) For the protection of motor starters against short-circuits, see "Coordination with short-circuit protection devices".

AF50..RT ... AF95B..RT 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

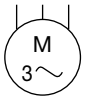
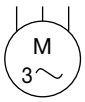
Contactor types		AF50..RT	AF63..RT	AF75..RT	AF95B..RT
Standards (1)		IEC/EN 60947-1, IEC/EN 60947-4-1 IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), EN 50155 (applicable parts), TR CU 001/2011 (on request) IEC 61373			(4)
Fire and smoke		EN 45545-2 (HL2, HL3)			EN 45545-2 (HL2)
Rated operational voltage Ue max.		690 V			1000 V
Rated frequency (without derating)		50/60 Hz			
Conventional free-air thermal current Ith					
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		100 A	115 A	125 A	145 A
With conductor cross-sectional area		2 x 25 mm²	2 x 25 mm²	2 x 25 mm²	50 mm²
AC-1 Utilization category					
For air temperature close to contactor					
Ie / Rated operational current AC-1	θ ≤ 40 °C	100 A	115 A	125 A	145 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 55 °C	85 A	95 A	105 A	135 A
	θ ≤ 70 °C	70 A	80 A	85 A	115 A
With conductor cross-sectional area		2 x 25 mm²	2 x 25 mm²	2 x 25 mm²	50 mm²
Ie / Rated operational current AC-1	θ ≤ 40 °C	80 A	90 A	95 A	-
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 55 °C	68 A	75 A	80 A	-
	θ ≤ 70 °C	55 A	60 A	65 A	-
With conductor cross-sectional area		1 x 25 mm²	1 x 25 mm²	1 x 25 mm²	-
AC-3 Utilization category					
For air temperature close to contactor θ ≤ 55 °C					
Ie / Max. rated operational current AC-3 (2)					
	220-230-240 V	53 A	65 A	75 A	96 A
	380-400 V	50 A	65 A	75 A	96 A
 3-phase motors	415 V	50 A	65 A	75 A	96 A
	440 V	45 A	65 A	70 A	93 A
	500 V	45 A	55 A	65 A	80 A
	690 V	35 A	43 A	46 A	65 A
	1000 V	-	-	-	30 A
Rated operational power AC-3 (2)					
	220-230-240 V	15 kW	18.5 kW	22 kW	25 kW
	380-400 V	22 kW	30 kW	37 kW	45 kW
 1500 r.p.m. 50 Hz 1800 r.p.m. 60 Hz 3-phase motors	415 V	25 kW	37 kW	40 kW	55 kW
	440 V	25 kW	37 kW	40 kW	55 kW
	500 V	30 kW	37 kW	45 kW	55 kW
	690 V	30 kW	37 kW	40 kW	55 kW
	1000 V	-	-	-	40 kW
Rated making capacity AC-3		10 x Ie AC-3 acc. to IEC 60947-4-1			
Rated breaking capacity AC-3		8 x Ie AC-3 acc. to IEC 60947-4-1			
Short-circuit protection device for contactors					
without thermal overload relay - Motor protection excluded (3)					
Ue ≤ 500 V AC - gG type fuse		100 A	125 A	160 A	160 A
Rated short-time withstand current Icw	1 s	1000 A			1320 A
at 40 °C ambient temperature,	10 s	650 A			800 A
in free air from a cold state	30 s	370 A			500 A
	1 min	250 A			350 A
	15 min	110 A	135 A	135 A	160 A
Maximum breaking capacity					
cos φ = 0.45	at 440 V	1300 A			1160 A
(cos φ = 0.35 for Ie > 100 A)	at 690 V	630 A			800 A
Power dissipation per pole	Ie / AC-1	5 W	6.5 W	7 W	6.5 W
	Ie / AC-3	1.3 W	1.5 W	2 W	2.7 W
Max. electrical switching frequency	AC-1	300 cycles/h			
	AC-3	300 cycles/h			
	AC-4	150 cycles/h			

(1) For compliance confirmation on applicable parts based on your application and combination, please consult your ABB sales representatives.
(2) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".
For AC-3e utilization category, please consult your ABB local sales organization.
(3) For the protection of motor starters against short-circuits, see "Coordination with short-circuit protection devices".
(4) AF95B: please consult us.

AF116B..RT ... AF370B..RT 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types		AF116B..RT	AF140B..RT	AF146B..RT	AF190B..RT	AF205B..RT	AF265B..RT	AF305B..RT	AF370B..RT
Standards (1)		IEC/EN 60947-1, IEC/EN 60947-4-1 IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), EN 50155 (applicable parts), TR CU 001/2011 IEC 61373							
Fire and smoke		EN 45545-2 (HL2)							
Rated operational voltage Ue max.		690 V	690 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V
Rated frequency (without derating)		50 / 60 Hz							
Conventional free-air thermal current Ith									
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		160 A	200 A	225 A	275 A	350 A	400 A	500 A	600 A
With conductor cross-sectional area		70 mm²	95 mm²	95 mm²	150 mm²	240 mm² (4)	240 mm²	300 mm² (5)	2 x 185 mm² (5)
AC-1 Utilization category									
For air temperature close to contactor									
Ie / Rated operational current AC-1	θ ≤ 40 °C	160 A	200 A	225 A	275 A	350 A	400 A	500 A	600 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 60 °C	145 A	175 A	200 A	250 A	300 A	350 A	400 A	500 A
	θ ≤ 70 °C	130 A	160 A	175 A	200 A	240 A	290 A	325 A	400 A
Ie / Rated operational current AC-1	θ ≤ 40 °C	–	–	225 A	250 A	275 A	350 A	375 A	400 A
Ue max. ≤ 1000 V, 50/60 Hz	θ ≤ 60 °C	–	–	200 A	225 A	250 A	300 A	325 A	350 A
	θ ≤ 70 °C	–	–	175 A	185 A	200 A	240 A	260 A	290 A
With conductor cross-sectional area		70 mm²	95 mm²	95 mm²	150 mm²	240 mm² (4)	240 mm²	300 mm² (5)	2 x 185 mm² (5)
AC-3 Utilization category									
For air temperature close to contactor θ ≤ 60 °C									
Ie / Max. rated operational current AC-3 (2)									
	220-230-240 V	116 A	140 A	146 A	190 A	205 A	265 A	305 A	370 A
	380-400 V	116 A	140 A	146 A	190 A	205 A	265 A	305 A	370 A
 3-phase motors	415 V	116 A	140 A	146 A	190 A	205 A	265 A	305 A	370 A
	440 V	116 A	140 A	146 A	190 A	205 A	265 A	305 A	370 A
	500 V	110 A	130 A	130 A	135 A	165 A	250 A	290 A	315 A
	690 V	65 A	80 A	93 A	135 A	165 A	250 A	290 A	315 A
	1000 V	–	–	60 A	85 A	100 A	100 A	100 A	100 A
Rated operational power AC-3 (2)									
	220-230-240 V	30 kW	37 kW	45 kW	55 kW	55 kW	75 kW	90 kW	110 kW
	380-400 V	55 kW	75 kW	75 kW	90 kW	110 kW	132 kW	160 kW	200 kW
 1500 r.p.m. 50 Hz 1800 r.p.m. 60 Hz 3-phase motors	415 V	55 kW	75 kW	75 kW	90 kW	110 kW	132 kW	160 kW	200 kW
	440 V	75 kW	90 kW	90 kW	110 kW	132 kW	160 kW	160 kW	200 kW
	500 V	75 kW	90 kW	90 kW	90 kW	110 kW	200 kW	200 kW	250 kW
	690 V	55 kW	75 kW	90 kW	132 kW	160 kW	200 kW	250 kW	315 kW
	1000 V	–	–	75 kW	110 kW	132 kW	132 kW	132 kW	132 kW
Rated making capacity AC-3		10 x Ie AC-3 acc. to IEC 60947-4-1							
Rated breaking capacity AC-3		8 x Ie AC-3 acc. to IEC 60947-4-1							
Short-circuit protection device for contactors									
without thermal overload relay - Motor protection excluded (3)									
Ue ≤ 500 V AC - gG type fuse		250 A	315 A	315 A	355 A	400 A	500 A	500 A	630 A
Rated short-time withstand current Icw	1 s	1300 A	1460 A	1460 A	1900 A	2050 A	2650 A	3050 A	3700 A
at 40 °C ambient temperature,	10 s	928 A	1168 A	1168 A	1520 A	1640 A	2120 A	2440 A	2960 A
in free air from a cold state	30 s	536 A	674 A	674 A	878 A	947 A	1224 A	1409 A	1709 A
	1 min	379 A	477 A	477 A	621 A	670 A	865 A	996 A	1208 A
	15 min	160 A	200 A	225 A	275 A	350 A	400 A	500 A	600 A
Maximum breaking capacity									
cos φ = 0.45	at 440 V	2000 A	3000 A	3000 A	3300 A	3500 A	3800 A	4600 A	5000 A
(cos φ = 0.35 for Ie > 100 A)	at 690 V	1000 A	1500 A	1500 A	2200 A	2500 A	3300 A	3800 A	4000 A
Power dissipation per pole	Ie / AC-1	12 W	18 W	23 W	15 W	25 W	32 W	50 W	72 W
	Ie / AC-3	6 W	9 W	10 W	7 W	8 W	14 W	19 W	27 W
Maximum electrical switching frequency	AC-1	300 cycles/h							
	AC-3	300 cycles/h							
	AC-4	150 cycles/h							

(1) For compliance confirmation on applicable parts based on your application and combination, please consult your ABB sales representatives.
(2) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".
For AC-3e utilization category, please consult your ABB local sales organization.
(3) For the protection of motor starters against short-circuits, see "Coordination with short-circuit protection devices".
(4) For currents above 275A use terminal enlargements or terminal extensions.
(5) For currents above 450A use terminal enlargements or terminal extensions.

AF09(Z)B..RT ... AF38(Z)B..RT 3-pole contactors
Technical data

Main pole - Utilization characteristics according to UL / NEMA / CSA

Contactor types		AF09(Z)B..RT	AF12(Z)B..RT	AF16(Z)B..RT	AF26(Z)B..RT	AF30(Z)B..RT	AF38(Z)B..RT
Standards		UL 508, CSA C22.2 No. 60947-4-1					
Maximum operational voltage		600 V					
NEMA size		00	0	–	1	–	–
NEMA continuous amp rating	Thermal current	9 A	18 A		27 A		
NEMA maximum horse power ratings							
1-phase, 60 Hz	115 V AC	1/3 hp	1 hp		2 hp		
	230 V AC	1 hp	2 hp		3 hp		
NEMA maximum horse power ratings							
3-phase, 60 Hz	200 V AC	1-1/2 hp	3 hp		7-1/2 hp		
	230 V AC	1-1/2 hp	3 hp		7-1/2 hp		
	460 V AC	2 hp	5 hp		10 hp		
	575 V AC	2 hp	5 hp		10 hp		
UL / CSA general use rating							
600 V AC		25 A	28 A	30 A	45 A	50 A	50 A
With conductor cross-sectional area		AWG 10	AWG 10	AWG 10	AWG 8	AWG 8	AWG 8
UL / CSA maximum 1-phase motor rating							
Full load current	120 V AC	13.8 A	16 A	20 A	24 A	24 A	24 A
	240 V AC	10 A	12 A	17 A	17 A	28 A	28 A
Horse power rating	120 V AC	3/4 hp	1 hp	1-1/2 hp	2 hp	2 hp	2 hp
	240 V AC	1-1/2 hp	2 hp	3 hp	3 hp	5 hp	5 hp
UL / CSA maximum 3-phase motor rating							
Full load current (1)	200-208 V AC	7.8 A	11 A	17.5 A	25.3 A	32.2 A	32.2 A
	220-240 V AC	6.8 A	9.6 A	15.2 A	22 A	28 A	28 A
	440-480 V AC	7.6 A	11 A	14 A	21 A	27 A	34 A
	550-600 V AC	9 A	11 A	17 A	22 A	27 A	32 A
Horse power rating (1)	200-208 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp	10 hp
	220-240 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp	10 hp
	440-480 V AC	5 hp	7-1/2 hp	10 hp	15 hp	20 hp	25 hp
	550-600 V AC	7-1/2 hp	10 hp	15 hp	20 hp	25 hp	30 hp
Short-circuit protection device for contactors							
without thermal overload relay - Motor protection excluded							
Fuse rating		30	30	60	60	100	100
Fuse type, 600 V		J					
Maximum electrical switching frequency							
For general use		600					
For motor use		1200					

(1) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see “Motor rated operational powers and currents”.

AF50..RT ... AF95B..RT 3-pole contactors

Technical data

Main pole - Utilization characteristics according to UL / NEMA / CSA

Contactor types		AF50..RT	AF63..RT	AF75..RT	AF95B..RT
Standards		UL 60947-4-1, CSA C22.2 No. 60947-1, CSA C22.2 No. 60947-4-1			
Max. operational voltage		600 V			
NEMA size		2	–	3	–
NEMA continuous amp rating	Thermal current	45 A	–	90 A	–
NEMA maximum horse power ratings					
1-phase, 60 Hz	115 V AC	3 hp	-	–	–
	230 V AC	7-1/2 hp	–	–	–
NEMA maximum horse power ratings					
3-phase, 60 Hz	200 V AC	10 hp	–	25 hp	–
	230 V AC	15 hp	–	30 hp	–
	460 V AC	25 hp	–	50 hp	–
	575 V AC	25 hp	–	50 hp	–
UL / CSA general use rating					
600 V AC		80 A	90 A	105 A	125 A
With conductor cross-sectional area		AWG 4	AWG 3	AWG 2	AWG 1
UL / CSA maximum 1-phase motor rating					
Full load current	120 V AC	34 A	56 A	80 A	80 A
	240 V AC	40 A	50 A	68 A	88 A
Horse power rating	120 V AC	3 hp	5 hp	7.5 hp	7.5 hp
	240 V AC	7.5 hp	10 hp	15 hp	20 hp
UL / CSA maximum 3-phase motor rating					
Full load current (1)	200-208 V AC	48.3 A	62.1 A	78.2 A	92 A
	220-240 V AC	54 A	68 A	80 A	80 A
	440-480 V AC	52 A	77 A	77 A	77 A
	550-600 V AC	52 A	77 A	77 A	77 A
Horse power rating (1)	200-208 V AC	15 hp	20 hp	25 hp	30 hp
	220-240 V AC	20 hp	25 hp	30 hp	30 hp
	440-480 V AC	40 hp	60 hp	60 hp	60 hp
	550-600 V AC	50 hp	75 hp	75 hp	75 hp
Short-circuit protection device for contactors without thermal overload relay - Motor protection excluded					
Fuse rating		175 A	200 A	200 A	200 A
Fuse type, 600 V		FRS-R	J		
Max. electrical switching frequency					
For general use		300 cycles/h			
For motor use		300 cycles/h			

(1) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see “Motor rated operational powers and currents”.

AF116B..RT ... AF370B..RT 3-pole contactors

Technical data

Main pole - Utilization characteristics according to UL / NEMA / CSA

Contactor types		AF116B..RT	AF140B..RT	AF146B..RT	AF190B..RT	AF205B..RT	AF265B..RT	AF305B..RT	AF370B..RT
Standards		UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A							
Maximum operational voltage		600 V		1000 V					
NEMA size		–	4	–	–	–	5	–	–
NEMA continuous amp rating	Thermal current	–	135 A	–	–	–	270 A	–	–
NEMA maximum horse power ratings									
1-phase, 60 Hz	115 V AC	–	–	–	–	–	–	–	–
	230 V AC	–	–	–	–	–	–	–	–
NEMA maximum horse power ratings									
3-phase, 60 Hz	200 V AC	–	40 hp	–	–	–	75 hp	–	–
	230 V AC	–	50 hp	–	–	–	100 hp	–	–
	460 V AC	–	100 hp	–	–	–	200 hp	–	–
	575 V AC	–	100 hp	–	–	–	200 hp	–	–
UL / CSA general use rating									
600 V AC		160 A	200 A	200 A	250 A	300 A	350 A	400 A	520 A
With conductor cross-sectional area		AWG 2/0	AWG 3/0	AWG 3/0	MCM 250	MCM 350 (2)	MCM 500	2//AWG 3/0	2//MCM 300
1000 V AC		–	–	200 A	250 A	300 A	350 A	400 A	520 A
With conductor cross-sectional area		–	–	AWG 3/0	MCM 250	MCM 350 (2)	MCM 500	2//AWG 3/0	2//MCM 300
UL / CSA maximum 1-phase motor rating									
Full load current	120 V AC	–	–	–	–	–	–	–	–
	240 V AC	–	–	–	–	–	–	–	–
Horse power rating	120 V AC	–	–	–	–	–	–	–	–
	240 V AC	–	–	–	–	–	–	–	–
UL / CSA maximum 3-phase motor rating									
Full load current (1)	200-208 V AC	92 A	120 A	120 A	150 A	177 A	221 A	285 A	359 A
	220-240 V AC	104 A	130 A	130 A	154 A	192 A	248 A	312 A	360 A
	440-480 V AC	96 A	124 A	124 A	156 A	180 A	240 A	302 A	361 A
	550-600 V AC	99 A	125 A	125 A	144 A	192 A	242 A	289 A	336 A
Horse power rating (1)	200-208 V AC	30 hp	40 hp	40 hp	50 hp	60 hp	75 hp	100 hp	125 hp
	220-240 V AC	40 hp	50 hp	50 hp	60 hp	75 hp	100 hp	125 hp	150 hp
	440-480 V AC	75 hp	100 hp	100 hp	125 hp	150 hp	200 hp	250 hp	300 hp
	550-600 V AC	100 hp	125 hp	125 hp	150 hp	200 hp	250 hp	300 hp	350 hp
Short-circuit protection device for contactors without thermal overload relay - Motor protection excluded									
High fault current		100 kA							
Fuse rating		225 A	250 A	250 A	350 A	400 A	500 A	600 A	600 A
Fuse type, 600 V		J							
Maximum electrical switching frequency									
For general use		300 cycles/h							
For motor use		300 cycles/h							

(1) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".
(2) For conductor cross-sectional area above MCM 300 use terminal enlargements LW205.

AF09(Z)B..RT ... AF38(Z)B..RT 3-pole contactors

Technical data

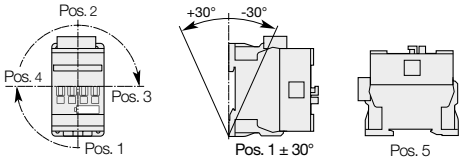
General technical data

Contactor types		AF09(Z)B..RT	AF12(Z)B..RT	AF16(Z)B..RT	AF26(Z)B..RT	AF30(Z)B..RT	AF38(Z)B..RT
Rated insulation voltage Ui							
acc. to IEC 60947-4-1		690 V					
acc. to UL / CSA		600 V					
Rated impulse withstand voltage Uimp.		6 kV					
Pollution degree		3					
Electromagnetic compatibility		Devices complying with IEC/EN 60947-1 - Environment A EN 50121-3-2					
Ambient air temperature close to contactor							
Operation	Fitted with thermal overload relay	-20...+60 °C					
	Without thermal overload relay	-40...+70 °C					
Storage		-60...+80 °C					
Climatic withstand		Category B according to IEC 60947-1 Annex Q					
Maximum operating altitude (without derating)		3000 m					
Mechanical durability							
Number of operating cycles		10 millions operating cycles					
Maximum switching frequency		3600 cycles/h					
Shock and vibration withstand acc. to IEC 61373		Category 1, class B					

Magnet system characteristics

Contactor types		AF09(Z)B..RT	AF12(Z)B..RT	AF16(Z)B..RT	AF26(Z)B..RT	AF30(Z)B..RT	AF38(Z)B..RT
Coil operating limits acc. to IEC 60947-4-1	DC supply	(AF..ZB) at θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max (AF..B) at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max; at θ ≤ 70 °C 0.85 x Uc min ... Uc max					
	AC supply	at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max at θ ≤ 70 °C 0.85 x Uc min ... Uc max					
DC control voltage							
Rated control circuit voltage Uc		20 ... 250 V DC					
Coil consumption	Average pull-in value	(AF..ZB) 12 ... 16 W					
	Average holding value	(AF..ZB) 1.7 W					
PLC-output control		(AF..ZB) ≥ 500 mA 24 V DC					
AC control voltage 50/60 Hz							
Rated control circuit voltage Uc		(AF..ZB) 24 ... 250 V AC - (AF..B) 250 ... 500 V AC					
Coil consumption	Average pull-in value	(AF..ZB) 16 VA - (AF..B) 50 VA					
	Average holding value	(AF..ZB) 1.7 VA / 1.5 W - (AF..B) 2.2 VA / 2 W					
Max. permitted control voltage during voltage fluctuation defined acc. to IEC 60077 / EN 50155		Rated control circuit voltage / Max. permitted control voltage 24 ... 60 V AC 50/60 Hz / 66 V AC 50/60 Hz 48 ... 130 V AC 50/60 Hz / 143 V AC 50/60 Hz 100 ... 250 V AC 50/60 Hz / 275 V AC 50/60 Hz 250 ... 500 V AC 50/60 Hz / 550 V AC 50/60 Hz					
Drop-out voltage		≤ 60 % of Uc min.					
Operating time							
Between coil energization and:	N.O. contact closing	40...95 ms					
	N.C. contact opening	38...90 ms					
Between coil de-energization and:	N.O. contact opening	11...95 ms					
	N.C. contact closing	13...98 ms					

Mounting characteristics and conditions for use

Contactor types	AF09(Z)B..RT	AF12(Z)B..RT	AF16(Z)B..RT	AF26(Z)B..RT	AF30(Z)B..RT	AF38(Z)B..RT
Mounting positions						
	Max. N.C. built-in add add-on N.C. auxiliary contacts : see accessory fitting details for a 3-pole contactor AF09(Z)B ... AF38(Z)B					
Mounting distances	The contactors can be assembled side by side					
Fixing						
On rail according to IEC/EN 60715	35 x 7.5 mm or 35 x 15 mm					
By screws (not supplied)	2 x M4 screws placed diagonally					

AF50..RT ... AF95B..RT 3-pole contactors

Technical data

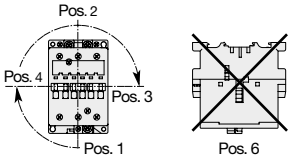
General technical data

Contactor types	AF50..RT	AF63..RT	AF75..RT	AF95B..RT
Rated insulation voltage Ui				
acc. to IEC 60947-4-1	1000 V			
acc. to UL	600 V			
Rated impulse withstand voltage Uimp.	8 kV			
Pollution degree	3			
Electromagnetic compatibility	Devices complying with IEC/EN 60947-1 - Environment A			
Ambient air temperature close to contactor				
Operation Fitted with thermal overload relay	-25...+55 °C			
Without thermal overload relay	-40...+70 °C			
Storage	-60...+80 °C			-40...+70 °C
Climatic withstand	acc. to IEC 60068-2-30 and 60068-2-11 UTE C 63-100 specification II			acc. to IEC 60068-2-30
Maximum operating altitude (without derating)	3000 m			
Mechanical durability				
Number of operating cycles	10 millions operating cycles			
Max. switching frequency	300 cycles/h			
Shock and vibration withstand acc. to IEC 61373	Category 1, class B			IEC 61373: 1999 (tables 2 and 3, category 1)

Magnet system characteristics

Contactor types		AF50..RT	AF63..RT	AF75..RT	AF95B..RT
Coil operating limits acc. to IEC 60947-4-1	AC or DC supply	At θ ≤ 70 °C 0.85 x Uc min...1.1 x Uc max.			
DC control voltage					
Rated control circuit voltage Uc		20...250 V DC			
Coil consumption	Average pull-in value	190 W			400 W
	Average holding value	2.8 W			2 W
AC control voltage 50/60 Hz					
Rated control circuit voltage Uc		48...250 V 50/60 Hz			
Coil consumption	Average pull-in value	210 VA			350 VA
	Average holding value	7 VA / 2.8 W			7 VA / 3.5 W
Max. permitted control voltage during voltage fluctuation defined acc. to IEC 60077 / EN 50155		Rated control circuit voltage / Max. permitted control voltage 48 ... 130 V AC 50/60 Hz / 150 V AC 50/60 Hz 100 ... 250 V AC 50/60 Hz / 275 V AC 50/60 Hz			
Drop-out voltage		55 % of Uc min.			
Operating time					
Between coil energization and:	N.O. contact closing	30...100 ms			30...80 ms
	N.C. contact opening	27...95 ms			27...77 ms
Between coil de-energization and:	N.O. contact opening	30...110 ms			55...125 ms
	N.C. contact closing	35...115 ms			60...130 ms

Mounting characteristics and conditions for use

Contactor types	AF50..RT	AF63..RT	AF75..RT	AF95B..RT
Mounting positions				
	Pos. 1 ± 30°, pos. 5: please consult us. Max. built-in and add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 3-pole contactor AF50..RT ... AF95B..RT			
Mounting distances	The contactors can be assembled side by side			
Fixing				
On rail according to IEC/EN 60715	35 x 15 mm or 75 x 25 mm			-
By screws (not supplied)	2 x M6 screws placed diagonally			

AF116B..RT ... AF370B..RT 3-pole contactors

Technical data

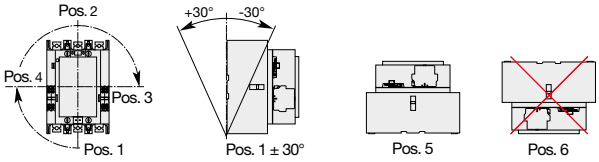
General technical data

Contactor types		AF116B..RT	AF140B..RT	AF146B..RT	AF190B..RT	AF205B..RT	AF265B..RT	AF305B..RT	AF370B..RT
Rated insulation voltage Ui									
acc. to IEC 60947-4-1		1000 V							
acc. to UL / CSA		600 V							
Rated impulse withstand voltage Uimp.		8 kV							
Electromagnetic compatibility		Devices complying with IEC/EN 60947-1 - Environment A							
Pollution degree		3							
Ambient air temperature close to contactor									
Operation	Fitted with thermal overload relay	-25 to +55 °C							
	Without thermal overload relay	-40 to +70 °C							
Storage		-40 to +70 °C							
Climatic withstand		Category B according to IEC 60947-1 Annex Q							
Maximum operating altitude (without derating)		3000 m							
Mechanical durability									
Number of operating cycles		5 million operating cycles							
Maximum switching frequency		300 cycles/h							
Shock and vibration withstand acc to IEC 61373		Category 1, class B							

Magnet system characteristics

Contactor types		AF116B..RT	AF140B..RT	AF146B..RT	AF190B..RT	AF205B..RT	AF265B..RT	AF305B..RT	AF370B..RT
Coil operating limits	AC supply	At θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max							
acc. to IEC 60947-4-1	DC supply	At θ ≤ 70 °C 0.80 x Uc min ... 1.1 x Uc max							
Rated control circuit voltage Uc		24...500 V AC, 20...500 V DC							
Coil consumption									
DC control voltage									
20...60 V DC	Average pull-in value	210 W			205 W		400 W		
	Average holding value	2.5 W			2.5 W		3.5 W		
48...130 V DC	Average pull-in value	130 W			130 W		360 W		
	Average holding value	2.5 W			2.5 W		2.5 W		
100...250 V DC	Average pull-in value	135 W			190 W		410 W		
	Average holding value	3 W			2.5 W		4.5 W		
250...500 V DC	Average pull-in value	205 W			190 W		600 W		
	Average holding value	4 W			4 W		4.7 W		
AC control voltage 50/60 Hz									
24...60 V AC	Average pull-in value	225 VA			165 VA		475 VA		
	Average holding value	5.5 VA			6 VA		8.5 VA		
48...130 V AC	Average pull-in value	170 VA			175 VA		340 VA		
	Average holding value	4 VA			4 VA		17 VA		
100...250 V AC	Average pull-in value	130 VA			220 VA		385 VA		
	Average holding value	6 VA			7 VA		17.5 VA		
250...500 V AC	Average pull-in value	205 VA			185 VA		420 VA		
	Average holding value	16 VA			16 VA		21 VA		
Max. permitted control voltage during voltage fluctuation defined acc. to IEC 60077 / EN 50155		Rated control circuit voltage / Max. permitted control voltage 24 ... 60 V AC 50/60 Hz / 66 V AC 50/60 Hz 48 ... 130 V AC 50/60 Hz / 143 V AC 50/60 Hz 100 ... 250 V AC 50/60 Hz / 275 V AC 50/60 Hz 250 ... 500 V AC 50/60 Hz / 550 V AC 50/60 Hz							
Drop-out voltage		55 % of Uc min							
Operating time									
Coil supply between A1 - A2									
Between coil energization and:	N.O. contact closing	20...55 ms			25...60 ms		30...60 ms		
Between coil de-energization and:	N.C. contact opening	40..70 ms			45...80 ms		45...80 ms		

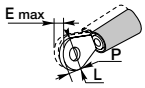
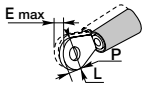
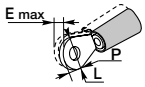
Mounting characteristics and conditions for use

Contactor types	AF116B..RT	AF140B..RT	AF146B..RT	AF190B..RT	AF205B..RT	AF265B..RT	AF305B..RT	AF370B..RT
Mounting positions								
	Max. add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 3-pole contactor AF116B..RT ... AF370B..RT							
Mounting distances	The contactors can be assembled side by side							
Fixing								
On rail acc. to IEC/EN 60715	-							
By screws (not supplied)	4 x M4			4 x M5				

AF09(Z)B..RT ... AF38(Z)B..RT 3–pole contactors

Technical data

Connecting characteristics

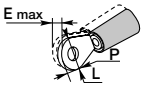
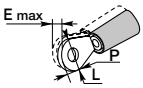
Contactor types		AF09(Z)B..RT	AF12(Z)B..RT	AF16(Z)B..RT	AF26(Z)B..RT	AF30(Z)B..RT	AF38(Z)B..RT
Main terminals		Conductors with insulated ring tongue ferrule					
Connection capacity (min. ... max.)							
Main conductors (poles)							
Flexible with insulated ferrule	1 or 2 x	0.75...6 mm²			1.5...10 mm²		
	Ø mm >	3.5 mm					
	L mm <	9.6 mm			12.8 mm		
	P mm <	5 mm			6.9 mm		
	E mm <	3.6 mm					
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 16...10			AWG 14...8		
Tightening torque		1.2 Nm / 11 lb.in			1.2 Nm / 11 lb.in		
Coil conductors							
Flexible with insulated ferrule	1 or 2 x	0.75...2.5 mm²					
	Ø mm >	3.5 mm					
	L mm <	8 mm					
	P mm <	4.7 mm					
	E mm <	2.9 mm					
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14					
Tightening torque		1.2 Nm / 11 lb.in					
Auxiliary conductors							
Flexible with insulated ferrule	1 or 2 x	0.75...2.5 mm²			-		
	Ø mm >	3.5 mm			-		
	L mm <	9.6 mm			-		
	P mm <	5 mm			-		
	E mm <	3.6 mm			-		
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14					
Tightening torque		1.2 Nm / 11 lb.in			-		
Degree of protection acc. to IEC/EN 60947–1 and IEC/EN 60529							
All terminals		IP10					
Front face		IP20					
Screw terminals		Delivered in open position (1)					
Main terminals		M3.5					
Screwdriver type		Flat Ø 5.5 / Pozidriv 2					
Coil terminals		M3.5					
Screwdriver type		Flat Ø 5.5 / Pozidriv 2					
Built–in auxiliary terminals		M3.5			-		
Screwdriver type		Flat Ø 5.5 / Pozidriv 2					

(1) Screws of unused terminals must be tightened with a max. tightening torque of 0.5 Nm / 4.58 lb.in.

AF50..RT ... AF95B..RT 3–pole contactors

Technical data

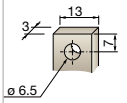
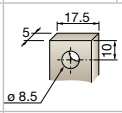
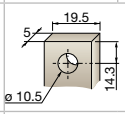
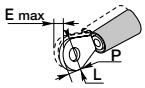
Connecting characteristics

Contactor types		AF50..RT	AF63..RT	AF75..RT	AF95B..RT
Main terminals		Conductors with insulated ring tongue ferrule			
Connection capacity (min. ... max.)					
Main conductors (poles)					
Flexible with insulated ferrule	1 or 2 x	6...25 mm²			6...35 mm²
	Ø mm >	6 mm			6 mm
	L mm <	13 mm			16 mm
	P mm <	6.3 mm			
	E mm <	6 mm			
Tightening torque		4 N.m / 40 lb.in			
Coil conductors					
Flexible with insulated ferrule	1 or 2 x	0.75...2.5 mm²			0.75...2.5 mm²
	Ø mm >	3.5 mm			3.5 mm
	L mm <	8 mm			8 mm
	P mm <	3.9 mm			4.7 mm
	E mm <	2.9 mm			2.9 mm
Tightening torque		1 Nm / 9 lb.in			1 Nm / 9 lb.in
Degree of protection acc. to IEC/EN 60947–1 and IEC/EN 60529					
All terminals		IP10			
Screw terminals		Delivered in open position, screws of unused terminals must be tightened			
Main terminals		M6			M6
Screwdriver type		Flat Ø 5.5 / Pozidriv 2			
Coil terminals		M3.5			M3.5
Screwdriver type		Flat Ø 5.5 / Pozidriv 2			

AF116B..RT ... AF370B..RT 3-pole contactors

Technical data

Connecting characteristics

Contactor types			AF116B..RT	AF140B..RT	AF146B..RT	AF190B..RT	AF205B..RT	AF265B..RT	AF305B..RT	AF370B..RT
Main terminals Flat type										
Connection capacity (min. ... max.)										
Main conductors (poles)										
Cu cable - Stranded		1 x	10...95 mm²			6...150 mm²		16...300 mm²		
Clamp type			LD... not included			1SDA066917R1		1SDA055016R1		
Tightening torque			8 Nm			14 Nm		25 Nm		
Cu cable - Stranded		2 x	10...95 mm²			50...120 mm²		70...185 mm²		
Clamp type			LD... not included			1SFN074709R1000, LZ185-2C/120		1SCA022194R0890, OZXB4		
Tightening torque			8 Nm			16 Nm		22 Nm		
Al cable - Stranded		1 x	-			95...185 mm²		185...240 mm²		
Clamp type			-			1SDA054988R1		1SDA055020R1		
Tightening torque			-			31 Nm		43 Nm		
Cu cable - Flexible		1 x	10...70 mm²			6...120 mm²		16...240 mm²		
Clamp type			LD... not included			1SDA066917R1		1SDA055016R1		
Tightening torque			8 Nm			14 Nm		25 Nm		
Cu cable - Flexible		2 x	10...70 mm²			50...95 mm²		70...185 mm²		
Clamp type			LD... not included			1SFN074709R1000, LZ185-2C/120		1SCA022194R0890, OZXB4		
Tightening torque			8 Nm			16 Nm		22 Nm		
Lugs	L ≤		22 mm (.866 in)			24 mm (.945 in)		32 mm (1.260 in)		
	Ø >		6 mm (.236 in)			8 mm (.315 in)		10 mm (.394 in)		
Socket type			LL... included			LL... included		LL... included		
Tightening torque			9 Nm / 80 lb.in			18 Nm / 160 lb.in		28 Nm / 248 lb.in		
Connection capacity acc. to UL / CSA		1 x	AWG 6...3/0			6...300 MCM		4...400 MCM		
Clamp type			LD... not included			ATK185 (1)		ATK300 (1)		
Tightening torque			8 Nm / 71 lb.in			34 Nm / 301 lb.in		42 Nm / 372 lb.in		
Connection capacity acc. to UL / CSA		2 x	AWG 6...3/0			-		4...500 MCM		
Clamp type			LD... not included			-		ATK300/2 (1)		
Tightening torque			8 Nm / 71 lb.in			-		42 Nm / 372 lb.in		
Coil conductors										
Flexible with insulated ferrule		1 or 2 x	0.75...2.5 mm²							
	Ø mm >		3.5 mm							
	L mm <		8 mm							
	P mm <		4.7 mm							
	E mm <		2.9 mm							
Connection capacity acc. to UL / CSA		1 or 2 x	AWG 18...14							
Tightening torque			1.00 Nm / 9 lb.in							
Degree of protection acc. to IEC/EN 60947–1 and IEC/EN 60529										
Main terminals			IP00							
Coil terminals			IP20							
Screw terminals										
Main terminals			M6			M8		M10		
Screwdriver type			Screws and bolts							
Coil terminals (delivered in open position)			M3.5							
Screwdriver type			Flat Ø 5.5 mm / Pozidriv 2							

(1) Available in North America only.

AF09(Z)B..RT ... AF16(Z)B..RT 3-pole contactors
Technical data

Built-in auxiliary contacts according to IEC

Contactor types		AF09(Z)B..RT	AF12(Z)B..RT	AF16(Z)B..RT
Rated operational voltage Ue max.		690 V		
Rated frequency (without derating)		50 / 60 Hz		
Conventional free air thermal current Ith - θ ≤ 40 °C		16 A		
Ie / Rated operational current AC-15				
acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A		
	220-240 V 50/60 Hz	4 A		
	400-440 V 50/60 Hz	3 A		
	500 V 50/60 Hz	2 A		
	690 V 50/60 Hz	2 A		
Making capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1		
Breaking capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1		
Ie / Rated operational current DC-13				
acc. to IEC 60947-5-1	24 V DC	6 A / 144 W		
	48 V DC	2.8 A / 134 W		
	72 V DC	1 A / 72 W		
	110 V DC	0.55 A / 60 W		
	125 V DC	0.55 A / 69 W		
	220 V DC	0.27 A / 60 W		
	250 V DC	0.27 A / 68 W		
	400 V DC	0.15 A / 60 W		
	500 V DC	0.13 A / 65 W		
	600 V DC	0.1 A / 60 W		
Short-circuit protection device gG type fuse		10 A		
Rated short-time withstand current	for 1.0 s	100 A		
Icw	for 0.1 s	140 A		
Minimum switching capacity		12 V / 3 mA		
with failure rate acc. to IEC 60947-5-4		10^{-7}		
Non-overlapping time between N.O. and N.C. contacts		≥ 2 ms		
Power dissipation per pole at 6 A		0.1 W		
Maximum electrical switching	AC-15	1200 cycles/h		
frequency	DC-13	900 cycles/h		
Mechanically linked contacts acc. to annex L of IEC 60947-5-1		Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts (CA4, CAL4, CAT4 aux. contact blocks) are mechanically linked contacts.		
Mirror contacts acc. to annex F of IEC 60947-4-1		Built-in N.C. auxiliary contacts or additional N.C. auxiliary contacts (CA4, CAL4, CAT4 aux. contact blocks) are mirror contacts.		

Built-in auxiliary contacts according to UL / CSA

Contactor types	AF09(Z)B..RT	AF12(Z)B..RT	AF16(Z)B..RT
Maximum operational voltage	600 V AC, 600 V DC		
Pilot duty	A600, Q600		
AC thermal rated current	10 A		
AC maximum volt-ampere making	7200 VA		
AC w volt-ampere breaking	720 VA		
DC thermal rated current	2.5 A		
DC maximum volt-ampere making-breaking	69 VA		

AF09(Z)B ... AF370B 3-pole contactors

Electrical durability and utilization categories

General

Utilization categories determine the current making and breaking conditions relating to the characteristics of the loads to be controlled by the contactors. International standard IEC 60947-4-1 and European standard EN 60947-4-1 are the standards to be referred to.
If Ic is the current to be broken by the contactor and Ie the rated operational current normally drawn by the load, then:

- Categories AC-1 and AC-3 Ic = Ie
- Category AC-2 Ic = 2.5 x Ie
- Category AC-4 Ic = 6 x Ie

Generally speaking Ic = m x Ie where m is a multiple of the load operational current.

On next pages, the curves corresponding to categories AC-1, AC-3 and AC-4 represent the electrical durability variation of standard contactors in relation to the breaking current Ic. Electrical durability is expressed in millions of operating cycles.

Curve utilization mode

Electrical durability forecast and contactor selection for categories AC-1, AC-2, AC-3 or AC-4

Characteristics	Load to be controlled
Operational voltage	Ue
Current normally drawn	Ie (Ue / Ie / kW relation for motors, see "Motor rated operational powers and currents")
Utilization category	AC-1, AC-2, AC-3 or AC-4
Breaking current	Ic = Ie for AC-1 and for AC-3 ; Ic = 2.5 x Ie for AC-2 ; Ic = 6 x Ie for AC-4

- Define the number of operating cycles N required.
- On the diagram corresponding to the operational category, select the contactor with the curve immediately above the intersection point (Ic ; N).

Electrical durability forecast and contactor selection for mixed duty motor control: AC-3 (Ic = Ie) type switching off while "motor running" and, occasionally, AC-4 (Ic = 6 x Ie) type switching off while "motor accelerating"

Characteristics	Load to be controlled
Operational voltage	Ue
Current normally drawn while "motor running"	Ie (Ue / Ie / kW relation for motors, see "Motor rated operational powers and currents")
Utilization category	AC-1, AC-2, AC-3 or AC-4
Breaking current for AC-3	Ic = Ie
Breaking current for AC-4 while "motor accelerating"	Ic = 6 x Ie
Percentage of AC-4 operating cycles	K (on the basis of the total number of operating cycles)

- Define the total number of operating cycles N required.
- Note the smallest contactor rating compatible for AC-3 (Ue / Ie) on Main pole utilization characteristic table (see “Technical data”).
- For the selected contactor make a note of the following in relation to the voltage using diagram AC-3 in next pages:
  - The number of operating cycles A for Ic = Ie (AC-3)
  - The number of operating cycles B for Ic = 6 x Ie (AC-4)
- Calculate the estimated number of cycles N’ (N’ is always below A)

$$N' = \frac{A}{1 + 0.01\ K\ (A/B - 1)}$$

- If N' is too low in relation to the target N, calculate the estimated number of cycles for a higher contactor rating.

Case of uninterrupted duty

For uninterrupted duty, some verifications of preventing maintenance are necessary to check the functionality of the concerned product (consult us).
The combinated effect of environmental conditions and the proper temperature of the product may require some disposals. As a matter of fact, for this duty, the use duration prevails over the number of operating cycles.

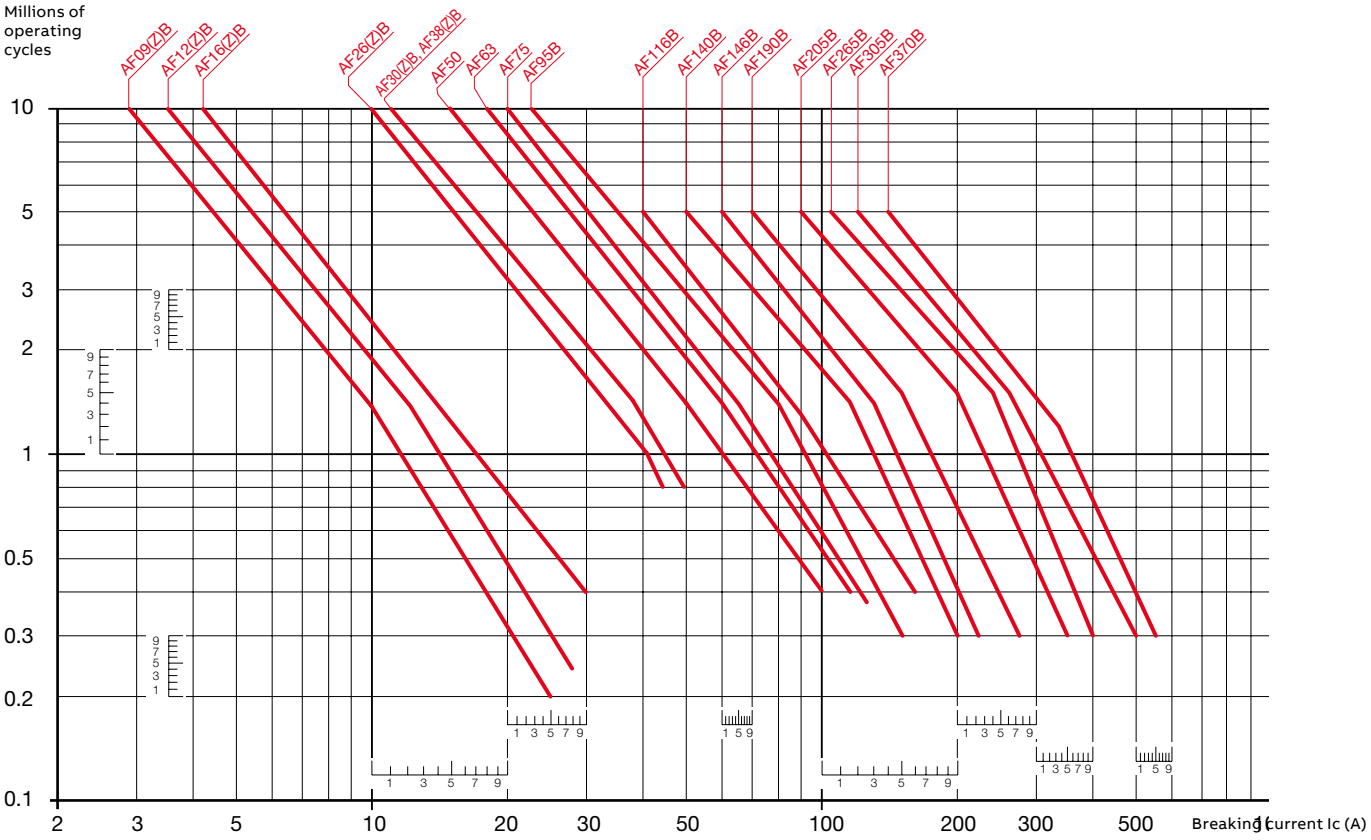
AF09(Z)B ... AF370B 3-pole contactors

Electrical durability

Electrical durability for AC-1 utilization category - Ue ≤ 690 V

Switching non-inductive or slightly inductive loads. The breaking current Ic for AC-1 is equal to the rated operational current of the load.

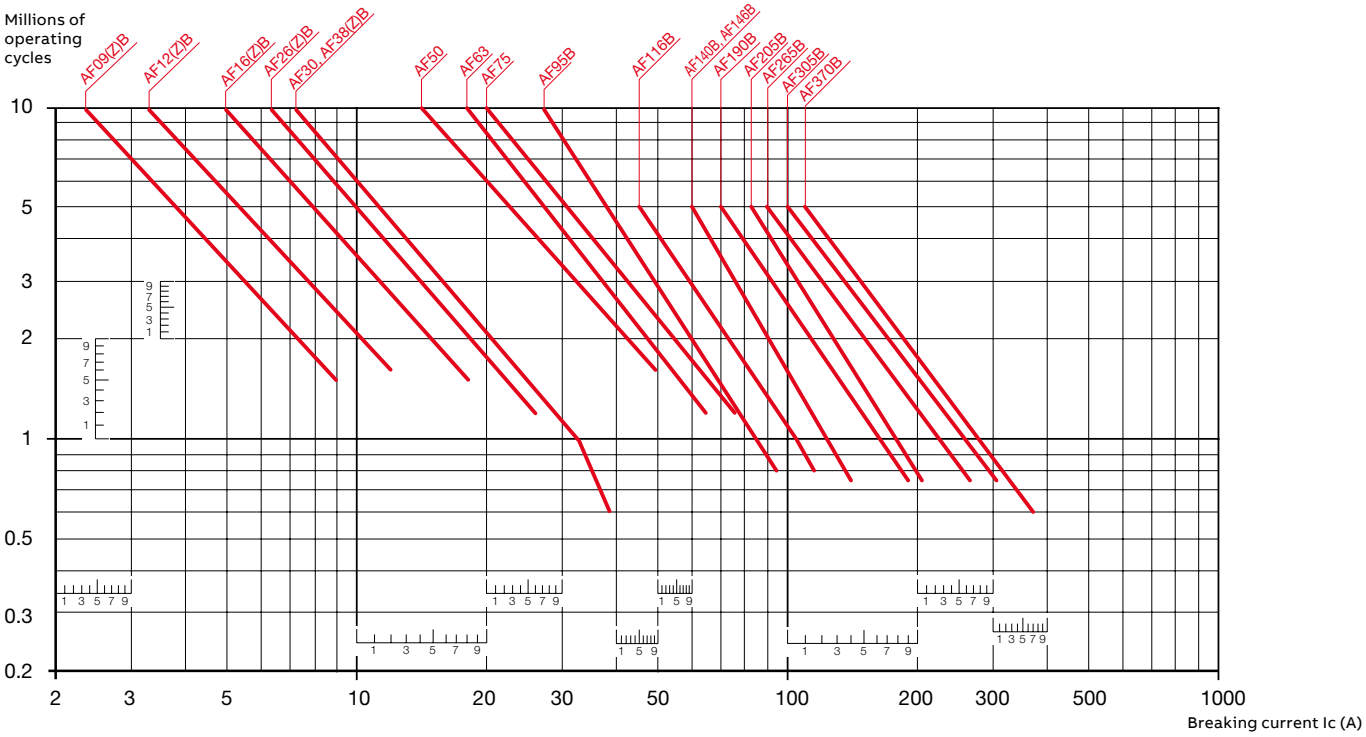
Ambient temperature and maximum electrical switching frequency: see "Technical data".



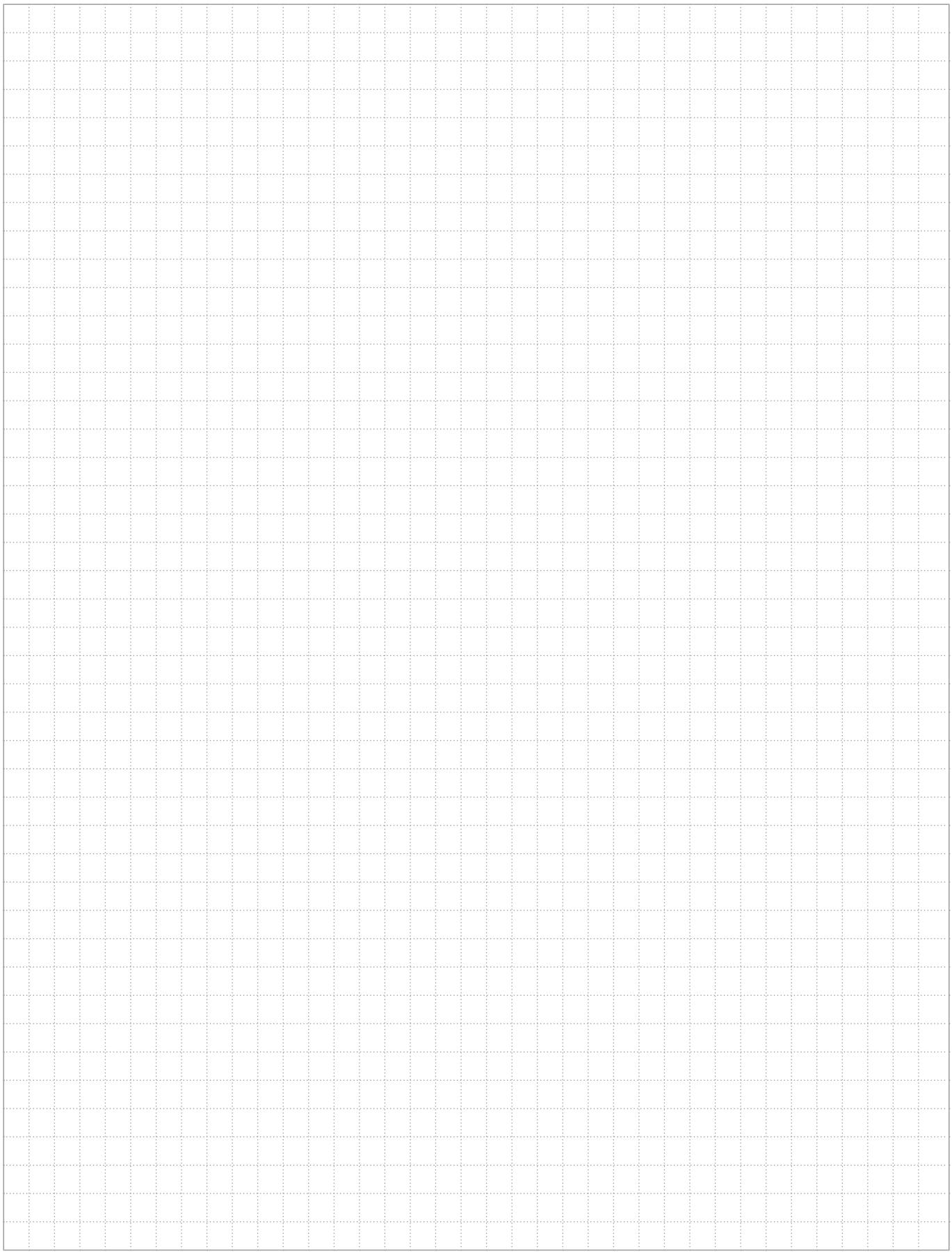
AF09(Z)B ... AF370B 3-pole contactors

Electrical durability

Electrical durability for AC-3 utilization category - Ue ≤ 440 V.
Switching cage motors: starting and switching off running motors. The breaking current Ic for AC-3 is equal to the rated operational current Ie (Ie = motor full load current).
Ambient temperature and maximum electrical switching frequency: see "Technical data".



Notes



AF..B..RT 4-pole contactors connection with ring tongue ferrules

4/36	AF09ZB..RT ... AF38ZB..RT	DC operated
4/37	AF09(Z)B..RT ... AF38(Z)B..RT	AC operated
4/39	AF45..RT ... AF75B..RT	DC operated
4/40	AF45..RT ... AF75B..RT	AC operated
4/42	AF116B..RT ... AF140B..RT	DC operated
4/43	AF116B..RT ... AF140B..RT	AC operated
4/44	AF190B..RT ... AF370B..RT	DC operated
4/45	AF190B..RT ... AF370B..RT	AC operated
4/47	Technical data	
4/59	Electrical durability	
4/61	Contactors for DC switching applications	

For direct product details information, use product type or order code, ex:

www.abb.com/productdetails/**AF09-30-10-13**
or www.abb.com/productdetails/**1SBL137001R1310**

AF09ZB..RT ... AF38ZB..RT 4-pole contactors

25 to 55 A AC-1

DC operated - connection with ring tongue ferrules

AF09ZB-40-00RT

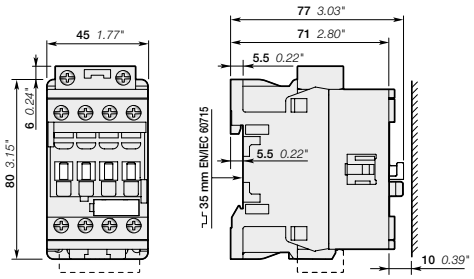
AF09ZB..RT ... AF38ZB..RT 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds.
They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling power circuits up to 690 V AC and 440 V DC. These contactors are of the block type design with 4 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

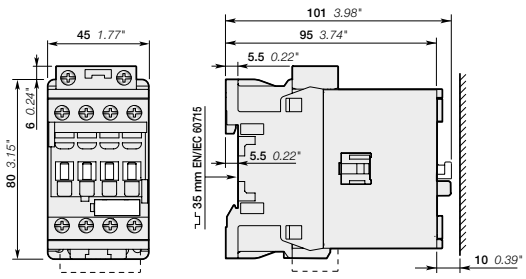
AF26ZB-40-00RT

IEC	UL / CSA	Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current θ ≤ 40 °C AC-1	General use rating 600 V AC						Pkg (1 pce)
A	A	V DC	V DC				kg
4 N.O. main poles							
25	25	24, 33, 48	20...60	0 0	AF09ZB-40-00RT-21	1SBL136260R2100	0.320
		72, 96, 110	48...130	0 0	AF09ZB-40-00RT-22	1SBL136260R2200	0.320
		220	100...250	0 0	AF09ZB-40-00RT-23	1SBL136260R2300	0.320
30	30	24, 33, 48	20...60	0 0	AF16ZB-40-00RT-21	1SBL176260R2100	0.320
		72, 96, 110	48...130	0 0	AF16ZB-40-00RT-22	1SBL176260R2200	0.320
		220	100...250	0 0	AF16ZB-40-00RT-23	1SBL176260R2300	0.320
45	45	24, 33, 48	20...60	0 0	AF26ZB-40-00RT-21	1SBL236260R2100	0.390
		72, 96, 110	48...130	0 0	AF26ZB-40-00RT-22	1SBL236260R2200	0.390
		220	100...250	0 0	AF26ZB-40-00RT-23	1SBL236260R2300	0.390
55	55	24, 33, 48	20...60	0 0	AF38ZB-40-00RT-21	1SBL296260R2100	0.390
		72, 96, 110	48...130	0 0	AF38ZB-40-00RT-22	1SBL296260R2200	0.390
		220	100...250	0 0	AF38ZB-40-00RT-23	1SBL296260R2300	0.390
2 N.O. + 2 N.C. main poles							
25	25	24, 33, 48	20...60	0 0	AF09ZB-22-00RT-21	1SBL136560R2100	0.320
		72, 96, 110	48...130	0 0	AF09ZB-22-00RT-22	1SBL136560R2200	0.320
		220	100...250	0 0	AF09ZB-22-00RT-23	1SBL136560R2300	0.320
30	30	24, 33, 48	20...60	0 0	AF16ZB-22-00RT-21	1SBL176560R2100	0.320
		72, 96, 110	48...130	0 0	AF16ZB-22-00RT-22	1SBL176560R2200	0.320
		220	100...250	0 0	AF16ZB-22-00RT-23	1SBL176560R2300	0.320
45	45	24, 33, 48	20...60	0 0	AF26ZB-22-00RT-21	1SBL236560R2100	0.390
		72, 96, 110	48...130	0 0	AF26ZB-22-00RT-22	1SBL236560R2200	0.390
		220	100...250	0 0	AF26ZB-22-00RT-23	1SBL236560R2300	0.390
55	55	24, 33, 48	20...60	0 0	AF38ZB-22-00RT-21	1SBL296560R2100	0.390
		72, 96, 110	48...130	0 0	AF38ZB-22-00RT-22	1SBL296560R2200	0.390
		220	100...250	0 0	AF38ZB-22-00RT-23	1SBL296560R2300	0.390

(1) Other control voltages, see voltage code table.



AF09ZB..RT, AF16ZB..RT



AF26ZB..RT, AF38ZB..RT

Main dimensions mm, inches

AF09(Z)B..RT ... AF38(Z)B..RT 4-pole contactors

25 to 55 A AC-1

AC operated - connection with ring tongue ferrules

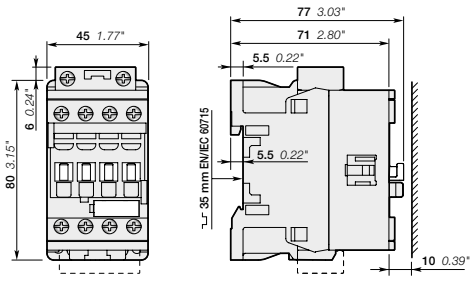
AF09(Z)B-40-00RT

AF26(Z)B-40-00RT

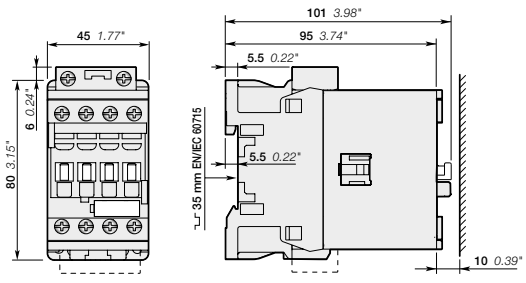
AF09(Z)B..RT ... AF38(Z)B..RT 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling power circuits up to 690 V AC and 440 V DC. These contactors are of the block type design with 4 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max. of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression and side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC Rated operational current θ ≤ 40 °C AC-1 A	UL / CSA General use rating 600 V AC A	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1) V AC 50/60 Hz	Auxiliary contacts fitted		Type	Order code	Weight Pkg (1 pce) kg
4 N.O. main poles							
25	25	24...60	0	0	AF09ZB-40-00RT-21	1SBL136260R2100	0.320
		48...130	0	0	AF09ZB-40-00RT-22	1SBL136260R2200	0.320
		100...250	0	0	AF09ZB-40-00RT-23	1SBL136260R2300	0.320
		250...500	0	0	AF09B-40-00RT-14	1SBL137260R1400	0.320
30	30	24...60	0	0	AF16ZB-40-00RT-21	1SBL176260R2100	0.320
		48...130	0	0	AF16ZB-40-00RT-22	1SBL176260R2200	0.320
		100...250	0	0	AF16ZB-40-00RT-23	1SBL176260R2300	0.320
		250...500	0	0	AF16B-40-00RT-14	1SBL177260R1400	0.320
45	45	24...60	0	0	AF26ZB-40-00RT-21	1SBL236260R2100	0.390
		48...130	0	0	AF26ZB-40-00RT-22	1SBL236260R2200	0.390
		100...250	0	0	AF26ZB-40-00RT-23	1SBL236260R2300	0.390
		250...500	0	0	AF26B-40-00RT-14	1SBL237260R1400	0.390
55	55	24...60	0	0	AF38ZB-40-00RT-21	1SBL296260R2100	0.390
		48...130	0	0	AF38ZB-40-00RT-22	1SBL296260R2200	0.390
		100...250	0	0	AF38ZB-40-00RT-23	1SBL296260R2300	0.390
		250...500	0	0	AF38B-40-00RT-14	1SBL297260R1400	0.390
2 N.O. + 2 N.C. main poles							
25	25	24...60	0	0	AF09ZB-22-00RT-21	1SBL136560R2100	0.320
		48...130	0	0	AF09ZB-22-00RT-22	1SBL136560R2200	0.320
		100...250	0	0	AF09ZB-22-00RT-23	1SBL136560R2300	0.320
		250...500	0	0	AF09B-22-00RT-14	1SBL137560R1400	0.320
30	30	24...60	0	0	AF16ZB-22-00RT-21	1SBL176560R2100	0.320
		48...130	0	0	AF16ZB-22-00RT-22	1SBL176560R2200	0.320
		100...250	0	0	AF16ZB-22-00RT-23	1SBL176560R2300	0.320
		250...500	0	0	AF16B-22-00RT-14	1SBL177560R1400	0.320
45	45	24...60	0	0	AF26ZB-22-00RT-21	1SBL236560R2100	0.390
		48...130	0	0	AF26ZB-22-00RT-22	1SBL236560R2200	0.390
		100...250	0	0	AF26ZB-22-00RT-23	1SBL236560R2300	0.390
		250...500	0	0	AF26B-22-00RT-14	1SBL237560R1400	0,390
55	55	24...60	0	0	AF38ZB-22-00RT-21	1SBL296560R2100	0.390
		48...130	0	0	AF38ZB-22-00RT-22	1SBL296560R2200	0.390
		100...250	0	0	AF38ZB-22-00RT-23	1SBL296560R2300	0.390
		250...500	0	0	AF38B-22-00RT-14	1SBL297560R1400	0.390



AF09(Z)B..RT, AF16(Z)B..RT

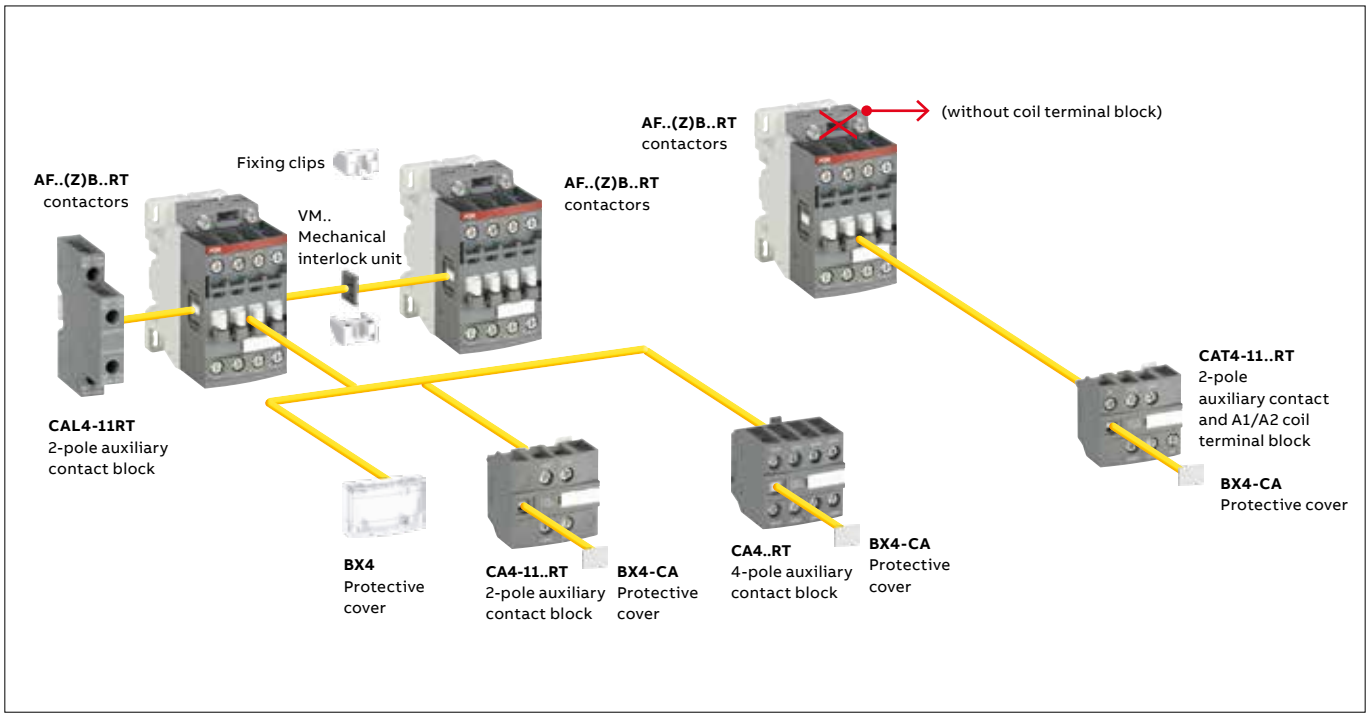


AF26(Z)B..RT, AF38(Z)B..RT

Main dimensions mm, inches

AF09(Z)B..RT ... AF38(Z)B..RT 4-pole contactors

Contactors and main accessories



Main accessory fitting details - for ordering details, technical data and other accessories: see section accessories

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor types	Main poles	Built-in auxiliary contacts	Front-mounted accessories Auxiliary contact blocks 2-pole CA4-11..RT		2-pole CAT4-11..RT		4-pole CA4..RT		Mechanical interlocking unit (between 2 contactors) VM4		Side-mounted accessories Auxiliary contact blocks Left side 2-pole CAL4-11RT		Right side
AF09(Z)B..RT ... AF16(Z)B..RT	4 0	0 0 (1)	1	or	1	or	1		–	+	1		–
			1	or	1		–		–	+	1	+	1
			1	or	1	or	1	+	1	+	1	or	1
AF26(Z)B..RT ... AF38(Z)BRT	4 0	0 0 (2)	1	or	1	or	1		–	+	1		–
			1	or	1		–		–	+	1	+	1
			1	or	1	or	1	+	1	+	1	or	1
AF09(Z)B..RT, AF16(Z)B..RT	2 2	0 0 (2)	1	or	1	or	1		–	+	1		–
AF26(Z)B..RT, AF38(Z)B..RT	2 2	0 0 (2)	1	or	1		–		–	+	1	+	1

(1) Including add-on contacts: 4 N.C. auxiliary contacts max. on positions 1, 2, 3, 4 and 3 N.C. auxiliary contacts max on positions 1+/-30°, 5.
(2) Including add-on contacts: 3 N.C. auxiliary contacts max. on positions 1, 2, 3, 4 and 2 N.C. auxiliary contacts max on positions 1+/-30°, 5.

AF45..RT ... AF75..RT 4-pole contactors

100 to 125 A AC-1

DC operated - connection with ring tongue ferrules

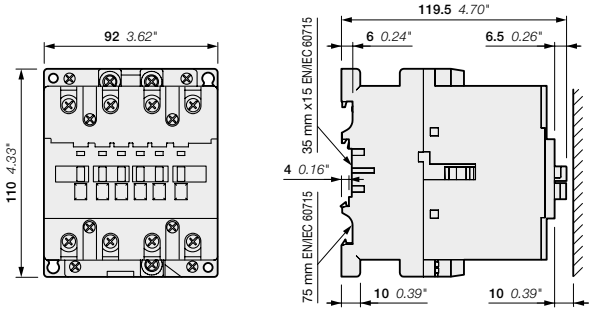
AF75-40-00RT

AF45..RT, AF75..RT 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling non-iductive or slightly inductive loads and generally for controlling power circuits up to 690 V AC and up to 220 V DC. These contactors are of the block
type design with 4 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IE 60077) used for battery supply
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC Rated operational current θ ≤ 40 °C AC-1 A	UL / CSA General use rating 600 V AC A	Supply control voltage Uc (IEC 60077) (1) V DC	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1) V DC	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
4 N.O. main poles							
100	80	24, 33, 48	20...60	0 0	AF45-40-00RT (2)	1SBL337210R7200	1.420
		72, 96, 110	48...130	0 0	AF45-40-00RT	1SBL337210R6900	1.420
		220	100...250	0 0	AF45-40-00RT	1SBL337210R7000	1.420
125	105	24, 33, 48	20...60	0 0	AF75-40-00RT (2)	1SBL417210R7200	1.420
		72, 96, 110	48...130	0 0	AF75-40-00RT	1SBL417210R6900	1.420
		220	100...250	0 0	AF75-40-00RT	1SBL417210R7000	1.420
2 N.O. + 2 N.C. main poles (3)							
100	80	24, 33, 48	20...60	0 0	AF45-22-00RT (2) (4)	1SBL337562R9001	1.420
125	105	72, 96, 110	48...130	0 0	AF75-22-00RT	1SBL417510R6900	1.420

(1) Other control voltages, see voltage code table.
(2) The connection polarities indicated close to the coil terminals must be respected: A1 for the positive pole and A2 for the negative pole.
(3) Other control voltages, on request.
(4) Main contact terminal M5.



AF45..RT, AF75..RT

Main dimensions mm, inches

AF45..RT ... AF75..RT 4-pole contactors

100 to 125 A AC-1

AC operated - connection with ring tongue ferrules

1SBC590077F0304

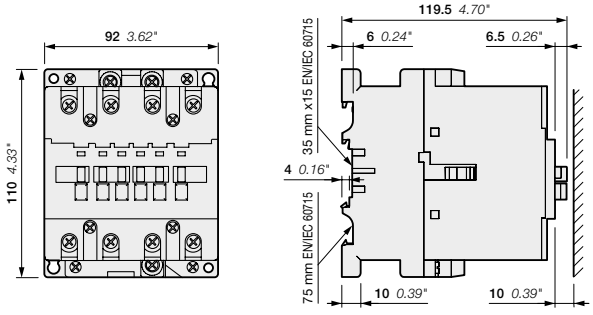
AF75-40-00RT

AF45..RT, AF75..RT 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling non-iductive or slightly inductive loads and generally for controlling power circuits up to 690 V AC and up to 220 V DC. These contactors are of the block type design with 4 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting sinusoïdal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC	UL / CSA	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current θ ≤ 40 °C AC-1	General use rating 600 V AC					Pkg (1 pce)
A	A	V AC 50/60 Hz				kg
4 N.O. main poles						
100	80	48...130	0 0	AF45-40-00RT	1SBL337210R6900	1.420
		100...250	0 0	AF45-40-00RT	1SBL337210R7000	1.420
125	105	48...130	0 0	AF75-40-00RT	1SBL417210R6900	1.420
		100...250	0 0	AF75-40-00RT	1SBL417210R7000	1.420
2 N.O. + 2 N.C. main poles (1)						
125	105	48...130	0 0	AF75-22-00RT	1SBL417510R6900	1.420

(1) Other control voltages on request.

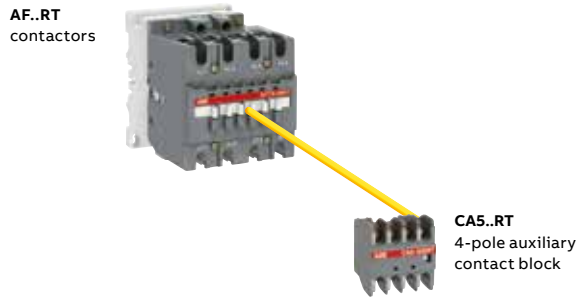


AF45..RT, AF75..RT

Main dimensions mm, inches

AF45..RT ... AF75..RT 4-pole contactors

Contactors and main accessories



Main accessory fitting details - for ordering details, technical data and other accessories: see section accessories

Contactor types	Main poles	Available auxiliary contacts	Front-mounted accessories Auxiliary contact blocks 4-pole CA5..RT
AF45..RT ... AF75..RT	4 0 2 2	0 0 0 0	1 x CA5..RT

AF116B..RT ... AF140B..RT 4-pole contactors

160 to 200 A AC-1

DC operated - connection with ring tongue ferrules

1SFC101203V0001

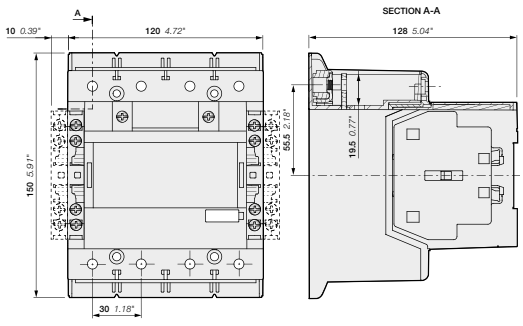
AF140B-40-22RT

AF116B..RT ... AF140B..RT 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds.
They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling power circuits up to 690 V AC and up to 220 V DC. These contactors are of the block type design with 4 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC Rated operational current θ ≤ 40 °C AC-1	UL / CSA General use rating 600 V AC	Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
A	A	V DC	V DC				kg
4 N.O. main poles							
160	160	24, 33, 48	20...60	2 2	AF116B-40-22RT-11	1SFL427262R1122	2.190
		72, 96, 110	48...130	2 2	AF116B-40-22RT-12	1SFL427262R1222	2.190
		220	100...250	2 2	AF116B-40-22RT-13	1SFL427262R1322	2.190
200	175	24, 33, 48	20...60	2 2	AF140B-40-22RT-11	1SFL447262R1122	2.190
		72, 96, 110	48...130	2 2	AF140B-40-22RT-12	1SFL447262R1222	2.190
		220	100...250	2 2	AF140B-40-22RT-13	1SFL447262R1322	2.190

(1) Other control voltages, see voltage code table.



AF116B, AF140B-40-22RT

Main dimensions mm, inches

AF116B..RT ... AF140B..RT 4-pole contactors

160 to 200 A AC-1

AC operated - connection with ring tongue ferrules

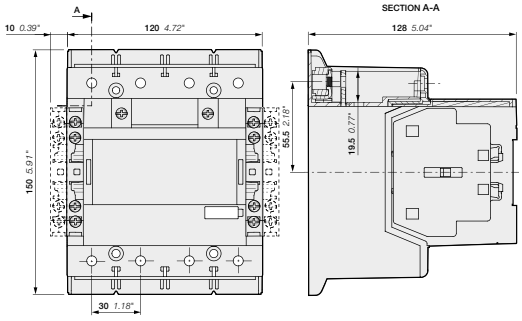
1SFC101203V0001

AF140B-40-22RT

AF116B..RT ... AF140B..RT 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds.
They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling power circuits up to 690 V AC and up to 220 V DC. These contactors are of the block type design with 4 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max. of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC	UL / CSA	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted		Type	Order code	Weight
Rated operational current θ ≤ 40 °C AC-1	General use rating 600 V AC						Pkg (1 pce)
A	A	V AC 50/60 Hz					kg
4 N.O. main poles							
160	160	24...60	2	2	AF116B-40-22RT-11	1SFL427262R1122	2.190
		48...130	2	2	AF116B-40-22RT-12	1SFL427262R1222	2.190
		100...250	2	2	AF116B-40-22RT-13	1SFL427262R1322	2.190
		250...500	2	2	AF116B-40-22RT-14	1SFL427262R1422	2.190
200	175	24...60	2	2	AF140B-40-22RT-11	1SFL447262R1122	2.190
		48...130	2	2	AF140B-40-22RT-12	1SFL447262R1222	2.190
		100...250	2	2	AF140B-40-22RT-13	1SFL447262R1322	2.190
		250...500	2	2	AF140B-40-22RT-14	1SFL447262R1422	2.190



AF116B, AF140B-40-22RT

Main dimensions mm, inches

AF190B..RT ... AF370B..RT 4-pole contactors

275 to 525 A AC-1

DC operated - connection with ring tongue ferrules

1SFC101206V0001

AF205B-40-22RT

1SFC101208V0001

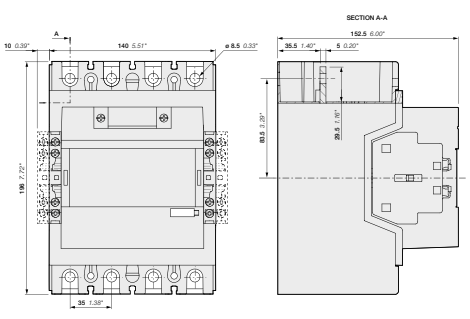
AF370B-40-22RT

AF190B..RT ... AF370B..RT 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds.
They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling power circuits up to 1000 V AC and up to 220 V DC. These contactors are of the block type design with 4 main poles.

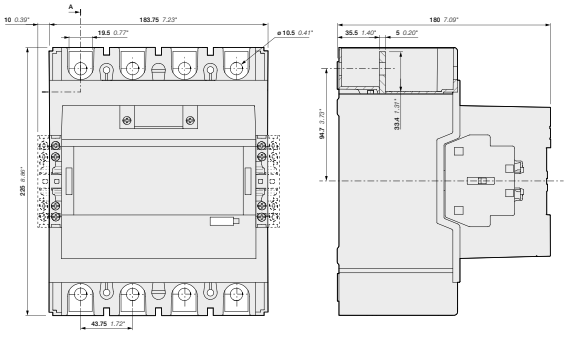
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC	UL / CSA	Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted		Type	Order code	Weight
Rated operational current θ ≤ 40 °C AC-1	General use rating 600 V AC							Pkg (1 pce)
A	A	V DC	V DC					kg
4 N.O. main poles								
275	230	24, 33, 48	20...60	2	2	AF190B-40-22RT-11	1SFL487262R1122	3.940
		72, 96, 110	48...130	2	2	AF190B-40-22RT-12	1SFL487262R1222	3.940
		220	100...250	2	2	AF190B-40-22RT-13	1SFL487262R1322	3.940
350	250	24, 33, 48	20...60	2	2	AF205B-40-22RT-11	1SFL527262R1122	3.940
		72, 96, 110	48...130	2	2	AF205B-40-22RT-12	1SFL527262R1222	3.940
		220	100...250	2	2	AF205B-40-22RT-13	1SFL527262R1322	3.940
400	300	24, 33, 48	20...60	2	2	AF265B-40-22RT-11	1SFL547262R1122	6.400
		72, 96, 110	48...130	2	2	AF265B-40-22RT-12	1SFL547262R1222	6.400
		220	100...250	2	2	AF265B-40-22RT-13	1SFL547262R1322	6.400
500	350	24, 33, 48	20...60	2	2	AF305B-40-22RT-11	1SFL587262R1122	6.400
		72, 96, 110	48...130	2	2	AF305B-40-22RT-12	1SFL587262R1222	6.400
		220	100...250	2	2	AF305B-40-22RT-13	1SFL587262R1322	6.400
525	420	24, 33, 48	20...60	2	2	AF370B-40-22RT-11	1SFL607262R1122	6.400
		72, 96, 110	48...130	2	2	AF370B-40-22RT-12	1SFL607262R1222	6.400
		220	100...250	2	2	AF370B-40-22RT-13	1SFL607262R1322	6.400

(1) Other control voltages, see voltage code table.



AF190B, AF205B-40-22RT



AF265B, AF305B, AF370B-40-22RT

Main dimensions mm, inches

AF190B..RT ... AF370B..RT 4-pole contactors

275 to 525 A AC-1

AC operated - connection with ring tongue ferrules

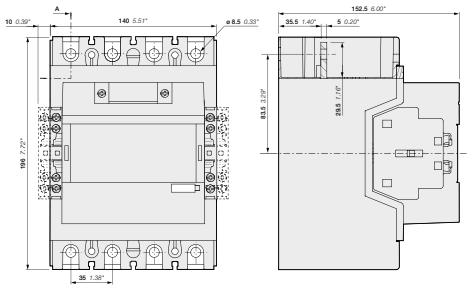
AF205B-40-22RT

AF370B-40-22RT

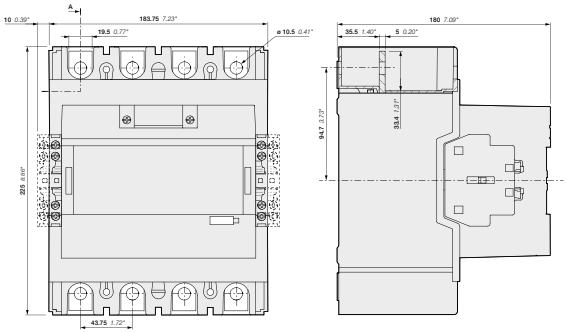
AF190B..RT ... AF370B..RT 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds.
They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling power circuits up to 690 V AC and up to 220 V DC. These contactors are of the block type design with 4 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC	UL / CSA	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted		Type	Order code	Weight
Rated operational current θ ≤ 40 °C AC-1	General use rating 600 V AC						Pkg (1 pce)
A	A	V AC 50/60 Hz					kg
4 N.O. main poles							
275	230	24...60	2	2	AF190B-40-22RT-11	1SFL487262R1122	3.940
		48...130	2	2	AF190B-40-22RT-12	1SFL487262R1222	3.940
		100...250	2	2	AF190B-40-22RT-13	1SFL487262R1322	3.940
		250...500	2	2	AF190B-40-22RT-14	1SFL487262R1422	3.940
350	250	24...60	2	2	AF205B-40-22RT-11	1SFL527262R1122	3.940
		48...130	2	2	AF205B-40-22RT-12	1SFL527262R1222	3.940
		100...250	2	2	AF205B-40-22RT-13	1SFL527262R1322	3.940
		250...500	2	2	AF205B-40-22RT-14	1SFL527262R1422	3.940
400	300	24...60	2	2	AF265B-40-22RT-11	1SFL547262R1122	6.400
		48...130	2	2	AF265B-40-22RT-12	1SFL547262R1222	6.400
		100...250	2	2	AF265B-40-22RT-13	1SFL547262R1322	6.400
		250...500	2	2	AF265B-40-22RT-14	1SFL547262R1422	6.400
500	350	24...60	2	2	AF305B-40-22RT-11	1SFL587262R1122	6.400
		48...130	2	2	AF305B-40-22RT-12	1SFL587262R1222	6.400
		100...250	2	2	AF305B-40-22RT-13	1SFL587262R1322	6.400
		250...500	2	2	AF305B-40-22RT-14	1SFL587262R1422	6.400
525	420	24...60	2	2	AF370B-40-22RT-11	1SFL607262R1122	6.400
		48...130	2	2	AF370B-40-22RT-12	1SFL607262R1222	6.400
		100...250	2	2	AF370B-40-22RT-13	1SFL607262R1322	6.400
		250...500	2	2	AF370B-40-22RT-14	1SFL607262R1422	6.400



AF190B, AF205B-40-22RT

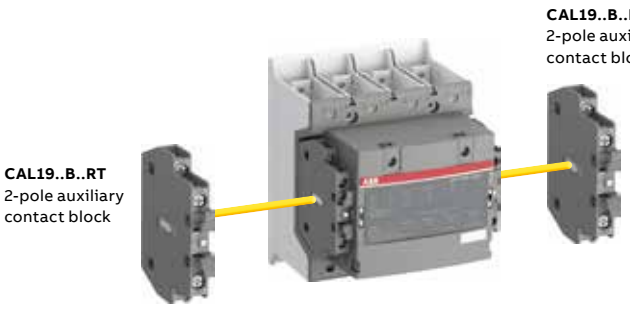


AF265B, AF305B, AF370B-40-22RT

Main dimensions mm, inches

AF116B..RT ... AF370B..RT 4-pole contactors

Contactors and main accessories



Main accessory fitting details - for ordering details, technical data and other accessories: see section accessories

Contactor types	Main poles	Available auxiliary contacts	Side-mounted accessories Auxiliary contact blocks CAL19-11-RT		CAL19-11B-RT	Mechanical interlock units (between two contactors)
AF116B..RT ... AF370B..RT	4 0	2 2	2 x CAL19-11-RT included	+	2 x CAL19-11B-RT	–

AF09(Z)B..RT ... AF38(Z)B..RT 4-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types		AF09(Z)B..RT	AF16(Z)B..RT	AF26(Z)B..RT	AF38(Z)B..RT
Standards (1)		IEC/EN 60947-1, IEC/EN 60947-4-1 IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), EN 50155 (applicable parts), TR CU 001/2011 IEC 61373			
Fire and smoke		EN 45545-2 (HL2, HL3)			
Rated operational voltage Ue max.		690 V			
Rated frequency (without derating)		50 / 60 Hz			
Conventional free-air thermal current Ith					
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		35 A	35 A	55 A	55 A
With conductor cross-sectional area		6 mm²	6 mm²	16 mm²	16 mm²
AC-1 Utilization category					
For air temperature close to contactor					
Ie / Rated operational current AC-1	θ ≤ 40 °C	25 A	30 A	45 A	55 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 60 °C	25 A	30 A	40 A	45 A
	θ ≤ 70 °C	22 A	26 A	32 A	37 A
With conductor cross-sectional area		4 mm²	6 mm²	10 mm²	16 mm²
AC-3 Utilization category					
For air temperature close to contactor θ ≤ 60 °C					
Ie / Max. rated operational current AC-3 (2)					
3-phase motors	220-230-240 V	9 A	18 A	23.2 A	23.2 A
	380-400 V	9 A	18 A	22 A	22 A
	415 V	9 A	18 A	21.2 A	21.2 A
	440 V	9 A	18 A	20 A	20 A
	500 V	9.5 A	15 A	17.6 A	17.6 A
	690 V	7 A	10.5 A	10.5 A	10.5 A
Rated operational power AC-3 (2)					
1500 r.p.m. 50 Hz 1800 r.p.m. 60 Hz 3-phase motors	220-230-240 V	2.2 kW	4 kW	5.5 kW	5.5 kW
	380-400 V	4 kW	7.5 kW	11 kW (3)	11 kW (3)
	415 V	4 kW	9 kW	11 kW	11 kW
	440 V	4 kW	9 kW	11 kW	11 kW
	500 V	5.5 kW	9 kW	11 kW	11 kW
	690 V	5.5 kW	9 kW	9 kW	9 kW
Rated making capacity AC-3		10 x Ie AC-3 acc. to IEC 60947-4-1			
Rated breaking capacity AC-3		8 x Ie AC-3 acc. to IEC 60947-4-1			
Short-circuit protection device for contactors					
without thermal overload relay - Motor protection excluded					
Ue ≤ 500 V AC - gG type fuse		25 A	32 A	50 A	63 A
Rated short-time withstand current Icw	1 s	300 A	300 A	450 A	450 A
at 40 °C ambient temperature,	10 s	150 A	150 A	300 A	300 A
in free air from a cold state	30 s	80 A	80 A	225 A	225 A
	1 min	60 A	60 A	150 A	150 A
	15 min	35 A	35 A	55 A	55 A
Maximum breaking capacity	at 440 V	250 A	250 A	–	–
cos φ = 0.45	at 690 V	106 A	106 A	–	–
Power dissipation per pole	Ie / AC-1	0.8 W	1.2 W	1.6 W	2.3 W
	Ie / AC-3	0.1 W	0.35 W	0.42 W	0.42 W
Max. electrical switching frequency	AC-1	600 cycles/h			

(1) For compliance confirmation on applicable parts based on your application and combination, please consult your ABB sales representatives.
(2) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 1-phase or 3-phase motors, see "Motor rated operational powers and currents".
(3) 400 V 3-phase motor only.

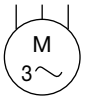
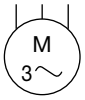
Main pole - Utilization characteristics according to UL / NEMA / CSA

Contactor types	AF09(Z)B..RT	AF16(Z)B..RT	AF26(Z)B..RT	AF38(Z)B..RT
Standards	UL 508, CSA C22.2 No. 14			
Maximum operational voltage	600 V			
UL / CSA general use rating				
600 V AC	25 A	30 A	45 A	55 A
With conductor cross-sectional area	AWG 10	AWG 10	AWG 8	AWG 6
Maximum electrical switching frequency				
For general use	600			

AF45..RT ... AF75..RT 4-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types		AF45..RT	AF75..RT
Standards (1)		IEC/EN 60947-1, IEC/EN 60947-1 IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), EN 50155 (applicable parts), TR CU 001/2011 (on request) IEC 61373	
Fire and smoke		EN 45545-2 (HL2, HL3)	
Rated operational voltage Ue max.		690 V	
Rated frequency (without derating)		50 / 60 Hz	
Conventional free-air thermal current Ith			
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		100 A	125 A
With conductor cross-sectional area		2 x 25 mm²	2 x 25 mm²
AC-1 Utilization category			
For air temperature close to contactor			
Ie / Rated operational current AC-1	θ ≤ 40 °C	100 A	125 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 55 °C	85 A	105 A
	θ ≤ 70 °C	70A	85 A
With conductor cross-sectional area		2 x 25 mm²	2 x 25 mm²
Ie / Rated operational current AC-1	θ ≤ 40 °C	70 A	95 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 55 °C	60 A	80 A
	θ ≤ 70 °C	50 A	65 A
With conductor cross-sectional area		1 x 25 mm²	1 x 25 mm²
AC-3 Utilization category			
For air temperature close to contactor θ ≤ 55 °C			
Ie / Max. rated operational current AC-3 (2)			
	220-230-240 V	40 A	75 A
 3-phase motors	380-400 V	37 A	75 A
	415 V	37 A	75 A
	440 V	37 A	70 A
	500 V	33 A	65 A
	690 V	25 A	46 A
Rated operational power AC-3 (2)			
	220-230-240 V	11 kW	22 kW
 1500 r.p.m. 50 Hz 1800 r.p.m. 60 Hz 3-phase motors	380-400 V	18.5 kW	37 kW
	415 V	18.5 kW	40 kW
	440 V	22 kW	40 kW
	500 V	22 kW	45 kW
	690 V	22 kW	40 kW
Rated making capacity AC-3		10 x Ie AC-3 acc. to IEC 60947-4-1	
Rated breaking capacity AC-3		8 x Ie AC-3 acc. to IEC 60947-4-1	
Short-circuit protection device for contactors			
without thermal overload relay - Motor protection excluded			
Ue ≤ 500 V AC - gG type fuse		100 A	160 A
Rated short-time withstand current Icw	1 s	1000 A	
At 40 °C ambient temperature,	10 s	650 A	
in free air from a cold state	30 s	370 A	
	1 min	250 A	
	15 min	110 A	135 A
Maximum breaking capacity			
cos φ = 0.45	at 440 V	900 A	1300 A
(cos φ = 0.35 for Ie >100 A)	at 690 V	490 A	630 A
Power dissipation per pole	Ie / AC-1	5 W	7 W
	Ie / AC-3	0.65 W	2 W
Max. electrical switching frequency	AC-1	300 cycles/h	
	AC-3	300 cycles/h	

(1) For compliance confirmation on applicable parts based on your application and combination, please consult your ABB sales representatives.
(2) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".

Main pole - Utilization characteristics according to UL / CSA

Contactor types	AF45..RT	AF75..RT
Standards	UL 508, CSA C22.2 No. 14	
Max. operational voltage	600 V	
UL / CSA general use rating		
600 V AC	80 A	105 A
With conductor cross-sectional area	AWG 6	AWG 2
Max. electrical switching frequency		
For general use	300 cycles/h	

AF116B..RT ... AF370B..RT 4-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types		AF116B..RT	AF140B..RT	AF190B..RT	AF205B..RT	AF265B..RT	AF305B..RT	AF370B..RT
Standards (1)		IEC/EN 60947-1, IEC/EN 60947-4-1 IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), EN 50155 (applicable parts), TR CU 001/2011 IEC 61373						
Fire and smoke		EN 45545-2 (HL2)						
Rated operational voltage Ue max.		690 V		1000 V				
Rated frequency (without derating)		50 / 60 Hz						
Conventional free-air thermal current Ith								
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		160 A	200 A	275 A	350 A	400 A	500 A	525 A
With conductor cross-sectional area		70 mm²	95 mm²	150 mm²	240 mm² (3)	240 mm²	300 mm² (4)	2x 185 mm² (4)
AC-1 Utilization category								
For air temperature close to contactor								
Ie / Rated operational current AC-1	θ ≤ 40 °C	160 A	200 A	275 A	350 A	400 A	500 A	525 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 60 °C	145 A	175 A	250 A	300 A	350 A	400 A	425 A
	θ ≤ 70 °C	130 A	160 A	200 A	240 A	290 A	325 A	350 A
Ue max. ≤ 1000 V, 50/60 Hz	θ ≤ 40 °C	-	-	250 A	275 A	350 A	375 A	400 A
	θ ≤ 60 °C	-	-	225 A	250 A	300 A	325 A	350 A
	θ ≤ 70 °C	-	-	185 A	200 A	240 A	260 A	290 A
With conductor cross-sectional area		70 mm²	95 mm²	150 mm²	240 mm² (3)	240 mm²	300 mm² (4)	2x 185 mm² (4)
AC-3 Utilization category								
For air temperature close to contactor θ ≤ 60 °C (3)								
Ie / Max. rated operational current AC-3 (2)								
3-phase motors	220-230-240 V	116 A	140 A	190 A	205 A	265 A	305 A	370 A
	380-400 V	116 A	140 A	190 A	205 A	265 A	305 A	370 A
	415 V	116 A	140 A	190 A	205 A	265 A	305 A	370 A
	440 V	116 A	140 A	190 A	205 A	265 A	305 A	370 A
	500 V	-	-	-	-	-	-	-
	690 V	-	-	-	-	-	-	-
	1000 V	-	-	-	-	-	-	-
Rated operational power AC-3 (2)								
1500 r.p.m. 50 Hz 1800 r.p.m. 60 Hz 3-phase motors	220-230-240 V	30 kW	37 kW	55 kW	55 kW	75 kW	90 kW	110 kW
	380-400 V	55 kW	75 kW	90 kW	110 kW	132 kW	160 kW	200 kW
	415 V	55 kW	75 kW	90 kW	110 kW	132 kW	160 kW	200 kW
	440 V	75 kW	90 kW	110 kW	132 kW	160 kW	160 kW	200 kW
	500 V	-	-	-	-	-	-	-
	690 V	-	-	-	-	-	-	-
	1000 V	-	-	-	-	-	-	-
Rated making capacity AC-3		10 x Ie AC-3 acc. to IEC 60947-4-1						
Rated breaking capacity AC-3		8 x Ie AC-3 acc. to IEC 60947-4-1						
Short-circuit protection device for contactors								
Without thermal overload relay - Motor protection excluded								
Ue ≤ 500 V AC - gG type fuse		200 A	250 A	355 A	400 A	630 A	630 A	630 A
Rated short-time withstand current Icw	1 s	1300 A	1460 A	1900 A	2050 A	2650 A	3050 A	3700 A
At 40 °C ambient temperature,	10 s	928 A	1168 A	1520 A	1640 A	2120 A	2440 A	2960 A
in free air from a cold state	30 s	536 A	674 A	878 A	947 A	1224 A	1409 A	1709 A
	1 min	379 A	477 A	621 A	670 A	865 A	996 A	1208 A
	15 min	160 A	200 A	275 A	350 A	400 A	500 A	525 A
Maximum breaking capacity	at 440 V	2000 A	3000 A	3300 A	3500 A	3800 A	4600 A	5000 A
cos φ = 0.45	at 690 V	-	-	-	-	-	-	-
Power dissipation per pole	Ie / AC-1	12 W	18 W	15 W	25 W	32 W	50 W	72 W
	Ie / AC-3	-	-	-	-	-	25 W	-
Max. electrical switching frequency	AC-1	300 cycles/h						-
	AC-3	300 cycles/h					120 cycles/h	-

(1) For compliance confirmation on applicable parts based on your application and combination, please consult your ABB sales representatives.
(2) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".
(3) For currents above 275 A use terminal enlargements or terminal extensions.
(4) For currents above 450 A use terminal enlargements or terminal extensions.

Main pole - Utilization characteristics according to UL / CSA

Contactor types	AF116B..RT	AF140B..RT	AF190B..RT	AF205B..RT	AF265B..RT	AF305B..RT	AF370B..RT
Standards	UL 60947-4-1						
Max. operational voltage	600 V						
UL / CSA general use rating							
600 V AC	160 A	175 A	230 A	250 A	300 A	350 A	420 A
With conductor cross-sectional area	AWG 2/0	AWG 3/0	MCM 250	MCM 250	MCM 400	MCM 500	2//MCM 300
Max. electrical switching frequency							
For general use	300 cycles/h						

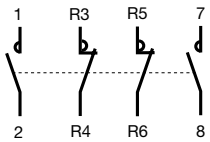
AF09(Z)B..RT ... AF38(Z)B..RT 4-pole contactors

Technical data

General technical data

Contactor types	AF09(Z)B..RT	AF16(Z)B..RT	AF26(Z)B..RT	AF38(Z)B..RT
Rated insulation voltage Ui				
acc. to IEC 60947-4-1	690 V			
acc. to UL / CSA	600 V			
Rated impulse withstand voltage Uimp.	6 kV			
Electromagnetic compatibility	Devices complying with IEC/EN 60947-1 - Environment A EN 50121-3-2			
Pollution degree	3			
Ambient air temperature				
Operation in free air	-40...+70 °C			
Storage	-60...+80 °C			
Climatic withstand	Category B according to IEC 60947-1 Annex Q			
Maximum operating altitude (without derating)	3000 m			
Mechanical durability				
Number of operating cycles	10 millions operating cycles			
Maximum switching frequency	3600 cycles/h			
Shock and vibration withstand acc. to IEC 61373	Category 1, class B			

Remark for 4-pole contactors fitted with 2 N.O. + 2 N.C. main poles

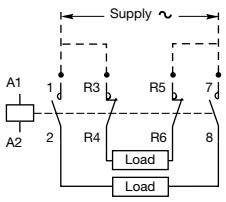


These contactors are suitable for controlling 2 separate circuits, i.e. 2 loads with 2 separate supplies, or 1 circuit comprising 2 separate loads with a single supply (see diagrams below). When the contactor operates there is no mechanical overlapping between the N.O. poles and the N.C. poles: BREAK before MAKE.

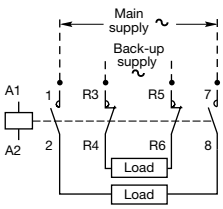
These contactors are not suitable for a reversing starter or for controlling a single load from 2 separate supplies.

Block diagrams

– Single supply and 2 separate loads



– 2 separate supplies and 2 separate loads



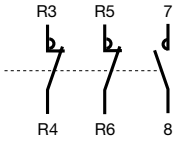
AF45..RT ... AF75..RT 4-pole contactors

Technical data

General technical data

Contactor types	AF45..RT	AF75..RT
Rated insulation voltage Ui		
acc. to IEC 60947-4-1	1000 V	
acc. to UL / CSA	600 V	
Rated impulse withstand voltage Uimp.	8 kV	
Electromagnetic compatibility	Devices complying with IEC/EN 60947-1 - Environment A	
Pollution degree	3	
Ambient air temperature close to contactor		
Operation	-40...+70 °C	
Storage	-60...+80 °C	
Climatic withstand	acc. to IEC 60068-2-30 and 60068-2-11 - UTE C 63-100 specification II	
Maximum operating altitude (without derating)	3000 m	
Mechanical durability		
Number of operating cycles	10 millions operating cycles	
Max. switching frequency	300 cycles/h	
Shock withstand		
acc. to IEC 61373	Category 1, class B	

Remark for 4-pole contactors fitted with 2 N.O. + 2 N.C. main poles

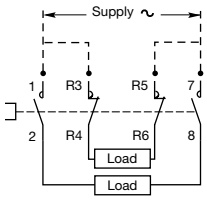


These contactors are suitable for controlling 2 separate circuits, i.e. 2 loads with 2 separate supplies, or 1 circuit comprising 2 separate loads with a single supply (see diagrams below). When the contactor operates there is no mechanical overlapping between the N.O. poles and the N.C. poles: BREAK before MAKE.

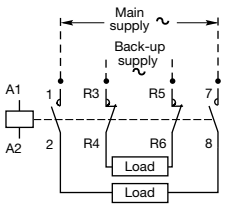
These contactors are not suitable for a reversing starter or for controlling a single load from 2 separate supplies.

Block diagrams

– Single supply and 2 separate loads



– 2 separate supplies and 2 separate loads



AF116B..RT ... AF370B..RT 4-pole contactors

Technical data

General technical data

Contactor types	AF116B..RT	AF140B..RT	AF190B..RT	AF205B..RT	AF265B..RT	AF305B..RT	AF370B..RT
Rated insulation voltage Ui							
acc. to IEC 60947-4-1	1000 V						
acc. to UL / CSA	600 V						
Rated impulse withstand voltage Uimp.	8 kV						
Electromagnetic compatibility	Devices complying with IEC/EN 60947-1 - Environment A						
Pollution degree	3						
Ambient air temperature close to contactor							
Operation	-40 to +70 °C						
Storage	-40 to +70 °C						
Climatic withstand	Category B according to IEC 60947-1 Annex Q						
Maximum operating altitude (without derating)	3000 m						
Mechanical durability							
Number of operating cycles	5 million operating cycles						
Maximum switching frequency	300 cycles/h						
Shock and vibration withstand acc to IEC 61373	Category 1, class B						

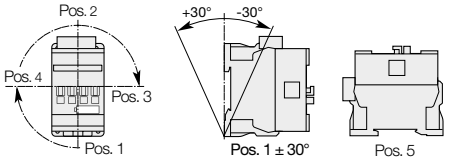
AF09(Z)B..RT ... AF38(Z)B..RT 4-pole contactors

Technical data

Magnet system characteristics

Contactor types		AF09(Z)B..RT	AF16(Z)B..RT	AF26(Z)B..RT	AF38(Z)B..RT
Coil operating limits acc. to IEC 60947-4-1	DC supply	(AF..ZB) at θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max (AF..B) at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max; at θ ≤ 70 °C 0.85 x Uc min ... Uc max			
	AC supply	at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max at θ ≤ 70 °C 0.85 x Uc min ... Uc max			
DC control voltage					
Rated control circuit voltage Uc		20...250 V DC			
Coil consumption	Average pull-in value	(AF..ZB) 12...16 W			
	Average holding value	(AF..ZB) 1.7 W			
PLC-output control		(AF..ZB) ≥ 500 mA 24 V DC			
AC control voltage 50/60 Hz					
Rated control circuit voltage Uc		(AF..ZB) 24 ... 250 V AC - (AF..B) 250 ... 500 V AC			
Coil consumption	Average pull-in value	(AF..ZB) 16 VA - (AF..B) 50 VA			
	Average holding value	(AF..ZB) 1.7 VA / 1.5 W - (AF..B) 2.2 VA / 2 W			
Max. permitted control voltage during voltage fluctuation defined acc. to IEC 60077 / EN 50155		Rated control circuit voltage / Max. permitted control voltage 24 ... 60 V AC 50/60 Hz / 66 V AC 50/60 Hz 48 ... 130 V AC 50/60 Hz / 143 V AC 50/60 Hz 100 ... 250 V AC 50/60 Hz / 275 V AC 50/60 Hz 250 ... 500 V AC 50/60 Hz / 550 V AC 50/60 Hz			
Drop-out voltage		≤ 60 % of Uc min.			
Operating time					
Between coil energization and:	N.O. contact closing	40...95 ms			
	N.C. contact opening	38...90 ms			
Between coil de-energization and:	N.O. contact opening	11...95 ms			
	N.C. contact closing	13...98 ms			

Mounting characteristics and conditions for use

Contactor types	AF09(Z)B..RT	AF16(Z)B..RT	AF26(Z)B..RT	AF38(Z)B..RT
Mounting positions				
	Max. add-on N.C. auxiliary contacts: see accessory fitting details for a 4-pole contactor AF09(Z)B ... AF38(Z)B			
Mounting distances	The contactors can be assembled side by side			
Fixing				
On rail according to IEC/EN 60715	35 x 7.5 mm or 35 x 15 mm			
By screws (not supplied)	2 x M4 screws placed diagonally			

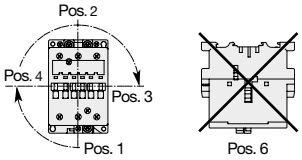
AF45..RT ... AF75..RT 4-pole contactors

Technical data

Magnet system characteristics

Contactor types		AF45..RT	AF75..RT
Coil operating limits acc. to IEC 60947-4-1	AC or DC supply	At θ ≤ 70 °C 0.85 x Uc min...1.1 x Uc max.	
DC control voltage			
Rated control circuit voltage Uc		20...250 V DC	
Coil consumption	Average pull-in value	190 W	
	Average holding value	2.8 W	
AC control voltage 50/60 Hz			
Rated control circuit voltage Uc		48...250 V 50 / 60 Hz	
Coil consumption	Average pull-in value	210 VA	
	Average holding value	7 VA / 2.8 W	
Max. permitted control voltage during voltage fluctuation defined acc. to IEC 60077 / EN 50155		Rated control circuit voltage / Max. permitted control voltage 48 ... 130 V AC 50/60 Hz / 150 V AC 50/60 Hz 100 ... 250 V AC 50/60 Hz / 275 V AC 50/60 Hz	
Drop-out voltage		55 % of Uc min.	
Operating time			
Between coil energization and:	N.O. contact closing	30...100 ms	
	N.C. contact opening	27...95 ms	
Between coil de-energization and:	N.O. contact closing	30...110 ms	
	N.C. contact opening	35...115 ms	

Mounting characteristics and conditions for use

Contactor types	AF45..RT	AF75..RT
Mounting positions		
	Pos. 1 ± 30°, pos. 5: please consult us Max. and add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 4-pole contactor AF45..RT ... AF75..RT	
Mounting distances	The contactors can be assembled side by side	
Fixing		
On rail according to IEC/EN 60715	35 x 15 mm or 75 x 25 mm	
By screws (not supplied)	2 x M6 screws placed diagonally	

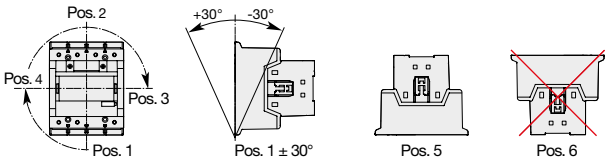
AF116B..RT ... AF370B..RT 4-pole contactors

Technical data

Magnet system characteristics

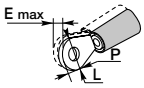
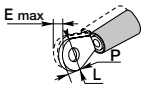
Contactor types		AF116B..RT	AF140B..RT	AF190B..RT	AF205B..RT	AF265B..RT	AF305B..RT	AF370B..RT
Coil operating limits	AC supply	At θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max						
acc. to IEC 60947-4-1	DC supply	At θ ≤ 70 °C 0.80 x Uc min ... 1.1 x Uc max						
Rated control circuit voltage Uc		24...500 V AC, 20...500 V DC						
Coil consumption								
DC control voltage								
20...60 V DC	Average pull-in value	210 W		205 W		400 W		
	Average holding value	2.5 W		2.5 W		3.5 W		
48...130 V DC	Average pull-in value	130 W		130 W		360 W		
	Average holding value	2.5 W		2.5 W		2.5 W		
100...250 V DC	Average pull-in value	135 W		190 W		410 W		
	Average holding value	3 W		2.5 W		4.5 W		
250...500 V DC	Average pull-in value	205 W		190 W		600 W		
	Average holding value	4 W		4 W		4.7 W		
AC control voltage 50/60 Hz								
24...60 V AC	Average pull-in value	225 VA		165 VA		475 VA		
	Average holding value	5.5 VA		6 VA		8.5 VA		
48...130 V AC	Average pull-in value	170 VA		175 VA		340 VA		
	Average holding value	4 VA		4 VA		17 VA		
100...250 V AC	Average pull-in value	130 VA		220 VA		385 VA		
	Average holding value	6 VA		7 VA		17.5 VA		
250...500 V AC	Average pull-in value	205 VA		185 VA		420 VA		
	Average holding value	16 VA		16 VA		21 VA		
Max. permitted control voltage during voltage fluctuation defined acc. to IEC 60077 / EN 50155		Rated control circuit voltage / Max. permitted control voltage 24 ... 60 V AC 50/60 Hz / 66 V AC 50/60 Hz 48 ... 130 V AC 50/60 Hz / 143 V AC 50/60 Hz 100 ... 250 V AC 50/60 Hz / 275 V AC 50/60 Hz 250 ... 500 V AC 50/60 Hz / 550 V AC 50/60 Hz						
Drop-out voltage		55 % of Uc min						
Operating time								
Coil supply between A1 - A2								
Between coil energization and:	N.O. contact closing	20...55 ms		25...60 ms		30...60 ms		
Between coil de-energization and:	N.O. contact opening	40..70 ms		45...80 ms		45...80 ms		

Mounting characteristics and conditions for use

Contactor types	AF116B..RT	AF140B..RT	AF190B..RT	AF205B..RT	AF265B..RT	AF305B..RT	AF370B..RT
Mounting positions							
	Max. add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 4-pole contactor AF116B..RT ... AF370B..RT						
Mounting distances	The contactors can be assembled side by side						
Fixing							
On rail acc. to IEC/EN 60715	-						
By screws (not supplied)	4 x M4		4 x M5				

AF09(Z)B..RT ... AF38(Z)B..RT 4-pole contactors
Technical data

Connecting characteristics

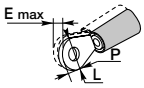
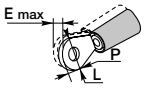
Contactor types	DC operated	AF09(Z)B..RT	AF16(Z)B..RT	AF26(Z)B..RT	AF38(Z)B..RT
Main terminals		Conductors with insulated ring tongue ferrule			
Connection capacity (min. ... max.)					
Main conductors (poles)					
Flexible with insulated ferrule	1 or 2 x	0.75...6 mm²		1.5...16 mm²	
	Ø mm >	3.5 mm			
	L mm <	9.6 mm		9.3 mm	
	P mm <	5 mm		5.7 mm	
	E mm <	3.6 mm			
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 16...10		AWG 16...6	
Tightening torque		1.2 Nm / 11 lb.in		1.2 Nm/11 lb.in	
Coil conductors					
Flexible with insulated ferrule	1 or 2 x	0.75...2.5 mm²			
	Ø mm >	3.5 mm			
	L mm <	8 mm			
	P mm <	4.7 mm			
	E mm <	2.9 mm			
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14			
Tightening torque		1.2 Nm / 11 lb.in			
Degree of protection acc. to IEC/EN 60947–1 and IEC/EN 60529					
All terminals		IP10			
Front face		IP20			
Screw terminals		Delivered in open position (1)			
Main terminals		M3.5			
Screwdriver type		Flat Ø 5.5 / Pozidriv 2			
Coil terminals		M3.5			
Screwdriver type		Flat Ø 5.5 / Pozidriv 2			

(1) Screws of unused terminals must be tightened with a max. tightening torque of 0.5 Nm / 4.58 lb.in.

AF45..RT ... AF75..RT 4–pole contactors

Technical data

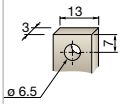
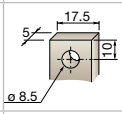
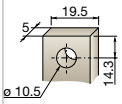
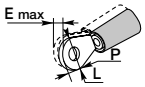
Connecting characteristics

Contactor types		AF45..RT	AF75..RT
Main terminals		Conductors with insulated ring tongue ferrule	
Connection capacity (min. ... max.)			
Main conductors (poles)			
Flexible with insulated ferrule	1 or 2 x	6 ... 25 mm²	
	Ø mm >	6 mm	
	L mm <	13 mm	
	P mm <	6 mm	
	E mm <	6.3 mm	
Tightening torque		4 Nm / 40 lb.in	
Coil conductors			
Flexible with insulated ferrule	1 or 2 x	0.75 ... 2.5 mm²	
	Ø mm >	3.5 mm	
	L mm <	8 mm	
	P mm <	3.9 mm	
	E mm <	2.9 mm	
Tightening torque		1 Nm / 9 lb.in	
Degree of protection acc. to IEC/EN 60947–1 and IEC/EN 60529			
All terminals		IP10	
Screw terminals		Delivered in open position, screws of unused terminals must be tightened	
Main terminals		M5	M6
Screwdriver type		Flat Ø 5.5 / Pozidriv 2	
Coil terminals		M3.5	
Screwdriver type		Flat Ø 5.5 / Pozidriv 2	

AF116B..RT ... AF370B..RT 4-pole contactors

Technical data

Connecting characteristics

Contactor types	AC / DC operated	AF116B..RT	AF140B..RT	AF190B..RT	AF205B..RT	AF265B..RT	AF305B..RT	AF370B..RT
Main terminals Flat type								
Connection capacity (min. ... max.)								
Main conductors (poles)								
Cu cable - Stranded	1 x	10...95 mm²		6...150 mm²		16...300 mm²		
Clamp type		LD... included		1SDA066917R1		1SDA055016R1		
Tightening torque		8 Nm		14 Nm		25 Nm		
Cu cable - Stranded	2 x	10...95 mm²		50...120 mm²		70...185 mm²		
Clamp type		LD... included		1SFN074709R1000, LZ185-2C/120		1SCA022194R0890, OZXB4		
Tightening torque		8 Nm		16 Nm		22 Nm		
Al cable - Stranded	1 x	–		95...185 mm²		185...240 mm²		
Clamp type		–		1SDA054988R1		1SDA055020R1		
Tightening torque		–		31 Nm		43 Nm		
Cu cable - Flexible	1 x	10...70 mm²		6...120 mm²		16...240 mm²		
Clamp type		LD... included		1SDA066917R1		1SDA055016R1		
Tightening torque		8 Nm		14 Nm		25 Nm		
Cu cable - Flexible	2 x	10...70 mm²		50...95 mm²		70...185 mm²		
Clamp type		LD... included		1SFN074709R1000, LZ185-2C/120		1SCA022194R0890, OZXB4		
Tightening torque		8 Nm		16 Nm		22 Nm		
Lugs	L ≤	22 mm (.866 in)		24 mm (.945 in)		32 mm (1.260 in)		
	Ø >	6 mm (.236 in)		8 mm (.315 in)		10 mm (.394 in)		
Socket type		LL... included		LL... included		LL... included		
Tightening torque		9 Nm / 80 lb.in		18 Nm / 160 lb.in		28 Nm / 248 lb.in		
Connection capacity acc. to UL / CSA	1 x	AWG 6...3/0		6...300 MCM		4...400 MCM		
Clamp type		LD... included		ATK185 (1)		ATK300 (1)		
Tightening torque		8 Nm / 71 lb.in		34 Nm / 301 lb.in		42 Nm / 372 lb.in		
Connection capacity acc. to UL / CSA	2 x	AWG 6...3/0		–		4...500 MCM		
Clamp type		LD... included		–		ATK300/2 (1)		
Tightening torque		8 Nm / 71 lb.in		–		42 Nm / 372 lb.in		
Coil conductors								
Flexible with insulated ferrule	1 or 2 x	0.75...2.5 mm²						
 Ø mm >		3.5 mm						
L mm <		8 mm						
P mm <		4.7 mm						
E mm <		2.9 mm						
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...14						
Tightening torque		1.00 Nm / 9 lb.in						
Degree of protection acc. to IEC/EN 60947–1 and IEC/EN 60529								
Main terminals		IP00						
Coil terminals		IP20						
Screw terminals								
Main terminals		M6		M8		M10		
Screwdriver type		Screws and bolts						
Coil terminals (delivered in open position)		M3.5						
Screwdriver type		Flat Ø 5.5 mm / Pozidriv 2						

(1) Available in North America only.

AF09(Z)B..RT ... AF370B..RT 4-pole contactors

Electrical durability and utilization categories

General

Utilization categories determine the current making and breaking conditions relating to the characteristics of the loads to be controlled by the contactors. International standard IEC 60947-4-1 and European standard EN 60947-4-1 are the standards to be referred to. If Ic is the current to be broken by the contactor and Ie the rated operational current normally drawn by the load, then Ic = Ie for category AC-1. The curve corresponding to category AC-1 represents the electrical durability variation of standard contactors in relation to the breaking current Ic.
Electrical durability is expressed in millions of operating cycles.

Curve utilization mode
Electrical durability forecast and contactor selection for category AC-1
Note the characteristics of the load to be controlled:

- Operational voltage ..... Ue
- Current normally drawn ..... Ie
- Utilization category AC-1
- Breaking current ..... Ic = Ie for AC-1

Define the number of operating cycles N required.
On the diagram corresponding to the operational category, select the contactor with the curve immediately above the intersection point (Ic ; N).

Case of uninterrupted duty
For uninterrupted duty, some verifications of preventing maintenance are necessary to check the functionality of the concerned product (consult us). The combinated effect of environmental conditions and the proper temperature of the product may require some disposals. As a matter of fact, for this duty, the use duration prevails over the number of operating cycles.

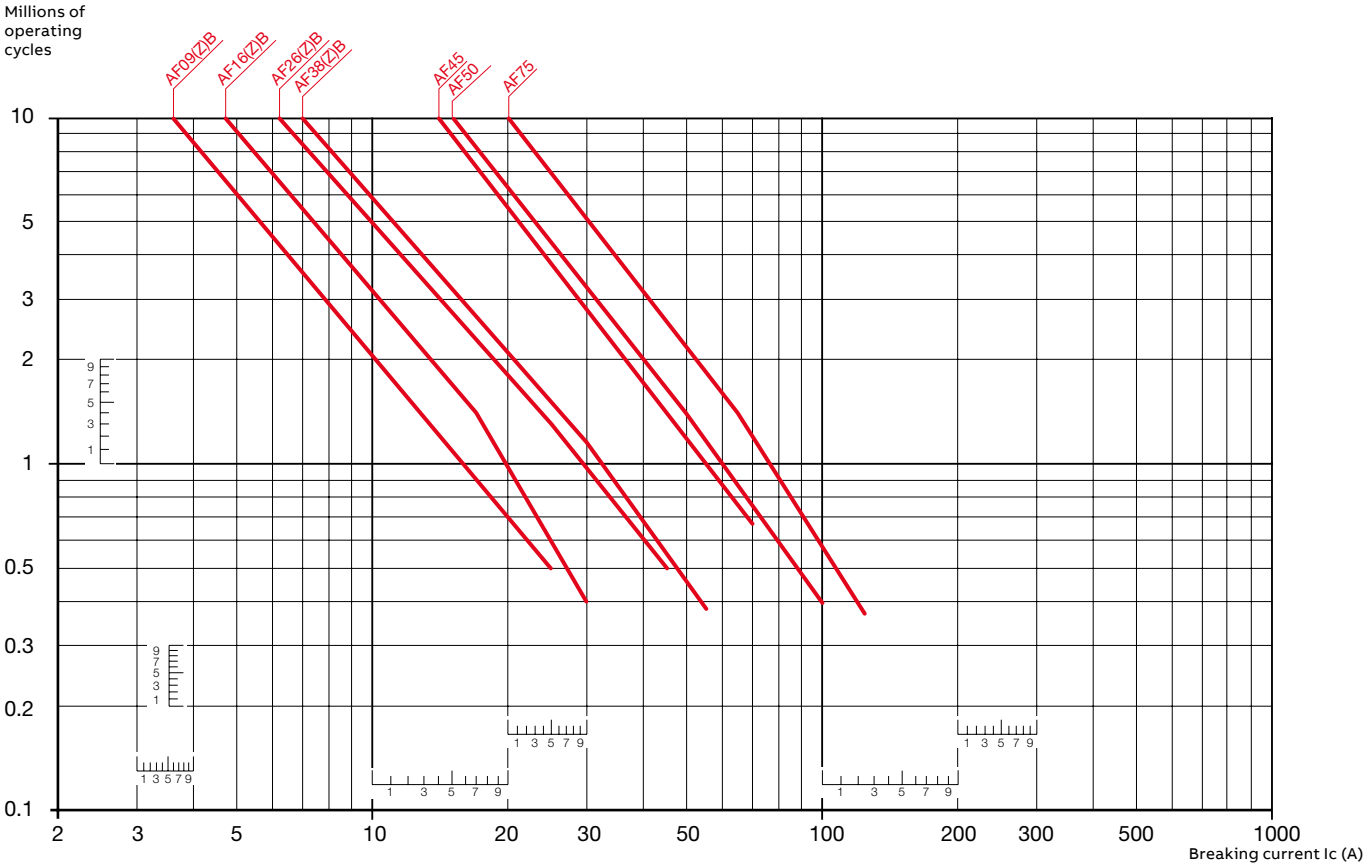
AF09(Z)B..RT ... AF370B..RT 4-pole contactors

Electrical durability

Electrical durability for AC-1 utilization category - Ue ≤ 690 V

Switching non-inductive or slightly inductive loads. The breaking current Ic for AC-1 is equal to the rated operational current of the load.

Ambient temperature and maximum electrical switching frequency: see "Technical data".



Contactors for DC switching applications

DC-1, DC-3, DC-5 applications according to IEC 60947-4-1

The circuit switching on DC is more difficult than on AC, as alternating current go to zero according to the frequency of the supply source while DC current has a continuous value. The main parameters to be considered for selecting a contactor are the current, the voltage and the L/R time constant of the controlled load.

Time constant and utilization categories

In DC applications, the nature of load to switch (resistor, inductance or a combination) is characterized by the ratio of the inductance to the resistance (L (inductance of operated circuit) / R (resistance of operated circuit) = mH/Ω = ms)
This ratio L/R is called the time constant of the circuit.

DC current utilization categories are defined according to IEC 60947-4-1:

- DC-1 non inductive or slightly inductive loads, resistance furnaces (L/R ≤ 1 ms)
- DC-3 shunt motors: starting, plugging, inching, dynamic breaking of DC motors (L/R ≤ 2 ms)
- DC-5 series motors: starting, plugging, inching, dynamic breaking of DC motors (L/R ≤ 7.5 ms).

The higher the time constant value is, the more difficult it is to break the arc.
The addition of a resistor in parallel with an inductive winding helps in the elimination of the arcs, by reducing the time constant.

Operational voltage

- The higher the operational voltage value is, the more difficult it is to break the arc.
- The use of main poles connected in series will allow to increase the value of switched voltage.
  However, the maximum switched voltage must be within the max operational voltage of the contactor.
  All the poles required for breaking must be connected in series between the load and the source polarity not linked to earth (or chassis) (see recommended connection diagrams).

ABB offer a large choice of possibilities for DC switching applications (see selection tables):

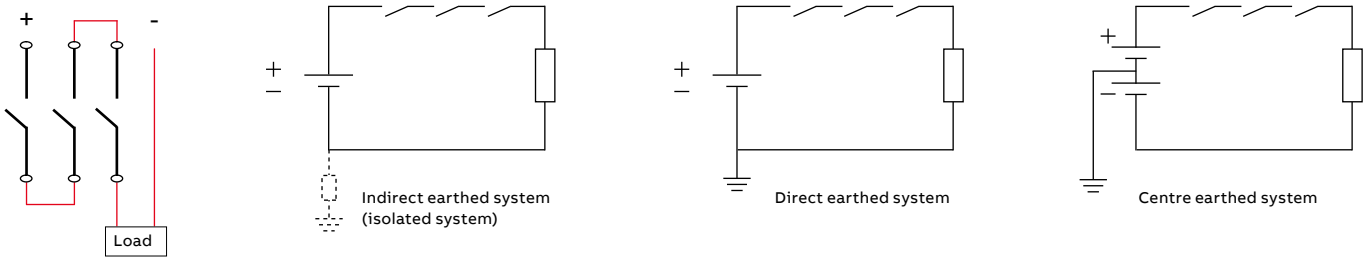
AF..(Z)B 3-pole or 4-pole contactors with either 1- pole breaking or breaking with poles connected in series.

Selection tables

The enclosed selection tables will guide your choice through all contactor variants according to utilization category, for operational voltage up to 1000 V DC-1 and operational current up to 520 A in ambient temperatures from -25 °C up to 40 °C.

Connection diagrams

Recommended connection
In the example below, the 3 poles are connected in series without the load in between.
This connection is recommended in systems according to the following configurations.



Points to consider

The above relates to power circuit switching. The SCPD (Short-Circuit Protection Device) must comply with applicable protection rules.

AF09(Z)B..RT ... AF95B..RT contactors

DC circuit switching

General

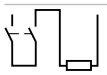
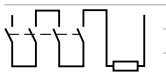
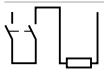
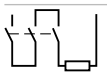
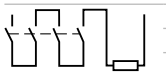
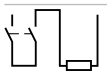
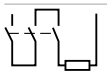
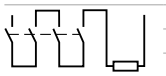
The arc switching on DC is more difficult than on AC.

- For selecting a contactor it is essential to determine the current, the voltage and the L/R time constant of the controlled load
- For information, typical time constant values are quoted hereafter: non inductive loads such as resistance furnaces (L/R ≈ 1 ms), inductive loads such as shunt motors (L/R ≈ 2 ms) or series motors (L/R ≈ 7.5 ms)
- The addition of a resistor in parallel with an inductive winding helps in the elimination of the arcs
- All the poles required for breaking must be connected in series between the load and the source polarity not linked to earth (or chassis).

Technical data

- The tables indicate for the standard contactors the Ie max. operating currents depending on: the utilization category (i.e. L/R) DC-1, DC-3, DC-5 as defined in the IEC 60947-4-1 publication, the operating voltage Ue and the pole coupling details. Ampere values quoted in these tables are valid for a -25...+70 °C temperature close to the contactors, as long as these values do not exceed the AC-1 Ampere values for the corresponding ambient temperature
- Max. switching frequency: 300 cycles/h.

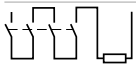
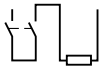
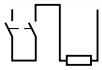
Selection table

Contactor types		AF09	AF12	AF16	AF26		AF30	AF38		AF45	AF50	AF63	AF75	AF95
		3 or 4-pole			3-pole	4-pole	3-pole	3-pole	4-pole	4-pole	3 or 4-pole		3 or 4-pole	3-pole
Utilization category DC-1, L/R ≤ 1 ms														
	≤ 72 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	110 A	120 A	-
	110 V	10 A	15 A	20 A	-	-	-	-	-	-	-	-	-	-
	220 V	-	-	-	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	110 A	120 A	-
	110 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	110 A	120 A	145 A
	220 V	10 A	15 A	20 A	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	110 A	120 A	-
	110 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	110 A	120 A	145 A
	220 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	110 A	120 A	145 A
	≤ 72 V	25 A	-	30 A	-	45 A	-	-	55 A	70 A	100 A	-	120 A	-
	110 V	25 A	-	30 A	-	45 A	-	-	55 A	70 A	100 A	-	120 A	-
	220 V	25 A	-	30 A	-	45 A	-	-	55 A	70 A	100 A	-	120 A	-
	440 V	10 A	-	20 A	-	-	-	-	-	-	-	-	-	-
Utilization category DC-3, L/R ≤ 2 ms														
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	105 A	125 A	130 A
	110 V	6 A	7 A	8 A	-	-	-	-	-	-	-	-	-	-
	220 V	-	-	-	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	110 A	120 A	-
	110 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	110 A	120 A	145 A
	220 V	6 A	7 A	8 A	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	110 A	120 A	-
	110 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	110 A	120 A	145 A
	220 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	110 A	120 A	145 A
	≤ 72 V	25 A	-	30 A	-	-	-	-	-	70 A	100 A	-	120 A	-
	110 V	25 A	-	30 A	-	-	-	-	-	70 A	100 A	-	120 A	-
	220 V	25 A	-	30 A	-	-	-	-	-	70	100 A	-	120 A	-
	440 V	6 A	-	8 A	-	-	-	-	-	-	-	-	-	-
Utilization category DC-5, L/R ≤ 7.5 ms														
	≤ 72 V	9 A	12 A	16 A	20 A	-	25 A	25 A	-	50 A	50 A	63 A	75 A	-
	110 V	4 A	4 A	4 A	-	-	-	-	-	-	-	-	-	-
	220 V	-	-	-	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	110 A	120 A	-
	110 V	10 A	15 A	20 A	45 A	-	50 A	50 A	-	70 A	80 A	90 A	100 A	145 A
	220 V	4 A	4 A	4 A	-	-	-	-	-	-	-	-	-	-
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	110 A	120 A	-
	110 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	110 A	120 A	145 A
	220 V	9 A	12 A	16 A	20 A	-	25 A	25 A	-	50 A	50 A	63 A	75 A	145 A
	≤ 72 V	25 A	-	30 A	-	-	-	-	-	70 A	100 A	-	120 A	-
	110 V	25 A	-	30 A	-	-	-	-	-	70 A	100 A	-	120 A	-
	220 V	10 A	-	20 A	-	-	-	-	-	70 A	70 A	-	100 A	-
	440 V	4 A	-	4 A	-	-	-	-	-	-	-	-	-	-

AF116B..RT ... AF370B..RT contactors

DC circuit switching

Selection table

Contactor types		AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
		3 or 4-pole		3-pole	3 or 4-pole				
Utilization category DC-1, L/R ≤ 1 ms									
	≤ 72 V	160 A	200 A	200 A	250 A	350 A	400 A	500 A	520 A
	90 V	160 A	200 A	200 A	250 A	350 A	400 A	500 A	520 A
	100 V	-	-	-	250 A	350 A	400 A	500 A	520 A
	110 V	-	-	-	-	-	400 A	500 A	520 A
	≤ 72 V	160 A	200 A	200 A	250 A	350 A	400 A	500 A	520 A
	110 V	160 A	200 A	200 A	250 A	350 A	400 A	500 A	520 A
	175 V	160 A	200 A	200 A	250 A	350 A	400 A	500 A	520 A
	200 V	-	-	-	250 A	350 A	400 A	500 A	520 A
	220 V	-	-	-	-	-	400 A	500 A	520 A
	≤ 72 V	160 A	200 A	200 A	250 A	350 A	400 A	500 A	520 A
	110 V	160 A	200 A	200 A	250 A	350 A	400 A	500 A	520 A
	220 V	160 A	200 A	200 A	250 A	350 A	400 A	500 A	520 A
	260 V	160 A	200 A	200 A	250 A	350 A	400 A	500 A	520 A
	300 V	-	-	-	250 A	350 A	400 A	500 A	520 A
	340 V	-	-	-	-	-	400 A	500 A	520 A
	440 V	-	-	-	-	-	-	-	-
	600 V	-	-	-	-	-	-	-	-
	850 V	-	-	-	-	-	-	-	-
	< 350 V	200 A	200 A	-	250 A	350 A	400 A	500 A	520 A
	400 V	-	-	-	250 A	350 A	400 A	500 A	520 A
	440 V	-	-	-	-	-	400 A	500 A	520 A
Utilization category DC-3, L/R ≤ 2 ms									
	≤ 72 V	-	-		-	-	-	-	-
	110 V	-	-		-	-	-	-	-
	≤ 72 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	110 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	220 V	-	-		-	-	-	-	-
	≤ 72 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	110 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	220 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	440 V	-	-		-	-	-	-	-
	600 V	-	-		-	-	-	-	-
Utilization category DC-5, L/R ≤ 7.5 ms									
	≤ 72 V	-	-		-	-	-	-	-
	110 V	-	-		-	-	-	-	-
	≤ 72 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	110 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	220 V	-	-		-	-	-	-	-
	≤ 72 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	110 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	220 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A
	440 V	-	-		-	-	-	-	-
	600 V	-	-		-	-	-	-	-

For additional ratings ≥ 440 V, please consult us.

NF..B..RT contactor relays connection with ring tongue ferrules

4/66 NF(Z)B..RT 4-pole and 8-pole DC operated
4/67 NF(Z)B..RT 4-pole and 8-pole AC operated
4/69 Technical data

For direct product details information, use product type or order code, ex:

www.abb.com/productdetails/**NFZB22ERT-21**
or www.abb.com/productdetails/**1SBH136060R2122**

NFZB..RT 4 and 8-pole contactor relays

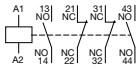
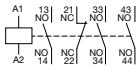
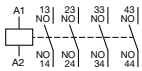
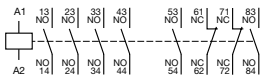
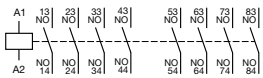
DC operated - connection with ring tongue ferrules

NFZB22ERT

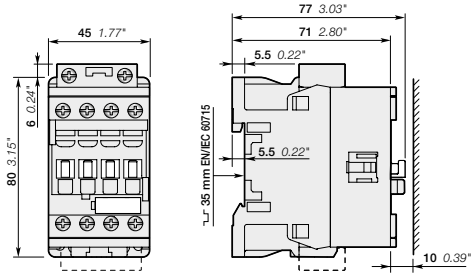
NFZB44ERT

NFZB..RT contactor relays comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are used for switching auxiliary and control circuits. These contactor relays are of the block type design with 4 or 8 main poles.

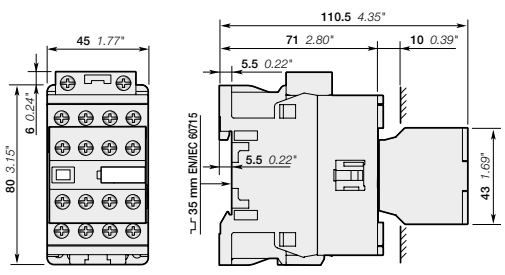
- designed in accordance to the applicable parts of IEC 60077 EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standards EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Number of contacts	Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Type	Order code	Weight Pkg (1 pce)
	V DC	V DC			kg
	24, 33, 48	20...60	NFZB22ERT-21	1SBH136060R2122	0.320
	72, 96, 110	48...130	NFZB22ERT-22	1SBH136060R2222	0.320
	220	100...250	NFZB22ERT-23	1SBH136060R2322	0.320
	24, 33, 48	20...60	NFZB31ERT-21	1SBH136060R2131	0.320
	72, 96, 110	48...130	NFZB31ERT-22	1SBH136060R2231	0.320
	220	100...250	NFZB31ERT-23	1SBH136060R2331	0.320
	24, 33, 48	20...60	NFZB40ERT-21	1SBH136060R2140	0.320
	72, 96, 110	48...130	NFZB40ERT-22	1SBH136060R2240	0.320
	220	100...250	NFZB40ERT-23	1SBH136060R2340	0.320
	24, 33, 48	20...60	NFZB44ERT-21	1SBH136060R2144	0.370
	72, 96, 110	48...130	NFZB44ERT-22	1SBH136060R2244	0.370
	220	100...250	NFZB44ERT-23	1SBH136060R2344	0.370
	24, 33, 48	20...60	NFZB62ERT-21	1SBH136060R2162	0.370
	72, 96, 110	48...130	NFZB62ERT-22	1SBH136060R2262	0.370
	220	100...250	NFZB62ERT-23	1SBH136060R2362	0.370
	24, 33, 48	20...60	NFZB80ERT-21	1SBH136060R2180	0.370
	72, 96, 110	48...130	NFZB80ERT-22	1SBH136060R2280	0.370
	220	100...250	NFZB80ERT-23	1SBH136060R2380	0.370

(1) Other control voltages, see voltage code table.



NFZB22ERT, NFZB31ERT, NFZB40ERT



NFZB44ERT, NFZB62ERT, NFZB80ERT

Main dimensions mm, inches

NF(Z)B..RT 4 and 8-pole contactor relays

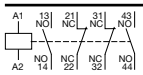
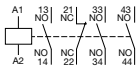
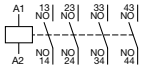
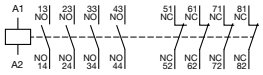
AC operated - connection with ring tongue ferrules

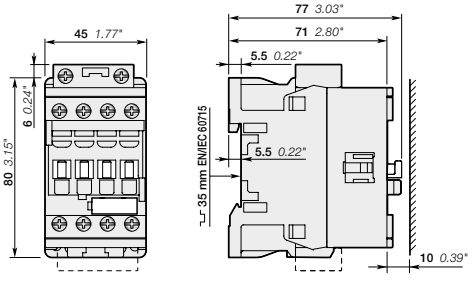
NF(Z)B22ERT

NF(Z)B44ERT

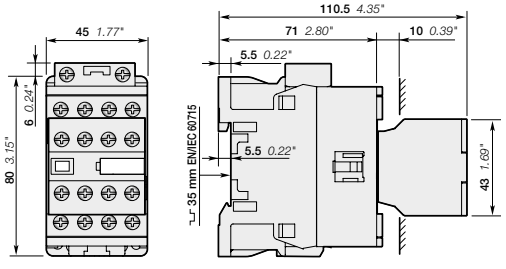
NF(Z)B..RT contactor relays comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are used for switching auxiliary and control circuits. These contactor relays are of the block type design with 4 or 8 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max. of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40° C up to +70 °C
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Number of contacts	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1) V AC 50/60 Hz	Type	Order code	Weight Pkg (1 pce) kg
	24...60	NFZB22ERT-21	1SBH136060R2122	0.320
	48...130	NFZB22ERT-22	1SBH136060R2222	0.320
	100...250	NFZB22ERT-23	1SBH136060R2322	0.320
	250...500	NFB22ERT-14	1SBH137060R1422	0.320
	24...60	NFZB31ERT-21	1SBH136060R2131	0.320
	48...130	NFZB31ERT-22	1SBH136060R2231	0.320
	100...250	NFZB31ERT-23	1SBH136060R2331	0.320
	250...500	NFB31ERT-14	1SBH137060R1431	0.320
	24...60	NFZB40ERT-21	1SBH136060R2140	0.320
	48...130	NFZB40ERT-22	1SBH136060R2240	0.320
	100...250	NFZB40ERT-23	1SBH136060R2340	0.320
	250...500	NFB40ERT-14	1SBH137060R1440	0,320
	24...60	NFZB44ERT-21	1SBH136060R2144	0.370
	48...130	NFZB44ERT-22	1SBH136060R2244	0.370
	100...250	NFZB44ERT-23	1SBH136060R2344	0.370
	250...500	NFB44ERT-14	1SBH137060R1444	0.370
	24...60	NFZB62ERT-21	1SBH136060R2162	0.370
	48...130	NFZB62ERT-22	1SBH136060R2262	0.370
	100...250	NFZB62ERT-23	1SBH136060R2362	0.370
	250...500	NFB62ERT-14	1SBH137060R1462	0.370
	24...60	NFZB80ERT-21	1SBH136060R2180	0.370
	48...130	NFZB80ERT-22	1SBH136060R2280	0.370
	100...250	NFZB80ERT-23	1SBH136060R2380	0.370
	250...500	NFB80ERT-14	1SBH137060R1480	0.370



NF(Z)B22ERT, NF(Z)B31ERT, NF(Z)B40ERT

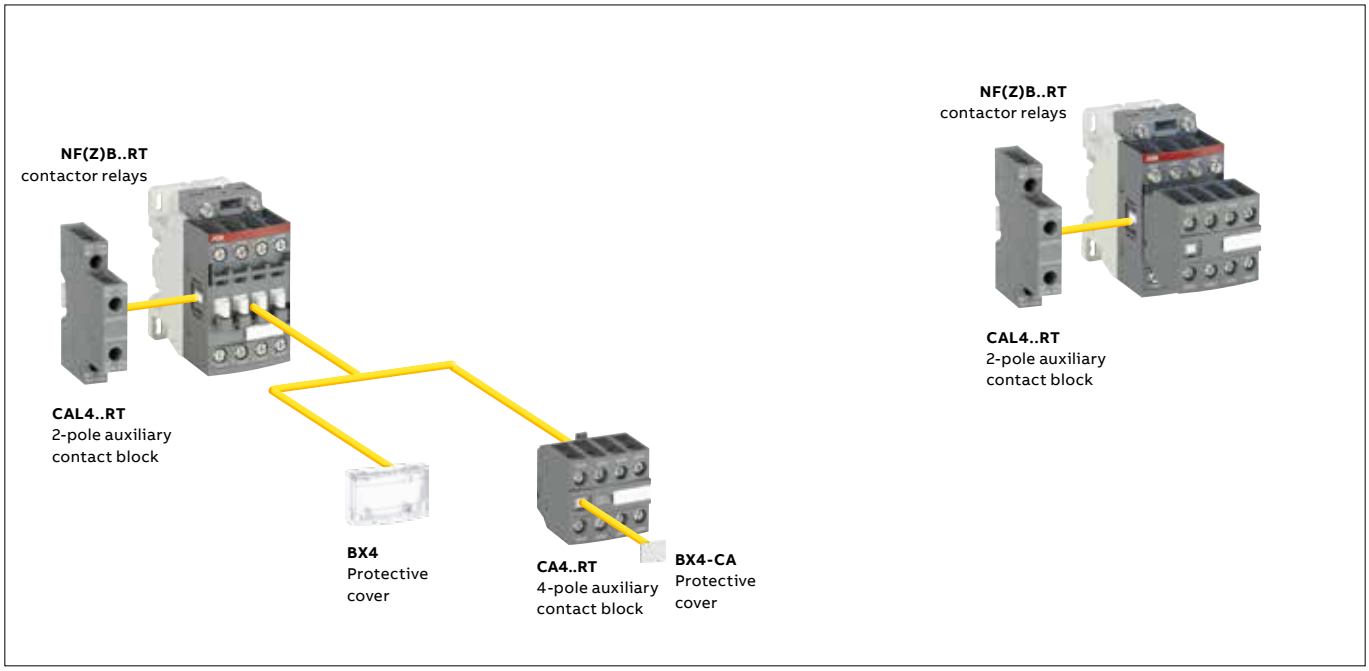


NF(Z)B44ERT, NF(Z)B62ERT, NF(Z)B80ERT

Main dimensions mm, inches

NF(Z)B..RT 4 and 8-pole contactor relays

Contactor relays and main accessories



Main accessory fitting details - for ordering details, technical data and other accessories: see section accessories

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor relay types	Main poles			Front-mounted accessories Auxiliary contact blocks 4-pole CA4..RT		Side-mounted accessories Auxiliary contact blocks Left side 2-pole CAL4-11RT		Right side
				Max. add-on N.C. auxiliary contacts: 3 N.C. max. on positions 1, 2, 3, 4 and 2 N.C. max on positions 1+/-30°, 5				
NF(Z)B	2 2	ERT		1	+	1		–
	3 1	ERT		–	+	1	+	1
				Max. add-on N.C. auxiliary contacts: 4 N.C. max. on positions 1, 2, 3, 4 and 3 N.C. max on positions 1+/-30°, 5				
NF(Z)B	4 0	ERT		1	+	1		–
				–	+	1	+	1
NF(Z)B	4 4	ERT		–	+	1		–
	6 2	ERT						
	8 0	ERT						

NF(Z)B..RT 4 and 8-pole contactor relays

Technical data

Contact utilization characteristics according to IEC

Contactor relay types		**NF(Z)B..RT**
Standards (1)		IEC/EN 60947-1, IEC/EN 60947-5-1 IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), EN 50155 (applicable parts), TR CU 001/2011 IEC 61373
Fire and smoke		EN 45545-2 (HL2, HL3)
Rated operational voltage Ue max.		690 V
Rated frequency (without derating)		50 / 60 Hz
Conventional free-air thermal current - Ith θ ≤ 40 °C		16 A
Ie / Rated operational current AC-15		
acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A
	220-240 V 50/60 Hz	4 A
	400-440 V 50/60 Hz	3 A
	500 V 50/60 Hz	2 A
	690 V 50/60 Hz	2 A
Making capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1
Breaking capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1
Ie / Rated operational current DC-13		
acc. to IEC 60947-5-1	24 V DC	6 A / 144 W
	48 V DC	2.8 A / 134 W
	72 V DC	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.27 A / 60 W
	250 V DC	0.27 A / 68 W
	400 V DC	0.15 A / 60 W
	500 V DC	0.13 A / 65 W
	600 V DC	0.1 A / 60 W
Short-circuit protection device gG type fuse		10 A
Rated short-time withstand current Icw	for 1.0 s	100 A
at 40 °C ambient temperature, in free air from a cold state	for 0.1 s	140 A
Minimum switching capacity		12 V / 3 mA
with failure rate acc. to IEC 60947-5-4		10^{-7}
Non-overlapping time between N.O. and N.C. contacts		≥ 2 ms
Power dissipation per pole at 6 A		0.1 W
Maximum electrical switching frequency	AC-15	1200 cycles/h
	DC-13	900 cycles/h
Mechanically linked contacts acc. to annex L of IEC 60947-5-1		Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts (CA4, CAL4 aux. contact blocks) are mechanically linked contacts

(1) For compliance confirmation on applicable parts based on your application and combination, please consult your ABB sales representatives.

Contact utilization characteristics according to UL / CSA

Contactor relay types	**NF(Z)B..RT**
Standards	UL 508, CSA C22.2 No. 14
Maximum operational voltage	600 V AC, 600 V DC
Pilot duty	A600, Q600
AC thermal rated current	10 A
AC maximum volt-ampere making	7200 VA
AC maximum volt-ampere breaking	720 VA
DC thermal rated current	2.5 A
DC maximum volt-ampere making-breaking	69 VA

NF(Z)B..RT 4 and 8-pole contactor relays

Technical data

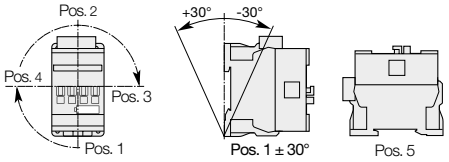
General technical data

Contactor relay types	**NF(Z)B..RT**
Rated insulation voltage Ui	
acc. to IEC 60947-5-1	690 V
acc. to UL / CSA	600 V
Rated impulse withstand voltage Uimp.	6 kV
Electromagnetic compatibility	Devices complying with IEC/EN 60947-1 - Environment A EN 50121-3-2
Pollution degree	3
Ambient air temperature close to contactor relay	
Operation in free air	-40...+70 °C
Storage	-60...+80 °C
Climatic withstand	Category B according to IEC 60947-1 Annex Q
Maximum operating altitude (without derating)	3000 m
Mechanical durability	
Number of operating cycles	20 millions operating cycles
Maximum switching frequency	6000 cycles/h
Shock and vibration withstand acc. to IEC 61373	Category 1, class B

Magnet system characteristics

Contactor types		**NF(Z)B..RT**
Coil operating limits acc. to IEC 60947-5-1	DC supply	(NFZB) at θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max (NFB) at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max; at θ ≤ 70 °C 0.85 x Uc min ... Uc max
	AC supply	at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max at θ ≤ 70 °C 0.85 x Uc min ... Uc max
DC control voltage		
Rated control circuit voltage Uc		20 ... 250 V DC
Coil consumption	Average pull-in value	(NFZB) 12 ... 16 W
	Average holding value	(NFZB) 1.7 W
PLC-output control		(NFZB) ≥ 500 mA 24 V DC
AC control voltage 50/60 Hz		
Rated control circuit voltage Uc		(NFZB) 24 ... 250 V AC - (NFB) 250 ... 500 V AC
Coil consumption	Average pull-in value	(NFZB) 16 VA - (NFB) 50 VA
	Average holding value	(NFZB) 1.7 VA / 1.5 W - (NFB) 2.2 VA / 2 W
Max. permitted control voltage during voltage fluctuation defined acc. to IEC 60077 / EN 50155		Rated control circuit voltage / Max. permitted control voltage 24 ... 60 V AC 50/60 Hz / 66 V AC 50/60 Hz 48 ... 130 V AC 50/60 Hz / 143 V AC 50/60 Hz 100 ... 250 V AC 50/60 Hz / 275 V AC 50/60 Hz 250 ... 500 V AC 50/60 Hz / 550 V AC 50/60 Hz
Drop-out voltage		≤ 60 % of Uc min.
Operating time		
Between coil energization and:	N.O. contact closing	40...95 ms
	N.C. contact opening	38...90 ms
Between coil de-energization and:	N.O. contact opening	11...95 ms
	N.C. contact closing	13...98 ms

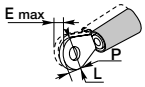
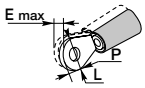
Mounting characteristics

Contactor types	**NF(Z)B..RT**
Mounting positions	
	Max. add-on N.C. auxiliary contacts: see accessory fitting details for a NF(Z)B contactor relay
Mounting distances	The contactor relays can be assembled side by side
Fixing	
On rail according to IEC/EN 60715	35 x 7.5 mm or 35 x 15 mm
By screws (not supplied)	2 x M4 screws placed diagonally

NF(Z)B..RT 4 and 8-pole contactor relays

Technical data

Connecting characteristics

Contactor types		NF(Z)B..RT
Main terminals		Conductors with insulated ring tongue ferrule
Connection capacity (min. ... max.)		
Main conductors (poles)		
Flexible with insulated ferrule	1 or 2 x	0.75...2.5 mm²
	Ø mm >	3.5 mm
	L mm <	8 mm
	P mm <	4.1 mm
	E mm <	2.9 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14
Tightening torque		1.2 Nm / 11 lb.in
Coil conductors		
Flexible with insulated ferrule	1 or 2 x	0.75...2.5 mm²
	Ø mm >	3.5 mm
	L mm <	8 mm
	P mm <	4.7 mm
	E mm <	2.9 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14
Tightening torque		1.2 Nm / 11 lb.in
Degree of protection acc. to IEC/EN 60947–1 and IEC/EN 60529		
All terminals		IP10
Front face		IP20
Screw terminals		Delivered in open position (1)
Main terminals		M3.5
Screwdriver type		Flat Ø 5.5 / Pozidriv 2
Coil terminals		M3.5
	Screwdriver type	Flat Ø 5.5 / Pozidriv 2

(1) Screws of unused terminals must be tightened with a max. tightening torque of 0.5 Nm / 4.58 lb.in.

Accessories for AF..B..RT contactors and NF..B..RT contactor relays Connection with ring tongue ferrules

4/74 **Auxiliary contact blocks**

4/82 **Other accessories**

4/84 **Spare parts for AF116B..RT ... AF146B..RT contactors**

For direct product details information, use product type or order code, ex:

www.abb.com/productdetails/**CA4-11MRT**
www.abb.com/productdetails/**1SBN010155R1111**

Auxiliary contact blocks for AF09(Z)B..RT ... AF370B..RT

Connection with ring tongue ferrules

CA4-11ERT

CA4-22ERT

CAL4-11RT

CAT4-11MRT

The auxiliary contact blocks are used for the operation of auxiliary circuits and control circuits for standard industrial environments.

Types of auxiliary contact blocks for front mounting:

- Select the 2- or 4-pole auxiliary contact blocks CA-..E, CA4-..M, CA4-..U or CA4-..N type,according to the contactor or contactor relay type for compliance with the standard requirements (see "Terminal marking and positioning").

Types of auxiliary contact blocks for side mounting:

- For clipping onto the right- and/or left-hand side of the contactors.
- The CAL ...-11B is a second block for mounting in addition to a first CAL ...-11 block, right- and/or left-hand of the AF116B..RT ... AF370B..RT contactors.

The auxiliary contact blocks are equipped with screw type connecting terminals delivered open, protected against accidental direct contact and bear the corresponding function marking.

For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce)
					kg
Front-mounted instantaneous auxiliary contact blocks					
AF09(Z)B ... AF16(Z)B-30-10RT	1 1 – –	CA4-11MRT	1SBN010155R1111	1	0.040
AF26(Z)B ... AF38(Z)B-30-00RT AF09(Z)B ... AF38(Z)B-40-00RT AF09(Z)B ... AF38(Z)B-22-00RT	1 1 – –	CA4-11ERT	1SBN010155R1011	1	0.040
AF09(Z)B ... AF16(Z)B-30-10RT	2 2 – –	CA4-22MRT	1SBN010142R1122	1	0.050
	3 1 – –	CA4-31MRT	1SBN010142R1131	1	0.050
AF26(Z)B ... AF38(Z)B-30-00RT	2 2 – –	CA4-22ERT	1SBN010142R1022	1	0.050
AF09(Z)B ... AF38(Z)B-40-00RT	3 1 – –	CA4-31ERT	1SBN010142R1031	1	0.050
AF09(Z)B ... AF38(Z)B-22-00RT	4 0 – –	CA4-40ERT	1SBN010142R1040	1	0.050
AF09(Z)B ... AF16(Z)B-30-01RT	2 2 – –	CA4-22URT	1SBN010142R1322	1	0.060
4-pole NF(Z)B..RT	2 2 – –	CA4-22NRT	1SBN010142R1222	1	0.050
	3 1 – –	CA4-31NRT	1SBN010142R1231	1	0.050
	4 0 – –	CA4-40NRT	1SBN010142R1240	1	0.050
AF50..RT ... AF95B..RT	2 2 – –	CA5-22ERT	1SBN010042R1022	1	0.060
	3 1 – –	CA5-31ERT	1SBN010042R1031	1	0.060
	4 0 – –	CA5-40ERT	1SBN010042R1040	1	0.060
Side-mounted instantaneous auxiliary contact blocks					
AF09(Z)B ... AF38(Z)B..RT NF(Z)B..RT	1 1 – –	CAL4-11RT	1SBN010129R1011	1	0.040
AF95B..RT	1 1 – –	CAL18-11RT	1SFN010729R1011	1	0.050
AF116B..RT ... AF370B..RT 1st block	1 1 – –	CAL19-11-RT	1SFN010829R1011	2	0.040
2nd block	1 1 – –	CAL19-11B-RT	1SFN010829R3311	2	0.040
Front-mounted instantaneous auxiliary contact and A1/A2 coil terminal blocks					
AF09(Z)B ... AF16(Z)B-30-10RT	1 1 – –	CAT4-11MRT	1SBN010154R1111	1	0.045
AF26(Z)B ... AF38(Z)B-30-00RT AF09(Z)B ... AF38(Z)B-40-00RT AF09(Z)B ... AF38(Z)B-22-00RT	1 1 – –	CAT4-11ERT	1SBN010154R1011	1	0.045

For each contactor or contactor relay type, refer to "Accessory fitting details" table.

CA4, CAT4, CAL4 auxiliary contact blocks for AF09(Z)B..RT ... AF38(Z)B..RT

Connection with ring tongue ferrules

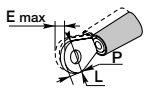
Contact utilization characteristics according to IEC

Types		2-pole CA4, 4-pole CA4, 2-pole CAT4, 2-pole CAL4
Standards		IEC/EN 60947-5-1
Rated insulation voltage Ui acc. to IEC 60947-5-1		690 V
Rated impulse withstand voltage Uimp		6 kV
Rated operational voltage Ue max.		24 ... 690 V
Conventional thermal current Ith - θ ≤ 40 °C		16 A
Rated frequency (without derating)		50 / 60 Hz
Ie / Rated operational current AC-15		
acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A
	220-240 V 50/60 Hz	4 A
	400-440 V 50/60 Hz	3 A
	500 V 50/60 Hz	2 A
	690 V 50/60 Hz	2 A
Making capacity		10 x Ie AC-15 acc. to IEC 60947-5-1
Breaking capacity		10 x Ie AC-15 acc. to IEC 60947-5-1
Ie / Rated operational current DC-13		
acc. to IEC 60947-5-1	24 V DC	6 A / 144 W
	48 V DC	2.8 A / 134 W
	72 V DC	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.27 A / 60 W
	250 V DC	0.27 A / 68 W
	400 V DC	0.15 A / 60 W
	500 V DC	0.13 A / 65 W
	600 V DC	0.1 A / 60 W
Short-circuit protection device gG type fuse		10 A
Rated short-time withstand current Icw	for 1.0 s	100 A
θ ≤ 40 °C	for 0.1 s	140 A
Minimum switching capacity		12 V / 3 mA
with failure rate acc. to IEC 60947-5-4		10^{-7}
Power dissipation per pole at 6 A		0.1 W
Mechanical durability Number of operating cycles		10 millions operating cycles
Max. switching frequency		3600 cycles/h
Max. electrical switching frequency	AC-15	1200 cycles/h
	DC-13	900 cycles/h
Mechanically linked contacts acc. to annex L of IEC 60947-5-1		Additional N.O. or N.C. auxiliary contacts (CA4, CAL4, CAT4) are mechanically linked contacts.
Mirror contacts acc. to annex F of IEC 60947-4-1		Additional N.C. auxiliary contacts (CA4, CAL4, CAT4) are mirror contacts.

Contact utilization characteristics according to UL / CSA

Types	2-pole CA4, 4-pole CA4, 2-pole CAT4, 2-pole CAL4
Standards	UL 508, CSA C22.2 No. 14-10
Max. operational voltage	600 V AC, 600 V DC
Pilot duty	A600, Q600
AC thermal rated current	10 A
AC maximum volt-ampere making	7200 VA
AC maximum volt-ampere breaking	720 VA
DC thermal rated current	2.5 A
DC maximum volt-ampere making-breaking	69 VA

Connecting characteristics

Types		2-pole CA4, 4-pole CA4, 2-pole CAT4, 2-pole CAL4
Connection capacity (min. ... max.)		
Main conductors (poles)		
Flexible with insulated ferrule	1 or 2 x	0.75 ... 2.5 mm²
	Ø mm >	3.5 mm
	L mm <	8 mm
	P mm <	4.1 mm
	E mm <	2.9 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14
Tightening torque		1.2 N.m / 11 lb.in
Degree of protection		
acc. to IEC/EN 60947–1 and IEC/EN 60529		IP20
Screw terminals		Delivered in open position (1)
All terminals		M3.5
Screwdriver type		Flat Ø 5.5 / Pozidriv 2

(1) Screws of unused terminals must be tightened with a max. tightening torque of 0.5 Nm / 4.58 lb.in.

CA5, CAL18 auxiliary contact blocks for AF45..RT ... AF95B..RT

Connection with ring tongue ferrules

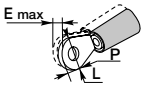
Contact utilization characteristics according to IEC

Types			4-pole CA5 - front mounted	CAL18-11 - side mounted
Standards			IEC/EN 60947-5-1	
Rated insulation voltage Ui acc. to IEC 60947-5-1			690 V	
Rated impusle withstand voltage Uimp.			6 KV	
Rated operational voltage Ue max.			24...690 V AC	
Conventional thermal current Ith - θ ≤ 40 °C			16 A	
Ie / Rated operational current AC-15				
acc. to IEC 60947-5-1	24-127 V 50/60 Hz		6 A	
	220-240 V 50/60 Hz		4 A	
	380-440 V 50/60 Hz		3 A	
	500-690 V 50/60 Hz		2 A	
Making capacity acc. to IEC 60947-5-1			10 x Ie AC-15	
Breaking capacity acc. to IEC 60947-5-1			10 x Ie AC-15	
Ie / Rated operational current DC-13				
acc. to IEC 60947-5-1		24 V DC	6 A / 144 W	
		48 V DC	2.8 A / 134 W	
		72 V DC	1 A / 72 W	
		110 V DC	0.55 A / 60 W	
		125 V DC	0.55 A / 69 W	
		220 V DC	0.3 A / 66 W	
		250 V DC	0.3 A / 75 W	
Short-circuit protection device gG type fuse			10 A	
Rated short-time withstand current Icw		for 1.0 s	100 A	
θ = 40 °C		for 0.1 s	140 A	
Minimum switching capacity				
AF50 ... AF75 contactors			17 V / 1 mA	–
with failure rate acc. to IEC 60947-5-4			≤ 10^{-7}	–
AF95B contactors			24 V / 50 mA	24 V / 50 mA (0.5 million of operating cycles)
with failure rate acc. to IEC 60947-5-4			–	≤ 10^{-6}
Power dissipation per pole at 6 A			0.1 W	0.15 W
Mechanical durability				
Number of operating cycles			10 millions operating cycles (AF45 ... AF75) 3 millions operating cycles (AF95B)	5 millions operating cycles
Max. switching frequency			3600 cycles/h	
Maximum electrical switching frequency		AC-15	1200 cycles/h	
		DC-13	900 cycles/h	
Mirror contacts			Additional N.C. auxiliary contacts are mirror contacts.	
acc. to annex F of IEC 60947-4-1				

Contact utilization characteristics according to UL / CSA

Standards		UL 508, CSA C22.2 No. 14	
Max. operational voltage		600 V AC, 250 V DC	
Pilot duty		A600, Q300	
AC thermal rated current		10 A	

Connecting characteristics

Connection capacity (min. ... max.)				
Main conductors (poles)				
Flexible with insulated ferrule				
		1 or 2 x	0.75...2.5 mm²	
		Ø mm >	3.7 mm	3.5 mm
		L mm <	7.7 mm	8 mm
		P mm <	3.7 mm	4.7 mm
		E mm <	2.9 mm	2.9 mm
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18...14	AWG 18...14
Tightening torque			1.2 Nm / 11 lb.in	1 Nm / 9 lb.in
Degree of protection				
acc. to IEC/EN 60947–1 and IEC/EN 60529			IP10	IP20
Screw terminals			Delivered in open position, screws of unused terminals must be tightened	
All terminals			M3.5	
Screwdriver type			Flat Ø 5.5 / Pozidriv 2	

CAL19 auxiliary contact blocks for AF116B..RT ... AF370B..RT

Connection with ring tongue ferrules

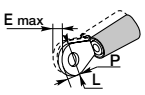
Contact utilization characteristics according to IEC

Types		CAL19B
Standards		IEC/EN 60947-5-1
Rated insulation voltage Ui acc. to IEC 60947-5-1		690 V
Rated impulse withstand voltage Uimp.		6 kV
Rated operational voltage Ue max.		24...690 V AC
Conventional thermal current Ith - θ ≤ 40 °C		16 A
Rated frequency (without derating)		50/60 Hz
Ie / Rated operational current AC-15		
acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A
	220-240 V 50/60 Hz	4 A
	380-440 V 50/60 Hz	3 A
	500-690 V 50/60 Hz	2 A
Making capacity acc. to IEC 60947-5-1		10 x Ie AC-15
Breaking capacity acc. to IEC 60947-5-1		10 x Ie AC-15
Ie / Rated operational current DC-13		
acc. to IEC 60947-5-1	24 V DC	3 A / 72 W
	48 V DC	1.5 A / 72 W
	72 V DC	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.3 A / 69 W
	250 V DC	0.3 A / 75 W
Short-circuit protection device gG type fuse		10 A
Rated short-time withstand current Icw	for 1.0 s	100 A
θ = 40 °C	for 0.1 s	140 A
Minimum switching capacity		24 V / 50 mA
with failure rate acc. to IEC 60947-5-4		≤ 10-6
Power dissipation per pole at 6 A		0.15 W
Mechanical durability		
Number of operating cycles		5 millions operating cycles
Max. switching frequency		300 cycles/h
Max. electrical switching frequency	AC-15	300 cycles/h
	DC-13	300 cycles/h
Mirror contacts acc. to annex F of IEC 60947-4-1		N.C. auxiliary contacts are mirror contacts

Contact utilization characteristics according to UL / CSA

Standards	UL 508, CSA C22.2 No. 14
Max. operational voltage	600 V AC, 250 V DC
Pilot duty	A600, Q300
AC thermal rated current	10 A
AC maximum volt-ampere making	7200 V A
AC maximum volt-ampere breaking	720 V A
DC thermal rated current	2.5 A
DC maximum volt-ampere making-breaking	69 V A

Connecting characteristics

Connection capacity (min. ... max.)		
Main conductors (poles)		
Flexible with insulated ferrule		
	1 or 2 x	0.75...2.5 mm²
	Ø mm >	3.5 mm
	L mm <	8 mm
	P mm <	4.1 mm
	E mm <	2.9 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14
Tightening torque		1 Nm / 9 lb.in
Degree of protection		
acc. to IEC/EN 60947–1 and IEC/EN 60529		IP20
Screw terminals		Delivered in open position, screws of unused terminals must be tightened
All terminals		M3.5
Screwdriver type		Flat Ø 5.5 / Pozidriv 2

Auxiliary contact blocks for AF116B..RT ... AF370B..RT

for severe industrial environments

CEL19..RT

The auxiliary contact blocks are used for the operation of auxiliary and control circuits for severe industrial environments.

Types of auxiliary contact blocks for side mounting:

- CEL 1-pole block, with built-in microswitch IP67 degree of protection (IP20 on terminals). Instantaneous N.O. or N.C. contact.

For clipping onto the right- and/or left-hand side of the contactors.

The auxiliary contact blocks are equipped with screw type connecting terminals delivered open, protected against accidental direct contact and bear the corresponding function marking.

For contactors	Auxiliary contacts		Type	Order code	Pkg qty	Weight (1 pce)
						kg
Side-mounting instantaneous auxiliary contact blocks						
AF116B..RT ... AF370B..RT	1	0	CEL19-10-RT	1SFN010833R1010	1	0.040
	0	1	CEL19-01-RT	1SFN010833R1001	1	0.040

Auxiliary contact blocks for AF116B..RT ... AF370B..RT

for severe industrial environments

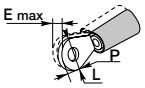
Contact utilization characteristics according to IEC

Types			**CEL19**
Standards			IEC/EN 60947-5-1
Rated insulation voltage Ui acc. to IEC 60947-5-1			250 V
Rated operational voltage Ue max.			125 V
Conventional thermal current Ith - θ ≤ 40 °C			0.1 A
Ie / Rated operational current AC-14			
acc. to IEC 60947-5-1		24-127 V 50/60 Hz	0.1 A
Making capacity acc. to IEC 60947-5-1			6 x Ie AC-14
Breaking capacity acc. to IEC 60947-5-1			6 x Ie AC-14
Ie / Rated operational current DC-12			
acc. to IEC 60947-5-1		24 V DC	0.1 A
		48 V DC	0.1 A
		72 V DC	0.1 A
		110 V DC	0.1 A
		220 V DC	–
Short-circuit protection device			0.1 A (FF type fuses) (1)
Minimum switching capacity			
with failure rate acc. to IEC 60947-5-4			3 V / 1 mA
Mechanical durability	Number of operating cycles		(2)
	Max. switching frequency		(2)
Electrical durability	Number of operating cycles		(2)
	Max. switching frequency	AC-14, AC15	(2)
		DC-12	(2)
Mirror contacts acc. to annex F of IEC 60947-4-1			N.C. auxiliary contacts are mirror contacts

Contact utilization characteristics according to UL / CSA

Standards		UL 508, CSA C22.2 No. 14
Max. operational voltage		125 V
Pilot duty		
AC thermal rated current		0.1 A

Connecting characteristics

Connection capacity (min. ... max.)		
Main conductors (poles)		
Flexible with insulated ferrule		
	1 or 2 x	0.75...2.5 mm²
	Ø mm >	3.5 mm
	L mm <	8 mm
	P mm <	4.1 mm
	E mm <	2.9 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14
Tightening torque		1 Nm
Degree of protection	Terminals	IP20
acc. to IEC/EN 60947-1 and IEC/EN 60529	Microswitches	IP67
Screw terminals		Delivered in open position, screws of unused terminals must be tightened
All terminals		M3.5
Screwdriver type		Flat Ø 5.5 / Pozidriv 2

(1) or HRC fuses for very fast action (6.3 x 32 mm size).
(2) Please consult us.

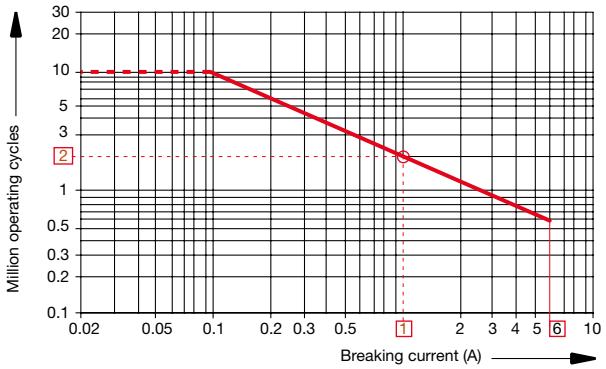
Auxiliary contact blocks for AF09(Z)B ... AF38(Z)B and NF(Z)B contactor relays

Electrical durability

Electrical durability for AC-15 utilization category

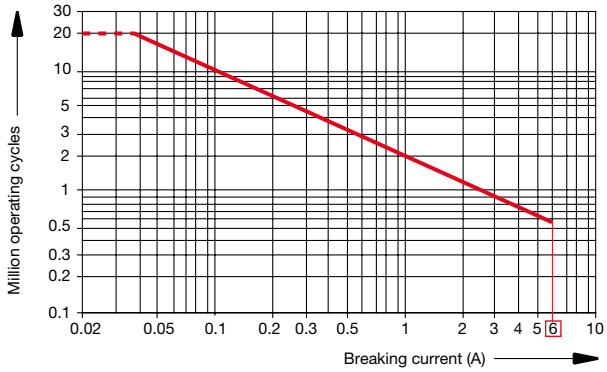
AC-15 utilization category according to IEC/EN 60947-5-1:
- making current: 10 x Ie with cos ϕ = 0.7 and Ue
- breaking current: Ie with cos ϕ = 0.4 and Ue.

These curves represent the electrical durability of the built-in or add-on auxiliary contacts in relation to the breaking current. The curves have been drawn for resistive and inductive loads up to 690 V, 40...60 Hz.



- AF09(Z)B ... AF38(Z)B contactor built-in auxiliary contacts
- CA4, CAT4 and CAL4 add-on auxiliary contacts.

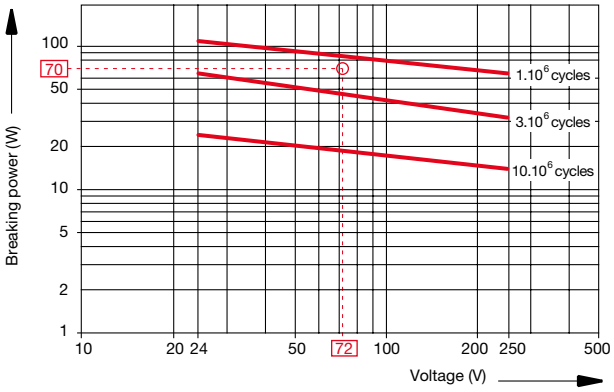
Example:
Breaking current = 1 A
On the opposite curve at intersection "O" 1 A the corresponding value for the electrical durability is approximately 2 millions operating cycles.



NF(Z)B contactor relays.
(For add on auxiliary contacts see curve above).

Electrical durability for DC-13 utilization category

DC-13 utilization category according to IEC/EN 60947-5-1: making and breaking current Ie and Ue.



- AF09(Z)B ... AF38(Z)B contactor built-in auxiliary contacts
- CA4, CAT4 and CAL4 add-on auxiliary contacts
- NF(Z)B contactor relays.

Example:
Control of DC electro-magnet:
Ue voltage = 72 V DC and breaking power = 70 W.
On the opposite curve at intersection "O" 72 V / 70 W the corresponding value for the electrical durability is approximately 2 millions operating cycles.

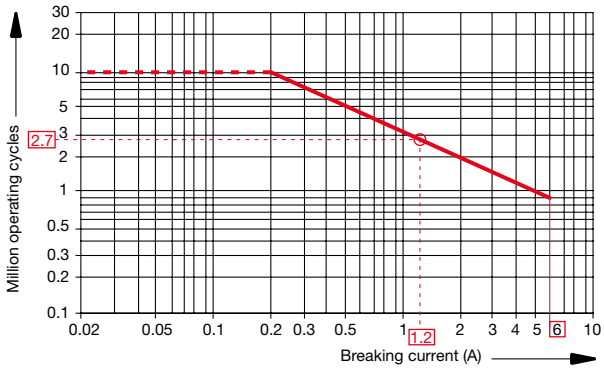
Auxiliary contacts for AF45 ... AF95B

Electrical durability

Electrical durability for AC-15 utilization category

AC-15 utilization category according to IEC/EN 60947-5-1:
- making current: 10 x Ie with cos ϕ = 0.7 and Ue
- breaking current: Ie with cos ϕ = 0.4 and Ue.

These curves represent the electrical durability of the built-in or add-on auxiliary contacts, in relation to the breaking current.
The curves have been drawn for resistive and inductive loads up to 690 V, 40...60 Hz.

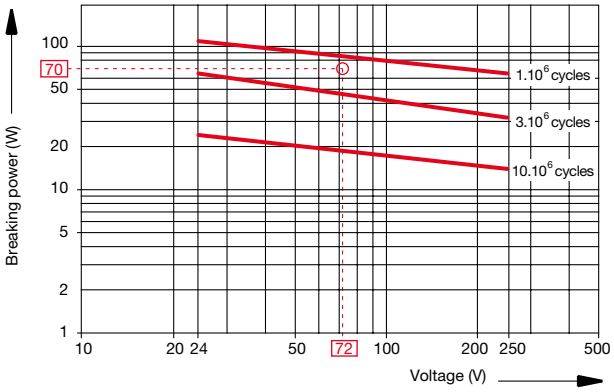


- 1-pole and 4-pole CA5,
  1-pole CC5,
  2-pole CAL5 and CAL18 add-on auxiliary contacts.

Example:
Breaking current = 1.2 A
On the opposite curve at intersection "O" 1.2 A
the corresponding value for the electrical durability is approximately 2.7 millions operating cycles.

Electrical durability for DC-13 utilization category

DC-13 utilization category according to IEC/EN 60947-5-1: making and breaking current = Ie with Ue value.



- 1-pole and 4-pole CA5,
  1-pole CC5,
  2-pole CAL5 and CAL18 add-on auxiliary contacts.

Example:
Control of DC electro-magnet: Ue voltage = 72 V DC and breaking power = 70 W.
On the opposite curve at intersection "O" 72 V / 70 W
the corresponding value for the electrical durability is approximately 2 millions operating cycles.

Other accessories

Connection with ring tongue ferrules

LDC4RT

For contactors	Type	Order code		Pkg qty	Weight (1 pce) kg
Additional coil terminal blocks					
Additional coil terminal blocks for a bottom access to the coil terminals of contactors or contactor relays.					
With screw terminals for ring tongue ferrules					
AF09(Z)B ... AF38(Z)B..RT NF(Z)B..RT	LDC4RT	1SBN070158T1000		10	0.010

BX4

BX4-CA

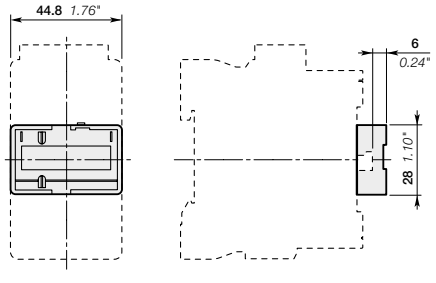
Protective covers					
Sealable and transparent protective covers BX4 and non-removable BX4-CA to protect the devices against accidental contact.					
AF09(Z)B ... AF38(Z)B..RT 1-stack contactors and NF(Z)B..RT contactor relays	BX4	1SBN110108T1000		10	0.006
For 2 and 4-pole CA4..RT auxiliary contact blocks	BX4-CA	1SBN110109W1000		50	0.001

BA4

Function markers AF09(Z)B ... AF96B and AF116B ... AF370B					
Box of 16 blank cards (16 markers by card) printable on HTP500 thermal transfer printer and AMS 500 marking table to identify your contactors, overload relays or manual motor starters. Marker dimensions: 7 x 20 mm (.276" x .787").					
AF09(Z)B ... AF96B and AF116B ... AF370B contactors	BA4	1SNA235156R2700		16	0.011

BA5-50

Function markers AF45 ... AF95B					
Set of 50 function markers designed to be clipped onto the front face of devices. Details can be added to these markers using a ball point pen, indelible felt-tip pen or pentel white. Self-adhesive labels (not supplied) can also be added to them. Marker dimensions: 7 x 19 mm (.276" x .748").					
AF45 ... AF95B	BA5-50	1SBN110000R1000		1	0.017



BX4

Main dimensions mm, inches

Other accessories

1SBC100022V0014

BP38-4

Mounting pieces

Mounting piece for replacing TAL26 ... TAL40..RT contactors fixed by screws by AF09(Z)B ... AF38(Z)B..RT contactors.

For contactors		Type	Order code	Pkg qty	Weight (1 pce) kg
From contactor	To contactor				
A26 ... A40..RT, TAL26 ... TAL40..RT	AF09(Z)B ... AF38(Z)B..RT	BP38-4	1SBN112303T1000	10	0.003

1SBC100041V0014

BDT4
For AF09(Z)(B) ... AF65(B), NF(Z)(B)

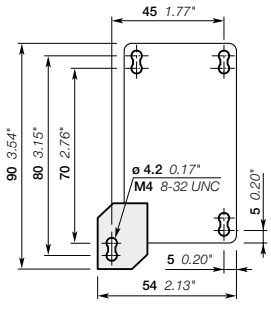
1SBC100042V0014

BDT4
For AF80(B), AF96(B)

Test block

BDT4 test block is suitable for switching on contactor off-load.
Marking on the block indicates the contactor type to fit with.

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AF09(Z)(B) ... AF96(B), NF(Z)(B)	BDT4	1SBN110122T1000	10	0.007



BP38-4

Main dimensions mm, inches

Spare parts for AF116B..RT ... AF146B..RT contactors

Coil module, electronic module

Coil Modules

Coil modules replacement kit for 3 and 4-pole contactors. Includes coil, electronic module, fasteners, damping and terminal cover.

	Rated contol circuit Voltage Uc		Type	Order code	Pkg qty	Weight (1 pce)
	V 50/60Hz	V DC				kg
3-pole contactors with ring tongue ferrules connection						
AF116B...RT	24...60	20...60	ZAF116B-11-RT	1SFN154276R1106	1	0.324
	48...130	48...130	ZAF116B-12-RT	1SFN154276R1206	1	0.313
	100...250	100...250	ZAF116B-13-RT	1SFN154276R1306	1	0.288
	250...500	250...500	ZAF116B-14-RT	1SFN154276R1406	1	0.298
AF140B...RT	24...60	20...60	ZAF140B-11-RT	1SFN154476R1106	1	0.324
	48...130	48...130	ZAF140B-12-RT	1SFN154476R1206	1	0.313
	100...250	100...250	ZAF140B-13-RT	1SFN154476R1306	1	0.288
	250...500	250...500	ZAF140B-14-RT	1SFN154476R1406	1	0.298
AF146B...RT	24...60	20...60	ZAF146B-11-RT	1SFN154676R1106	1	0.324
	48...130	48...130	ZAF146B-12-RT	1SFN154676R1206	1	0.313
	100...250	100...250	ZAF146B-13-RT	1SFN154676R1306	1	0.288
	250...500	250...500	ZAF146B-14-RT	1SFN154676R1406	1	0.298
4-pole contactors with ring tongue ferrules connection						
AF116B...RT	24...60	20...60	ZAF116B-40-11-RT	1SFN154276R1146	1	0.340
	48...130	48...130	ZAF116B-40-12-RT	1SFN154276R1246	1	0.331
	100...250	100...250	ZAF116B-40-13-RT	1SFN154276R1346	1	0.308
	250...500	250...500	ZAF116B-40-14-RT	1SFN154276R1446	1	0.320
AF140B...RT	24...60	20...60	ZAF140B-40-11-RT	1SFN154476R1146	1	0.340
	48...130	48...130	ZAF140B-40-12-RT	1SFN154476R1246	1	0.331
	100...250	100...250	ZAF140B-40-13-RT	1SFN154476R1346	1	0.308
	250...500	250...500	ZAF140B-40-14-RT	1SFN154476R1446	1	0.320

Electronic Module

Coil modules replacement kit for 4-pole contactors. Includes coil, electronic module, fasteners, damping and terminal cover.

For contactors	Rated contol circuit Voltage Uc		Type	Order code	Pkg qty	Weight (1 pce)
	V 50/60Hz	V DC				kg
3-pole contactors with ring tongue ferrules connection						
AF116B...RT	24...60	20...60	ZP116B-11-RT	1SFN164223R1111	1	0.133
	48...130	48...130	ZP116B-12-RT	1SFN164223R1112	1	0.131
	100...250	100...250	ZP116B-13-RT	1SFN164223R1113	1	0.133
	250...500	250...500	ZP116B-14-RT	1SFN164223R1114	1	0.143
AF140B...RT	24...60	20...60	ZP140B-11-RT	1SFN164423R1111	1	0.133
	48...130	48...130	ZP140B-12-RT	1SFN164423R1112	1	0.131
	100...250	100...250	ZP140B-13-RT	1SFN164423R1113	1	0.133
	250...500	250...500	ZP140B-14-RT	1SFN164423R1114	1	0.143
AF146B...RT	24...60	20...60	ZP146B-11-RT	1SFN164623R1111	1	0.133
	48...130	48...130	ZP146B-12-RT	1SFN164623R1112	1	0.131
	100...250	100...250	ZP146B-13-RT	1SFN164623R1113	1	0.133
	250...500	250...500	ZP146B-14-RT	1SFN164623R1114	1	0.143
4-pole contactors with ring tongue ferrules connection						
AF116B...RT	24...60	20...60	ZPT116B-11-RT	1SFN164224R1111	1	0.149
	48...130	48...130	ZPT116B-12-RT	1SFN164224R1112	1	0.149
	100...250	100...250	ZPT116B-13-RT	1SFN164224R1113	1	0.153
	250...500	250...500	ZPT116B-14-RT	1SFN164224R1114	1	0.165
AF140B...RT	24...60	20...60	ZPT140B-11-RT	1SFN164424R1111	1	0.149
	48...130	48...130	ZPT140B-12-RT	1SFN164424R1112	1	0.149
	100...250	100...250	ZPT140B-13-RT	1SFN164424R1113	1	0.153
	250...500	250...500	ZPT140B-14-RT	1SFN164424R1114	1	0.165

Notes

Terminal marking and positioning, dimensions AF..B..RT contactors and NF..B..RT contactor relays Connection with ring tongue ferrules

Terminal marking and positioning

4/88 AF(Z)..B..RT 3-pole contactors
4/89 AF(Z)..B..RT 4-pole contactors
4/90 NF(Z)..B..RT contactor relays
4/91 Add-on auxiliary contacts

Dimensions

4/92 AF(Z)..B..RT 3-pole contactors
4/102 AF(Z)..B..RT 4-pole contactors
4/110 NF(Z)..B..RT contactor relays

4/113 **Voltage code table**

For direct product details information, use product type or order code, ex:

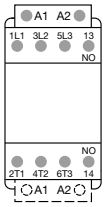
www.abb.com/productdetails/**AF09-30-10-13**
or www.abb.com/productdetails/**1SBL137001R1310**

AF09(Z)B..RT ... AF370B..RT 3-pole contactors

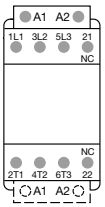
Terminal marking and positioning

AF09(Z)B..RT ... AF38(Z)B..RT contactors

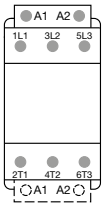
Standard devices without addition of auxiliary contacts



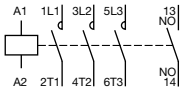
AF09(Z)B ... AF16(Z)B-30-10RT



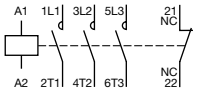
AF09(Z)B ... AF16(Z)B-30-01RT



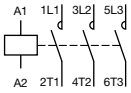
AF26(Z)B ... AF38(Z)B-30-00RT



AF09(Z)B ... AF16(Z)B-30-10RT

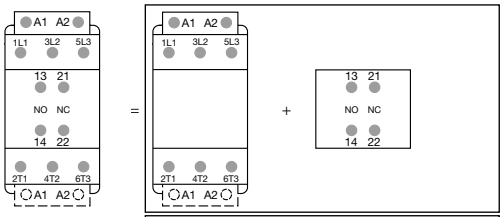


AF09(Z)B ... AF16(Z)B-30-01RT

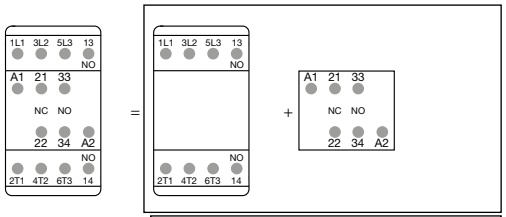


AF26(Z)B ... AF38(Z)B-30-00RT

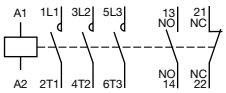
Other possible contact combinations with auxiliary contacts added by the user



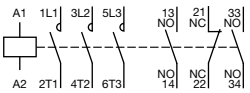
Combination 11 = AF26(Z)B ... AF38(Z)B-30-00RT + CA4-11ERT



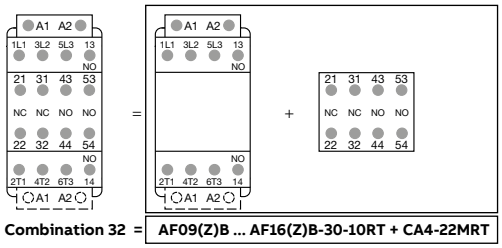
Combination 21 = AF09(Z)B ... AF16(Z)B-30-10RT + CAT4-11MRT



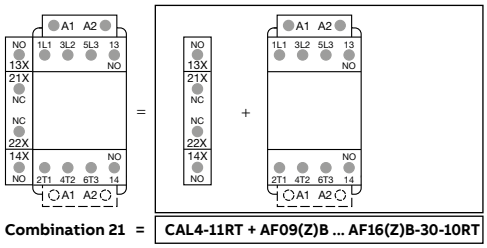
Combination 11



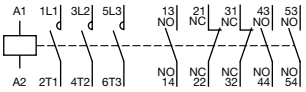
Combination 21



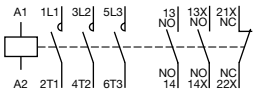
Combination 32 = AF09(Z)B ... AF16(Z)B-30-10RT + CA4-22MRT



Combination 21 = CAL4-11RT + AF09(Z)B ... AF16(Z)B-30-10RT



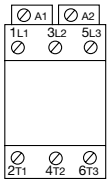
Combination 32



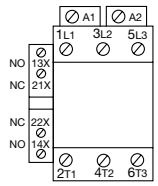
Combination 21

AF50..RT ... AF95B..RT contactors

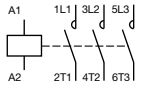
Standard devices without addition of auxiliary contacts



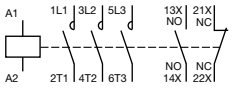
AF50 ... AF75-30-00RT



AF95B-30-11RT



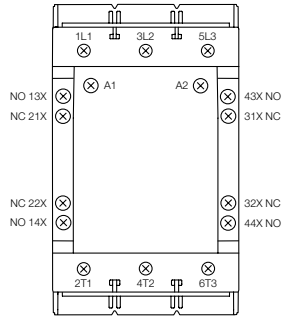
AF50 ... AF75-30-00RT



AF95B-30-11RT

AF116B..RT ... AF370B..RT contactors

Standard devices with factory mounted auxiliary contacts



AF116B ... AF370B-30-22RT

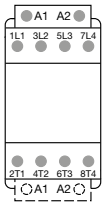
AF116B ... AF370B-30-22RT

AF09(Z)B..RT ... AF370B..RT 4-pole contactors

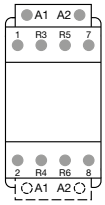
Terminal marking and positioning

AF09(Z)B..RT ... AF38(Z)B..RT contactors

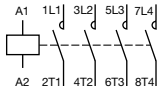
Standard devices without addition of auxiliary contacts



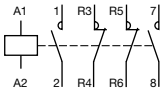
AF09(Z)B ... AF38(Z)B-40-00RT



AF09(Z)B ... AF38(Z)B-22-00RT

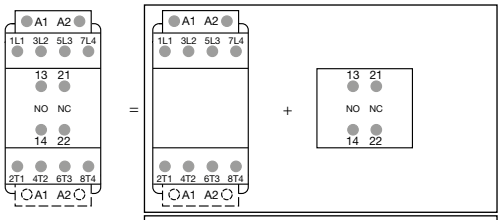


AF09(Z)B ... AF38(Z)B-40-00RT

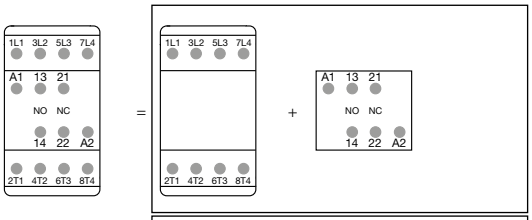


AF09(Z)B ... AF38(Z)B-22-00RT

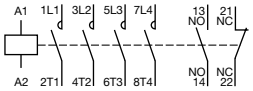
Other possible contact combinations with auxiliary contacts added by the user



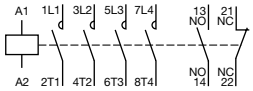
Combination 11 = AF09(Z)B ... AF26(Z)B-40-00RT + CA4-11ERT



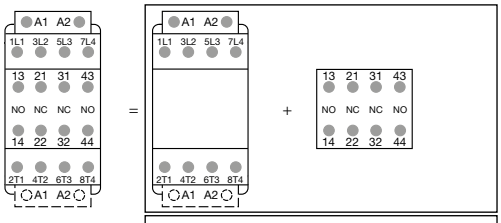
Combination 11 = AF09(Z)B ... AF26(Z)B-40-00RT + CAT4-11ERT



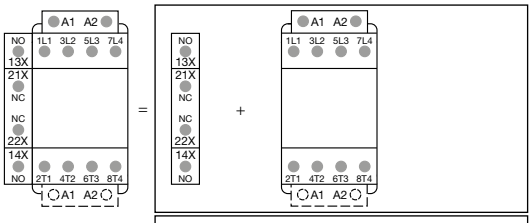
Combination 11



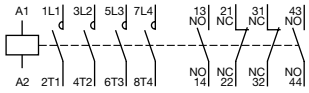
Combination 11



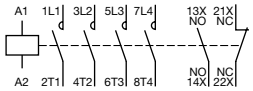
Combination 22 = AF09(Z)B ... AF26(Z)B-40-00RT + CA4-22ERT



Combination 11 = CAL4-11RT + AF09(Z)B ... AF26(Z)B-40-00RT



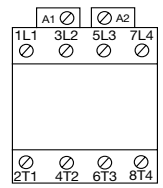
Combination 22



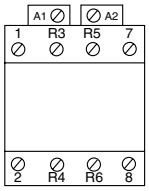
Combination 11

AF45..RT ... AF75RT contactors

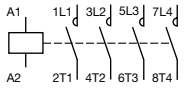
Standard devices without addition of auxiliary contacts



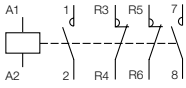
AF45-40-00RT
AF75-40-00RT



AF45-22-00RT
AF75-22-00RT



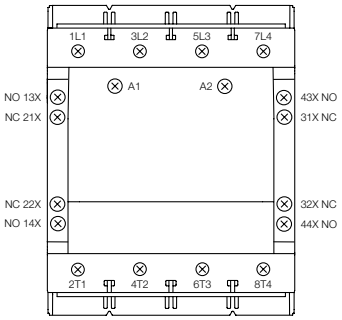
AF45-40-00RT
AF75-40-00RT



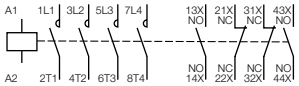
AF45-22-00RT
AF75-22-00RT

AF116B..RT ... AF370B..RT contactors

Standard devices with factory mounted auxiliary contacts



AF116B ... AF370B-40-22RT



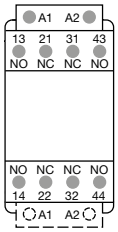
AF116B ... AF370B-40-22RT

NF(Z)B..RT contactor relays

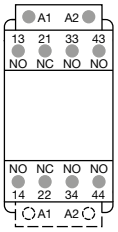
Terminal marking and positioning

NF(Z)B..RT contactors

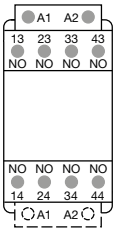
Standard devices without addition of auxiliary contacts



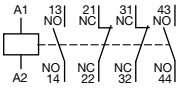
NF(Z)B22ERT



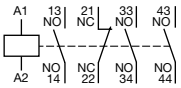
NF(Z)B31ERT



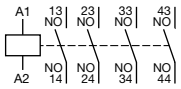
NF(Z)B40ERT



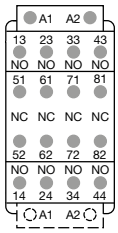
NF(Z)B22ERT



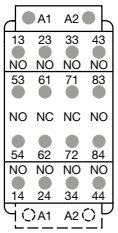
NF(Z)B31ERT



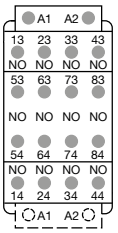
NF(Z)B40ERT



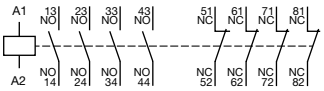
NF(Z)B44ERT



NF(Z)B62ERT

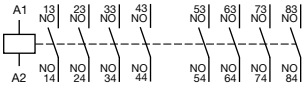


NF(Z)B80ERT



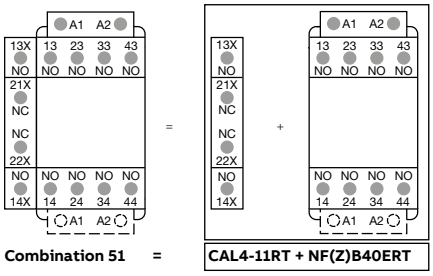
NF(Z)B44ERT

NF(Z)B62ERT

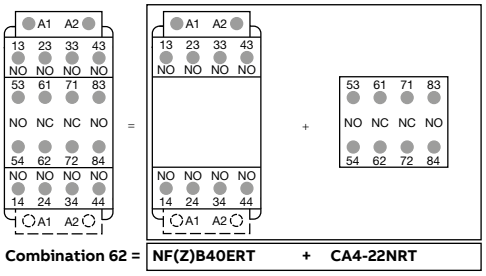


NF(Z)B80ERT

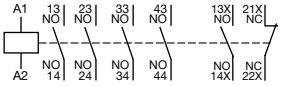
Other possible contact combinations with auxiliary contacts added by the user



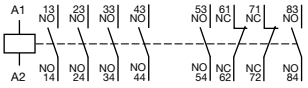
Combination 51 = **CAL4-11RT + NF(Z)B40ERT**



Combination 62 = **NF(Z)B40ERT + CA4-22NRT**



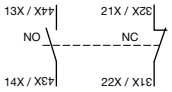
Combination 51 ERT



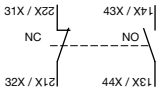
Combination 62 ERT

Add-on auxiliary contacts
Terminal marking and positioning
Connection with ring tongue ferrules

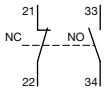
2-pole auxiliary contacts



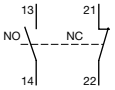
CAL4-11RT
(Left-side mounted)



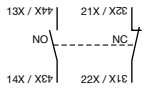
CAL4-11RT
(Right-side mounted)



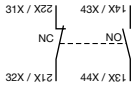
CAT4-11MRT
CA4-11MRT



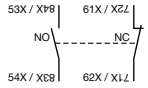
CAT4-11ERT
CA4-11ERT



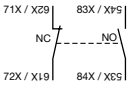
CAL18-11-RT, CAL19-11-RT
(Left-side mounted)



CAL18-11-RT, CAL19-11-RT
(Right-side mounted)

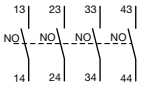


CAL19-11B-RT
(Left-side mounted)

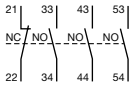


CAL19-11B-RT
(Right-side mounted)

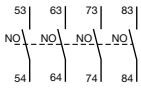
4-pole auxiliary contacts



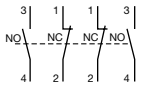
CA4-40ERT



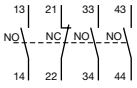
CA4-31MRT



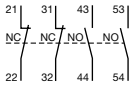
CA4-40NRT



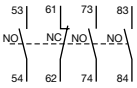
CA4-22URT



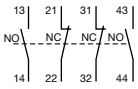
CA4-31ERT



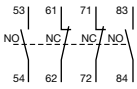
CA4-22MRT



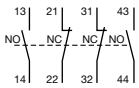
CA4-31NRT



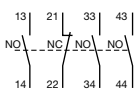
CA4-22ERT



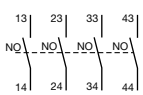
CA4-22NRT



CA5-22 ERT



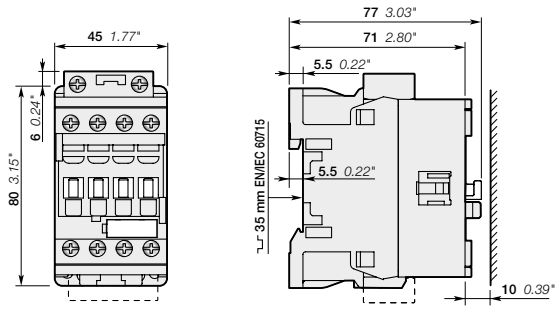
CA5-31ERT



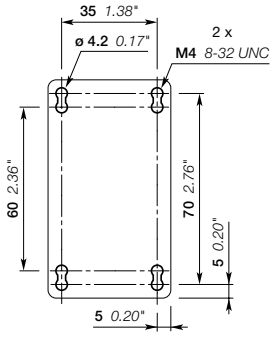
CA5-40ERT

AF09(Z)B..RT, AF12(Z)B..RT, AF16(Z)B..RT 3-pole contactors

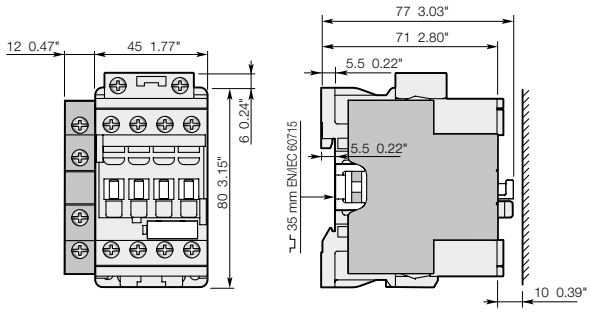
Dimensions



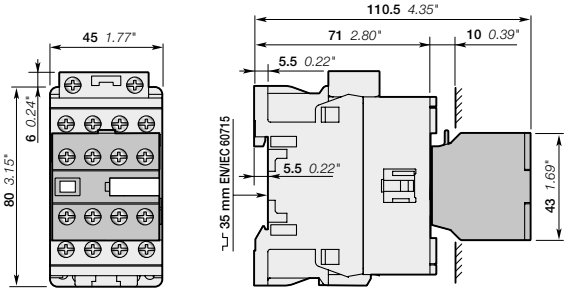
AF09(Z)B..RT, AF12(Z)B..RT, AF16(Z)B..RT



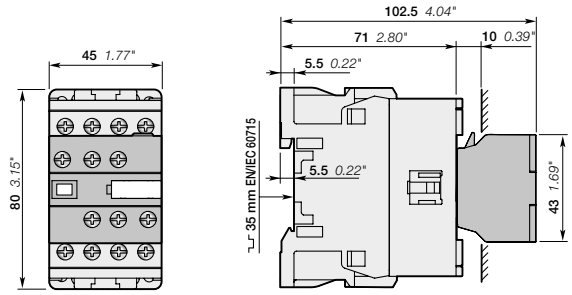
AF09(Z)B..RT, AF12(Z)B..RT, AF16(Z)B..RT



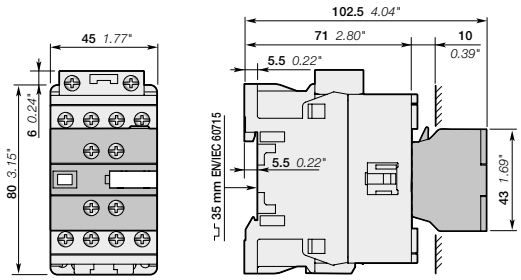
AF09(Z)B..RT, AF12(Z)B..RT, AF16(Z)B..RT
+ CAL4-11RT 2-pole auxiliary contact block



AF09(Z)B..RT, AF12(Z)B..RT, AF16(Z)B..RT
+ CA4..RT 4-pole auxiliary contact block



AF09(Z)B..RT, AF12(Z)B..RT, AF16(Z)B..RT
+ CAT4..RT 2-pole auxiliary contact and coil terminal block

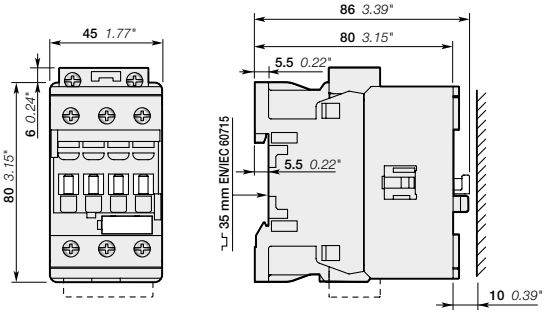


AF09(Z)B..RT, AF12(Z)B..RT, AF16(Z)B..RT
+ CA4-11..RT 2-pole auxiliary contact block

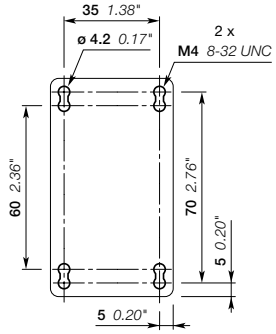
Note: contactor lateral distance to grounded component 2 mm 0.08" min.

AF26(Z)B..RT, AF30(Z)B..RT, AF38(Z)B..RT 3-pole contactors

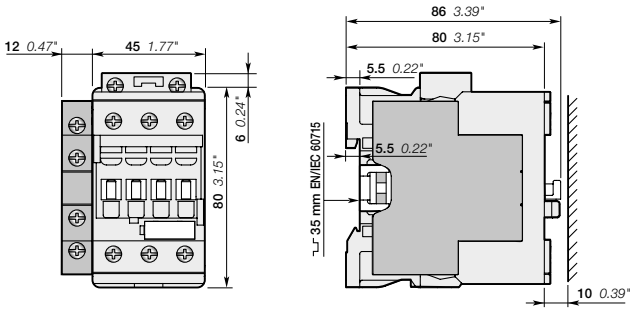
Dimensions



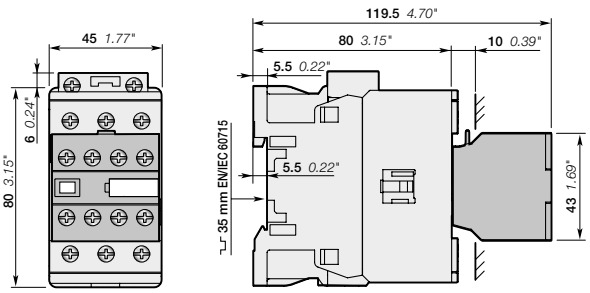
AF26(Z)B..RT, AF30(Z)B..RT, AF38(Z)B..RT



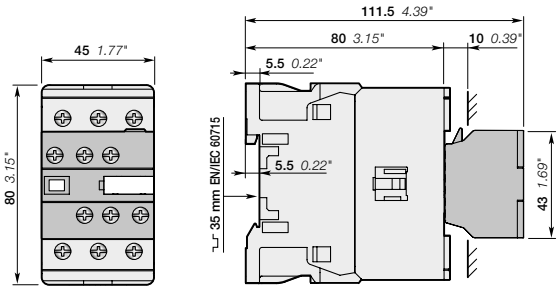
AF26(Z)B..RT, AF30(Z)B..RT, AF38(Z)B..RT



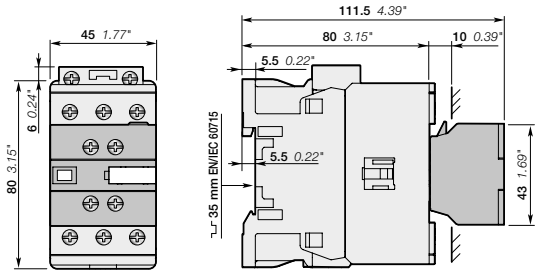
AF26(Z)B..RT, AF30(Z)B..RT, AF38(Z)B..RT
+ CAL4-11RT 2-pole auxiliary contact block



AF26(Z)B..RT, AF30(Z)B..RT, AF38(Z)B..RT
+ CA4..RT 4-pole auxiliary contact block



AF26(Z)B..RT, AF30(Z)B..RT, AF38(Z)B..RT
+ CAT4..RT 2-pole auxiliary contact and coil terminal block



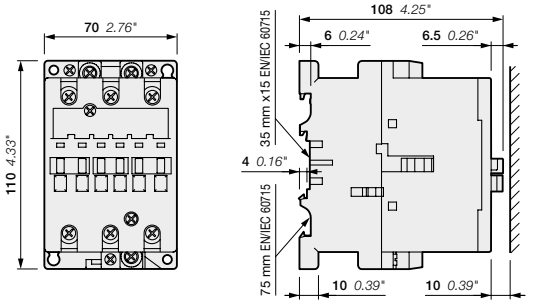
AF26(Z)B..RT, AF30(Z)B..RT, AF38(Z)B..RT
+ CA4-11..RT 2-pole auxiliary contact block

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

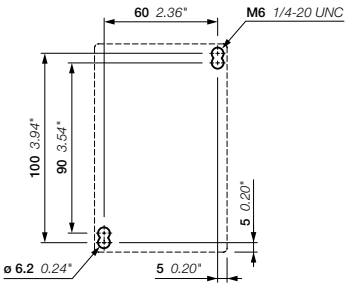
Main dimensions mm, inches

AF50..RT ... AF95B..RT 3-pole contactors

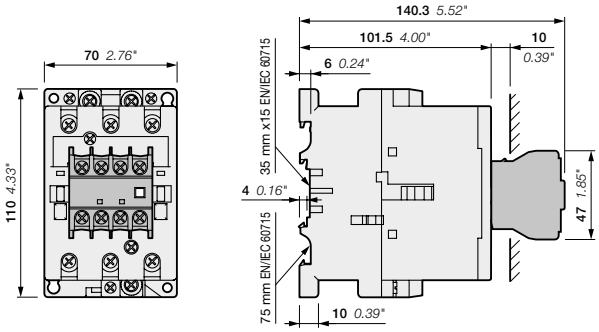
Dimensions



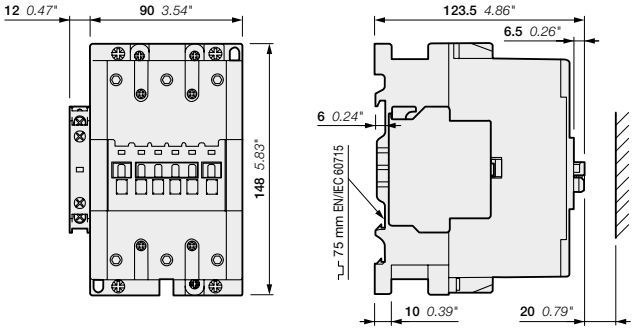
AF50..RT, AF63..RT, AF75..RT



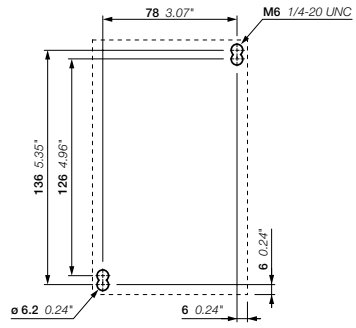
AF50..RT, AF63..RT, AF75..RT



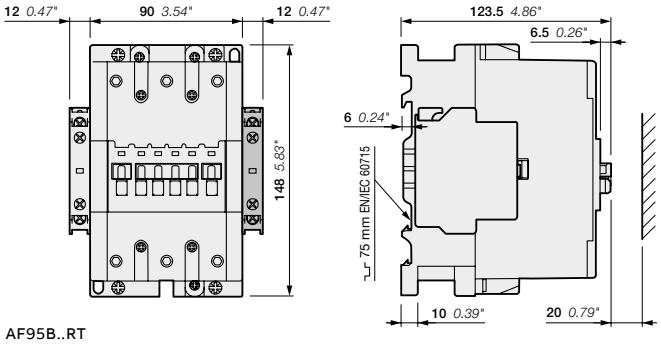
AF50..RT, AF63..RT, AF75..RT
+ CA5 4-pole auxiliary contact block



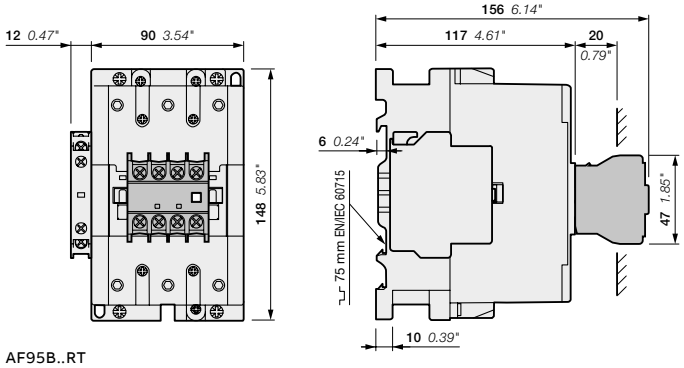
AF95B..RT



AF95B..RT



AF95B..RT
+ CAL18-11RT 2-pole auxiliary contact block

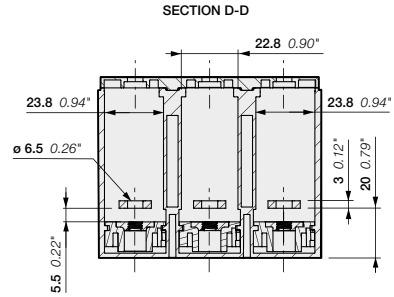


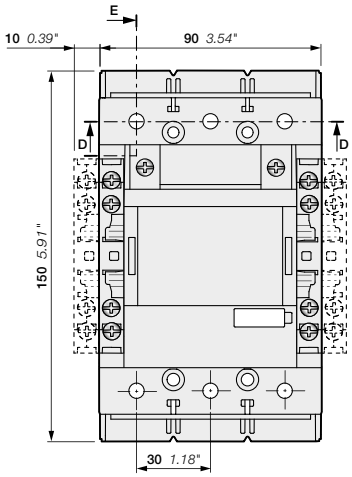
AF95B..RT
+ CA5-..RT 4-pole auxiliary contact block

Main dimensions mm, inches

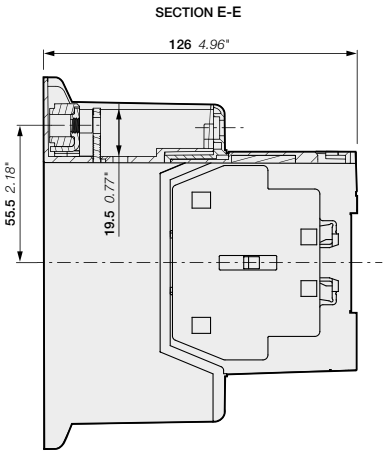
AF116B..RT, AF140B..RT, AF146B..RT 3-pole contactors

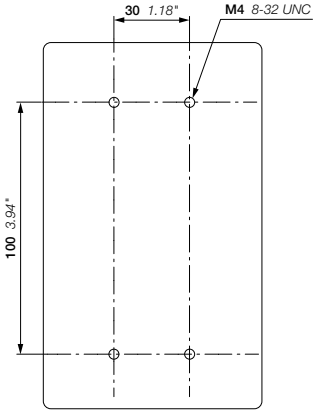
Dimensions





AF116B, AF140B, AF146B-30-22RT





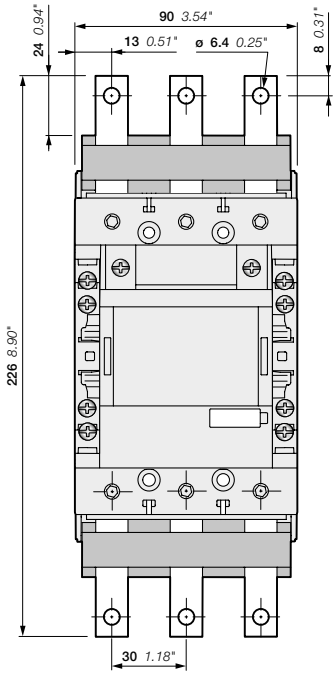
AF116B, AF140B, AF146B-30-22RT

Main dimensions mm, inches

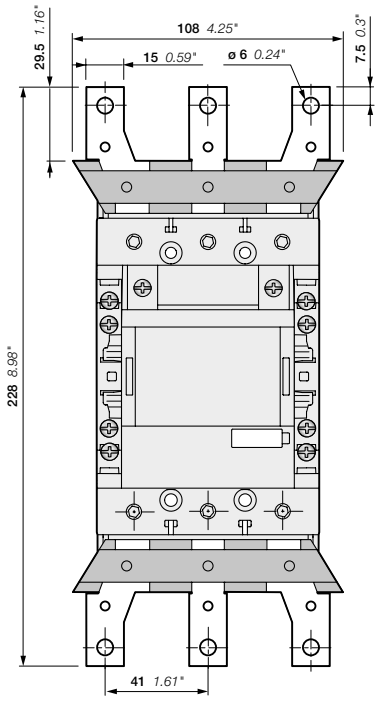
04

AF116B..RT, AF140B..RT, AF146B..RT 3-pole contactors

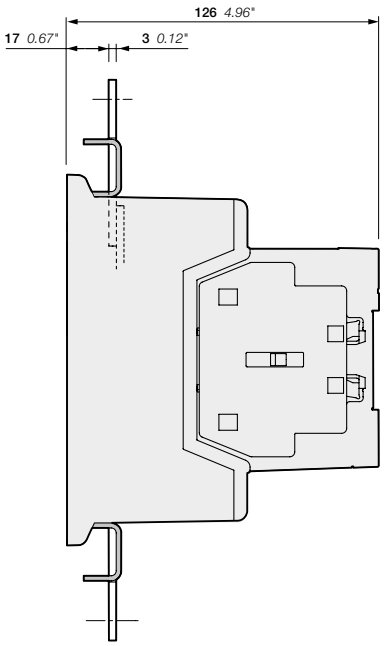
Dimensions

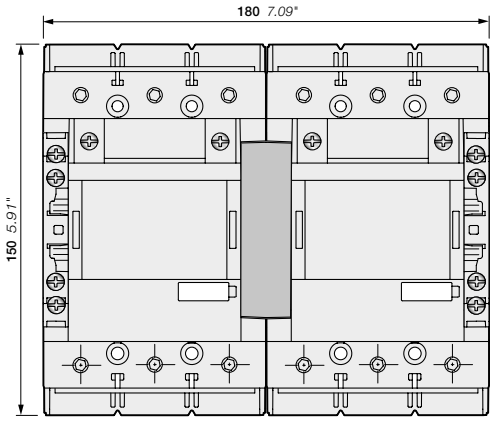


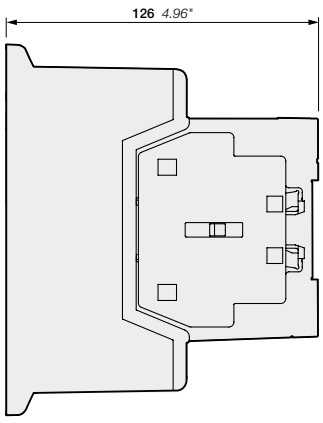
AF116B, AF140B, AF146B-30-22RT
+ LX140 terminal extension



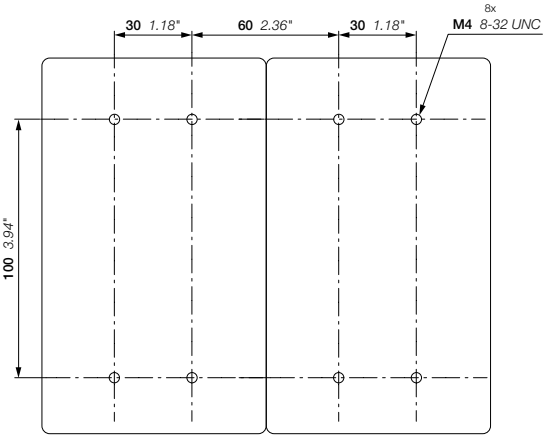
AF116B, AF140B, AF146B-30-22RT
+ LW140 terminal enlargement







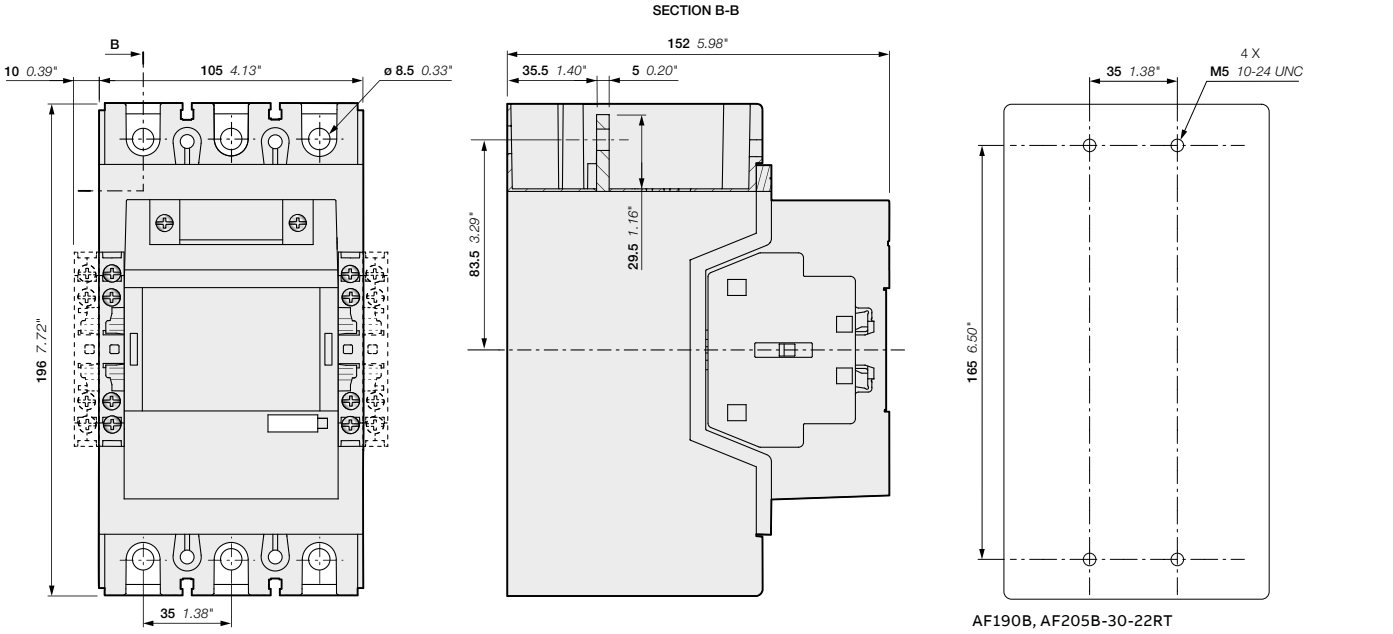
AF116B, AF140B, AF146B-30-22RT
+ VM19 mechanical interlocking unit



AF116B, AF140B, AF146B-30-22RT
+ VM19 mechanical interlocking unit

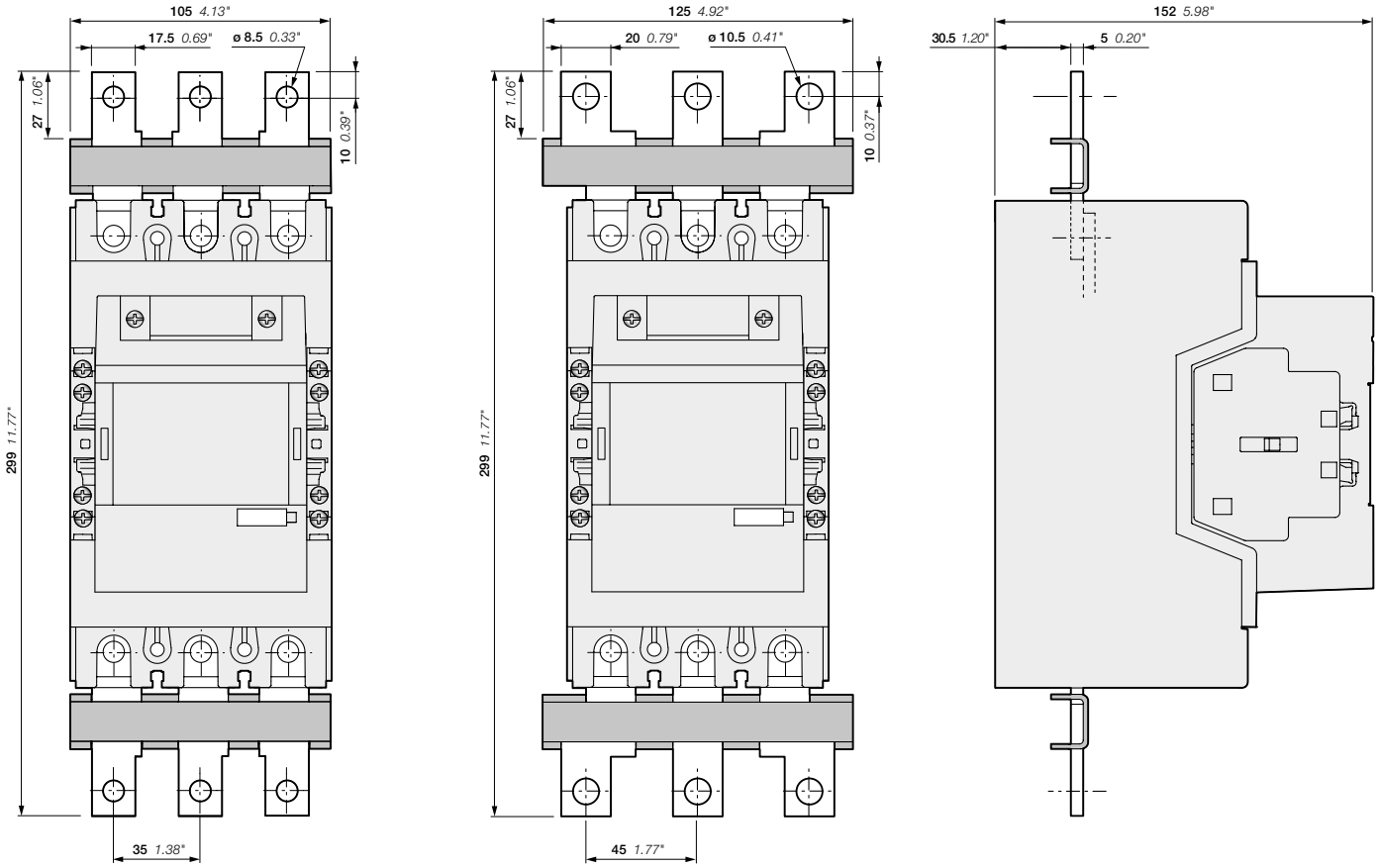
AF190B..RT, AF205B..RT 3-pole contactors

Dimensions



AF190B, AF205B-30-22RT

AF190B, AF205B-30-22RT



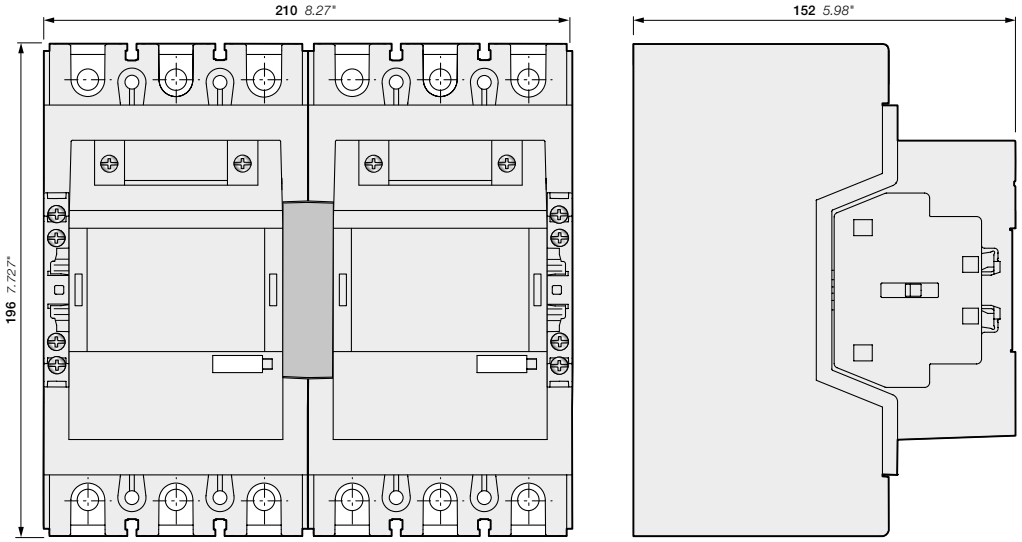
AF190B, AF205B-30-22RT
+ LX205 terminal extension

AF190B, AF205B-30-22RT
+ LW205 terminal enlargement

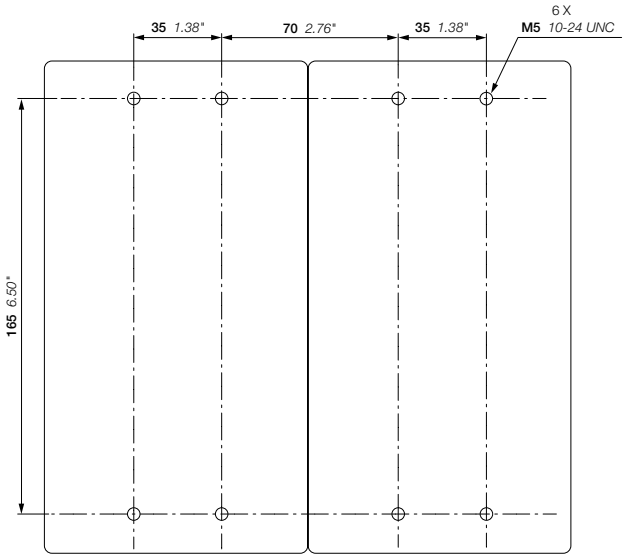
Main dimensions mm, inches

AF190B..RT, AF205B..RT 3-pole contactors

Dimensions



AF190B, AF205B-30-22RT
+ VM19 mechanical interlocking unit

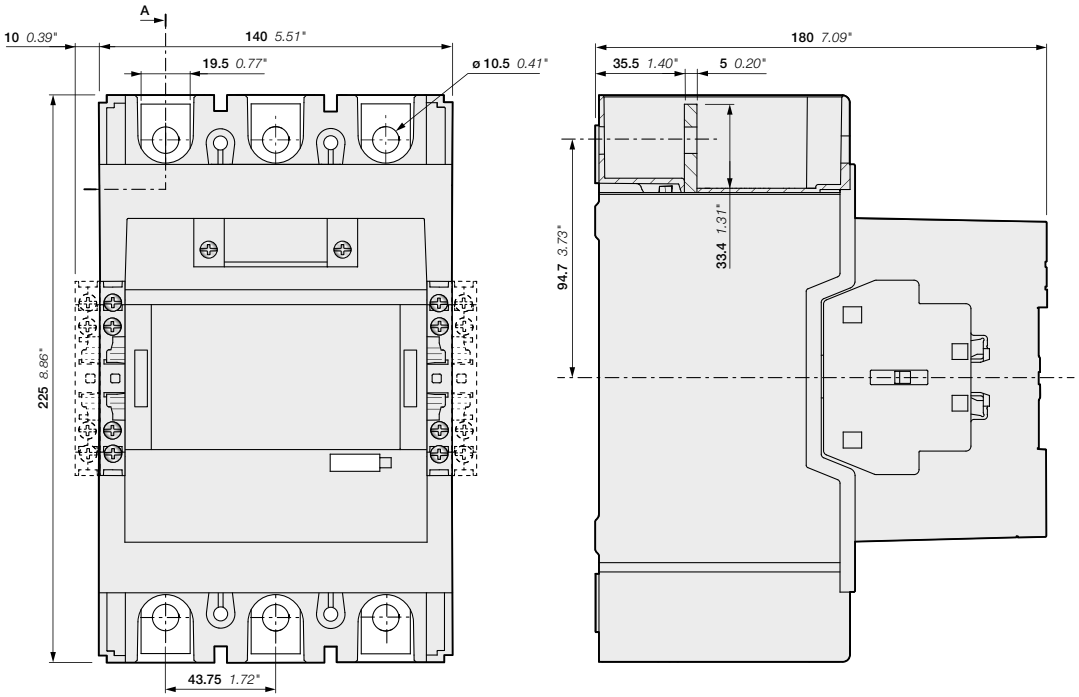


AF190B, AF205B-30-22RT
+ VM19 mechanical interlocking unit

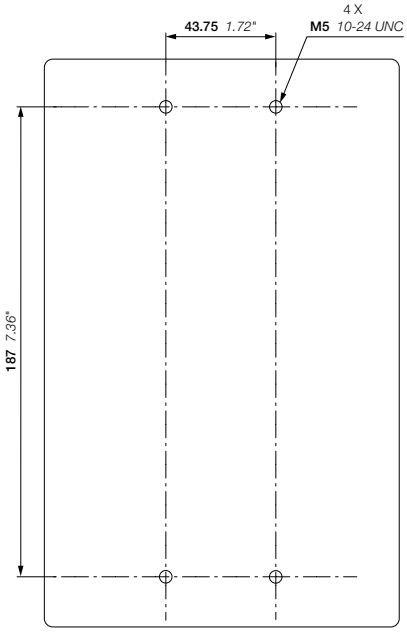
Main dimensions mm, inches

AF265B..RT, AF305B..RT, AF370B..RT 3-pole contactors

Dimensions



AF265B, AF305B, AF370B-30-22RT

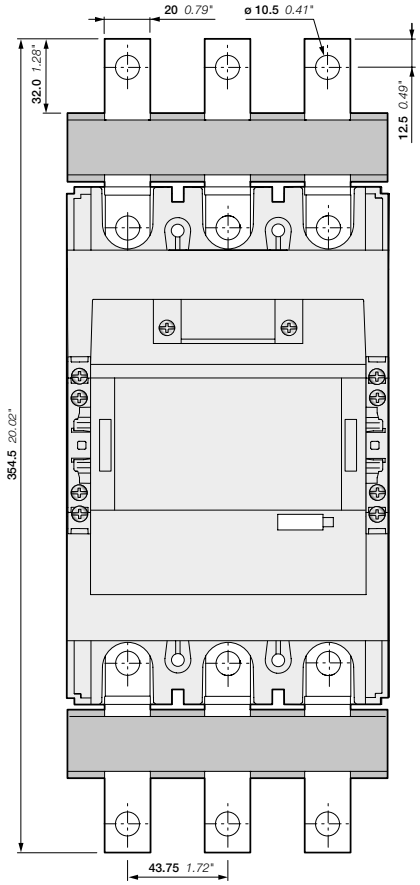


AF265B, AF305B, AF370B-30-22RT

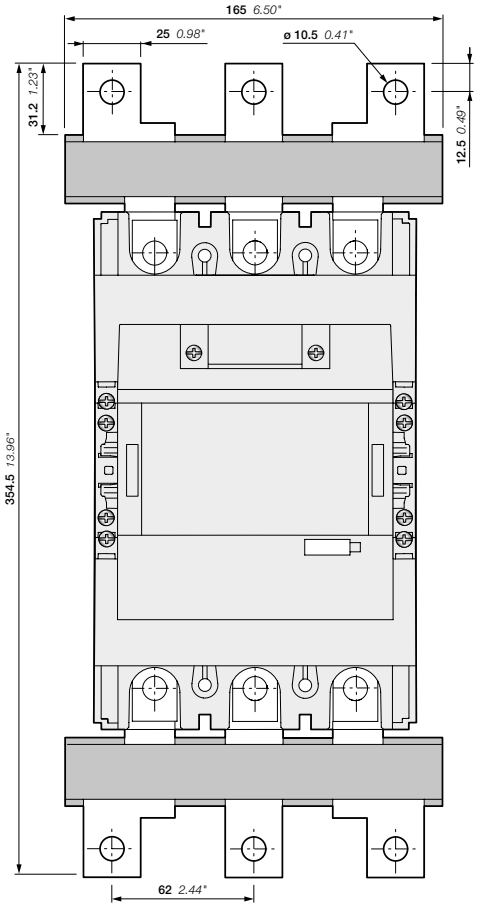
Main dimensions mm, inches

AF265B..RT, AF305B..RT, AF370B..RT 3-pole contactors

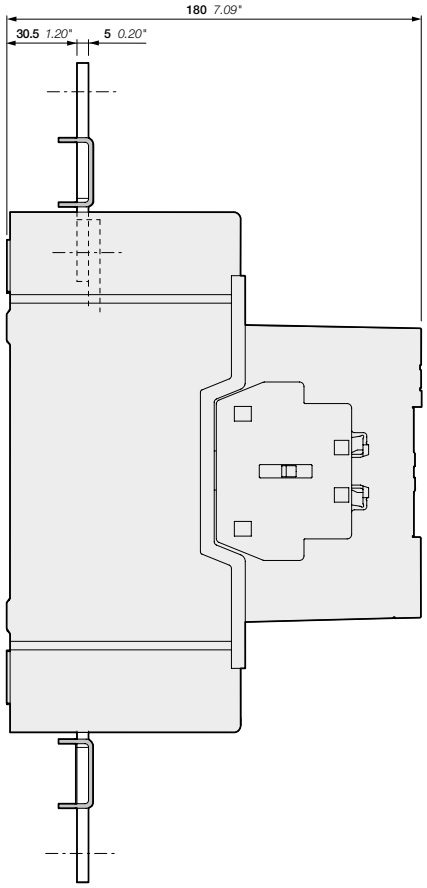
Dimensions



AF265B, AF305B, AF370B-30-22RT
+ LX370 terminal extension



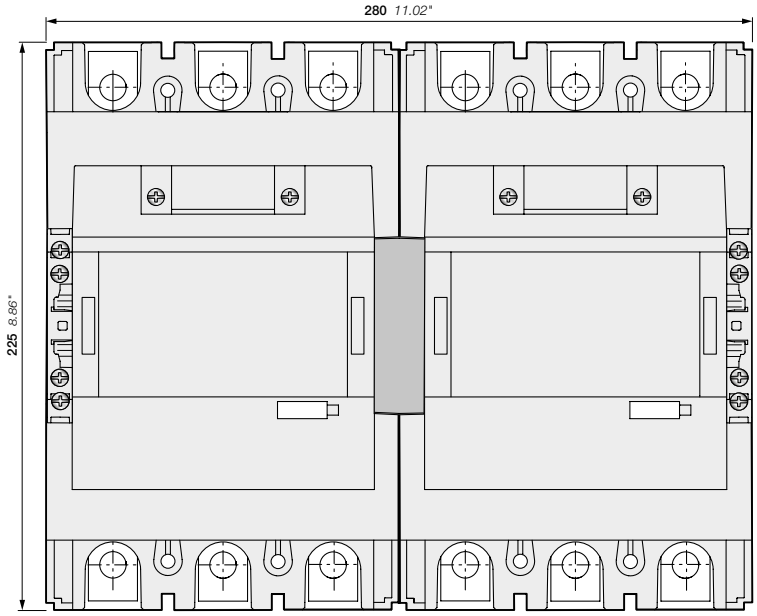
AF265B, AF305B, AF370B-30-22RT
+ LW370 terminal enlargement

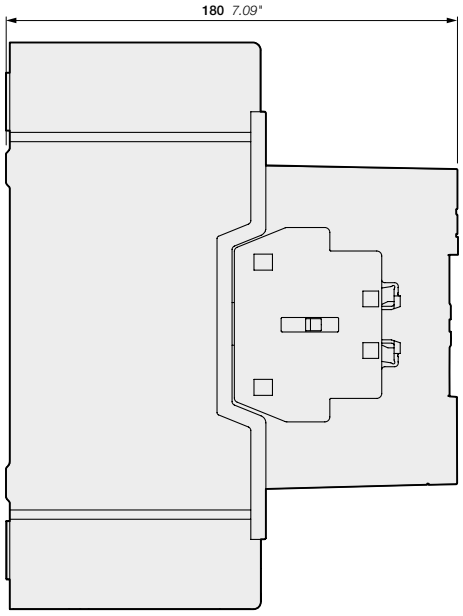


Main dimensions mm, inches

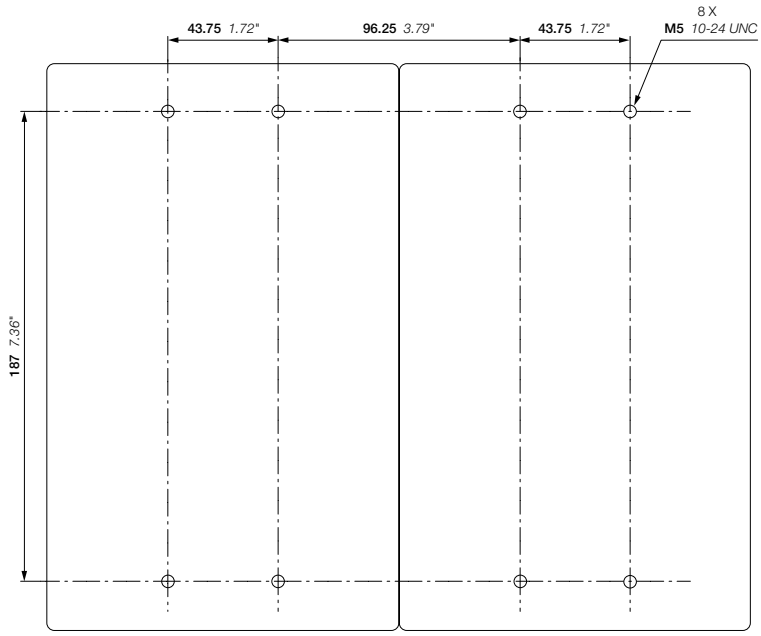
AF265B..RT, AF305B..RT, AF370B..RT 3-pole contactors

Dimensions





AF265B, AF305B, AF370B-30-22RT
+ VM19 mechanical interlocking unit

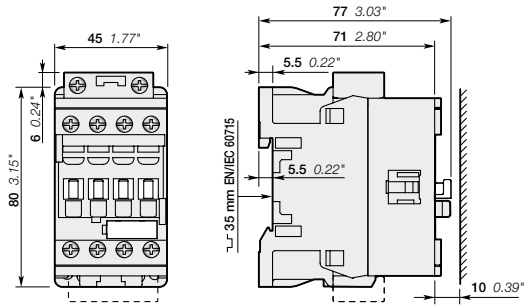


AF265B, AF305B, AF370B-30-22RT
+ VM19 mechanical interlocking unit

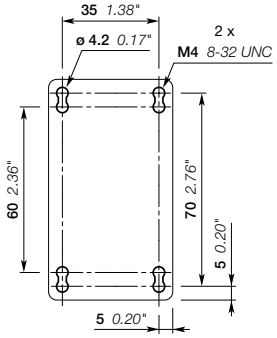
Main dimensions mm, inches

AF09(Z)B..RT, AF16(Z)B..RT 4-pole contactors

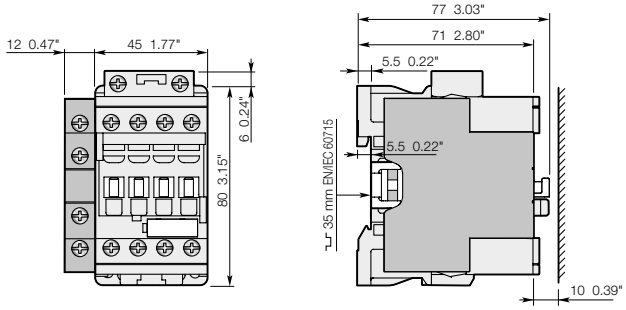
Dimensions



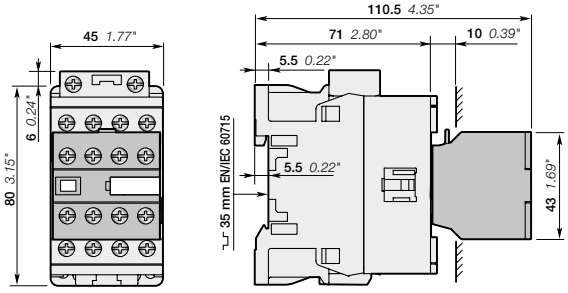
AF09(Z)B..RT, AF16(Z)B..RT



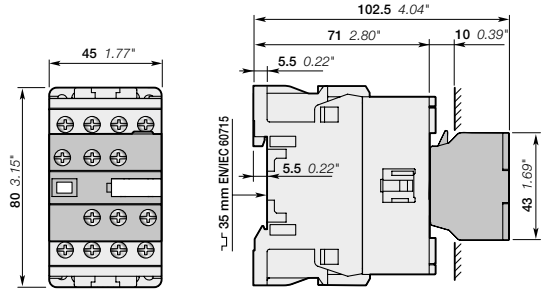
AF09(Z)B..RT, AF16(Z)B..RT



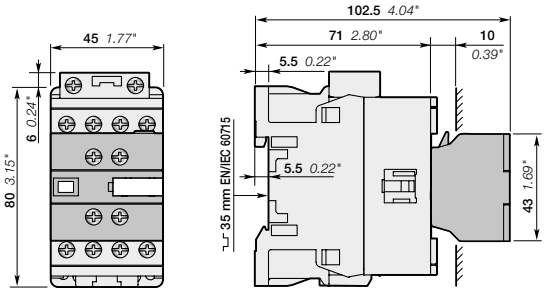
AF09(Z)B..RT, AF16(Z)B..RT
+ CAL4-11RT 2-pole auxiliary contact block



AF09(Z)B..RT, AF16(Z)B..RT
+ CA4..RT 4-pole auxiliary contact block



AF09(Z)B..RT, AF16(Z)B..RT
+ CAT4..RT 2-pole auxiliary contact and coil terminal block

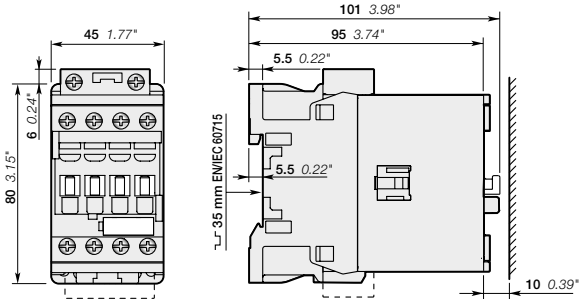


AF09(Z)B..RT, AF16(Z)B..RT
+ CA4-11..RT 2-pole auxiliary contact block

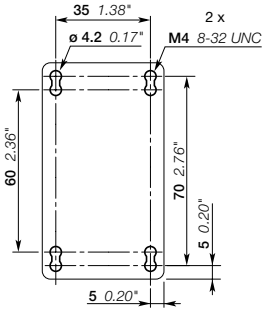
Note: contactor lateral distance to grounded component 2 mm 0.08" min.

AF26(Z)B..RT, AF38(Z)B..RT 4-pole contactors

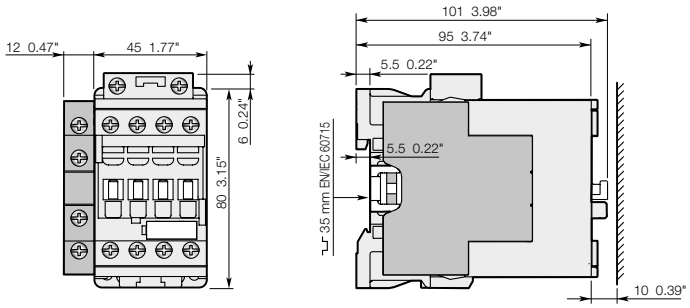
Dimensions



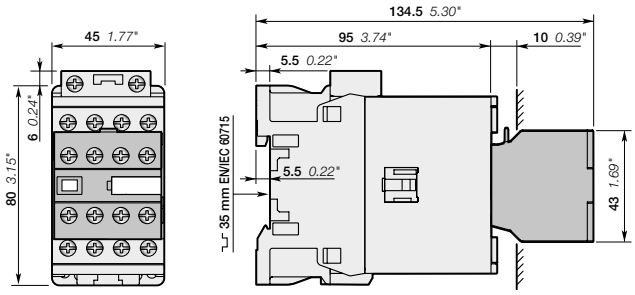
AF26(Z)B..RT, AF38(Z)B..RT



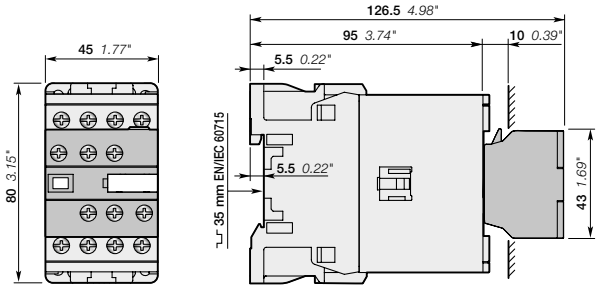
AF26(Z)B..RT, AF38(Z)B..RT



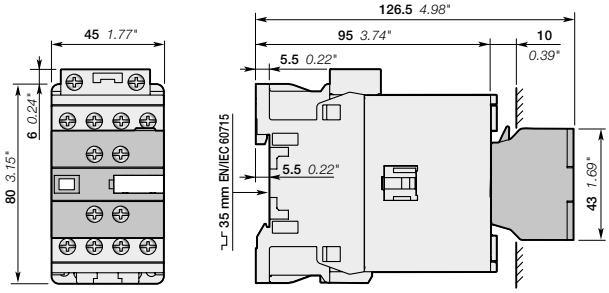
AF26(Z)B..RT, AF38(Z)B..RT
+ CAL4-11RT 2-pole auxiliary contact block



AF26(Z)B..RT, AF38(Z)B..RT
+ CA4..RT 4-pole auxiliary contact block



AF26(Z)B..RT, AF38(Z)B..RT
+ CAT4..RT 2-pole auxiliary contact and coil terminal block



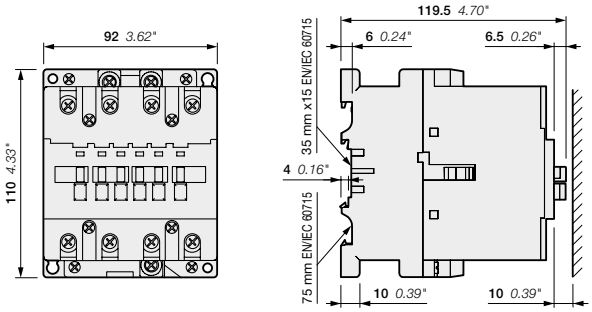
AF26(Z)B..RT, AF38(Z)B..RT
+ CA4-11..RT 2-pole auxiliary contact block

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

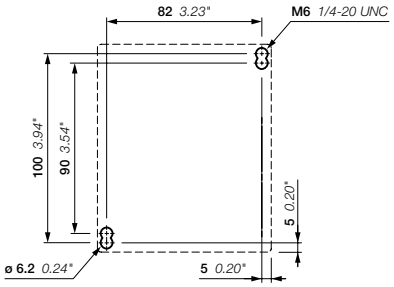
Main dimensions mm, inches

AF45..RT, AF75..RT 4-pole contactors

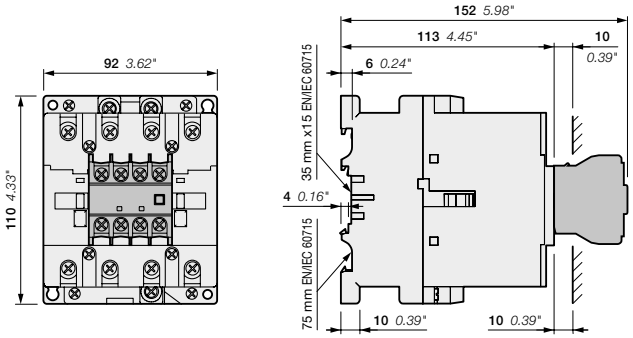
Dimensions



AF45..RT, AF75..RT



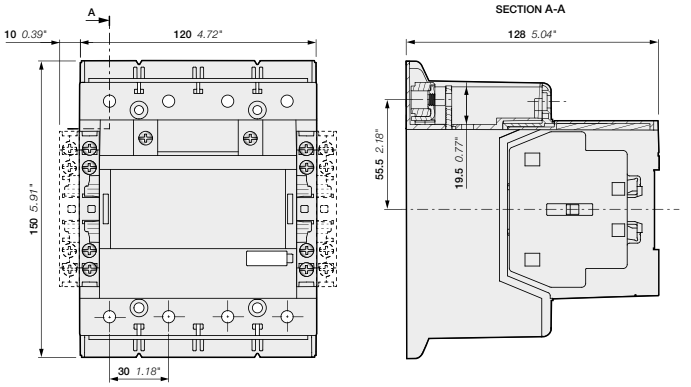
AF45..RT, AF75..RT



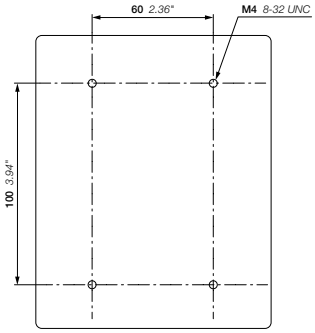
AF45..RT, AF75..RT
+ CA5 front mounted 4-pole auxiliary contact block

AF116B..RT, AF140B..RT 4-pole contactors

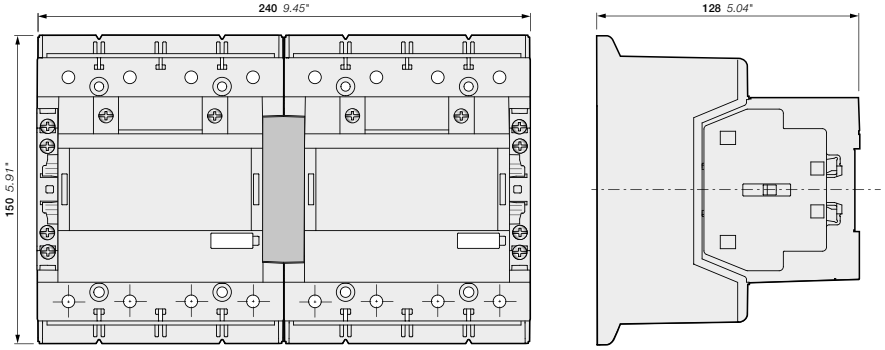
Dimensions



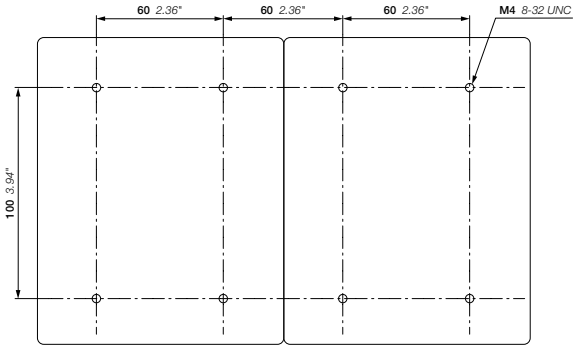
AF116B, AF140B-40-22RT



AF116B, AF140B-40-22RT



AF116B, AF140B-40-22RT
+ VM19 mechanical interlocking unit

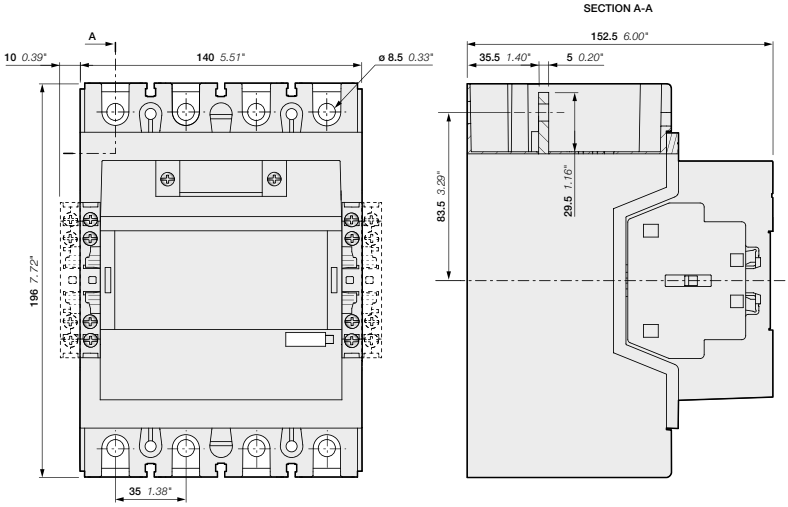


AF116B, AF140B-40-22RT
+ VM19 mechanical interlocking unit

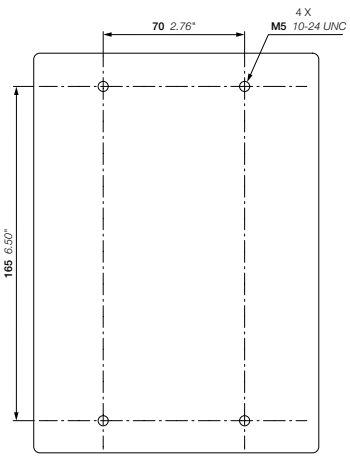
Main dimensions mm, inches

AF190B..RT, AF205B..RT 4-pole contactors

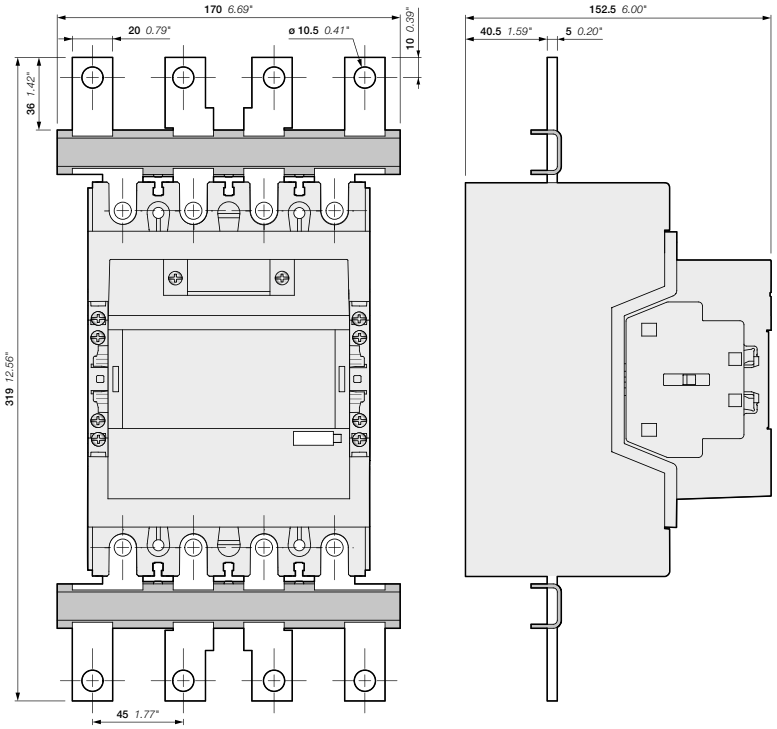
Dimensions



AF190B, AF205B-40-22RT



AF190B, AF205B-40-22RT



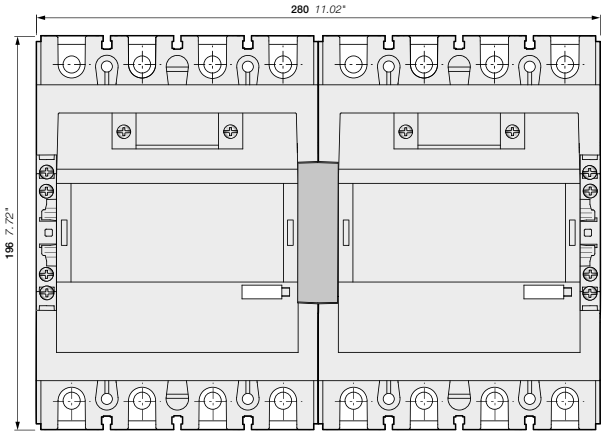
AF190B, AF205B-40-22RT
+ LW205-40 terminal enlargement

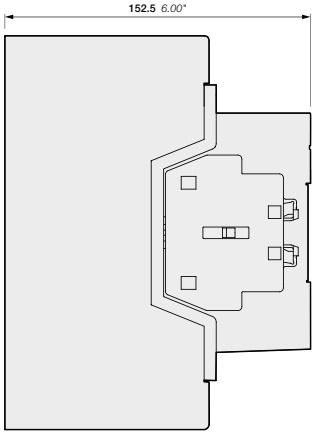
Main dimensions mm, inches

04

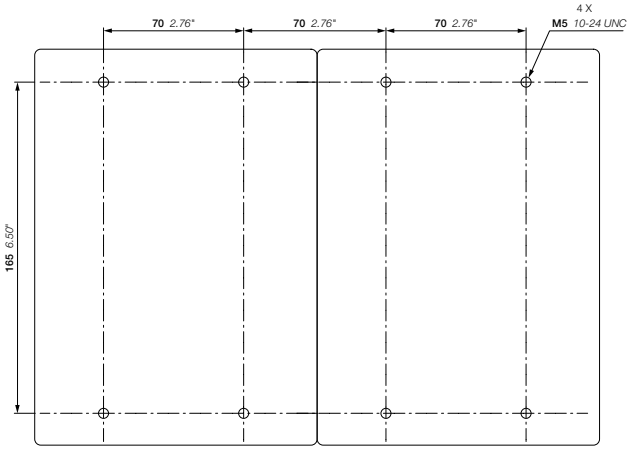
AF190B..RT, AF205B..RT 4-pole contactors

Dimensions





AF190B, AF205B-40-22RT
+ VM19 mechanical interlocking unit

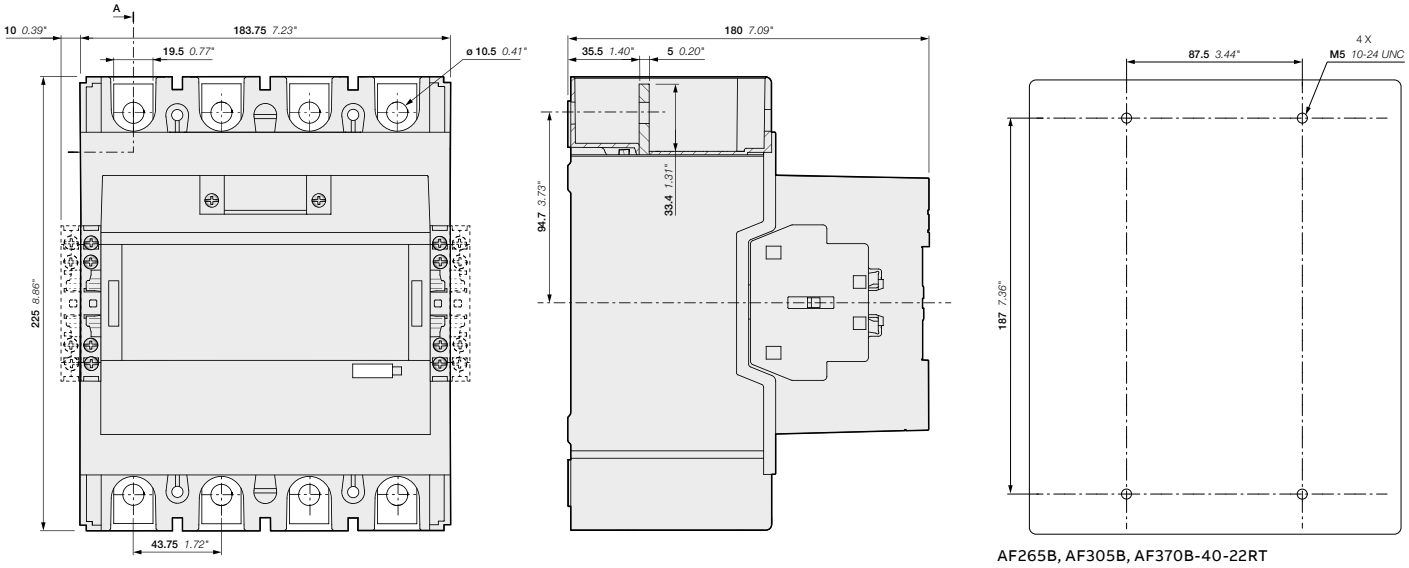


AF190B, AF205B-40-22RT
+ VM19 mechanical interlocking unit

Main dimensions mm, inches

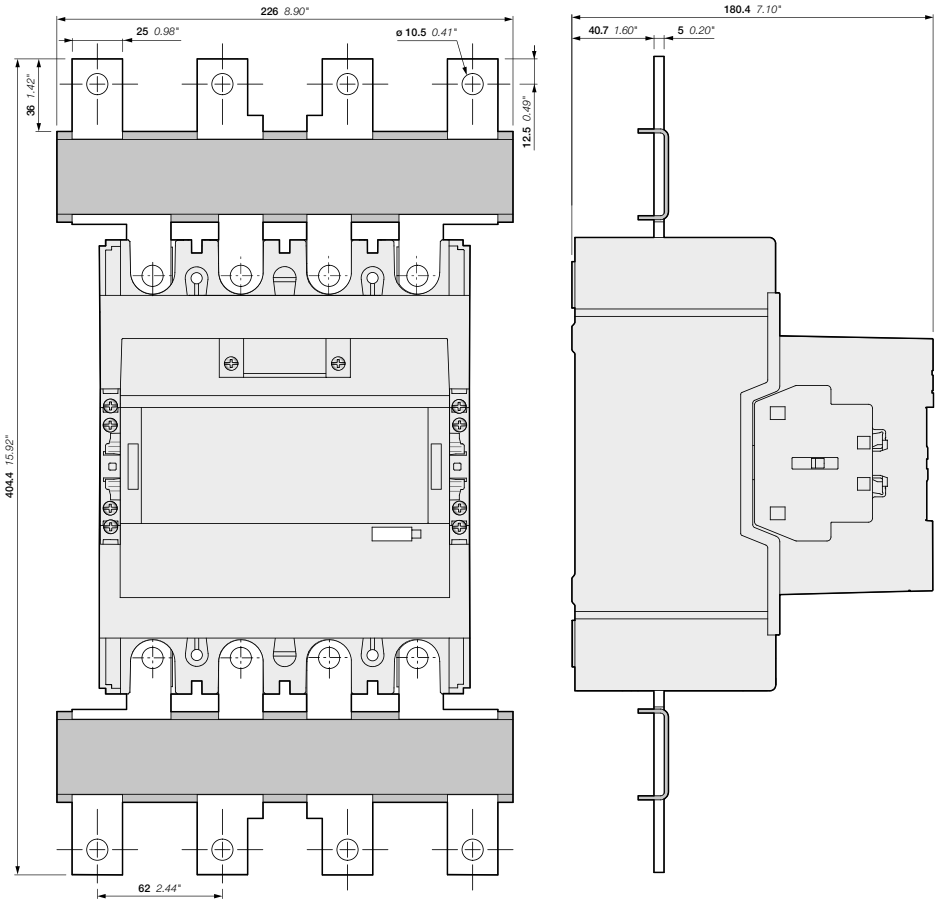
AF265B..RT, AF305B..RT, AF370B..RT 4-pole contactors

Dimensions



AF265B, AF305B, AF370B-40-22RT

AF265B, AF305B, AF370B-40-22RT

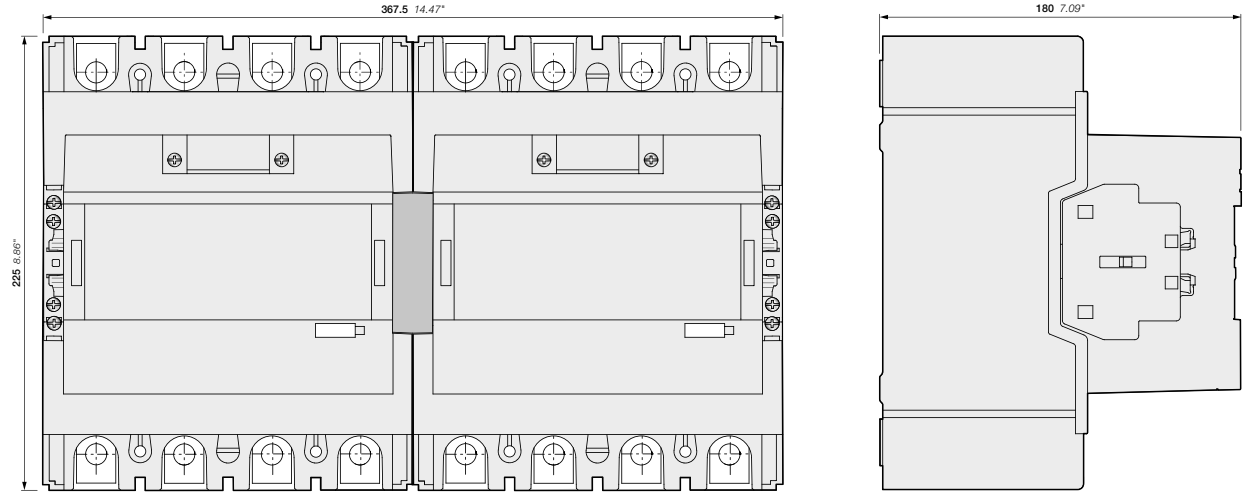


AF265B, AF305B, AF370B-40-22RT
+ LW370-40 terminal enlargement

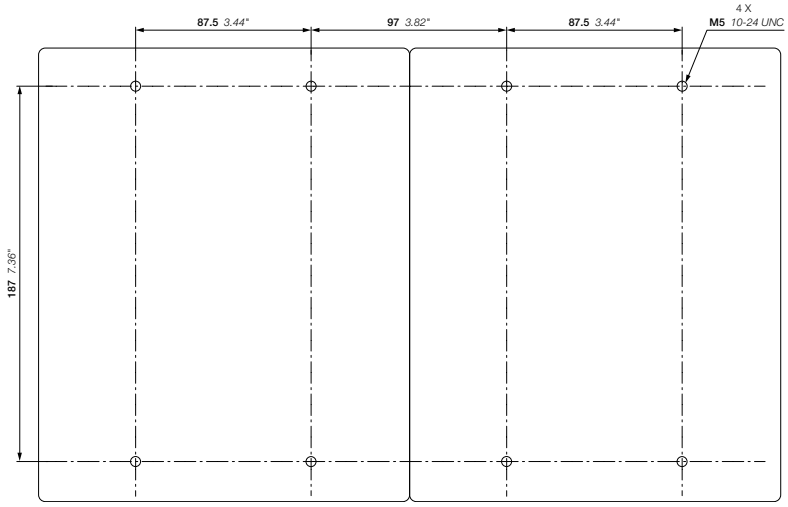
Main dimensions mm, inches

AF265B..RT, AF305B..RT, AF370B..RT 4-pole contactors

Dimensions



AF265B, AF305B, AF370B-40-22RT
+ VM19 mechanical interlocking unit

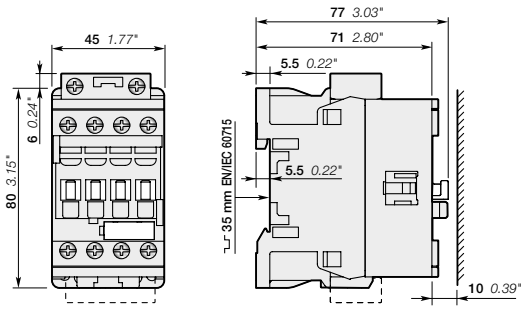


AF265B, AF305B, AF370B-40-22RT
+ VM19 mechanical interlocking unit

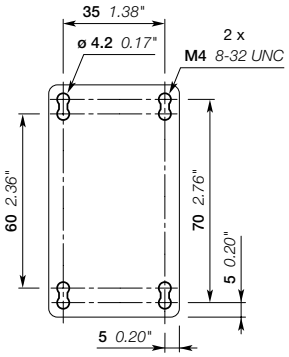
Main dimensions mm, inches

NF(Z)B..RT contactor relays

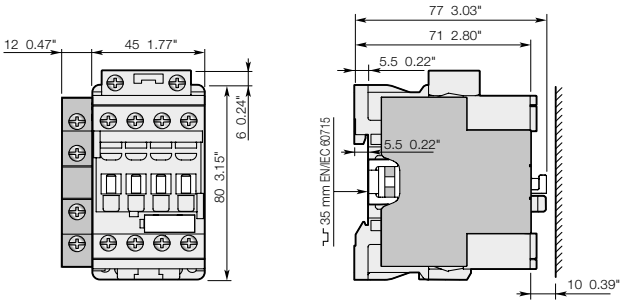
Dimensions



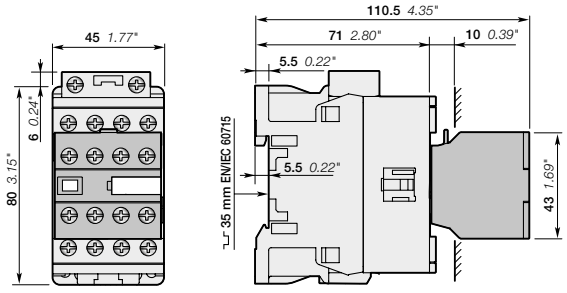
NF(Z)B22ERT, NF(Z)B31ERT, NF(Z)B40ERT



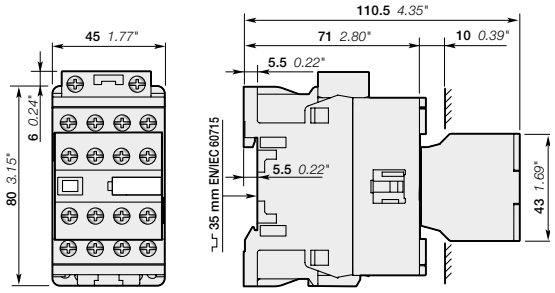
NF(Z)B..RT



NF(Z)B22ERT, NF(Z)B31ERT, NF(Z)B40ERT
+ CAL4-11RT 2-pole auxiliary contact block



NF(Z)B22ERT, NF(Z)B31ERT, NF(Z)B40ERT
+ CA4..RT 4-pole auxiliary contact block



NF(Z)B44ERT, NF(Z)B62ERT, NF(Z)B80ERT

Note: Contactor relay lateral distance to grounded component 2 mm 0.08" min.

Main dimensions mm, inches

Voltage code table

The below tables indicate the available voltage ranges Uc min. ... Uc max. usually used in rolling stock application according to IEC 60077 standard. When placing an order, please check the required control supply and select the corresponding AF..(Z)B / NF(Z)B control voltage range. Select a standard contactor from ordering detail pages. Change the coil voltage code in the order code according to the table below. Example: for contactor AF09ZB-30-10 and coil 48 ...130 V DC, type is AF09ZB-30-10RT-22 and order code is 1SBL136060R2210.

DC operated

Control supply Uc min. ... Uc max. acc. to IEC 60077 **V DC**	**Rated control circuit voltage** Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max. **V DC**	**Coil code** AF09..ZB..RT ...AF38..ZB..RT NFZB..RT	AF45 ... AF95B..RT	AF116B ... AF370B..RT
17...32 23...42.5 23...44.5 25...45 33...60 36...65	20...60	21	72	11
42...78 50...90 55...96 63...113 67...120 77...143	48...130	22	69	12
87.5...162.5 90...150 105...183 120...167 152...264 187...253	100...250	23	70	13

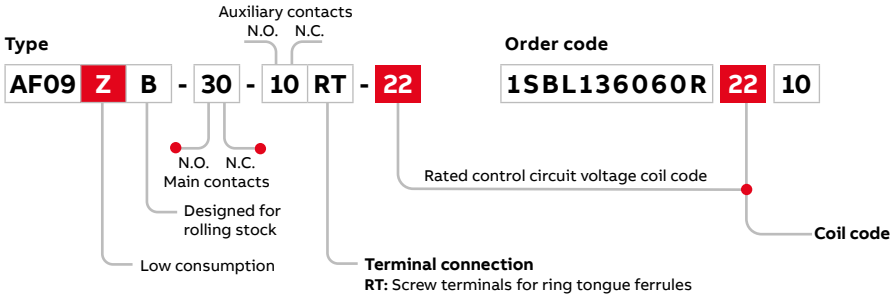
AC operated

Rated control circuit voltage Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max. **V AC 50/60 Hz**	**Coil code** AF09..(Z)B..RT ...AF38..(Z)B..RT NF(Z)B..RT	AF45 ... AF95B..RT	AF116B ... AF370B..RT
24...60	21	—	11
48...130	22	69	12
100...250	23	70	13
250...500	14	—	14

Voltage code table

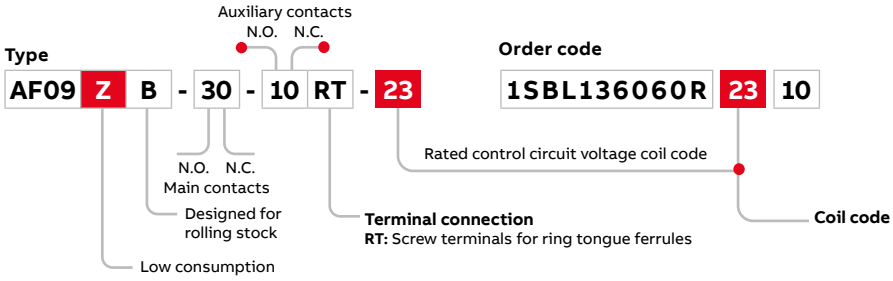
AF09(Z)B ... AF38(Z)B..RT 3 and 4-pole contactors

DC operated



Rated control circuit voltage Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max.		Supply control voltage Uc acc. to IEC 60077
DC		**DC**
21	20...60 V	24 V 33 V 48 V
22	**48...130 V**	**72 V** **96 V** **110 V**
23	100...250 V	220 V

AC operated



Rated control circuit voltage Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max.	
AC 50/60 Hz	
21	24...60 V
22	48...130 V
23	**100...250 V**
14	250...500 V

Note: For AC 50/60 Hz sinusoïdal control supply in rolling stock application, max. permitted control voltage must not be exceeded during voltage fluctuation defined acc. to IEC 60077 or EN 50155 (see technical data).

AF45 ... AF95B..RT 3 and 4-pole contactors

DC operated

Rated control circuit voltage Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max.		Supply control voltage Uc acc. to IEC 60077
DC		**DC**
72	20...60 V	24 V 33 V 48 V
69	**48...130 V**	**72 V** **96 V** **110 V**
70	100...250 V	220 V

AC operated

Rated control circuit voltage Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max.	
AC 50/60 Hz	
69	48...130 V
70	**100...250 V**

Note: For AC 50/60 Hz sinusoïdal control supply in rolling stock application, max. permitted control voltage must not be exceeded during voltage fluctuation defined acc. to IEC 60077 or EN 50155 (see technical data).

AF116B ... AF370B..RT 3 and 4-pole contactors

DC operated

	Rated control circuit voltage Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max. DC	Supply control voltage Uc acc. to IEC 60077 DC
11	20...60 V	24 V 33 V 48 V
12	**48...130 V**	**72 V** **96 V** **110 V**
13	100...250 V	220 V

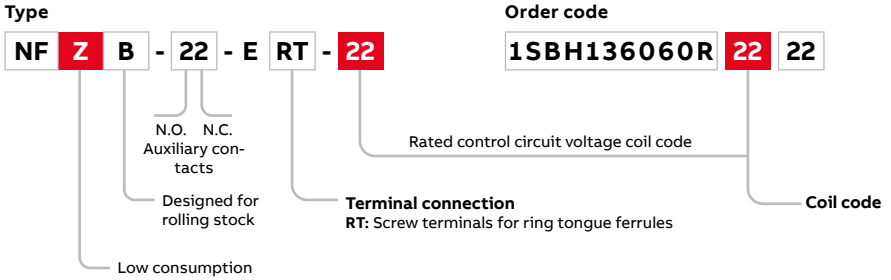
AC operated

	Rated control circuit voltage Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max. AC 50/60 Hz
11	24...60 V
12	48...130 V
13	**100...250 V**
14	250...500 V

Note: For AC 50/60 Hz sinusoïdal control supply in rolling stock application, max. permitted control voltage must not be exceeded during voltage fluctuation defined acc. to IEC 60077 or EN 50155 (see technical data).

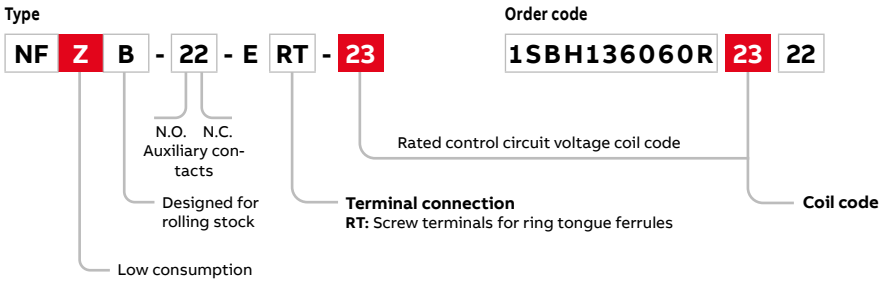
NF(Z)B..RT contactor relays

DC operated



	Rated control circuit voltage Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max. DC	Supply control voltage Uc acc. to IEC 60077 DC
21	20...60 V	24 V 33 V 48 V
22	**48...130 V**	**72 V** **96 V** **110 V**
23	100...250 V	220 V

AC operated



	Rated control circuit voltage Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max. AC 50/60 Hz
21	24...60 V
22	48...130 V
23	**100...250 V**
14	250...500 V

Note: For AC 50/60 Hz sinusoïdal control supply in rolling stock application, max. permitted control voltage must not be exceeded during voltage fluctuation defined acc. to IEC 60077 or EN 50155 (see technical data).

B, M mini contactors
K, M mini contactor relays

B mini contactors and K mini contactor relays
5/2 Overview

Connection with standard ferrules
5/3 TBC7 3-pole mini contactors DC operated
5/4 TBC7 4-pole mini contactors DC operated
5/5 TKC6 4-pole mini contactor relays DC operated
5/6 Technical data
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M mini contactors and mini contacor relays
5/14 Overview

Connection with standard ferrules
5/15 MC1C, MC2C-RAIL 3-pole mini contactors DC operated
5/16 MC2C-RAIL 4-pole mini contactors DC operated
5/17 MCRC-RAIL 4-pole mini contactor relays DC operated

Connection with ring tongue ferrules
5/18 MC1C..R, MC2C..R-RAIL 3-pole mini contactors DC operated
5/19 MC1C..R-RAIL 4-pole mini contactors DC operated
5/20 MCRC..R-RAIL 4-pole mini contactors relays DC operated
5/21 Accessories
5/25 Technical data
5/33 Terminal marking and positioning
5/36 Dimensions

For direct product details information, use product type or order code, ex:

www.abb.com/productdetails/**TBC7-30-10-51**
or www.abb.com/productdetails/**GJL1313061R5101**

B mini contactors

				Screw terminals
DC Control supply				
3-pole contactors		Coil consumption 5 W	Type	**TBC7**
4-pole contactors		Coil consumption 5 W	Type	**TBC7**
IEC	Rated operational power AC-3	220-230-240 V	kW	3
		380-400 V	kW	5.5
		440 V	kW	5.5
		500 V	kW	5.5
		690 V	kW	3
	Rated operational current AC-1	400 V, θ ≤ 40°C	A	20

K mini contactor relays

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

TBC7 3-pole mini contactors – connection with standard ferrules

4 to 5.5 kW

DC operated – large coil voltage range

2CDC211015F0011

TBC7-30-10

TBC7 3-pole mini contactors are compact control products mainly used for switching resistive or motor loads up to 690 V AC.

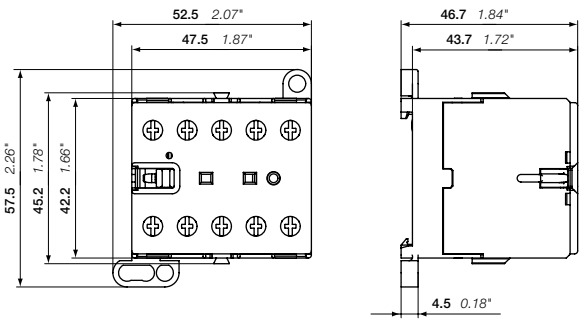
These contactors are designed with 3 main poles and one built-in auxiliary contact:

- control circuit: DC operated, 5 W at pull-in and at holding
- hum-free coil
- contacts configuration 30-01 fulfills the requirements for Mirror contacts acc. to annex F of IEC/EN 60947-4-1
- expanded ambient temperature range -30 ... +70 °C
- no auxiliary contact block permitted for mounting
- suitable for rail or wall mounting
- shocks and vibrations withstand conforming to IEC/EN 61373 (category 1, class B)
- usable according to European fire and smoke safety standard EN 45545-2

IEC		Rated control circuit voltage Uc min ... Uc max (1)	Auxiliary contacts fitted	Type	Order code	Pkg qty	Weight (1 pce)
Rated operational power	current θ ≤ 40 °C						
400 V							
AC-3	AC-1						
kW	A	V DC					kg
TBC7 mini contactors							
5.5	20	17 ... 32	1 0	TBC7-30-10-51	GJL1313061R5101	10	0.185
			0 1	TBC7-30-01-51	GJL1313061R5011	10	0.185
		50 ... 90	1 0	TBC7-30-10-55	GJL1313061R5105	10	0.185
			0 1	TBC7-30-01-55	GJL1313061R5015	10	0.185
		77 ... 143	1 0	TBC7-30-10-62	GJL1313061R6102	10	0.185
			0 1	TBC7-30-01-62	GJL1313061R6012	10	0.185
		140 ... 260	1 0	TBC7-30-10-68	GJL1313061R6108	10	0.185
			0 1	TBC7-30-01-68	GJL1313061R6018	10	0.185

Other types on request

(1) Uc min ... Uc max are absolute limits including network tolerances (-15% and +10%)



TBC7

Main dimensions mm, inches

TBC7 4-pole mini contactors – connection with standard ferrules

4 to 5.5 kW

DC operated – large coil voltage range

TBC7-31-00

TBC7 4-pole mini contactors are compact control products mainly used for switching resistive loads or motor loads up to 690 V AC.

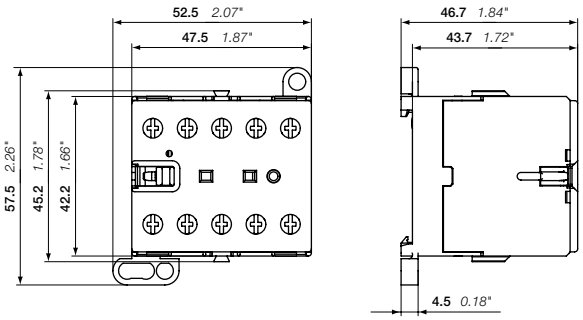
These contactors are designed with 4 main poles:

- control circuit: DC operated, 5 W at pull-in and at holding
- hum-free coil
- expanded ambient temperature range -30 ... +70 °C
- no auxiliary contact block permitted for mounting
- suitable for rail or wall mounting
- shocks and vibrations withstand conforming to IEC/EN 61373 (category 1, class B)
- usable according to European fire and smoke safety standard EN 45545-2

IEC Rated operational current θ ≤ 40 °C AC-1 A	Rated control circuit voltage Uc min ... Uc max (1) V DC	Auxiliary contacts fitted	Type	Order code	Pkg qty	Weight (1 pce) kg
3 N.O. + 1 N.C. main poles						
20	50 ... 90	0 0	TBC7-31-00-55	GJL1313461R5005	10	0.185
	77 ... 143	0 0	TBC7-31-00-62	GJL1313461R6002	10	0.185
	140 ... 260	0 0	TBC7-31-00-68	GJL1313461R6008	10	0.185
2 N.O. + 2 N.C. main poles						
20	50 ... 90	0 0	TBC7-22-00-55	GJL1313561R5005	10	0.185
	77 ... 143	0 0	TBC7-22-00-62	GJL1313561R6002	10	0.185
	140 ... 260	0 0	TBC7-22-00-68	GJL1313561R6008	10	0.185

Other types on request

(1) Uc min ... Uc max are absolute limits including network tolerances (-15% and +10%)



TBC7

Main dimensions mm, inches

TKC6 4-pole mini contactor relays – connection with standard ferrules

DC operated – large coil voltage range

TKC6-31Z

TKC6 4-pole mini contactors are space optimized control products mainly used for control functions or for small loads up to 4 A.

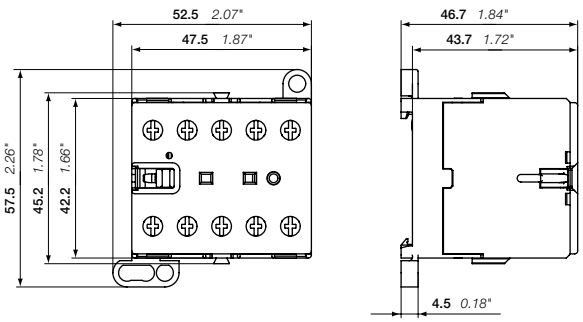
These contactors are designed with 4 poles with various contact combinations:

- control circuit: DC operated, 5 W at pull-in and at holding
- hum-free coil
- contacts configurations 22 and 31 fulfill the requirements for Mechanically linked contacts acc. to annex L of IEC/EN 60947-5-1
- expanded ambient temperature range -30 … +70 °C
- no auxiliary contact block permitted for mounting
- suitable for rail or wall mounting
- shocks and vibrations withstand conforming to IEC/EN 61373 (category 1, class B)
- usable according to European fire and smoke safety standard EN 45545-2

Rated control circuit voltage Uc min ... Uc max (1) V DC	**Type**	**Order code**	**Pkg qty**	**Weight (1 pce)** kg
17 ... 32	TKC6-22Z-51	GJH1213061R5221	10	0.180
50 ... 90	TKC6-22Z-55	GJH1213061R5225	10	0.180
77 ... 143	TKC6-22Z-62	GJH1213061R6222	10	0.180
140 ... 260	TKC6-22Z-68	GJH1213061R6228	10	0.180
17 ... 32	TKC6-31Z-51	GJH1213061R5311	10	0.180
50 ... 90	TKC6-31Z-55	GJH1213061R5315	10	0.180
77 ... 143	TKC6-31Z-62	GJH1213061R6312	10	0.180
140 ... 260	TKC6-31Z-68	GJH1213061R6318	10	0.180
17 ... 32	TKC6-40E-51	GJH1213061R5401	10	0.180
50 ... 90	TKC6-40E-55	GJH1213061R5405	10	0.180
77 ... 143	TKC6-40E-62	GJH1213061R6402	10	0.180
140 ... 260	TKC6-40E-68	GJH1213061R6408	10	0.180

Other types on request

(1) Uc min ... Uc max are absolute limits including network tolerances (-15% and +10%)



TKC6

Main dimensions mm, inches

TBC7 3- and 4-pole mini contactors

Technical data

Main pole – Utilization characteristics according to IEC

Contactor types	DC operated	**TBC7**
Standards		IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 61373, EN 45545-2
Rated operational voltage Ue max		690 V AC, 220 V DC
Rated frequency (without derating)		DC or 50 / 60 Hz
Conventional free-air thermal current Ith acc. to IEC/EN 60947-4-1, open contactors, θ ≤ 40 °C, with conductor cross-sectional area		20 A
AC-1 Utilization category for air temperature close to contactor θ ≤ 40 °C		
Ie / Rated operational current AC-1	240 V	20 A
Ue max ≤ 690 V, 50/60 Hz	400 V	20 A
	440 V	20 A
	500 V	12 A
	690 V	6 A
AC-1 Utilization category for air temperature close to contactor θ ≤ 55 °C		
Ie / Rated operational current AC-1	240 V	16 A
Ue max ≤ 690 V, 50/60 Hz	400 V	16 A
	440 V	16 A
	500 V	12 A
	690 V	6 A
AC-3, AC-3e Utilization category for air temperature close to contactor θ ≤ 55 °C		
Ie / Rated operational current AC-3, AC-3e	240 V	12 A
3-phase motors	400 V	12 A
	440 V	11 A
	500 V	9 A
	690 V	3.5 A
Rated operational power AC-3, AC-3e	240 V	3 kW
1500 r.p.m. 50 Hz	400 V	5.5 kW
1800 r.p.m. 60 Hz	440 V	5.5 kW
3-phase motors	500 V	5.5 kW
	690 V	3 kW
Rated making capacity		10 x Ie AC-3 acc. to IEC/EN 60947-4-1; 13 x Ie AC-3e acc. to IEC/EN 60947-4-1
Rated breaking capacity		8 x Ie AC-3 acc. to IEC/EN 60947-4-1; 8.5 x Ie AC-3e acc. to IEC/EN 60947-4-1
Short-circuit protection device for contactors without thermal O/L relay - motor protection excluded fuse type gG		Type 1: 25 A / Type 2: 25 A
Rated short-time withstand current Icw at 40 °C ambient temperature, in free air from a cold state	10 s	96 A
Maximum breaking capacity cos ϕ = 0.45	at 400 V	96 A
Maximum electrical switching frequency	AC-1	300 cycles/h
	AC-3	600 cycles/h
	DC-1, DC-3, DC-5	600 cycles/h

DC-1 / DC-3 / DC-5 Utilization category for air temperature close to the contactor θ ≤ 55 °C

Ie / Rated operational current		**DC-1**	**DC-3**	**DC-5**
		L/R ≤ 1 ms	L/R ≤ 2 ms	L/R ≤ 7.5 ms
Per pole	24 V	16 A	16 A	16 A
	48 V	16 A	8 A	2 A
	60 V	16 A	8 A	2 A
	110 V	5.0 A	1.5 A	0.4 A
	220 V	0.8 A	0.25 A	0.2 A
Two poles in serie	24 V	16 A	16 A	16 A
	48 V	16 A	16 A	16 A
	60 V	16 A	16 A	16 A
	110 V	16 A	7 A	2 A
	220 V	5 A	1.5 A	1 A
Three poles in serie	24 V	16 A	16 A	16 A
	48 V	16 A	16 A	16 A
	60 V	16 A	16 A	16 A
	110 V	16 A	15 A	8 A
	220 V	14 A	4.0 A	2 A

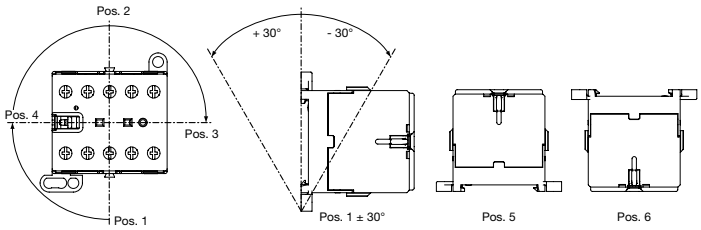
TBC7 3- and 4-pole mini contactors

Technical data

General technical data

Contactor types	DC operated	**TBC7**
Rated insulation voltage Ui		
acc. to IEC/EN 60947-4-1		690 V
Rated impulse withstand voltage Uimp		6 kV
Ambient air temperature, close to contactor		
Operation	Continuous	-30 ... +55 °C
	Without self-heating	-30 ... +70 °C
Storage		-40 ... +80 °C
Climatic withstand		Acc. to IEC 60947-1 Annex Q
Maximum operating altitude (without derating)		2000 m
Mechanical durability		10^7 operating cycles
Resistance to shock		Half-sine
acc. IEC/EN 60068-2-27		15 g / 11 ms
acc. to IEC/EN 60947-1 Annex. Q		Category E
acc. to IEC/EN 61373		Category 1, class B
Resistance to vibrations		Sinusoidal
acc. IEC/EN 60068-2-6		5 g / 3 ... 150 Hz
acc. to IEC/EN 60947-1 Annex. Q		Category E
acc. to IEC/EN 61373		Category 1, class B

Mounting characteristics and conditions for use

Contactor types	DC operated	**TBC7**
Mounting positions		
Mounting distances		The contactors can be assembled side by side
Fixing		
On rail acc. to IEC/EN 60715		35 x 7.5 mm or 35 x 15 mm
By screws (not supplied)		2 x M4 screws placed diagonally

TBC7 3- and 4-pole mini contactors

Technical data

Built-in auxiliary contact according to IEC

Types		**Built-in auxiliary contacts**
Standards		IEC/EN 60947-1, IEC/EN 60947-5-1, IEC/EN 61373, EN 45545-2
Rated operational voltage Ue max		690 V AC, 250 V DC
Rated frequency (without derating)		DC or 50 / 60 Hz
Conventional free-air thermal current Ith θ ≤ 40 °C		6 A
Ie / Rated operational current AC-15	24 V	4 A
	120 V	4 A
	240 V	4 A
	400 V	3 A
	440 V	3 A
	500 V	2 A
Ie / Rated operational current DC-13	24 V	2.5 A
	125 V	0.7 A
	250 V	0.4 A
Short-circuit protection device - fuse type gG		6 A
Minimum switching capacity with failure rate acc. to IEC 60947-5-4		17 V / 5 mA
Maximum electrical switching frequency	AC-15	600 cycles/h
	DC-13	600 cycles/h

Connection characteristics

Contactor types	DC operated	**TBC7**
Terminals		Screw terminals with cable clamp
Connection capacity		
Main conductors (poles)		
Rigid: solid	1 or 2 x	1 ... 4 mm²
Flexible without ferrule	1 or 2 x	1 ... 2.5 mm²
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 22 ... 10
Stripping length		9 mm
Tightening torques		0.8 ... 1.1 Nm / 7 lb.in
Connection capacity – auxiliary conductors (built-in auxiliary terminals + coil terminals)		
Rigid: solid	1 or 2 x	1 ... 4 mm²
Flexible without ferrule	1 or 2 x	1 ... 2.5 mm²
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 22 ... 10
Stripping length		9 mm
Tightening torques		
Coil terminals		0.8 ... 1.1 Nm / 7 lb.in
Built-in auxiliary terminals		0.8 ... 1.1 Nm / 7 lb.in
Degree of protection acc. to IEC/EN 60947-1 and IEC/EN 60529		
Main terminals		IP20
Coil terminals		IP20
Built-in auxiliary terminals		IP20
Screw terminals		(Delivered in open position, screws of unused terminals must be tightened)
All terminals		M3
Screwdriver type		Flat Ø 5.5 mm / Pozidriv 1

TKC6 4-pole mini contactors

Technical data

Main pole – Utilization characteristics according to IEC

Contactor types	DC operated	**TKC6**
Standards		IEC/EN 60947-1, IEC/EN 60947-5-1, IEC/EN 61373, EN 45545-2
Rated operational voltage Uemax		690 V AC, 250 V DC
Rated frequency (without derating)		DC or 50 / 60 Hz
Conventional free-air thermal current Ith θ ≤ 40 °C		6 A
Ie / Rated operational current AC-15	24 V	4 A
	120 V	4 A
	240 V	4 A
	400 V	3 A
	440 V	3 A
	500 V	2 A
Ie / Rated operational current DC-13	24 V	2.5 A
	125 V	0.7 A
	250 V	0.4 A
Short-circuit protection device for contactors - fuse type gG		6 A
Minimum switching capacity with failure rate acc. to IEC/EN 60947-5-4		17 V / 5 mA
Maximum electrical switching frequency	AC-15	600 cycles/h
	DC-13	600 cycles/h

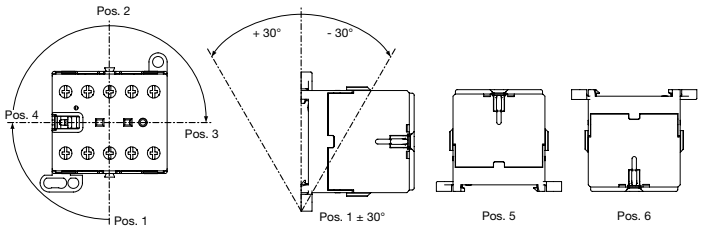
General technical data

Contactor relay types		DC operated	**TKC6**
Rated insulation voltage Ui			
acc. to IEC/EN 60947-5-1			690 V
Rated impulse withstand voltage Uimp			6 kV
Electromagnetic compatibility			
Ambient air temperature close to contactor relay			
Operation	Continuous		-30 ... +55 °C
	Without self-heating		-30 ... +70 °C
Storage			-40 ... +80 °C
Climatic withstand			Acc. to IEC/EN 60068-2-30
Maximum operating altitude (without derating)			2000 m
Mechanical durability			10^7 operating cycles
Resistance to shock			Half-sine
acc. IEC/EN 60068-2-27			15 g / 11ms
acc. to IEC/EN 60947-1 Annex. Q			Category E
acc. to IEC/EN 61373			Category 1, class B
Resistance to vibrations			Sinusoidal
acc. IEC/EN 60068-2-6			5 g / 3 ... 150 Hz
acc. to IEC/EN 60947-1 Annex. Q			Category E
acc. to IEC/EN 61373			Category 1, class B

TKC6 4-pole mini contactor relays

Technical data

Mounting characteristics and conditions for use

Contactor types	DC operated	**TKC6**
Mounting positions		
Mounting distances		The contactors can be assembled side by side.
Fixing		
On rail acc. to IEC/EN 60715		35 x 7.5 mm or 35 x 15 mm
By screws (not supplied)		2 x M4 screws placed diagonally

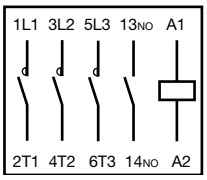
Connecting characteristics

Contactor relay types	DC operated	**TKC6**
Terminals		Screw terminals with cable clamp
Connection capacity		
Main conductors (poles)		
Rigid: solid	1 or 2 x	1 ... 4 mm²
Flexible without ferrule	1 or 2 x	1 ... 2.5 mm²
Connection apacity acc. to UL/CSA	1 or 2 x	AWG 22 ... 10
Stripping length		9 mm
Tightening torques		0.8 ... 1.1 Nm / 7 lb.in
Degree of protection acc. to IEC/EN60947-1 and IEC/EN 60529		
All		IP20
Screw terminals		(Delivered in open position, screws of unused terminals must be tightened)
All terminals		M3
Screwdriver type		Flat Ø 5.5 / Pozidriv 1

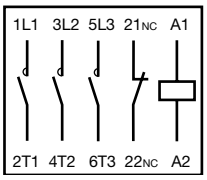
B mini contactors and K mini contactor relays

Terminal marking and positioning

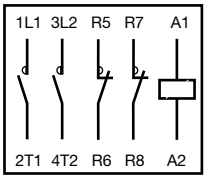
Mini contactors



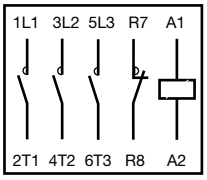
TBC7-30-10-..



TBC7-30-01-..

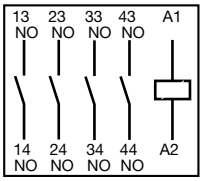


TBC7-22-..

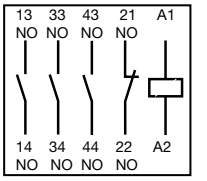


TBC7-31-..

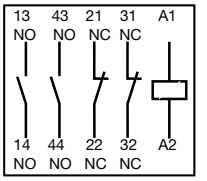
Mini contactor relays



TKC6-40-..



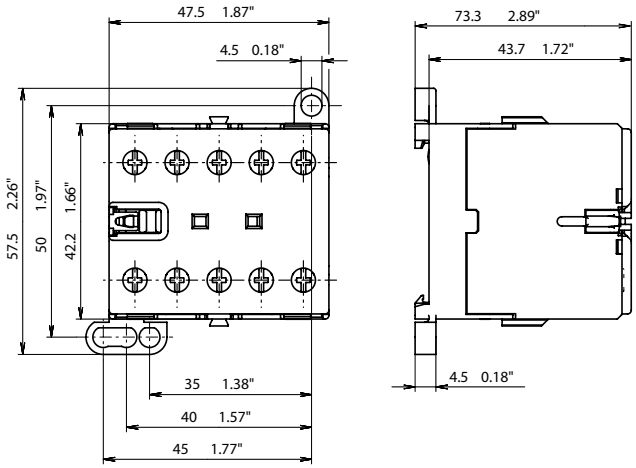
TKC6-31-..



TKC6-22-..

Mini contactors and contactor relays

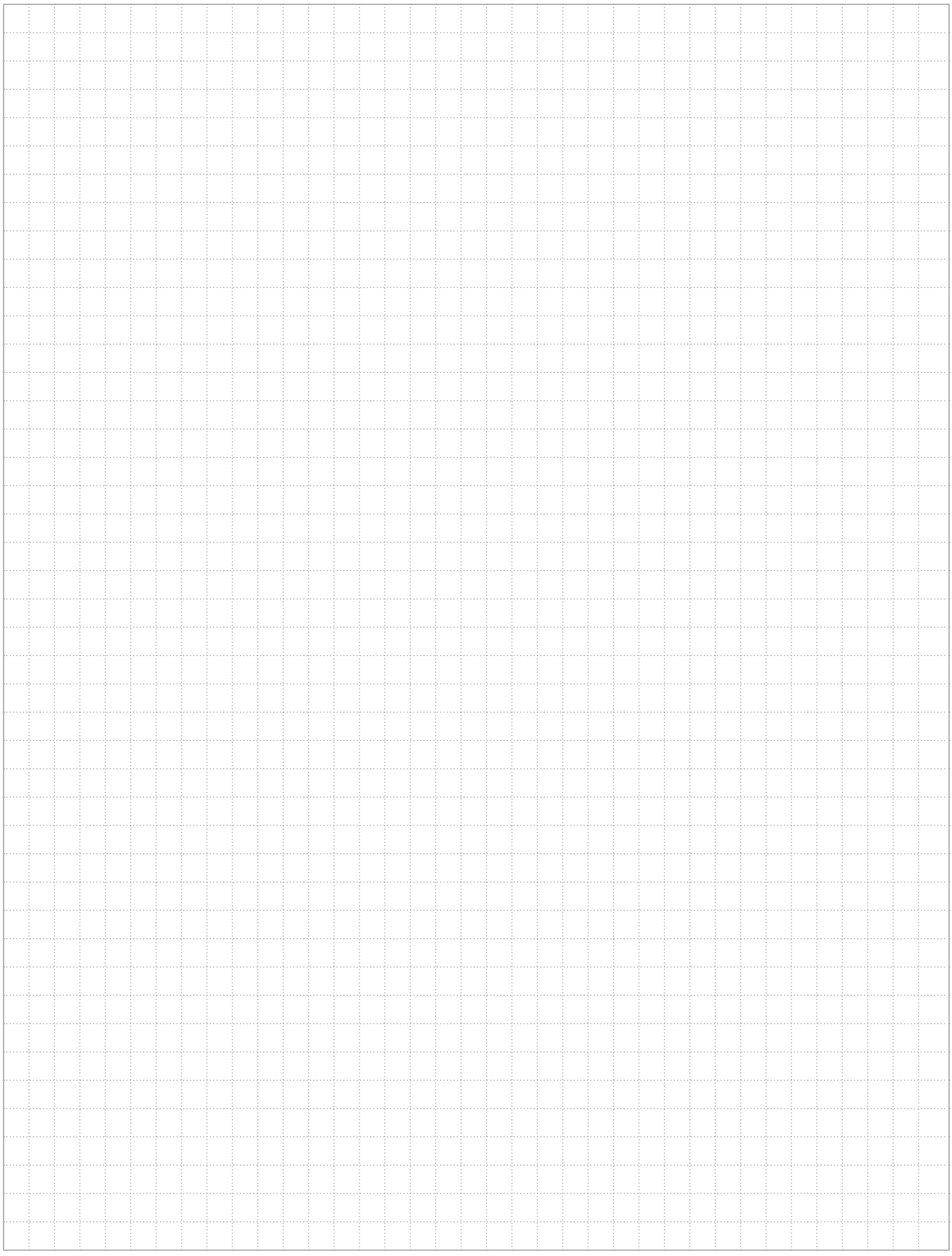
Dimension



TBC7 3 and 4-pole mini contactors, TKC6 4-pole mini contactor relays

Main dimensions mm, inches

Notes



M mini contactors

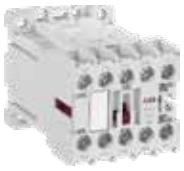
				Screw terminals for standard ferrules		Screw terminals for ring tongue ferrules	
DC Control supply							
3-pole contactors		Coil consumption 4 W	Type	**MC1C..TW..-RAIL**	**MC2C..TW..-RAIL**	**MC1C..RW..-RAIL**	**MC2C..RW..-RAIL**
4-pole contactors		Coil consumption 4 W	Type		**MC2C..TW..-RAIL**	**MC1C..RW..-RAIL**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

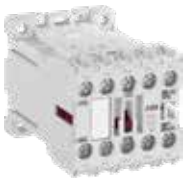
Main accessories

Auxiliary contact blocks	Front mounting	MACN / MARN
Surge suppressors		MP0

(1) Valid for N.O. contacts only.

M mini contactor relays





				Screw terminals for standard ferrules	Screw terminals for ring tongue ferrules
DC Control supply					
4-pole contactor relays		Coil consumption 4 W	Type	**MCRC..TW..-RAIL**	**MCRC..RW..-RAIL**
IEC	Rated operational current AC-15	240 V	A	6	6
		400 V	A	4	4
		500 V	A	2.5	2.5
		690 V	A	1.5	1.5
	Rated operational current DC-13	24 V	A	5	5
		48 V	A	2.5	2.5
		125 V	A	0.7	0.7
		250 V	A	0.3	0.3
		440 V	A	0.15	0.15
UL/CSA Pilot duty				A600, Q600	

Main accessories

Auxiliary contact blocks	Front mounting	MARN
Surge suppressor		MP0

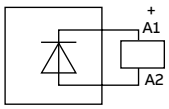
MC1C, MC2C-RAIL 3-pole mini contactors for standard ferrules

4 to 5.5 kW

DC operated

MC1C310AT-RAIL

MC2C310AT-RAIL



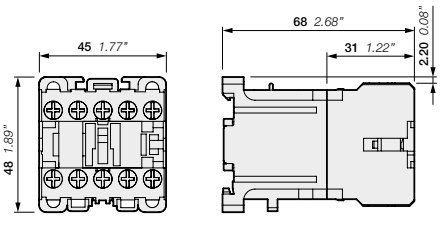
MC1C, MC2C-RAIL 3-pole mini contactors are a high performance but space saving solution for the control of small motors and resistive loads up to 690 V AC and 220 V DC and comply with the latest railway rolling stock standards.

These contactors are designed with 3 main poles and one built-in auxiliary contact:

- control circuit: DC operated
- add-on auxiliary contact blocks for front or side mounting (up to 2 additional contacts) and a wide range of accessories
- diode included
- suitable for rail or wall mounting
- designed in accordance to the applicable parts of IEC/EN 60077 standard
- shocks and vibrations withstand conforming to IEC/EN 61373 (category 1, class B)
- usable according to European fire and smoke safety standard EN 45545-2

IEC		UL/CSA		Rated control circuit voltage Uc min ... Uc max (1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 55 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
kW	A	hp	A					kg
MC1C-RAIL mini contactors								
4	20	5	20	17 ... 30	1 0	MC1C310ATWDD-RAIL	1SAL105219R9911	0.250
					0 1	MC1C301ATWDD-RAIL	1SAL105220R9911	0.250
				24 ... 41	1 0	MC1C310ATWED-RAIL	1SAL102000R9911	0.250
					0 1	MC1C301ATWED-RAIL	1SAL102021R9911	0.250
				51 ... 90	1 0	MC1C310ATWID-RAIL	1SAL102001R9911	0.250
					0 1	MC1C301ATWID-RAIL	1SAL247757R9911	0.250
				77 ... 137	1 0	MC1C310ATWJD-RAIL	1SAL105221R9911	0.250
					0 1	MC1C301ATWJD-RAIL	1SAL105222R9911	0.250
MC2C-RAIL mini contactors								
5.5	20	7.5	20	17 ... 30	1 0	MC2C310ATWDD-RAIL	1SAL105226R9912	0.250
					0 1	MC2C301ATWDD-RAIL	1SAL105227R9912	0.250
				24 ... 41	1 0	MC2C310ATWED-RAIL	1SAL102022R9912	0.250
					0 1	MC2C301ATWED-RAIL	1SAL102042R9912	0.250
				51 ... 90	1 0	MC2C310ATWID-RAIL	1SAL247470R9912	0.250
					0 1	MC2C301ATWID-RAIL	1SAL102084R9912	0.250
				77 ... 137	1 0	MC2C310ATWJD-RAIL	1SAL105228R9912	0.250
					0 1	MC2C301ATWJD-RAIL	1SAL105229R9912	0.250

(1) Uc min ... Uc max are absolute limits including network tolerances (-15% and +10%)



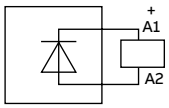
MC1C, MC2C-RAIL

Main dimensions mm, inches

MC2C-RAIL 4-pole mini contactors for standard ferrules

5.5 kW
DC operated

MC2C400AT-RAIL



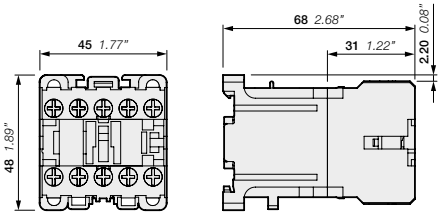
MC2C-RAIL 4-pole mini contactors are a high performance but space saving solution for the control of small motors and resistive loads up to 690 V AC and 220 V DC and comply with the latest railway rolling stock standards.

These contactors are designed with 4 main poles:

- control circuit: DC operated
- add-on auxiliary contact blocks for front or side mounting (up to 2 additional contacts) and a wide range of accessories
- diode included
- suitable for rail or wall mounting
- designed in accordance to the applicable parts of IEC/EN 60077 standard
- shocks and vibrations withstand conforming to IEC/EN 61373 (category 1, class B)
- usable according to European fire and smoke safety standard EN 45545-2

IEC	UL/CSA		Rated control circuit voltage Uc min ... Uc max (1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current θ ≤ 55 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
A	hp	A	V DC				kg
4 N.O. main poles							
20	7.5	20	17 ... 30	0 0	MC2C400ATWDD-RAIL	1SAL247475R9912	0.250
			24 ... 41	0 0	MC2C400ATWED-RAIL	1SAL102106R9912	0.250
			51 ... 90	0 0	MC2C400ATWID-RAIL	1SAL247476R9912	0.250
			77 ... 137	0 0	MC2C400ATWJD-RAIL	1SAL102109R9912	0.250
2 N.O. + 2 N.C. main poles							
20	7.5	20	17 ... 30	0 0	MC2CB00ATWDD-RAIL	1SAL102110R9912	0.250
			24 ... 41	0 0	MC2CB00ATWED-RAIL	1SAL102111R9912	0.250
			51 ... 90	0 0	MC2CB00ATWID-RAIL	1SAL247485R9912	0.250
			77 ... 137	0 0	MC2CB00ATWJD-RAIL	1SAL247486R9912	0.250

(1) Uc min ... Uc max are absolute limits including network tolerances (-15% and +10%)



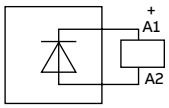
MC2C-RAIL

Main dimensions mm, inches

MCRC-RAIL 4-pole mini contactor relays for standard ferrules

DC operated

MCRC040AT-RAIL



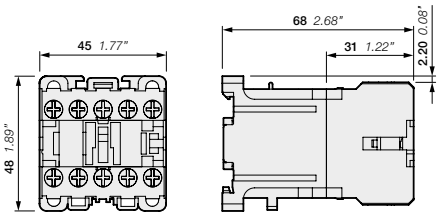
MCRC-RAIL 4-pole mini contactor relays are a high performance but space saving solution used for control functions or for switching small loads up to 6 A.

These contactors are designed with 4 poles with various contact combinations:

- control circuit: DC operated
- add-on auxiliary contact blocks for front or side mounting (up to 4 additional contacts) and a wide range of accessories
- diode included
- suitable for rail or wall mounting
- designed in accordance to the applicable parts of IEC/EN 60077 standard
- shocks and vibrations withstand conforming to IEC/EN 61373 (category 1, class B)
- usable according to European fire and smoke safety standard EN 45545-2

Rated control circuit voltage Uc min ... Uc max (1)	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1pce)
V DC				kg
4 N.O. main poles				
17 ... 30	4 0	MCRC040ATWDD-RAIL	1SAH102498R9910	0.235
24 ... 41	4 0	MCRC040ATWED-RAIL	1SAH102113R9910	0.235
51 ... 90	4 0	MCRC040ATWID-RAIL	1SAH102114R9910	0.235
77 ... 137	4 0	MCRC040ATWJD-RAIL	1SAH102570R9910	0.235
3 N.O. + 1 N.C. main poles				
17 ... 30	3 1	MCRC031ATWDD-RAIL	1SAH102568R9910	0.235
24 ... 41	3 1	MCRC031ATWED-RAIL	1SAH102115R9910	0.235
51 ... 90	3 1	MCRC031ATWID-RAIL	1SAH102116R9910	0.235
77 ... 137	3 1	MCRC031ATWJD-RAIL	1SAH102569R9910	0.235
2 N.O. + 2 N.C. main poles				
17 ... 30	2 2	MCRC022ATWDD-RAIL	1SAH102499R9910	0.235
24 ... 41	2 2	MCRC022ATWED-RAIL	1SAH102117R9910	0.235
51 ... 90	2 2	MCRC022ATWID-RAIL	1SAH102118R9910	0.235
77 ... 137	2 2	MCRC022ATWJD-RAIL	1SAH102500R9910	0.235

(1) Uc min ... Uc max are absolute limits including network tolerances (-15% and +10%)



MCRC-RAIL

Main dimensions mm, inches

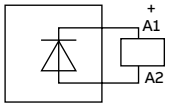
MC1C..R, MC2C..R-RAIL 3-pole mini contactors for ring tongue ferrules

4 to 5.5 kW

DC operated

MC1C310AR-RAIL

MC2C310AR-RAIL



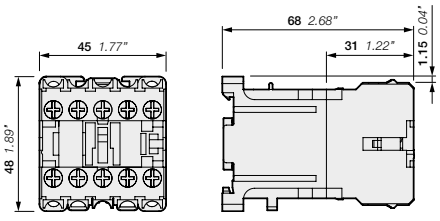
MC1C..R, MC2C..R, MC2C..R-RAIL mini contactors are a high performance but space saving solution for the control of small motors and resistive loads up to 690 V AC and 220 V DC and comply with the latest railway rolling stock standards.

These contactors are designed with 3 main poles and one built-in auxiliary contact:

- special screw terminals for an easy connection with ring tongue ferrules
- control circuit: DC operated
- add-on auxiliary contact blocks for front or side mounting (up to 2 additional contacts) and a wide range of accessories
- diode included
- suitable for rail or wall mounting
- designed in accordance to the applicable parts of IEC/EN 60077 standard
- shocks and vibrations withstand conforming to IEC/EN 61373 (category 1, class B)
- usable according to European fire and smoke safety standard EN 45545-2

IEC		UL/CSA		Rated control circuit voltage Uc min ... Uc max (1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 55 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
kW	A	hp	A	V DC				kg
MC1C..R-RAIL mini contactors								
4	20	5	20	17 ... 30	1 0	MC1C310ARWDD-RAIL	1SAL247490R9911	0.250
					0 1	MC1C301ARWDD-RAIL	1SAL102121R9911	0.250
				24 ... 41	1 0	MC1C310ARWED-RAIL	1SAL102119R9911	0.250
					0 1	MC1C301ARWED-RAIL	1SAL102122R9911	0.250
				51 ... 90	1 0	MC1C310ARWID-RAIL	1SAL102120R9911	0.250
					0 1	MC1C301ARWID-RAIL	1SAL102123R9911	0.250
				77 ... 137	1 0	MC1C310ARWJD-RAIL	1SAL247492R9911	0.250
					0 1	MC1C301ARWJD-RAIL	1SAL248105R9911	0.250
MC2C..R-RAIL mini contactors								
5.5	20	7.5	20	17 ... 30	1 0	MC2C310ARWDD-RAIL	1SAL247493R9912	0.250
					0 1	MC2C301ARWDD-RAIL	1SAL102132R9912	0.250
				24 ... 41	1 0	MC2C310ARWED-RAIL	1SAL102131R9912	0.250
					0 1	MC2C301ARWED-RAIL	1SAL102133R9912	0.250
				51 ... 90	1 0	MC2C310ARWID-RAIL	1SAL247494R9912	0.250
					0 1	MC2C301ARWID-RAIL	1SAL248183R9912	0.250
				77 ... 137	1 0	MC2C310ARWJD-RAIL	1SAL247495R9912	0.250
					0 1	MC2C301ARWJD-RAIL	1SAL102134R9912	0.250

(1) Uc min ... Uc max are absolute limits including network tolerances (-15% and +10%)

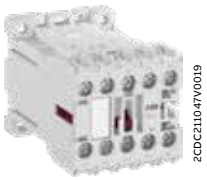


MC1C..R, MC2C..R-RAIL

Main dimensions mm, inches

MC1C..R-RAIL 4-pole mini contactors for ring tongue ferrules

DC operated

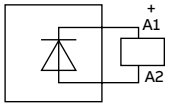


MC1C400AR-RAIL

MC1C..R-RAIL 4-pole mini contactors are a high performance but space saving solution for the control of small motors and resistive loads up to 690 V AC and 220 V DC and comply with the latest railway rolling stock standards.

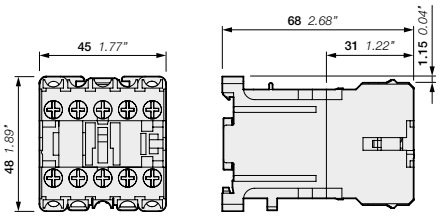
These contactors are designed with 4 main poles:

- special screw terminals for an easy connection with ring tongue ferrules
- control circuit: DC operated
- add-on auxiliary contact blocks for front or side mounting (up to 2 additional contacts) and a wide range of accessories
- diode included
- suitable for rail or wall mounting
- designed in accordance to the applicable parts of IEC/EN 60077 standard
- shocks and vibrations withstand conforming to IEC/EN 61373 (category 1, class B)
- usable according to European fire and smoke safety standard EN 45545-2



IEC	UL/CSA		Rated control circuit voltage Uc min ... Uc max (1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current θ ≤ 55 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
A	hp	A	V DC				kg
4 N.O. main poles							
20	5	20	17 ... 30	0 0	MC1C400ARWDD-RAIL	1SAL247499R9911	0.250
			24 ... 41	0 0	MC1C400ARWED-RAIL	1SAL102124R9911	0.250
			51 ... 90	0 0	MC1C400ARWID-RAIL	1SAL247500R9911	0.250
			77 ... 137	0 0	MC1C400ARWJD-RAIL	1SAL247501R9911	0.250
2 N.O. + 2 N.C. main poles							
20	5	20	17 ... 30	0 0	MC1CB00ARWDD-RAIL	1SAL102129R9911	0.250
			24 ... 41	0 0	MC1CB00ARWED-RAIL	1SAL102130R9911	0.250
			51 ... 90	0 0	MC1CB00ARWID-RAIL	1SAL247509R9911	0.250
			77 ... 137	0 0	MC1CB00ARWJD-RAIL	1SAL247510R9911	0.250

(1) Uc min ... Uc max are absolute limits including network tolerances (-15% and +10%)



MC1C..R-RAIL

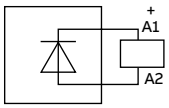
Main dimensions mm, inches

MC2C..R-RAIL 4-pole mini contactors for ring tongue ferrules

5.5 kW

DC operated

MC2C400AT-RAIL



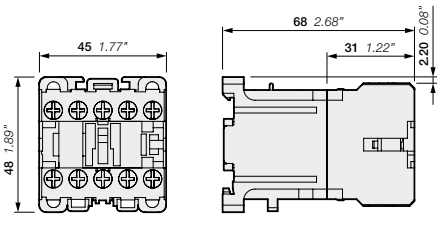
MC2C..R-RAIL 4-pole mini contactors are a high performance but space saving solution for the control of small motors and resistive loads up to 690 V AC and 220 V DC and comply with the latest railway rolling stock standards.

These contactors are designed with 4 main poles:

- special screw terminals for an easy connection with ring tongue ferrules
- control circuit: DC operated
- add-on auxiliary contact blocks for front or side mounting (up to 2 additional contacts) and a wide range of accessories
- diode included
- suitable for rail or wall mounting
- designed in accordance to the applicable parts of IEC/EN 60077 standard
- shocks and vibrations withstand conforming to IEC/EN 61373 (category 1, class B)
- usable according to European fire and smoke safety standard EN 45545-2

IEC	UL/CSA		Rated control circuit voltage Uc min ... Uc max (1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current θ ≤ 55 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
A	hp	A	V DC				kg
4 N.O. main poles							
20	7.5	20	17 ... 30	0 0	MC2C400ARWDD-RAIL	1SAL247502R9912	0.250
			24 ... 41	0 0	MC2C400ARWED-RAIL	1SAL247530R9912	0.250
			51 ... 90	0 0	MC2C400ARWID-RAIL	1SAL247503R9912	0.250
			77 ... 137	0 0	MC2C400ARWJD-RAIL	1SAL247504R9912	0.250
2 N.O. + 2 N.C. main poles							
20	7.5	20	17 ... 30	0 0	MC2CB00ARWDD-RAIL	1SAL247511R9912	0.250
			24 ... 41	0 0	MC2CB00ARWED-RAIL	1SAL247531R9912	0.250
			51 ... 90	0 0	MC2CB00ARWID-RAIL	1SAL247512R9912	0.250
			77 ... 137	0 0	MC2CB00ARWJD-RAIL	1SAL247513R9912	0.250

(1) Uc min ... Uc max are absolute limits including network tolerances (-15% and +10%)

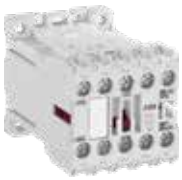


MC2C..R-RAIL

Main dimensions mm, inches

MCRC..R-RAIL 4-pole mini contactor relays for ring tongue ferrules

DC operated

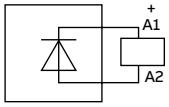


MCRC040AR-RAIL

MCRC..R-RAIL 4-pole mini contactor relays are a high performance but space saving solution used for control functions or for switching small loads up to 6 A.

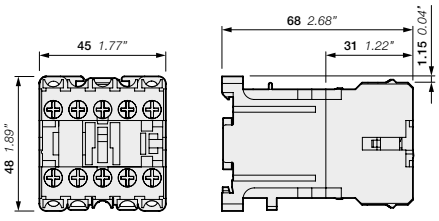
These contactors are designed with 4 poles with various contact combinations:

- ring tongue terminals for a reliable and secure connection
- control circuit: DC operated
- add-on auxiliary contact blocks for front or side mounting (up to 4 additional contacts) and a wide range of accessories
- diode included
- suitable for rail or wall mounting
- designed in accordance to the applicable parts of IEC/EN 60077 standard
- shocks and vibrations withstand conforming to IEC/EN 61373 (category 1, class B)
- usable according to European fire and smoke safety standard EN 45545-2



Rated control circuit voltage Uc min ... Uc max (1) V DC	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
4 N.O. main poles				
17 ... 30	4 0	MCRC040ARWDD-RAIL	1SAH102135R9910	0.235
24 ... 41	4 0	MCRC040ARWED-RAIL	1SAH102136R9910	0.235
51 ... 90	4 0	MCRC040ARWID-RAIL	1SAH102137R9910	0.235
77 ... 137	4 0	MCRC040ARWJD-RAIL	1SAH102138R9910	0.235
3 N.O. + 1 N.C. main poles				
17 ... 30	3 1	MCRC031ARWDD-RAIL	1SAH102139R9910	0.235
24 ... 41	3 1	MCRC031ARWED-RAIL	1SAH102140R9910	0.235
51 ... 90	3 1	MCRC031ARWID-RAIL	1SAH102141R9910	0.235
77 ... 137	3 1	MCRC031ARWJD-RAIL	1SAH102142R9910	0.235
2 N.O. + 2 N.C. main poles				
17 ... 30	2 2	MCRC022ARWDD-RAIL	1SAH102143R9910	0.235
24 ... 41	2 2	MCRC022ARWED-RAIL	1SAH102144R9910	0.235
51 ... 90	2 2	MCRC022ARWID-RAIL	1SAH102145R9910	0.235
77 ... 137	2 2	MCRC022ARWJD-RAIL	1SAH102146R9910	0.235

(1) Uc min ... Uc max are absolute limits including network tolerances (-15% and +10%)



MCR..R-RAIL

Main dimensions mm, inches

Auxiliary contact blocks for MC1-RAIL and MC2-RAIL mini contactors

With screw terminals and special screw terminals for ring tongue ferrules

MARN211AT

MARN211AR

Suitable for	Auxiliary contacts	Type	Order code	Weight Pkg (1 pce) kg
Front mounted instantaneous auxiliary contact blocks with screw terminals				
All MC1 and MC2 variants Contacts in accordance with EN 50005	2 0	MARN220AT	1SAL100994R9906	0.030
	1 1	MARN211AT	1SAL100993R9906	0.030
	0 2	MARN202AT	1SAL100992R9906	0.030
Front mounted instantaneous auxiliary contact blocks for ring tongue ferrules				
All MC1 and MC2 variants Contacts in accordance with EN 50005	2 0	MARN220AR	1SAL103349R9906	0.030
	1 1	MARN211AR	1SAL103350R9906	0.030
	0 2	MARN202AR	1SAL103351R9906	0.030

Note : All the auxiliary contact blocks can be used with type VC3 equipment acc. to IEC/EN 60077-1 while, only selected codes are suitable for usage with type VC1 equipment acc. to IEC/EN 60077-1. Please consult your ABB local sales organization.

Other accessories for MC1-RAIL and MC2-RAIL mini contactors

MP0DAE4

BEMC/132

MMH0

WKMIU

MVP0C

MVB0L

Suitable for	Rated control circuit voltage Uc			Protection type	Type	Order code	Pkg qty	Weight (1 pce)
	V DC	V 50 Hz	V 60 Hz					kg
Surge suppressors for contactor coils								
All MC1 and MC2 variants	24 ... 48	24 ... 48	24 ... 48	Varistor	MP0DAE4	1SAL100536R9906	1	0.006
	50 ... 127	50 ... 127	50 ... 127	Varistor	MP0DAE5	1SAL204848R9906	1	0.006
	130 ... 250	130 ... 250	130 ... 250	Varistor	MP0DAE6	1SAL204849R9906	1	0.006
Connecting links with manual motor starters								
All MC1 and MC2 variants					BEMC/132	1SAM301920R1001	1	0.021
Mechanical interlock								
All MC1 and MC2 variants					MMH0	1SAL100547R9906	1	0.003
Parallel connecting link								
All MC1 and MC2 variants					MVP0C	1SAL100600R9906	1	0.010
Connection sets for reversing contactors								
All MC1 and MC2 variants					WKMIU	1SAL101421R9906	1	0.030
Lütze® rail adapter for contactors and contactor relays								
All MC1 and MC2 variants					MVB0L	1SAL101830R9906	30	0.002

Auxiliary contact blocks for MCR-RAIL mini contactor relays

With screw terminals and special screw terminals for ring tongue ferrules

MARN211AT

MARN440AT

MARN211AR

MARN440AR

Suitable for	Auxiliary contacts	Type	Order code	Weight Pkg (1 pce) kg
Front mounted instantaneous auxiliary contact blocks with screw terminals				
All MCR variants Contacts in accordance with EN 50005	2 0	MARN220AT	1SAL100994R9906	0.030
	1 1	MARN211AT	1SAL100993R9906	0.030
	0 2	MARN202AT	1SAL100992R9906	0.030
	4 0	MARN440AT	1SAL100991R9906	0.040
	3 1	MARN431AT	1SAL100990R9906	0.040
	2 2	MARN422AT	1SAL100989R9906	0.040
Front mounted instantaneous auxiliary contact blocks for ring tongue ferrules				
All MCR variants Contacts in accordance with EN 50005	2 0	MARN220AR	1SAL103349R9906	0.030
	1 1	MARN211AR	1SAL103350R9906	0.030
	0 2	MARN202AR	1SAL103351R9906	0.030
	4 0	MARN440AR	1SAL103352R9906	0.040
	3 1	MARN431AR	1SAL103353R9906	0.040
	2 2	MARN422AR	1SAL103354R9906	0.040

Note : All the auxiliary contact blocks can be used with type VC3 equipment acc. to IEC/EN 60077-1 while, only selected codes are suitable for usage with type VC1 equipment acc. to IEC/EN 60077-1. Please consult your ABB local sales organization.

Other accessories for MCR-RAIL mini contactor relays

MP0AAE1

MMH0

MVB0L

Suitable for	Rated control circuit voltage Uc			Protection type	Type	Order code	Pkg qty	Weight (1 pce)
	V DC	V 50 Hz	V 60 Hz					kg
Surge suppressors for contactor coils								
All MCR variants	24 ... 48	24 ... 48	24 ... 48	Varistor	MP0DAE4	1SAL100536R9906	1	0.006
	50 ... 127	50 ... 127	50 ... 127	Varistor	MP0DAE5	1SAL204848R9906	1	0.006
	130 ... 250	130 ... 250	130 ... 250	Varistor	MP0DAE6	1SAL204849R9906	1	0.006
Mechanical interlock								
All MCR variants					MMH0	1SAL100547R9906	1	0.003
Lütze® rail adapter for contactors and contactor relays								
All MCR variants					MVB0L	1SAL101830R9906	30	0.002

MC1, MC2 3-pole and 4-pole mini contactors

Technical data

Main pole – Utilization characteristics according to IEC

Contactor types	DC operated	MC1C	MC2C
Standards		IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60077-1, IEC/EN 60077-2, IEC/EN 61373, EN 45545-2	
Rated operational voltage Ue max		690 V AC, 440 V DC	
Rated frequency (without derating)		DC or 50 / 60 Hz	
Conventional free-air thermal current Ith acc. to IEC/EN 60947-4-1, open contactors, θ ≤ 55 °C, with conductor cross-sectional area		20 A	
AC-1 Utilization category for air temperature close to contactor θ ≤ 55 °C			
Ie / Rated operational current AC-1	230 V	20 A	
Ue max ≤ 690 V, 50/60 Hz	400 V	20 A	
	500 V	20 A	
	690 V	20 A	
AC-1 Utilization category for air temperature close to contactor 55 < θ ≤ 70°C			
Ie / Rated operational current AC-1	230 V	16 A	
Ue max ≤ 690 V, 50/60 Hz	400 V	16 A	
	500 V	16 A	
	690 V	16 A	
AC-3 Utilization category for air temperature close to contactor θ ≤ 55 °C			
Ie / Rated operational current AC-3	230 V	9 A	12 A
M 3~ 3-phase motors	400 V	9 A	12 A
	500 V	8 A	10 A
	690 V	5 A (1)	5 A
Rated operational power AC-3	230 V	2.2 kW	3 kW
M 3~ 1500 r.p.m. 50 Hz, 1800 r.p.m. 60 Hz, 3-phase motors	400 V	4 kW	5.5 kW
	500 V	4 kW	5.5 kW
	690 V	4 kW (1)	4 kW
AC-4 Utilization category for air temperature close to contactor θ ≤ 55 °C			
Ie / Rated operational current AC-4	230 V	9 A	
M 3~ 3-phase motors	400 V	9 A (1)	
	500 V	8 A	
	690 V	5 A (1)	
Rated operational power AC-4	230 V	2.2 kW	
M 3~ 1500 r.p.m. 50 Hz, 1800 r.p.m. 60 Hz, 3-phase motors	400 V	4 kW (1)	
	500 V	4 kW	
	690 V	4 kW (1)	
DC-1 Utilization category for air temperature close to contactor θ ≤ 55 °C			
Ie / Rated operational current DC-1 with 3 poles in series	24 V	20 A	
	48 V	20 A	
	60 V	20 A	
	125 V	10 A	
	220 V	8 A	
DC-3 Utilization category for air temperature close to contactor θ ≤ 55 °C			
Ie / Rated operational current DC-3 with 3 poles in series	24 V	12 A	
	48 V	9 A	
	60 V	9 A	
	125 V	6 A	
	220 V	2.5 A	
DC-5 Utilization category for air temperature close to contactor θ ≤ 55 °C			
Ie / Rated operational current DC-5 with 3 poles in series	24 V	9 A	
	48 V	8 A	
	60 V	7 A	
	125 V	2 A	
	220 V	0.8 A	
Rated making capacity		10 x Ie AC-3 acc. to IEC/EN 60947-4-1, 12 x Ie AC-4 acc. to IEC/EN 60947-4-1	
Rated breaking capacity		8 x Ie AC-3 acc. to IEC/EN 60947-4-1, 10 x Ie AC-4 acc. to IEC/EN 60947-4-1	
Short-circuit protection device for contactors without thermal O/L relay - motor protection excluded fuse type gG		Type 1: 32 A / Type 2: 20 A	
Rated short-time withstand current Icw at 40 °C	0.1 s	500 A	
ambient temperature, in free air from a cold state	10 s	72 A	96 A
Maximum breaking capacity cos ϕ = 0.45	at 400 V	90 A	120 A
Maximum electrical switching frequency	AC	300 cycles/h (AC-1), 1200 cycles/h (AC-3), 150 cycles/h (AC-4)	
	DC	600 cycles/h	

(1) Valid for N.O. contacts only ; other ratings on request.

MC1, MC2 3-pole and 4-pole mini contactors

Technical data

Main pole – Utilization characteristics according to UL/NEMA/CSA

Contactor types	DC operated	MC1C	MC2C
Standards		UL/CSA 60947-1, UL/CSA 60947-4-1	
Maximum operational voltage		600 V AC	
UL/CSA general use rating		20 A / 600 V	
UL/CSA maximum 1-phase motor rating for air temperature close to contactor θ ≤ 40 °C			
Full load current	115 V AC	9.8 A	9.8 A
	230 V AC	10 A	12 A
Horse power rating	115 V AC	0.5 hp	0.5 hp
	230 V AC	1.5 hp	2 hp
UL/CSA maximum 3-phase motor rating for air temperature close to contactor θ ≤ 40 °C			
Full load current (1)	200 V AC	11 A	11 A
	240 V AC	9.6 A	9.6 A
	380-415 V AC	6.1 A	9.7 A
	440-480 V AC	7.6 A	11 A
	550-600 V AC	6.1 A	11 A
Horse power rating (1)	200 V AC	3 hp	3 hp
	240 V AC	3 hp	3 hp
	380-415 V AC	3 hp	5 hp
	440-480 V AC	5 hp	7.5 hp
	550-600 V AC	5 hp	10 hp
Short-circuit protection device for contactors without thermal overload relay - motor protection excluded			
Fuse rating	600 V	50 A	
Fuse type	600 V	Class J	

(1) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".

General technical data

Contactor types	DC operated	MC1C	MC2C
Rated insulation voltage Ui			
acc. to IEC/EN 60947-4-1		750 V	
acc. to UL/CSA 60947-4-1		600 V	
Rated impulse withstand voltage Uimp		6 kV (1)	
Ambient air temperature, close to contactor			
Operation		-40 ... +70 °C	
Storage		-55 ... +80 °C	
Climatic withstand		Acc. to IEC 60947-1 Annex Q	
Maximum operating altitude (without derating)		3000 m	
Mechanical durability		2 000 000 operating cycles	
Electrical durability			
	AC-1 16 A	8 000 operating cycles	8 000 operating cycles
	AC-3 400 V	8 000 operating cycles (9 A) (2)	8 000 operating cycles (12 A) (2)
	AC-4 400 V	8 000 operating cycles (9 A) (2)	8 000 operating cycles (9 A) (2)
Resistance to shock		Half-sine	
acc. to IEC/EN 60068-2-27		25 g / 11 ms	
acc. to IEC/EN 60947-1 Annex. Q		Category E	
acc. to IEC/EN 61373		Category 1, class B	
Resistance to vibrations		Sinusoidal	
acc. to IEC/EN 60068-2-6		5 g / 3 ... 150 Hz	
acc. to IEC/EN 60947-1 Annex. Q		Category E	
acc. to IEC/EN 61373		Category 1, class B	

(1) 2 mm clearance distance between contactor side wall and grounded metal parts of cabinet required
(2) Valid for 3-pole mini contactors only. For other ratings, please consult your ABB local sales organization.

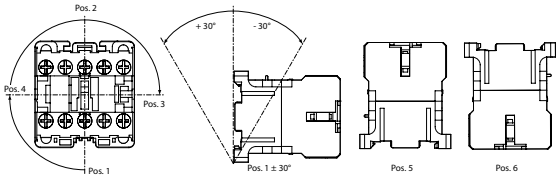
MC1, MC2 3-pole and 4-pole mini contactors

Technical data

Magnet system characteristics for MC1C, MC2C contactors

Contactor types	DC operated	MC1C	MC2C
Coil operating limits acc. to IEC/EN 60077-1	VC1	0.7 ... 1.25 x Uc	
DC supply	VC3	0.85 ... 1.1 x Uc	
DC control voltage			
Rated control circuit voltage Uc		See ordering tables	
Coil consumption	Average pull-in value	4 W	
	Average holding value	4 W	

Mounting characteristics and conditions for use

Contactor types	DC operated	MC1C	MC2C
Mounting positions			
Mounting distances		The contactors can be assembled side by side	
Fixing			
On rail acc. to IEC/EN 60715		35 x 7.5 mm or 35 x 15 mm	
By screws (not supplied)		4 screws at the 4 angles - M4	

MC1, MC2 3-pole and 4-pole mini contactors

Technical data

Built-in auxiliary contact according to IEC

Types		Built-in auxiliary contacts
Standards		IEC/EN 60947-1, IEC/EN 60947-5-1, IEC/EN 60077-1, IEC/EN 60077-2, IEC/EN 61373, EN 45545-2
Rated operational voltage Ue max		690 V AC, 440 V DC
Rated frequency (without derating)		DC or 50 / 60 Hz
Conventional free-air thermal current Ith θ ≤ 70 °C		16 A
Ie / Rated operational current AC-15	240 V	6 A
	400 V	4 A
	500 V	2.5 A
	690 V	1.5 A
Ie / Rated operational current DC-13	24 V	5 A
	48 V	2.5 A
	125 V	0.55 A
	250 V	0.3 A
	440 V	0.15 A
Short-circuit protection device - fuse type gG		10 A
Minimum switching capacity with failure rate acc. to IEC/EN 60947-5-4		17 V / 5 mA
Maximum electrical switching frequency	AC-15	360 cycles/h
	DC-13	360 cycles/h

Built-in auxiliary contact according to UL/CSA

Types	Built-in auxiliary contacts
Standards	UL/CSA 60947-1, UL/CSA 60947-5-1
Maximum operational voltage	600 V AC
Pilot duty	A600, Q600

Connection characteristics

Terminals		Screw terminals with cable clamp	Conductors with insulated ring tongue ferrule
Connection capacity			
Main conductors (poles + built-in auxiliary terminals)			
Rigid: solid	1 x	0.75 ... 4 mm²	–
	2 x	0.75 ... 2.5 mm²	–
Flexible without ferrule	1 or 2 x	0.75 ... 2.5 mm²	–
Flexible with ferrule	1 x	0.75 ... 2.5 mm²	–
(insulated or not)	2 x	0.75 ... 1.5 mm²	–
Lugs	Ø mm >	–	3.6 mm
	L mm <	–	6.6 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 12 ... 18	–
Stripping length		9 mm	–
Tightening torques		0.8 ... 1.0 Nm / 7 lb.in	0.8 Nm / 7 lb.in
Coil terminals			
Rigid: solid	1 or 2 x	0.75 ... 2.5 mm²	–
Flexible without ferrule	1 or 2 x	0.75 ... 2.5 mm²	–
Flexible with ferrule	1 x	0.75 ... 2.5 mm²	–
(insulated or not)	2 x	0.75 ... 1.5 mm²	–
Lugs	Ø mm >	–	3.6 mm
	L mm <	–	6.6 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 12 ... 18	–
Stripping length		9 mm	–
Tightening torques		0.8 Nm / 7 lb.in	
Degree of protection acc. to IEC/EN 60947-1 and IEC/EN 60529			
All terminals		IP20	
Screw terminals		(screws of unused terminals must be tightened)	
All terminals		M3	M3.5
Screwdriver type		Flat Ø 5.5 mm / Pozidriv 2	

MCR 4-pole mini contactor relays
Technical data

Main pole – Utilization characteristics according to IEC

Contactor types	DC operated	**MCRC**
Standards		IEC/EN 60947-1, EN 60947-5-1, IEC/EN 60077-1, IEC/EN 60077-2, IEC 61373, EN 45545-2
Rated operational voltage Ue max		690 V AC, 440 V DC
Rated frequency (without derating)		DC or 50 / 60 Hz
Conventional free-air thermal current Ith θ ≤ 70 °C		16 A
Ie / Rated operational current AC-15	240 V	6 A
	400 V	4 A
	500 V	2.5 A
	690 V	1.5 A
Ie / Rated operational current DC-13	24 V	5 A
	48 V	2.5 A
	125 V	0.55 A
	250 V	0.3 A
	440 V	0.15 A
Short-circuit protection device for contactors - fuse type gG		10 A
Minimum switching capacity with failure rate acc. to IEC/EN 60947-5-4		17 V / 5 mA
Maximum electrical switching frequency	AC-15	600 cycles/h
	DC-13	600 cycles/h

Main pole – Utilization characteristics according to UL/NEMA/CSA

Contactor types	DC operated	**MCRC**
Standards		UL/CSA 60947-1, UL/CSA 60947-5-1
Maximum operational voltage		600 V AC
Pilot duty		A600, Q600

MCR 4-pole mini contactor relays

Technical data

General technical data

Contactor relay types	DC operated	**MCRC**
Rated insulation voltage Ui		
acc. to IEC/EN 60947-5-1		750 V
acc. to UL/CSA 60947-5-1		600 V
Rated impulse withstand voltage Uimp		6 kV
Electromagnetic compatibility		
Ambient air temperature close to contactor relay	Operation in free air	-40 ... +70 °C
	Storage	-55 ... +80 °C
Climatic withstand		Acc. to IEC/EN 60947-1 Annex. Q
Maximum operating altitude (without derating)		3000 m
Mechanical durability		10^7 operating cycles
Resistance to shock		Half-sine
acc. to IEC/EN 60068-2-27		25 g / 11ms
acc. to IEC/EN 60947-1 Annex. Q		Category E
acc. to IEC/EN 61373		Category 1, class B
Resistance to vibrations		Sinusoidal
acc. to IEC/EN 60068-2-6		5 g / 3 ... 150 Hz
acc. to IEC/EN 60947-1 Annex. Q		Category E
acc. to IEC/EN 61373		Category 1, class B

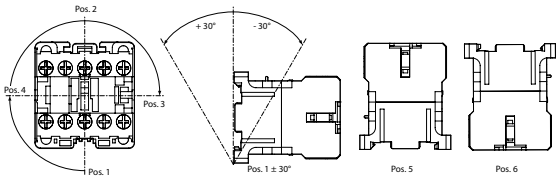
Magnet system characteristics for MCRC contactor relays

Contactor types	DC operated	**MCRC**
Coil operating limits acc. to IEC/EN 60077-1	VC1	0.7 ... 1.25 x Uc
DC supply	VC3	0.85 ... 1.1 x Uc
DC control voltage		
Rated control circuit voltage Uc		See ordering tables
Coil consumption	Average pull-in value	4 W
	Average holding value	4 W

MCR 4-pole mini contactor relays

Technical data

Mounting characteristics and conditions for use

Contactor types	DC operated	**MCRC**
Mounting positions		
Mounting distances		The contactors can be assembled side by side.
Fixing		
On rail acc. to IEC/EN 60715		35 x 7.5 mm or 35 x 15 mm
By screws (not supplied)		4 screws at the 4 angles - M4

Connection characteristics

Terminals		Screw terminals with cable clamp	Conductors with insulated ring tongue ferrule
Connection capacity			
Auxiliary terminals			
Rigid: solid	1 x	0.75 ... 4 mm²	–
	2 x	0.75 ... 2.5 mm²	–
Flexible without ferrule	1 or 2 x	0.75 ... 2.5 mm²	–
Flexible with ferrule	1 x	0.75 ... 2.5 mm²	–
(insulated or not)	2 x	0.75 ... 1.5 mm²	–
Lugs	Ø mm >	–	3.6 mm
	L mm <	–	6.6 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 12 ... 18	–
Stripping length		9 mm	–
Tightening torques		0.8 ... 1.0 Nm / 7 lb.in	0.8 Nm / 7 lb.in
Coil terminals			
Rigid: solid	1 or 2 x	0.75 ... 2.5 mm²	–
Flexible without ferrule	1 or 2 x	0.75 ... 2.5 mm²	–
Flexible with ferrule	1 x	0.75 ... 2.5 mm²	–
(insulated or not)	2 x	0.75 ... 1.5 mm²	–
Lugs	Ø mm >	–	3.6 mm
	L mm <	–	6.6 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 12 ... 18	–
Stripping length		9 mm	–
Tightening torques		0.8 Nm / 7 lb.in	
Degree of protection acc. to IEC/EN 60947-1 and IEC/EN 60529			
All terminals		IP20	
Screw terminals		(screws of unused terminals must be tightened)	
All terminals		M3	M3.5
Screwdriver type		Flat Ø 5.5 mm / Pozidriv 2	

Accessories

Technical data

Auxiliary contacts for front mounting according to IEC

Types		MARN
Standards		IEC/EN 60947-1, IEC/EN 60947-5-1, IEC/EN 60077-1, IEC/EN 60077-2
Rated operational voltage Ue max		690 V AC, 440 V DC
Rated frequency (without derating)		DC or 50 / 60 Hz
Conventional free-air thermal current Ith θ ≤ 55 °C		10 A
Ie / Rated operational current AC-15	240 V	6 A
	400 V	4 A
	500 V	2.5 A
	690 V	1.5 A
Short-circuit protection device - fuse type gG		10 A
Minimum switching capacity with failure rate acc. to IEC/EN 60947-5-4		17 V / 5 mA
Maximum electrical switching frequency	AC-15	360 cycles/h
	DC-13	360 cycles/h

Auxiliary contacts for front mounting according to UL/CSA

Types	MARN
Standards	UL/CSA 60947-1, UL/CSA 60947-5-1
Max. operational voltage	600 V AC
Pilot duty	A600, Q600

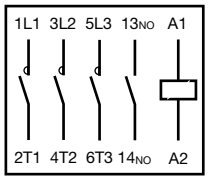
Connection characteristics

Terminals		Screw terminals with cable clamp	Conductors with insulated ring tongue ferrule
Connection capacity			
Auxiliary terminals			
Rigid: solid	1 or 2 x	0.75 ... 2.5 mm²	–
Flexible without ferrule	1 or 2 x	0.75 ... 2.5 mm²	–
Flexible with ferrule	1 x	0.75 ... 2.5 mm²	–
(insulated or not)	2 x	0.75 ... 1.5 mm²	–
Lugs	Ø mm >	–	3.6 mm
	L mm <	–	6.6 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 12 ... 18	–
Stripping length		9 mm	–
Tightening torques		0.8 Nm / 7 lb.in	
Degree of protection acc. to IEC/EN60947-1 and IEC/EN 60529			
Auxiliary terminals		IP20	
Screw terminals		(screws of unused terminals must be tightened)	
All terminals		M3.5	
Screwdriver type		Flat Ø 5.5 mm / Pozidriv 2	

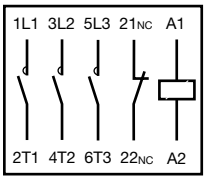
MC..-RAIL 3-pole and 4-pole mini contactors, MCR..-RAIL 4-pole mini contactor relays

Terminal marking and product positioning

MC..-RAIL 3-pole mini contactors

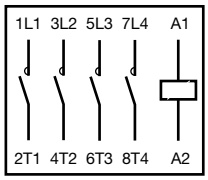


MC..C310A-RAIL

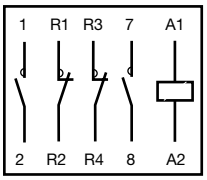


MC..C301A-RAIL

MC..-RAIL 4-pole mini contactors

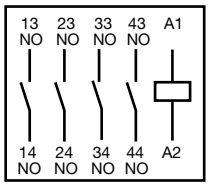


MC..C400A-RAIL

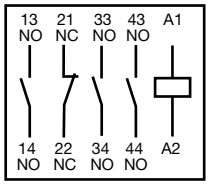


MC..CB00A-RAIL

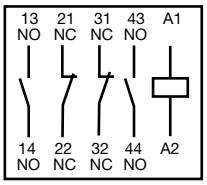
MC..-RAIL 4-pole mini contactor relays



MCRC040A-RAIL



MCRC031A-RAIL



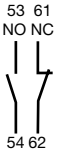
MCRC022A-RAIL

Auxiliary contact blocks for MC1-RAIL and MC2-RAIL mini contactors

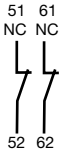
Terminal marking and product positioning

MACN.., MARN.. front mounted 2-pole auxiliary contact block

MARN220A

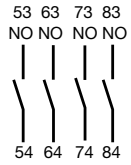


MARN211A

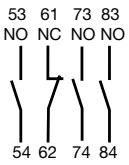


MARN202A

MACN.., MARN.. front mounted 4-pole auxiliary contact block



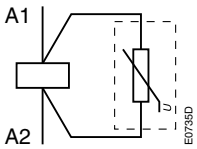
MARN440A



MARN431A

MARN422A

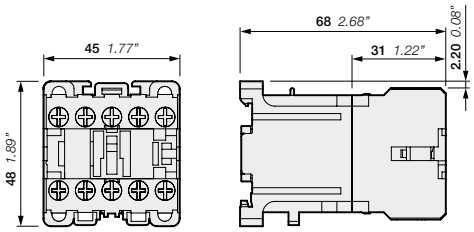
Surge suppressors



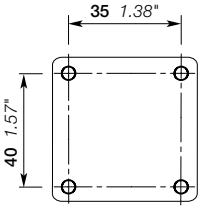
Varistor

MC..-RAIL mini contactors and MCR..-RAIL mini contactor relays - DC operated with specific screw terminals for ring tongue ferrules

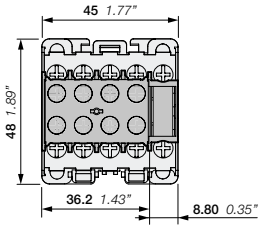
Dimensions

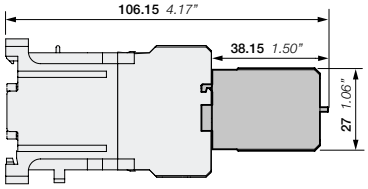


MC1C-RAIL, MC2C-RAIL, MCRC-RAIL, MC1C..R-RAIL, MC2C..R-RAIL, MCRC..R-RAIL

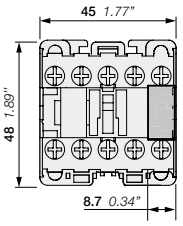


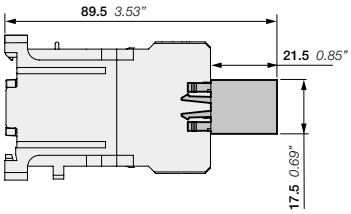
Drilling plan





MC1C-RAIL, MC2C-RAIL, MC1C..R-RAIL, MC2C..R-RAIL,
+ MARN2.. 2-pole auxiliary contact block
MCRC-RAIL, MCRC..R-RAIL
+ MARN..2 and 4-pole auxiliary contact block

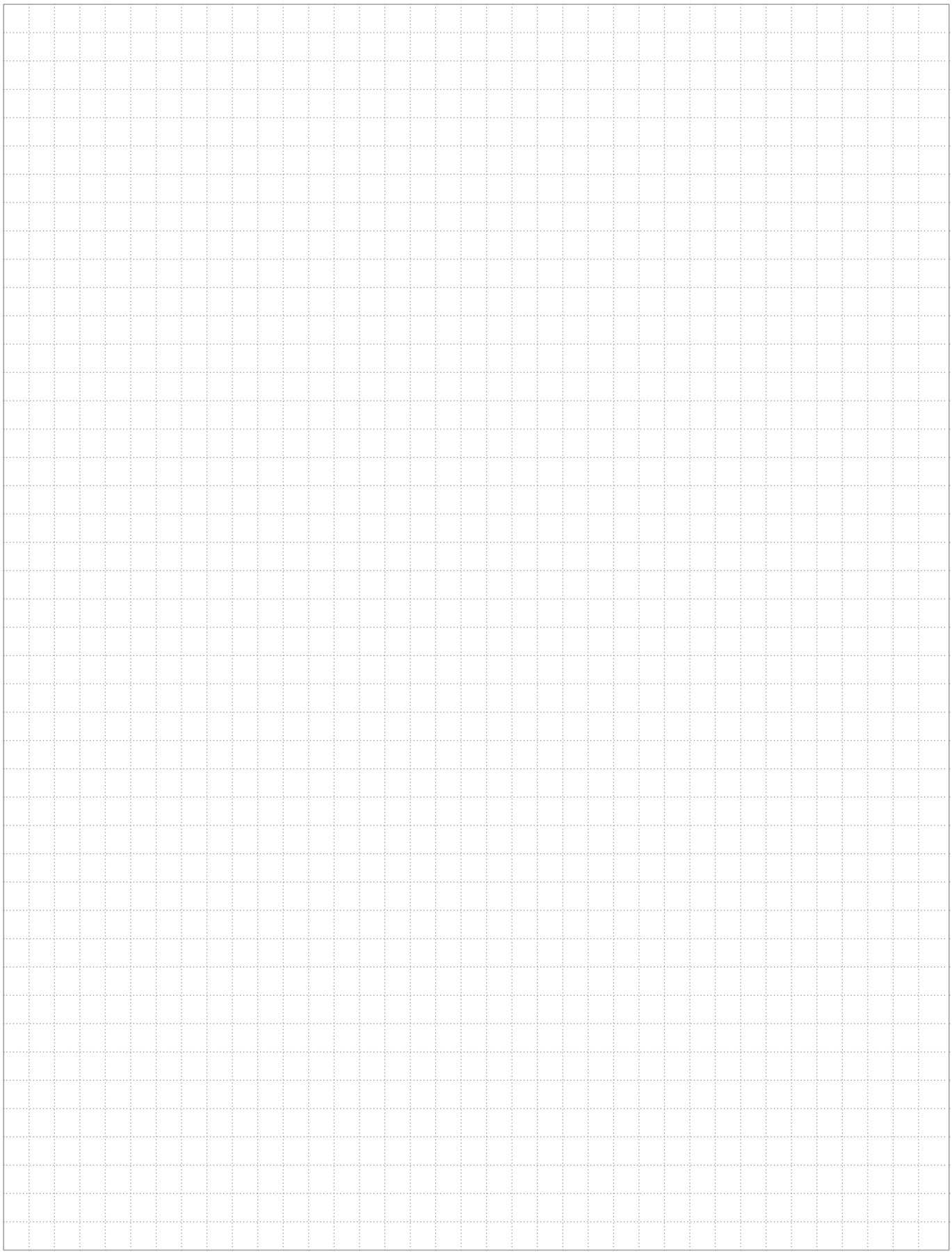




MC1C-RAIL, MC2C-RAIL, MCRC-RAIL, MC1C..R-RAIL, MC2C..R-RAIL,
MCRC..R-RAIL
+MP0A surge suppressor

Main dimensions mm, inches

Notes



Thermal overload relays

6/2 TF42-B thermal overload relays – 0.10 to 38.0 A
6/4 Technical data
6/7 TF65-B thermal overload relays – 22.0 to 67.0 A
6/8 Technical data
6/11 TF96-B thermal overload relays – 40.0 to 96.0 A
6/12 Technical data

For direct product details information, use product type or order code, ex:

www.abb.com/productdetails/**TF42-0.13B**
or
www.abb.com/productdetails/**1SAZ741201R1005**

TF42-B thermal overload relays – 0.10 to 38.0 A

Ordering details

TF42-B

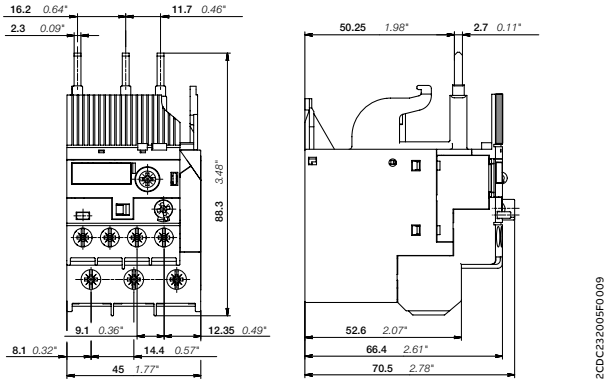
The TF42-B thermal overload relays are economic electromechanical protection devices for the main circuit, complying with the latest railway rolling stock standards and allowing installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds.

They offer a reliable protection for motors in the event of overload or phase failure. The devices have trip class 10.

The thermal overload relays are three pole relays with bimetal tripping elements. The motor current flows through the bimetal tripping elements and heats them directly and indirectly. In case of an overload (over current), the bimetal elements bent as a result of the heating. This leads to a release of the relay and a change of the contacts switching position (95-96 / 97-98).

- Manual or automatic reset selectable
- Phase loss sensitive acc. to IEC/EN 60947-4-1
- TEST and STOP function – Trip indication on the front
- Temperature compensation acc. to IEC/EN 60947-4-1
- Suitable for three- and single-phase applications
- Designed in accordance to the applicable parts of IEC 60077 standard
- Shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- Usable according to European fire and smoke safety standard EN 45545-2
- Can be directly mounted on AF09..B up to AF38..B or can be used in combination with a seperate mounting kit.

Setting range A	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
Suitable for AF09..B ... AF38..B contactors					
0.1 ... 0.13	0.5 A, fuse type T	10	TF42-0.13B	1SAZ741201R1005	0.130
0.13 ... 0.17	1.0 A, fuse type T	10	TF42-0.17B	1SAZ741201R1008	0.130
0.17 ... 0.23	1.0 A, fuse type T	10	TF42-0.23B	1SAZ741201R1009	0.130
0.23 ... 0.31	1.0 A, fuse type T	10	TF42-0.31B	1SAZ741201R1013	0.130
0.31 ... 0.41	2.0 A, fuse type gG	10	TF42-0.41B	1SAZ741201R1014	0.130
0.41 ... 0.55	2.0 A, fuse type gG	10	TF42-0.55B	1SAZ741201R1017	0.130
0.55 ... 0.74	4.0 A, fuse type gG	10	TF42-0.74B	1SAZ741201R1021	0.130
0.74 ... 1.0	6.0 A, fuse type gG	10	TF42-1.0B	1SAZ741201R1023	0.130
1.0 ... 1.3	6.0 A, fuse type gG	10	TF42-1.3B	1SAZ741201R1025	0.130
1.3 ... 1.7	10.0 A, fuse type gG	10	TF42-1.7B	1SAZ741201R1028	0.130
1.7 ... 2.3	10.0 A, fuse type gG	10	TF42-2.3B	1SAZ741201R1031	0.130
2.3 ... 3.1	10.0 A, fuse type gG	10	TF42-3.1B	1SAZ741201R1033	0.130
3.1 ... 4.2	20.0 A, fuse type gG	10	TF42-4.2B	1SAZ741201R1035	0.130
4.2 ... 5.7	20.0 A, fuse type gG	10	TF42-5.7B	1SAZ741201R1038	0.130
5.7 ... 7.6	35.0 A, fuse type gG	10	TF42-7.6B	1SAZ741201R1040	0.130
7.6 ... 10	35.0 A, fuse type gG	10	TF42-10B	1SAZ741201R1043	0.130
10 ... 13	40.0 A, fuse type gG	10	TF42-13B	1SAZ741201R1045	0.130
13 ... 16	40.0 A, fuse type gG	10	TF42-16B	1SAZ741201R1047	0.130
16 ... 20	63.0 A, fuse type gG	10	TF42-20B	1SAZ741201R1049	0.135
20 ... 24	63.0 A, fuse type gG	10	TF42-24B	1SAZ741201R1051	0.145
24 ... 29	63.0 A, fuse type gG	10	TF42-29B	1SAZ741201R1052	0.145
29 ... 35	80.0 A, fuse type gG	10	TF42-35B	1SAZ741201R1053	0.145
35 ... 38	80.0 A, fuse type gG	10	TF42-38B	1SAZ741201R1055	0.145



TF42-B

Main dimensions mm, inches

TF42-B thermal overload relays – 0.10 to 38.0 A

Ordering details - accessories

DB42

TF42-B + DB42

Suitable for	Description	Type	Order code	Weight (1 pce) kg
TF42-B	Single mounting kit	DB42	1SAZ701902R0001	0.087

TF42-B thermal overload relays – 0.10 to 38.0 A
Technical data

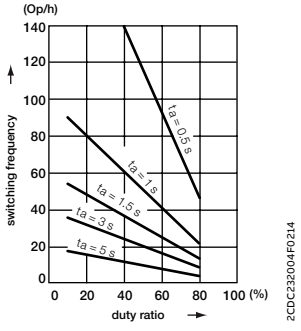
Main circuit – Utilization characteristics according to IEC/EN

Type		**TF42-B**
Standards		IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1, IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), IEC61373
Fire and smoke standards		EN45545-2 (Hazard levels HL2, HL3)
Rated operational voltage Ue		690 V AC, 600 V DC
Rated frequency		DC, 50/60 Hz, 400 Hz
Trip class		10
Number of poles		3
Duty time		100 %
Operating frequency without early tripping		Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty"
Rated impulse withstand voltage Uimp		6 kV
Rated insulation voltage Ui		690 V AC

Auxiliary circuit according to IEC/EN

Type		**TF42-B**
Rated operational voltage Ue		600 V
Conventional free air thermal current Ith	N.C., 95-96	6 A
	N.O., 97-98	4 A
Rated frequency		DC, 50/60 Hz
Number of poles		1 N.O. + 1 N.C.
Ie / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category		
110-120 V	N.C., 95-96	3.00 A
	N.O., 97-98	0.5 A
220-230-240 V	N.C., 95-96	3.00 A
	N.O., 97-98	0.5 A
440 V	N.C., 95-96	0.75 A
	N.O., 97-98	0.5 A
480-500 V	N.C., 95-96	0.75 A
	N.O., 97-98	0.5 A
Ie / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category		
24 V	N.C., 95-96	1.25 A
	N.O., 97-98	1.25 A
110-120-125 V	N.C., 95-96	0.55 A
	N.O., 97-98	0.55 A
250 V	N.C., 95-96	0.27 A
	N.O., 97-98	0.27 A
Minimum switching capacity		17 V / 3 mA
Short-circuit protective device	N.C., 95-96	6 A, fuse type gG
	N.O., 97-98	4 A, fuse type gG
Rated impulse withstand voltage Uimp		6 kV
Rated insulation voltage Ui		690 V

Technical diagram – Intermittent periodic duty



ta: Motor starting time

TF42-B thermal overload relays – 0.10 to 38.0 A

Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	**TF42-B**
Standards	UL 508, CSA 22.2 No. 14
Maximum operational voltage	600 V AC
Trip rating	125 % of FLA
Full load amps (FLA)	See table "Full load amps and short-circuit protective device"
Short-circuit rating RMS symmetrical	See table "Full load amps and short-circuit protective device"
Short-circuit protective device	See table "Full load amps and short-circuit protective device"

Auxiliary circuit according to UL/CSA

Type		**TF42-B**
Contact rating	N.C., 95-96	B600, Q600
	N.O., 97-98	D300, Q600
Conventional thermal current	N.C., 95-96	5 A
	N.O., 97-98	2.5 A

Full load amps and short-circuit protective device

Type	**Full load amps (FLA)**	**Short-circuit protective device**			
		480 / 600 V AC		**480 / 600 V AC**	
		Short-circuit rating RMS symmetrical	**Fuse type**	**Short-circuit rating RMS symmetrical**	**Fuse type**
TF42-0.13B	0.13 A	18 kA	1 A, K5	100 kA	30 A, Class J
TF42-0.17B	0.17 A	18 kA	1 A, K5	100 kA	30 A, Class J
TF42-0.23B	0.23 A	18 kA	1 A, K5	100 kA	30 A, Class J
TF42-0.31B	0.31 A	18 kA	3 A, K5	100 kA	30 A, Class J
TF42-0.41B	0.41 A	18 kA	3 A, K5	100 kA	30 A, Class J
TF42-0.55B	0.55 A	18 kA	3 A, K5	100 kA	30 A, Class J
TF42-0.74B	0.74 A	18 kA	3 A, K5	100 kA	30 A, Class J
TF42-1.0B	1.00 A	18 kA	6 A, K5	100 kA	30 A, Class J
TF42-1.3B	1.30 A	18 kA	6 A, K5	100 kA	30 A, Class J
TF42-1.7B	1.70 A	18 kA	6 A, K5	100 kA	30 A, Class J
TF42-2.3B	2.30 A	18 kA	10 A, K5	100 kA	30 A, Class J
TF42-3.1B	3.10 A	18 kA	10 A, K5	100 kA	30 A, Class J
TF42-4.2B	4.20 A	18 kA	15 A, K5	100 kA	30 A, Class J
TF42-5.7B	5.70 A	18 kA	20 A, K5	100 kA	30 A, Class J
TF42-7.6B	7.60 A	18 kA	25 A, K5	100 kA	30 A, Class J
TF42-10B	10.0 A	18 kA	35 A, K5	100 kA	45 A, Class J
TF42-13B	13.0 A	18 kA	40 A, K5	100 kA	45 A, Class J
TF42-16B	16.0 A	18 kA	60 A, K5	100 kA	45 A, Class J
TF42-20B	20.0 A	18 kA	80 A, K5	100 kA	60 A, Class J
TF42-24B	24.0 A	18 kA	80 A, K5	100 kA	60 A, Class J
TF42-29B	29.0 A	18 kA	100 A, K5	100 kA	100 A, Class J
TF42-35B	35.0 A	18 kA	150 A, K5	100 kA	175 A, Class J
TF42-38B	38.0 A	18 kA	150 A, K5	100 kA	175 A, Class J

TF42-B thermal overload relays – 0.10 to 38.0 A

Technical data

General technical data

Type			**TF42-B**
Pollution degree			3
Phase loss sensitive			Yes
Ambient air temperature			
	Operation	Open - compensated	-25 ... +60 °C
		Open	-25 ... +60 °C
	Storage		-50 ... +80 °C
Ambient air temperature compensation			Acc. to IEC/EN60947-4-1
Maximum operating altitude permissible			2000 m
Shock and vibration withstand acc. to IEC 61373			Category 1, Class B
Resistance to shock acc. to IEC 60068-2-27			25g / 11 ms
Resistance to vibrations acc. to IEC 60068-2-6			5g / 3 ... 150 Hz
Mounting position			Position 1-6 (optional for single mounting)
Mounting			Mount on the contactor and tighten the screws of the main circuit terminals or with single mounting kit on DIN rail (35 mm) or wall mounting
Degree of protection	Housing		IP20
	Main circuit terminals		IP10

Electrical connection

Main circuit

Type			**TF42-B (TF42-0.13 ... TF42-20)**	**TF42-B (TF42-24 ... TF42-38)**
Connecting capacity				
	Rigid	1 x or 2 x	0.75 ... 4 mm²	1.5 ... 2.5 mm² or 2.5 ... 10 mm² (1)
	Flexible with insulated ferrule	1 x or 2 x	0.75 ... 4 mm²	2.5 ... 4 mm² or 4 ... 6 mm² (1)
	Stranded acc. to UL/CSA	1 x or 2 x	AWG 18-10	AWG 14-6
	Flexible acc. to UL/CSA	1 x or 2 x	AWG 18-10	AWG 14-6
Stripping length			12 mm	
Tightening torque			1.5 - 2.5 Nm / 13 ... 22 lb.in	2.5 - 2.7 Nm / 22 lb.in
Recommended screw driver			M4 (Pozidriv 2)	

Auxiliary circuit

Type			**TF42-B**
Connecting capacity			
	Rigid	1 x or 2 x	0.75 ... 4 mm²
	Flexible with ferrule	1 x or 2 x	0.75 ... 2.5 mm²
	Flexible with insulated ferrule	1 x 2 x	0.75 ... 2.5 mm² 0.75 ... 1.5 mm²
	Flexible	1 x or 2 x	0.75 ... 1 mm² or 1 ... 2.5 mm² (1)
	Stranded acc. to UL/CSA	1 x or 2 x	AWG 18-12
	Flexible acc. to UL/CSA	1 x or 2 x	AWG 18-12
Stripping length			9 mm
Tightening torque			1 ... 1.2 Nm / 9 ... 11 lb.in
Recommended screw driver			M3 (Pozidriv 2)

(1) Only connect two different "conductor/wire" cross-sections, if they are within the indicated ranges.

TF65-B thermal overload relays – 22.0 to 67.0 A

Ordering details

TF65-B

DB65

DB65 + TF65-B

The TF65-B thermal overload relays are economic electromechanical protection devices for the main circuit. They offer reliable protection for motors in the event of overload or phase failure. The devices have trip class 10.

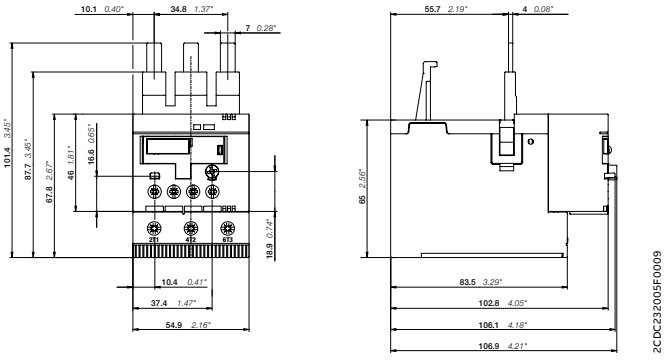
The thermal overload relays are three pole relays with bimetal tripping elements. The motor current flows through the bimetal tripping elements and heats them directly and indirectly. In case of an overload (over current), the bimetal elements bent as a result of the heating. This leads to a release of the relay and a change of the contacts switching position (95-96 / 97-98).

- Manual or automatic reset selectable
- Phase loss sensitive acc. to IEC/EN 60947-4-1
- TEST and STOP function – Trip indication on the front
- Temperature compensation acc. to IEC/EN 60947-4-1
- Suitable for three- and single-phase applications
- Designed in accordance to the applicable parts of IEC 60077 standard
- Shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- Usable according to European fire and smoke safety standard EN 45545-2
- Only usable together with single mounting kit DB65.

Setting range A	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
AF40B ... AF65B contactors					
22.0 ... 28.0	80 A, gG Type Fuses	10	TF65-28B	1SAZ821201R1001	0.372
25.0 ... 33.0	80 A, gG Type Fuses	10	TF65-33B	1SAZ821201R1002	0.372
30.0 ... 40.0	100 A, gG Type Fuses	10	TF65-40B	1SAZ821201R1003	0.372
36.0 ... 47.0	125 A, gG Type Fuses	10	TF65-47B	1SAZ821201R1004	0.372
44.0 ... 53.0	125 A, gG Type Fuses	10	TF65-53B	1SAZ821201R1005	0.372
50.0 ... 60.0	125 A, gG Type Fuses	10	TF65-60B	1SAZ821201R1006	0.382
57.0 ... 67.0	160 A, gG Type Fuses	10	TF65-67B	1SAZ821201R1007	0.382

Ordering details accessories

Description	Suitable for	Type	Order code	Weight (1 pce) kg
Single mounting kit	TF65-B	DB65	1SAZ801901R1001	0.132



TF65-B

Main dimensions mm, inches

TF65-B thermal overload relays – 22.0 to 67.0 A

Technical data

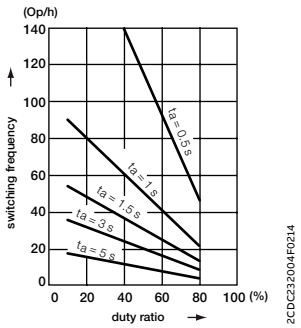
Main circuit – Utilization characteristics according to IEC/EN

Type		**TF65-B**
Standards		IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1, IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), IEC61373 Fire and smoke : EN 45545-2 (Hazard levels HL2)
Rated operational voltage Ue		690 V AC, 440 V DC
Rated frequency		DC, 50/60 Hz
Trip class		10
Number of poles		3
Duty time		100%
Operating frequency without early tripping		Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty"
Rated impulse withstand voltage Uimp		8 kV
Rated insulation voltage Ui		690 V

Auxiliary circuit according to IEC/EN

Type		**TF65-B**
Rated operational voltage Ue		600 V
Conventional free air thermal current Ith	N.C., 95-96	6 A
	N.O., 97-98	4 A
Rated frequency		DC, 50/60 Hz
Number of poles		1 N.O. + 1 N.C.
Ie / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category		
110-120 V	N.C., 95-96	3.00 A
	N.O., 97-98	0.50 A
220-230-240 V	N.C., 95-96	3.00 A
	N.O., 97-98	0.50 A
440 V	N.C., 95-96	0.75 A
	N.O., 97-98	0.50 A
480-500 V	N.C., 95-96	0.75 A
	N.O., 97-98	0.50 A
Ie / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category		
24 V	N.C., 95-96	1.25 A
	N.O., 97-98	1.25 A
110-120-125 V	N.C., 95-96	0.55 A
	N.O., 97-98	0.55 A
250 V	N.C., 95-96	0.27 A
	N.O., 97-98	0.27 A
Minimum switching capacity		12 V / 3 mA
Short-circuit protective device	N.C., 95-96	6 A, gG Type Fuses
	N.O., 97-98	4 A, gG Type Fuses
Rated impulse withstand voltage Uimp		6 kV
Rated insulation voltage Ui		690 V

Technical diagram – Intermittent periodic duty



ta: Motor starting time

TF65-B thermal overload relays – 22.0 to 67.0 A
Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	**TF65-B**
Standards	UL 60947-1, UL 60947-4-1
Maximum operational voltage	600 V AC
Trip rating	125% of FLA
Full load amps (FLA)	See table "Full load amps and short-circuit protective device"
Short-circuit rating RMS symmetrical	See table "Full load amps and short-circuit protective device"
Short-circuit protective device	See table "Full load amps and short-circuit protective device"

Auxiliary circuit according to UL/CSA

Type		**TF65-B**
Contact rating	N.C., 95-96	B600, Q600
	N.O., 97-98	D300, Q600
Conventional thermal current	N.C., 95-96	5 A
	N.O., 97-98	2.5 A

Full load amps and short-circuit protective device

Type	**Full load amps (FLA)**	**Short-circuit protective device**			
		480 / 600 V AC		**480 / 600 V AC**	
		Short-circuit rating RMS symmetrical	**Fuse type**	**Short-circuit rating RMS symmetrical**	**Fuse type**
TF65-28B	28 A	5 kA	100 A, K5 / RK5	100 kA	110 A, Class J
TF65-33B	33 A	5 kA	100 A, K5 / RK5	100 kA	110 A, Class J
TF65-40B	40 A	5 kA	100 A, K5 / RK5	100 kA	110 A, Class J
TF65-47B	47 A	5 kA	125 A, K5 / RK5	100 kA	125 A, Class J
TF65-53B	53 A	10 kA	125 A, K5 / RK5	100 kA	125 A, Class J
TF65-60B	60 A	10 kA	150 A, K5 / RK5	100 kA	150 A, Class J
TF65-67B	67 A	10 kA	150 A, K5 / RK5	100 kA	150 A, Class J

TF65-B thermal overload relays – 22.0 to 67.0 A

Technical data

General technical data

Type			**TF65-B**
Pollution degree			3
Phase loss sensitive			Yes
Ambient air temperature			
Operation	Open - compensated		-40 ... +70 °C
	Open		-40 ... +70 °C
Storage			-50 ... +85 °C
Ambient air temperature compensation			Acc. to IEC/EN 60947-4-1
Maximum operating altitude permissible			2000 m
Shock and vibration withstand acc. to IEC 61373			Category 1, Class B
Resistance to shock acc. to IEC 60068-2-27			25g / 11 ms
Resistance to vibrations acc. to IEC 60068-2-6			5g / 3 ... 150 Hz
Mounting position			Position 1-6 (optional for single mounting)
Mounting			Mount on the contactor and tighten the screws of the main circuit terminals or with single mounting kit on DIN rail (35 mm) or wall mounting
Degree of protection	Housing		IP20
	Main circuit terminals		IP10

Electrical connection

Main circuit

Type			**TF65-B**
Connecting capacity			
Rigid		1 x or 2 x	2.5 ... 16 mm²
		1 x	2.5 ... 35 mm²
Flexible with ferrule		1 x or 2 x	2.5 ... 10 mm²
		1 x	2.5 ... 35 mm²
Flexible with insulated ferrule		1 x or 2 x	2.5 ... 10 mm²
		1 x	2.5 ... 35 mm²
Flexible		1 x or 2 x	2.5 ... 16 mm²
		1 x	2.5 ... 35 mm²
Stranded acc. to UL/CSA		1 x	AWG 12 ... 2
		2 x	AWG 12 ... 6
Flexible acc. to UL/CSA		1 x	AWG 12 ... 2
		2 x	AWG 12 ... 6
Stripping length			17 mm
Tightening torque			4.0 - 4.5 Nm / 35 ... 40 lb.in
Recommended screw driver			M6 (Pozidriv 2)

Auxiliary circuit

Type			**TF65-B**
Connecting capacity			
Rigid		1 x or 2 x	0.75 ... 4 mm²
Flexible with ferrule		1 x or 2 x	0.75 ... 4 mm²
Flexible with insulated ferrule		1 x	0.75 ... 2.5 mm²
		2 x	0.75 ... 1.5 mm²
Flexible		1 x or 2 x	0.75 ... 1 mm² or 1 ... 2.5 mm²
Stranded acc. to UL/CSA		1 x or 2 x	AWG 18 ... 12
Flexible acc. to UL/CSA		1 x or 2 x	AWG 18 ... 12
Stripping length			9 mm
Tightening torque			1 ... 1.2 Nm / 9 ... 11 lb.in
Recommended screw driver			M3 (Pozidriv 2)

TF96-B thermal overload relays – 40.0 to 96.0 A

Ordering details

TF96-B

DB96

DB96 + TF96-B

The TF96-B thermal overload relays are economic electromechanical protection devices for the main circuit. They offer reliable protection for motors in the event of overload or phase failure. The devices have trip class 10.

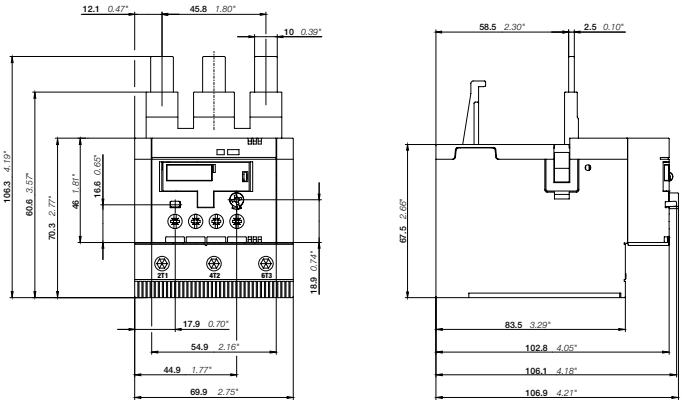
The thermal overload relays are three pole relays with bimetal tripping elements. The motor current flows through the bimetal tripping elements and heats them directly and indirectly. In case of an overload (over current), the bimetal elements bent as a result of the heating. This leads to a release of the relay and a change of the contacts switching position (95-96 / 97-98).

- Manual or automatic reset selectable
- Phase loss sensitive acc. to IEC/EN 60947-4-1
- TEST and STOP function – Trip indication on the front
- Temperature compensation acc. to IEC/EN 60947-4-1
- Suitable for three- and single-phase applications
- Designed in accordance to the applicable parts of IEC 60077 standard
- Shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- Usable according to European fire and smoke safety standard EN 45545-2
- Only usable together with single mounting kit DB96.

Setting range A	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
AF80B, AF96B contactors					
40.0 ... 51.0	125 A, gG Type Fuses	10	TF96-51B	1SAZ921201R1001	0.520
48.0 ... 60.0	160 A, gG Type Fuses	10	TF96-60B	1SAZ921201R1002	0.520
57.0 ... 68.0	160 A, gG Type Fuses	10	TF96-68B	1SAZ921201R1003	0.520
65.0 ... 78.0	200 A, gG Type Fuses	10	TF96-78B	1SAZ921201R1004	0.520
75.0 ... 87.0	200 A, gG Type Fuses	10	TF96-87B	1SAZ921201R1005	0.520
84.0 ... 96.0	250 A, gG Type Fuses	10	TF96-96B	1SAZ921201R1006	0.530

Ordering details accessories

Description	Suitable for	Type	Order code	Weight (1 pce) kg
Single mounting kit	TF96-B	DB96	1SAZ901901R1001	0.190



TF96-B

Main dimensions mm, inches

TF96-B thermal overload relays – 40.0 to 96.0 A
Technical data

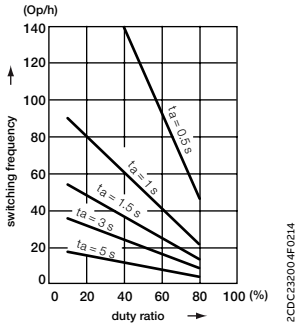
Main circuit – Utilization characteristics according to IEC/EN

Type		**TF96-B**
Standards		IEC/EN 60947-1, IEC/EN 60947-4-1, IEC/EN 60947-5-1, IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), IEC61373 Fire and smoke : EN 45545-2 (Hazard levels HL2)
Rated operational voltage Ue		690 V AC, 440 V DC
Rated frequency		DC, 50/60 Hz
Trip class		10
Number of poles		3
Duty time		100%
Operating frequency without early tripping		Up to 15 operations/h, see "Technical diagram – Intermittent periodic duty"
Rated impulse withstand voltage Uimp		8 kV
Rated insulation voltage Ui		690 V

Auxiliary circuit according to IEC/EN

Type		**TF96-B**
Rated operational voltage Ue		600 V
Conventional free air thermal current Ith	N.C., 95-96	6 A
	N.O., 97-98	4 A
Rated frequency		DC, 50/60 Hz
Number of poles		1 N.O. + 1 N.C.
Ie / Rated operational current AC-15 acc. to IEC/EN 60947-5-1 for utilization category		
110-120 V	N.C., 95-96	3.00 A
	N.O., 97-98	0.50 A
220-230-240 V	N.C., 95-96	3.00 A
	N.O., 97-98	0.50 A
440 V	N.C., 95-96	0.75 A
	N.O., 97-98	0.50 A
480-500 V	N.C., 95-96	0.75 A
	N.O., 97-98	0.50 A
Ie / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category		
24 V	N.C., 95-96	1.25 A
	N.O., 97-98	1.25 A
110-120-125 V	N.C., 95-96	0.55 A
	N.O., 97-98	0.55 A
250 V	N.C., 95-96	0.27 A
	N.O., 97-98	0.27 A
Minimum switching capacity		12 V / 3 mA
Short-circuit protective device	N.C., 95-96	6 A, fuse type gG
	N.O., 97-98	4 A, fuse type gG
Rated impulse withstand voltage Uimp		6 kV
Rated insulation voltage Ui		690 V

Technical diagram – Intermittent periodic duty



ta: Motor starting time

TF96-B thermal overload relays – 40.0 to 96.0 A
Technical data

Main circuit – Utilization characteristics according to UL/CSA

Type	**TF96-B**
Standards	UL 60947-1, UL 60947-4-1
Maximum operational voltage	600 V AC
Trip rating	125% of FLA
Full load amps (FLA)	See table "Full load amps and short-circuit protective device"
Short-circuit rating RMS symmetrical	See table "Full load amps and short-circuit protective device"
Short-circuit protective device	See table "Full load amps and short-circuit protective device"

Auxiliary circuit according to UL/CSA

Type		**TF96-B**
Contact rating	N.C., 95-96	B600, Q600
	N.O., 97-98	D300, Q600
Conventional thermal current	N.C., 95-96	5 A
	N.O., 97-98	2.5 A

Full load amps and short-circuit protective device

Type	**Full load amps (FLA)**	**Short-circuit protective device**			
		480 / 600 V AC		**480 / 600 V AC**	
		Short-circuit rating RMS symmetrical	**Fuse type**	**Short-circuit rating RMS symmetrical**	**Fuse type**
TF96-51B	51 A	5 kA	150 A, K5 / RK5	100 kA	125 A, Class J
TF96-60B	60 A	10 kA	150 A, K5 / RK5	100 kA	150 A, Class J
TF96-68B	68 A	10 kA	150 A, K5 / RK5	100 kA	150 A, Class J
TF96-78B	78 A	10 kA	175 A, K5 / RK5	100 kA	175 A, Class J
TF96-87B	87 A	10 kA	200 A, K5 / RK5	100 kA	200 A, Class J
TF96-96B	96 A	10 kA	250 A, K5 / RK5	100 kA	200 A, Class J

TF96-B thermal overload relays – 40.0 to 96.0 A

Technical data

General technical data

Type			**TF96-B**
Pollution degree			3
Phase loss sensitive			Yes
Ambient air temperature			
Operation (1)	Open - compensated		-40 ... +70 °C
	Open		-40 ... +70 °C
Storage			-50 ... +85 °C
Ambient air temperature compensation			Acc. to IEC/EN60947-4-1
Maximum operating altitude permissible			2000 m
Shock and vibration withstand acc. to IEC 61373			Category 1, Class B
Resistance to shock acc. to IEC 60068-2-27			25g / 11 ms
Resistance to vibrations acc. to IEC 60068-2-6			5g / 3 ... 150 Hz
Mounting position			Position 1-6 (optional for single mounting)
Mounting			Mount on the contactor and tighten the screws of the main circuit terminals or with single mounting kit on DIN rail (35 mm) or wall mounting
Degree of protection	Housing		IP20
	Main circuit terminals		IP10

Electrical connection

Main circuit

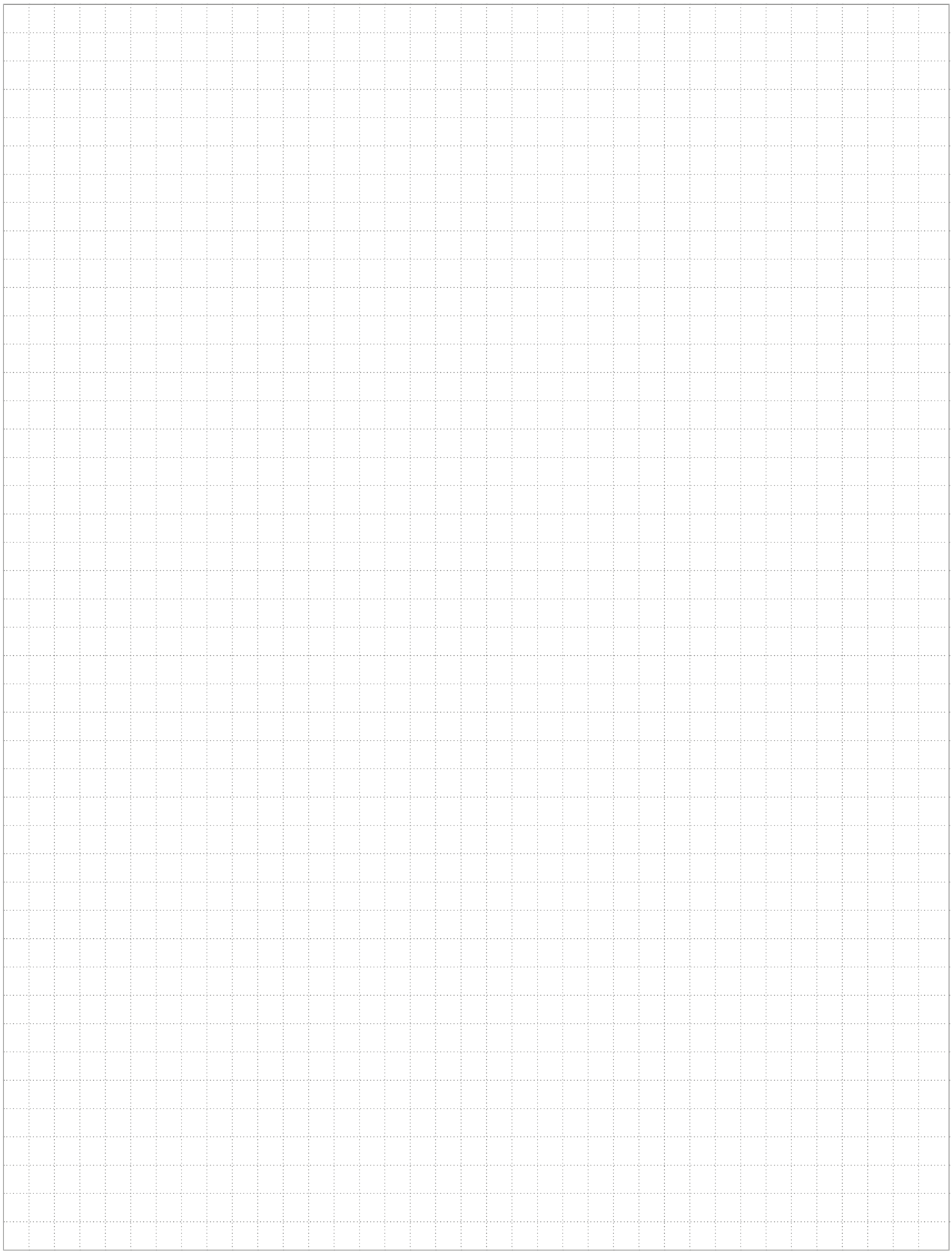
Type			**TF96-B**
Connecting capacity			
	Rigid	1 x or 2 x	6 ... 35 mm²
		1 x	6 ... 50 mm²
	Flexible with ferrule	1 x or 2 x	6 ... 35 mm²
		1 x	6 ... 50 mm²
	Flexible with insulated ferrule	1 x or 2 x	6 ... 16 mm²
		1 x	6 ... 50 mm²
	Flexible	1 x or 2 x	6 ... 35 mm²
		1 x	6 ... 50 mm²
	Stranded acc. to UL/CSA	1 x	AWG 8 ... 1
		2 x	AWG 8 ... 3
	Flexible acc. to UL/CSA	1 x	AWG 8 ... 1
		2 x	AWG 8 ... 3
Stripping length			20 mm (1)
Tightening torque			6 ... 9 Nm / 53 ... 80 lb.in (1)
Recommended screw driver			M8 (Hexagon)

(1) Valid for products, produced from week 27, 2015

Auxiliary circuit

Type			**TF96-B**
Connecting capacity			
	Rigid	1 x or 2 x	0.75 ... 4 mm²
	Flexible with ferrule	1 x or 2 x	0.75 ... 4 mm²
	Flexible with insulated ferrule	1 x	0.75 ... 2.5 mm²
		2 x	0.75 ... 1.5 mm²
	Flexible	1 x or 2 x	0.75 ... 1 mm² or 1 ... 2.5 mm²
	Stranded acc. to UL/CSA	1 x or 2 x	AWG 18 ...12
	Flexible acc. to UL/CSA	1 x or 2 x	AWG 18 ... 12
Stripping length			9 mm
Tightening torque			1 ... 1.2 Nm / 9 ... 11 lb.in
Recommended screw driver			M3 (Pozidriv 2)

Notes



Electronic Relays and Control

7/2 **Rolling Stock**

7/5 **Electrical, mechanical and environmental requirements**

7/6 **Time relays**

7/8 **Single-phase monitoring relays**

7/9 **Single-/multifunctional monitoring relays**

7/10 **Insulation monitoring relays**

7/12 **Building infrastructure**

For direct product details information, use product type or order code, ex:

www.abb.com/productdetails/**CT-MVS.21S**

or

www.abb.com/productdetails/**1SVR730020R0200**

Rolling stock

By developing solutions and products which are innovative, reliable, safe and easy to install, we are consistently meeting the high standard of safety expectations for transportation. We can contribute to the increased efficiency of your equipment and support transport operators throughout the whole life-cycle of the traction chain, i.e. in the areas of service, maintenance, upgrades, and retrofit projects.

Time relays
ABB's time relays are used in railway applications worldwide and have proven their excellent functionality in daily use, even under the toughest conditions. The CT-S range is designed for harsh environments and offers push-in terminals with excellent vibration resistance - perfect for use in rolling stock.

Monitoring relays
The ABB single- and three-phase monitoring relays ensure fault-free, economical operation of machines and systems. Thus, current and voltage monitoring relays for single-phase mains can protect devices, machines and systems against over-/undervoltages or over-/undercurrents and monitor correct functioning. The three-phase monitoring relays of the CM series can monitor the phase voltages, phase sequence and symmetry as well as phase correction, as necessary.

Insulation monitoring relays
The ABB installation monitoring devices maintain the high reliability of an IT system through constant monitoring of the insulation resistance. The insulation monitoring relay detects insulation faults at their inception and signals the non-fulfillment of a minimum value in good time, before an unexpected operational interruption can occur.

SLM
ABB
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ABB

Electrical, mechanical and environmental requirements

The selected products from the Electronic Relays and Controls range fulfill the train construction requirements mentioned on the previous pages. The following table shows which product of the range meets the requirements to which extent.

		EN 50155									
		Voltage supply									
				Interrupts							
				S1	S2	C1	C2				
Order code	Type	Supply from accumulator battery	Supply by a static converter or a rotating set	no interruptions	interruptions of up to 10 ms	0.6 x U_n over 100 ms	0 x U_n over 30 ms	Temperature class	Shock and vibration EN 61373	Altitude class EN 50125-1	Coated PCB Board
Time relays											
1SVR7x0030R3300	CT-MXS.22x	48 V DC	230 V AC / 50 Hz	■	■	■	■	T3 [5]	Cat. 1, Class B	AX max. 2000 m [1]	no
1SVR7x0010R0200	CT-MFS.21x	24-110 V DC		■	■	■	-				
1SVR7x0020R0200	CT-MVS.21x			■	■	■	-				
1SVR7x0100R0300	CT-ERS.21x			■	■	■	-				
1SVR7x0180R0300	CT-APS.21x			■	■	■	-				
1SVR7x0120R3300	CT-ARS.21x			■	■	-	n/a				
Single-phase monitoring relays											
1SVR7x0830R0300	CM-ESS.1x	24-110 V DC	230 V AC / 50 Hz	■	■	■	-	T3 [5]	Cat. 1, Class B	AX max. 2000 m [1]	no
1SVR7x0830R0400	CM-ESS.2x			■	■	■	-				
1SVR7x0840R0200	CM-SRS.11x			■	■	■	-				
1SVR7x0840R0400	CM-SRS.21x			■	■	■	-				
1SVR7x0840R0500	CM-SRS.22x			■	■	■	-				
1SVR7x0840R0700	CM-SRS.M2x			■	■	■	-				
Three-phase monitoring relays											
1SVR7x0020R0200	CM-MPS.21x	n/a [2]	3 x 400 V AC / 50 Hz [4]	■	■	[2]	[2]	T3 [5]	Cat.1, Class B	AX max. 2000 m [1]	no
1SVR7x0884R3300	CM-MPS.41x			■	■	[2]	[2]				
1SVR7x0884R4300	CM-MPS.43x			■	■	[2]	[2]				
1SVR7x0824R9300	CM-PFS.x			■	■	[2]	[2]				
1SVR7x0794R1300	CM-PVS.31x			■	■	[2]	[2]				
1SVR7x0794R3300	CM-PVS.41x			■	■	[2]	[2]				
Insulation monitoring relays											
1SVR7x0660R0100	CM-IWS.1x	24-110 V DC	230 V AC / 50 Hz	■	■	■	■	T3 [5]	Cat. 1, Class B	AX max. 2000 m [1]	no
1SVR7x0670R0200	CM-IWS.2x			■	■	■	■				
1SVR7x0660R0200	CM-IWN.1x			■	■	-	■				
1SVR7x0669R9400	CM-IVN.x	n/a [3]	n/a [3]	n/a [3]	n/a [3]	n/a [3]	n/a [3]				
1SVR7x0660R0200	CM-IWN.1x in comb. with CM-IVN.x	24-110 V DC	230 V AC / 50 Hz	■	■	-	■				
1SVR7x0669R9400											

[1] The insulation measurement of the devices is based on a figure of 2,000 m. The devices can be used in higher altitudes on request.
[2] Only applicable for devices with a DC power supply.
[3] passive device, no supply.
[4] self supplied from the measuring input.
[5] -25...+70 °C

—

Order code and product type

Order code: 1SVR7x.....
x: 3/5 = screw connection
x: 4/6 = Easy connect / push-in connection

Product type: CM-IWN.1x
x: S = screw connection
x: P = Easy connect / push-in connection

Time relays
Ordering details

CT-MVS.21P

CT-ERS.21P

CT-S range - The sophisticated range for harsh environments
For many years, ABB's time relays of the CT range have been used in applications worldwide and have proven their excellent functionality in daily use even under the toughest conditions. The range of time relays provide timing functions for all applications.
All devices are available with two different terminal versions. Choose between screw connection technology (double-chamber cage connection terminals) and the completely tool-free Easy Connect Technology (push-in terminals) with excellent vibration resistance.

- Single-function and multifunction timers
- Devices with:
  - 2 c/o (SPDT) contacts
  - 2nd c/o contact can be selected as instantaneous contact [1)]
  - Remote potentiometer connection [1)]
  - Control input with volt-free or voltage-related triggering e.g. to start timing, pause timing
  - Extended operating temperature range down to -40 °C [1)]
- Seal-able transparent cover for protection against unauthorized changes of time values
- Integrated marker label
- Approvals / Marks:
- Classifications: EN 50155 (applicable parts), IEC 60571 (applicable parts), EN 45545-2

[1)] depending on device

Ordering details

Timing function	Rated control supply voltage	Time ranges	Control input	Outputs	Type *	Order code
Multifunctional	24- 240 V AC/DC	10 (0.05 - 300 h)	■	2 c/o	CT-MVS.21S	1SVR730020R0200
					CT-MVS.21P	1SVR740020R0200
Multifunctional	24-48 V DC, 24-240 V AC	2×10 (0.05 s - 300 h)	■	2 c/o	CT- MXS.22S [2)]	1SVR730030R3300
					CT-MXS.22P [2)]	1SVR740030R3300
Multifunctional	24-240 V AC/DC	10 (0.05 s - 300 h)	□/□	2 c/o	CT-MFS.21S	1SVR730010R0200
					CT-MFS.21P	1SVR740010R0200
ON-delay (accumulative)	24-240 V AC/DC	10 (0.05 s - 300 h)	-	2 c/o	CT-ERS.21S	1SVR730100R0300
					CT-ERS.21P	1SVR740100R0300
OFF-delay	24-240 V AC/DC	10 (0.05 s - 300 h)	■	2 c/o	CT-APS.21S	1SVR730180R0300
					CT-APS.21P	1SVR740180R0300
OFF-delay	24-240 V AC/DC	7 (0.05 s - 10 min)	-	2 c/o	CT-ARS.21S	1SVR730120R3300
					CT-ARS.21P	1SVR740120R3300

[2)] Select function via DIP switches behind the marker label on the front of the unit

* **S**: screw connection
P: push-in / easy connect

	Order number*	1SVR7■0020R0200	1SVR7■0030R3300	1SVR7■0010R0200	1SVR7■0100R0300	1SVR7■0180R0300	1SVR7■0120R3300
	Type*	CT-MVS.21●	CT-MXS.22●	CT-MFS.21●	CT-ERS.21●	CT-APS.21●	CT-ARS.21●
Timing function							
ON-delay	⊠	■		■	■		
ON-delay, accumulative	⊠(+)	■		■			
OFF-delay w. aux. voltage	▬	■		■		■	
OFF-delay w. aux. voltage, accumulative	▬			■			
OFF-delay w/o aux. voltage	▬						■
ON- and OFF-delay, symmetrical	⊠▬	■		■			
ON- and OFF-delay, asymmetrical	1⎍⊠		■				
ON/OFF function	▭	■	■	■			
Impulse-ON	1⎍⊠	■		■			
Impulse-ON, accumulative	1⎍⊠			■			
Impulse-OFF w. aux. voltage	1⎍▬	■		■			
Impulse-OFF w. aux. voltage, accumulative	1⎍▬			■			
Impulse-ON and OFF	⎍⊠ ⎍▬		■				
Flasher starting with ON	⎍⊠			■			
Flasher with reset, starting with ON	⎍⊠			■			
Flasher starting with OFF	⎍▬			■			
Flasher with reset, starting with OFF	⎍▬			■			
Flasher starting with ON or OFF	⎍⊠ ⎍▬	■					
Pulse generator starting with ON or OFF	⎍▀		■				
Single pulse generator	▀1⎍		■				
Pulse former	1⎍	■		■			
Star-delta change-over with impulse	Δ1⎍	■		■			
Features							
Control input, voltage-related triggering		■	■			■	
Control input, volt-free triggering				2			
Remote potentiometer connection		■	2	■			
2nd c/o contact selectable as instantaneous contact		■		■			
Extended temperature range (-40...+60 °C)		■		■	■	■	
Time range							
0.05 s - 10 min							■
0.05 s - 300 h		■	2	■	■	■	
Supply voltage							
24-48 V DC			■				
24-240 V AC			■				
24-240 V AC/DC		■		■	■	■	■
Output							
c/o contact		2	2	2	2	2	2

—

Order number and type
All devices are available either with push-in terminals (P-type) or double-chamber cage connection terminals (S-type).

Terminal	Type	Order number
Push-in	● = P	■ = 4
Screw	● = S	■ = 3

1 2nd contact as an instantaneous contact

2 Preselection of the time range

3 Indication of operational states
U/T: ⎍ control supply voltage applied / ⎍⎍⎍ timing

R/R1/R2: ⎍ Output relay energized

4 Fine adjustment of time delay

5 Preselection of timing function

6 Marker label

Single-phase monitoring relays
Ordering details

2CDC 251 054 V0011

CM-SRS.22S

2CDC 251 060 V0011

CM-ESS.MP

CM-range - Current and voltage monitoring relays
Single-phase voltage and current monitoring relays protect sensitive equipment and control systems against undervoltage (brownout) or undercurrent events or overvoltage or overcurrent events. Different units with adjustable or fixed threshold values (trip points) are available.
All devices are available with two different terminal versions. Choose between screw connection technology (double-chamber cage connection terminals) and the completely tool-free Easy Connect Technology (push-in terminals) with excellent vibration resistance.

- Monitoring of DC and AC currents (3 mA to 15 A)
- Monitoring of DC and AC voltages (3-600 V)
- TRMS measuring principle
- One device includes 3 measuring ranges
- Over- and/or undercurrent/voltage monitoring configurable [1)]
- CM-SRS.M: Latching function configurable
- Hysteresis adjustable (3-30 %) or fixed hysteresis (5 %) [1)]
- Precise adjustment by front-face operating controls
- Latching function configurable [1)]
- Start-up delay T_v adjustable: 0; 0.1 - 30 s [1)]
- Tripping delay T_v adjustable: 0; 0.1 - 30 s [1)]
- 22.5 mm width
- 3 LEDs for status indication
- Approvals / Marks:
- Classifications: EN 50155 (applicable parts), IEC 60571 (applicable parts), EN 45545-2

[1)] depending on device

Overcurrent monitoring
Undercurrent monitoring
Without latching
With latching

Ordering details

Rated control supply voltage	Function configurable	Tripping delay T_v	Outputs	Measuring range	Type *	Order code
24-240 V AC/DC		without	1 c/o (SPDT) contact	3-30 mA 10-100 mA 0.1-1 A	CM-SRS.11S	1SVR730840R0200
					CM-SRS.11P	1SVR740840R0200
24-240 V AC/DC		adjustable 0 or 0.1-30 s	2 c/o (SPDT) contacts		CM-SRS.21S	1SVR730840R0400
					CM-SRS.21P	1SVR740840R0400
24-240 V AC/DC		adjustable 0 or 0.1-30 s	2 c/o (SPDT) contacts	0.3-1.5 A 1-5 A 3-15 A	CM-SRS.22S	1SVR730840R0500
24-240 V AC/DC					CM-SRS.M2S	1SVR730840R0700
24-240 V AC/DC		without	1 c/o (SPDT) contact	3-30 V 6-60 V 30-300 V 60-600 V	CM-ESS.1S	1SVR730830R0300
24-240 V AC/DC					CM-ESS.1P	1SVR740830R0300
24-240 V AC/DC		adjustable 0 or 0.1-30 s	2 c/o (SPDT) contacts	3-30 V 6-60 V 30-300 V 60-600 V	CM-ESS.2S	1SVR730830R0400
24-240 V AC/DC					CM-ESS.2P	1SVR740830R0400

* **S**: screw connection
P: push-in / easy connect

Single-/multifunctional monitoring relays
Ordering details

CM-PFS.P

CM-MPS.43P

CM-range - Three-phase monitoring relays
The reliable and continuous monitoring of three-phase networks guarantees trouble-free and economic operation of machines and installations.
The most multifunctional devices in the ERC assortment are the CM-MPS/N monitoring relays for rated voltage levels up to 820 V AC and 400 Hz. Additionally, a variety of economic and cost-efficient three-phase monitoring relays are offered in this range with specialized functionality.
All devices are available with two different terminal versions. Choose between screw connection technology (double-chamber cage connection terminals) and the completely tool-free Easy Connect Technology (push-in terminals) with excellent vibration resistance.

- Monitoring of three-phase mains for phase sequence, phase failure, phase unbalance over- and undervoltage [1)]
- TRMS measuring principle
- Threshold values are adjustable as absolute values [1)]
- Powered by the measuring circuit
- Precise adjustment by front-face operating controls
- S-range: 22.5 mm / N-range : 45 mm
- 3 LEDs for status indication
- Adjustable ON-delay / OFF-delay times
- Approvals / Marks:
- Classifications: EN 50155 (applicable parts), IEC 60571 (applicable parts), EN 45545-2

[1)] depending on device

- ON-delayed
- OFF-delayed
- Phase sequence monitoring activated
- Phase sequence monitoring deactivated
- Phase sequence correction activated
- Phase sequence correction deactivated
- 2x1 c/o (SPDT) contacts
- 1x2 c/o (SPDT) contacts

Ordering details - single function devices

Rated control supply voltage = measuring voltage	Monitoring function	Outputs	Type*	Order code
3x200-500 V AC (L-L)	Phase sequence, phase failure	2 c/o (SPDT) contacts	CM-PFS.S	1SVR730824R9300
			CM-PFS.P	1SVR740824R9300
3x160-300 V AC (L-L)	Phase sequence, phase failure, over- and undervoltage with adjustable threshold values (Three-phase)	2 x 1 c/o (SPDT) contacts	CM-PVS.31S	1SVR730794R1300
			CM-PVS.31P	1SVR740794R1300
3x300-500 V AC (L-L)			CM-PVS.41S	1SVR730794R3300
			CM-PVS.41P	1SVR740794R3300

Ordering details - multi function devices

Rated control supply voltage = measuring voltage	DIP switch	Monitoring function	Outputs	Neutral monitoring	Type*	Order code
180-280 V AC (L-N)	⊠, ■, ⟳, ⊘	Multifunctional (Phase failure, Phase sequence, overvoltage, undervoltage, Phase unbalance)	2 x 1 c/o (SPDT) contacts	■	CM-MPS.21S	1SVR730885R3300
					CM-MPS.21P	1SVR740885R3300
3x300-500 V AC (L-L)				-	CM-MPS.41S	1SVR730884R3300
					CM-MPS.41P	1SVR740884R3300
3x300-500 V AC (L-L)	⊠, ■, ⟳, ⊘, Ⓐ, Ⓐ̸, 2x1 c/o, 1x2 c/o		2 x 1 or 1 x 2 c/o (SPDT) contacts	-	CM-MPS.43S	1SVR730884R4300
					CM-MPS.43P	1SVR740884R4300

* **S**: screw connection
P: push-in / easy connect

Insulation monitoring relays
Ordering details

CM-IWS.2

CM-range - Monitoring of unearthed supply systems
The high reliability of a system is guaranteed by a continuous monitoring of the resistance between the system and the earth potential. An insulation monitoring of the CM-IWx range recognizes these so-called insulation faults and trips as soon as the measured value of the resistance between the system and earth potential falls below the set threshold. By using an insulation monitoring relay already the first insulation fault will be detected and can be fixed before a second fault occurs and forces the system to switch off.
Choose between screw connection technology (double-chamber cage connection terminals) and the completely tool-free Easy Connect Technology (push-in terminals) with excellent vibration resistance.

- According to IEC/EN 61557-8
- Rated control supply voltage 24 - 240 V AC/DC

CM-IWS
- For monitoring the insulation resistance of unearthed systems: up to U_n = 400 V AC
- Superimposed DC signal
- One measuring range 1–100 kΩ
- Precise adjustment of the threshold value in 1 kΩ steps
- Interrupted wire detection
- Fault storage/latching configurable by control input
- 1 c/o (SPDT) contact, closed-circuit principle

Approvals / Marks:

Classifications:
EN 50155 (applicable parts),
IEC 60571 (applicable parts), EN 45545-2

Ordering details - CM-IWS

Rated control supply voltage = measuring voltage	Nominal voltage U_n of the distribution system to be monitored	System leakage capacitance, max.	Outputs	Adjustment range of the specified response value R_{an} (threshold)	Type	Order code
24-240 V AC/DC	0-250 V AC / 0-300 V DC	10 µF	1 c/o (SPDT) contact	1-100 kΩ	CM-IWS.1S	1SVR730660R0100
					CM-IWS.1P	1SVR740660R0100
24-240 V AC/DC	0-400 V AC	10 µF		1-100 kΩ	CM-IWS.2S	1SVR730670R0200
					CM-IWS.2P	1SVR740670R0200

* **S**: screw connection
P: push-in / easy connect

Insulation monitoring relays
Ordering details

CM-IWN.1

CM-IWN.1

- For monitoring the insulation resistance of unearthed systems up to U_n= 250 V AC and 300 V DC or U_n= 400 V AC and 600 V DC
- Prognostic measuring principle with superimposed square wave signal
- One or two measuring ranges
  - 1-100 kΩ
  - 1-100 kΩ + 2-200 kΩ
- One or two configurable c/o contacts
- Precise adjustment of the measuring value in 1 or 2 kΩ steps
- (Non-volatile) fault storage, configurable latching, interrupted wire protection, open- or closed-circuit principle selectable

Ordering details - CM-IWN

Rated control supply voltage = measuring voltage	Nominal voltage U_n of the distribution system to be monitored	System leakage capacitance, max.	Outputs	Adjustment range of the specified response value R_{an} (threshold)	Type	Order code
24-240 V AC/DC	0-400 V AC / 0-600 V DC Expendable with coupling unit CM-IVN.x	20 µF	2 x 1 or 1 x 2 c/o (SPDT) contacts configurable	1-100 kΩ 2-200 kΩ (activated / de-activated by DIP-switch)	CM-IWN.1S	1SVR750660R0200
					CM-IWN.1P	1SVR760660R0200

Ordering details - Coupling unit expansion for CM-IWN.xS/P

Rated control supply voltage = measuring voltage	Nominal voltage Un of the distribution system to be monitored	Type *	Order code
Passive device, no control supply voltage needed	0-690 V AC / 0-1000 V DC	CM-IVN.S	1SVR750669R9400
		CM-IVN.P	1SVR760669R9400

* **S**: screw connection
  P: push-in / easy connect

Building infrastructure

When it comes to passenger stations and buildings, the key focus areas are energy efficiency, safety and security. We are constantly improving our offering, looking for the most user-friendly solutions and bringing people and technology together.

Universal Motor Controller
The intelligent universal motor controller UMC100.3 combines motor protection and control functions, fieldbus and Ethernet communication, as well as fault diagnosis in just one device. It provides flexible configuration options, detailed operational, diagnostic and service data required by modern predictive maintenance systems.

Primary switch mode supplies
The CP range offers the latest technology in a compact construction of power supplies. Modern power supply units are a vital component in most areas of energy management and automation technology. ABB pays the utmost attention to these areas' requirements.

Interface relays and optocouplers
A reliable voltage conversion between process peripherals and higher-level control systems. The wide variety of pluggable interface relays with standard or logic sockets can be used for switching AC or DC loads and offer a range of different coil voltages and plug-in functional modules.

Customer made motor starting solution

DOL and Reversing starters protected by manual motor starters

8/4 General
8/6 Selection tables
8/10 Wiring diagrams
8/11 Dimensions

DOL and Reversing starters protected by overload relays

8/13 General
8/15 Selection tables
8/17 Switching frequency diagrams
8/18 Wiring diagrams
8/19 Dimensions

For direct product details information, use product type or order code, ex:

www.abb.com/productdetails/**S801S-SCL32-SR**
or
www.abb.com/productdetails/**2CCS801901R0539**

Motor rated operational powers and currents

The currents given below concern standard three-phase four-pole cage motors (1500 r.p.m. at 50 Hz 1800 r.p.m. at 60 Hz). These values are given for guidance and may vary according to the motor manufacturer and depending on the number of poles.

IEC	Motor nominal current: standardized values in grey (according to IEC 60947-4-1 Annex G)									
Motor power	220 V	230 V	240 V	380 V	400 V	415 V	440 V	500 V	660 V	690 V
kW	A	A	A	A	A	A	A	A	A	A
0.06	0.37	**0.35**	0.34	0.21	**0.2**	0.19	0.18	**0.16**	0.13	**0.12**
0.09	0.54	**0.52**	0.50	0.32	**0.3**	0.29	0.26	**0.24**	0.18	**0.17**
0.12	0.73	**0.7**	0.67	0.46	**0.44**	0.42	0.39	**0.32**	0.24	**0.23**
0.18	1	**1**	1	0.63	**0.6**	0.58	0.53	**0.48**	0.37	**0.35**
0.25	1.6	**1.5**	1.4	0.9	**0.85**	0.82	0.74	**0.68**	0.51	**0.49**
0.37	2.0	**1.9**	1.8	1.2	**1.1**	1.1	1	**0.88**	0.67	**0.64**
0.55	2.7	**2.6**	2.5	1.6	**1.5**	1.4	1.3	**1.2**	0.91	**0.87**
0.75	3.5	**3.3**	3.2	2.0	**1.9**	1.8	1.7	**1.5**	1.15	**1.1**
1.1	4.9	**4.7**	4.5	2.8	**2.7**	2.6	2.4	**2.2**	1.7	**1.6**
1.5	6.6	**6.3**	6	3.8	**3.6**	3.5	3.2	**2.9**	2.2	**2.1**
2.2	8.9	**8.5**	8.1	5.2	**4.9**	4.7	4.3	**3.9**	2.9	**2.8**
3	11.8	**11.3**	10.8	6.8	**6.5**	6.3	5.7	**5.2**	4	**3.8**
4	15.7	**15**	14.4	8.9	**8.5**	8.2	7.4	**6.8**	5.1	**4.9**
5.5	20.9	**20**	19.2	12.1	**11.5**	11.1	10.1	**9.2**	7	**6.7**
7.5	28.2	**27**	25.9	16.3	**15.5**	14.9	13.6	**12.4**	9.3	**8.9**
11	39.7	**38**	36.4	23.2	**22**	21.2	19.3	**17.6**	13.4	**12.8**
15	53.3	**51**	48.9	30.5	**29**	28	25.4	**23**	17.8	**17**
18.5	63.8	**61**	58.5	36.8	**35**	33.7	30.7	**28**	22	**21**
22	75.3	**72**	69	43.2	**41**	39.5	35.9	**33**	25.1	**24**
30	100	**96**	92	57.9	**55**	53	48.2	**44**	33.5	**32**
37	120	**115**	110	69	**66**	64	58	**53**	40.8	**39**
45	146	**140**	134	84	**80**	77	70	**64**	49.1	**47**
55	177	**169**	162	102	**97**	93	85	**78**	59.6	**57**
75	240	**230**	220	139	**132**	127	116	**106**	81	**77**
90	291	**278**	266	168	**160**	154	140	**128**	97	**93**
110	355	**340**	326	205	**195**	188	171	**156**	118	**113**
132	418	**400**	383	242	**230**	222	202	**184**	140	**134**
160	509	**487**	467	295	**280**	270	245	**224**	169	**162**
200	637	**609**	584	368	**350**	337	307	**280**	212	**203**
250	782	**748**	717	453	**430**	414	377	**344**	261	**250**
315	983	**940**	901	568	**540**	520	473	**432**	327	**313**
355	1109	**1061**	1017	642	**610**	588	535	**488**	370	**354**
400	1255	**1200**	1150	726	**690**	665	605	**552**	418	**400**
500	1545	**1478**	1416	895	**850**	819	745	**680**	515	**493**
560	1727	**1652**	1583	1000	**950**	916	832	**760**	576	**551**
630	1928	**1844**	1767	1116	**1060**	1022	929	**848**	643	**615**
710	2164	**2070**	1984	1253	**1190**	1147	1043	**952**	721	**690**
800	2446	**2340**	2243	1417	**1346**	1297	1179	**1076**	815	**780**
900	2760	**2640**	2530	1598	**1518**	1463	1330	**1214**	920	**880**
1000	3042	**2910**	2789	1761	**1673**	1613	1466	**1339**	1014	**970**

UL/CSA	Motor nominal current: single and three phase (according to UL 60947-4-1A)									
Motor power	120 V 1-ph	200 V 1-ph	200 V 3-ph	208 V 1-ph	208 V 3-ph	220-240 V 1-ph	220-240 V 3-ph	380-415 V 3-ph	440-480 V 3-ph	550-600 V 3-ph
hp	A	A	A	A	A	A	A	A	A	A
1/10	3	–	–	–	–	1.5	–	–	–	–
1/8	3.8	–	–	–	–	1.9	–	–	–	–
1/6	4.4	2.5	–	2.4	–	2.2	–	–	–	–
1/4	5.8	3.3	–	3.2	–	2.9	–	–	–	–
1/3	7.2	4.1	–	4	–	3.6	–	–	–	–
1/2	9.8	5.6	2.5	5.4	2.4	4.9	2.2	1.3	1.1	0.9
3/4	13.8	7.9	3.7	7.6	3.5	6.9	3.2	1.8	1.6	1.3
1	16	9.2	4.8	8.8	4.6	8	4.2	2.3	2.1	1.7
1-1/2	20	11.5	6.9	11	6.6	10	6	3.3	3	2.4
2	24	13.8	7.8	13.2	7.5	12	6.8	4.3	3.4	2.7
3	34	19.6	11	18.7	10.6	17	9.6	6.1	4.8	3.9
5	56	32.2	17.5	30.8	16.7	28	15.2	9.7	7.6	6.1
7-1/2	80	46	25.3	44	24.2	40	22	14	11	9
10	100	57.5	32.2	55	30.8	50	28	18	14	11
15	135	–	48.3	–	46.2	68	42	27	21	17
20	–	–	62.1	–	59.4	88	54	34	27	22
25	–	–	78.2	–	74.8	110	68	44	34	27
30	–	–	92	–	88	136	80	51	40	32
40	–	–	120	–	114	176	104	66	52	41
50	–	–	150	–	143	216	130	83	65	52
60	–	–	177	–	169	–	154	103	77	62
75	–	–	221	–	211	–	192	128	96	77
100	–	–	285	–	273	–	248	165	124	99
125	–	–	359	–	343	–	312	208	156	125
150	–	–	414	–	396	–	360	240	180	144
200	–	–	552	–	528	–	480	320	240	192
250	–	–	–	–	–	–	604	403	302	242
300	–	–	–	–	–	–	722	482	361	289
350	–	–	–	–	–	–	828	560	414	336
400	–	–	–	–	–	–	954	636	477	382
450	–	–	–	–	–	–	1030	–	515	412
500	–	–	–	–	–	–	1180	786	590	472

Customer assembled motor starting solutions

ABB Expertise

ABB has acquired years of experience with respect to problems of coordination and is able to make a complete offer based on tests performed in its qualified laboratories. This offer covers 400 V AC, 500 V AC, 690 V AC networks.

A complete database of coordination tables, according to IEC 60947-4-1 (EN 60947-4-1), and UL 60947-4-1 between the branch circuit protective device and the motor starter is available on the ABB Website.

In the coordination tables the following short-circuit protection devices are recommended:

- Case circuit-breakers (MCCBs)
- Miniature circuit-breakers (MCBs)
- Switch-disconnector-fuses (aM, gG and BS)
- Manual motor starters (MMS).

Select Optimized Coordination tool (SOC)

Selected Optimized Coordination is a web tool for the selection of ABB products to be used in the following applications:

- Motor starting and protection
- Selectivity between protection devices
- Back-up protection
- Other devices protection.

In order to guarantee the best performance and the longest lifetime, devices involved into the applications mentioned above (short-circuit protection devices, contactors, overload relays, softstarters, ...) need to be coordinated.

- The coordination among devices cannot be determined directly: tests in power laboratories shall be carried out to qualify the coordination type at low fault and high fault currents, according to IEC or UL standards.
- ABB coordination tables are the results of such tests and represent the ABB offerings in terms of motor starting and protection, selectivity, back-up and switch-disconnector protection.
- In Selected Optimized Coordination all available ABB coordination tables are stored and easily accessible.

Website access:

https://www.lowvoltage-tools.abb.com/soc

How to combine assemble and wire starter components

The section "customer assembled motor stating solutions" in this catalog gives the components lists and wiring diagrams to assemble the most typical motor starting solutions.

It covers direct-on-line Starters, reversing starters or star-delta starters protected with manual motor starters or with thermal overload relays for Type I or type II coordination for normal starting time.

Note:

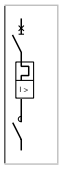
In order to confirm your starter combination ratings according to ABB's lattest coordination test results, or to see other coordination of components please refer to the above mentioned SOC tool. SOC tool get constant updates and additions

General remarks applicable to all tables

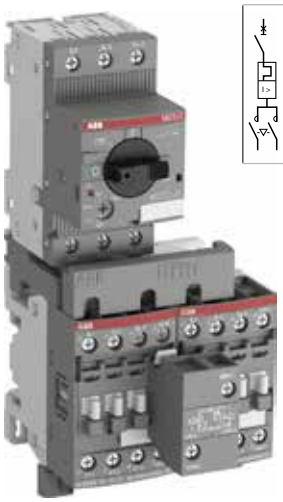
- Each table is defined for a maximum ambient temperature of 40 °C. For higher temperatures, apply a derating factor according to the following rules:
- Fuses: factor of 0.8 applied to In for an ambient temperature of 70 °C
- MCCBs and MCBs: factor of 0.8 applied to In for an ambient temperature of 60 °C
- The starter derating factor depends on the operating conditions of thermal overload relays:
- Factor of 0.9 applied to In for an ambient temperature of 70 °C.
- Each table is defined for motor currents: 3-phase motors, 4-pole
- Normal starting means a starting time < 2 s. - Difficult starting means an accelerating time 10 s < ts < 30 s
- Tripping classes of thermal overload relays according to IEC 60947-4-1 (EN 60947-4-1): 10A and 10
- Tripping classes of electronic overload relays according to IEC 60947-4-1 (EN 60947-4-1): 10E, 20E, 30E selectable
- In the tables with MCCBs, these are fitted with the magnetic relay alone. Setting is always carried out at > 12.3 Ie AC-3 so that the transient current peak occurring during starting does not lead to tripping.

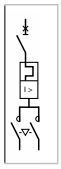
DOL and reversing starters protected by manual motor starters

With AF..B contactors - open type version in kit form



DOL starter
MS132-10B + BEA16-4
+ AF09ZB-30-10

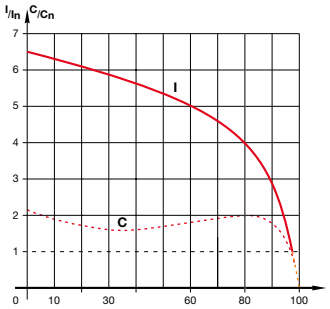




Reversing starter
MS132-10B + BEA16-4 + BER16-4
+ VEM4 + AF09ZB-30-10

Application

Full voltage direct-on-line (DOL) starting and reversing starting for controlling three-phase asynchronous motors is a simple and economic solution characterised by a high starting torque (1.9 to 2.1 times full-speed torque) and a starting current 5.5 to 7 times nominal current.



I = current
C = torque
In = nominal current
Cn = nominal torque

Coordination types

The contactor and the manual motor starter control and protect motors against overload and short-circuits according to coordination types 1 and 2 (IEC 60947-4-1 / EN 60947-4-1) defining the anticipated level of service continuity as follow:

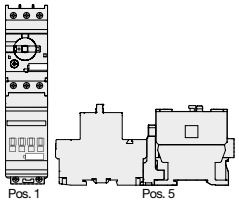
Type 1: In short-circuit conditions, the contactor or starter does not endanger persons or installations and will not be able to then operate without being repaired or having parts replaced.

Type 2: In short-circuit conditions, the contactor or starter does not endanger persons or installations and will be able to operate afterwards. The risk of contacts light welding is acceptable.

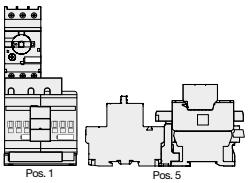
Main Technical Data

Standards		IEC 60947-4-1 / EN 60947-4-1, IEC 60947-2 / EN 60947-2 IEC 60947-5-1 / EN 60947-5-1 IEC 61373 Category 1 Class B Applicable parts of IEC 60077-1/2 and EN 50155
Rated operational voltage Ue max.		690 V - 50/60 Hz
Rated insulation voltage Ui		
acc. to IEC 60947-4-1		690 V
acc. to UL / CSA		600 V
Switching frequency		≤ 15 starts/hour - 80 % max. load factor - with max. 1.5 s starting time ≤ 30 starts/hour - 50 % max. load factor - with max. 1.5 s starting time
Ambient air temperature		
Close to the device	use with MS132-B	≤ 60 °C
Degree of protection		IP20
Fixing		
On rail acc. to	Manual motor starter	on 35 x 7.5 mm or 35 x 15 mm rail
IEC 60715, EN 60715	Contactor	fitted with BEA-..4 connecting link and fixed by: - 2 x M4 screws on the bottom side for direct-on-line starter 1 direction - 2 x M4 screws place diagonally for reversing starter Note: the difference of depth between manual motor starter and contactors must be compensated with the use of washers or spacers (not supplied)
By screws (not supplied)	Manual motor starter	fitted with 2 screw fixing kits FS116 by 2 x M4 screws on the top side
	Contactor	fitted with BEA-..4 connecting link and fixed by : - 2 x M4 screws on the bottom side for direct-on-line starter 1 direction - 2 x M4 screws place diagonally for reversing starter

Mounting positions



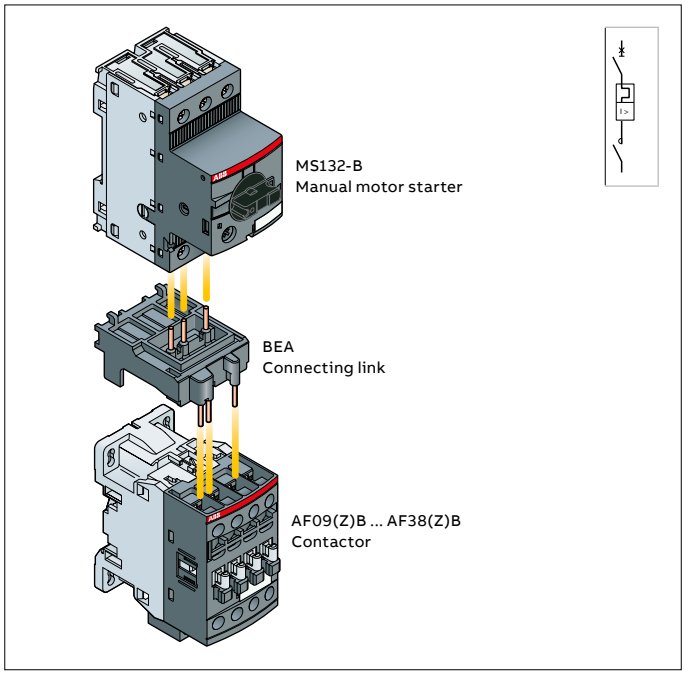
DOL starters



Reversing starters

DOL and reversing starters protected by manual motor starters

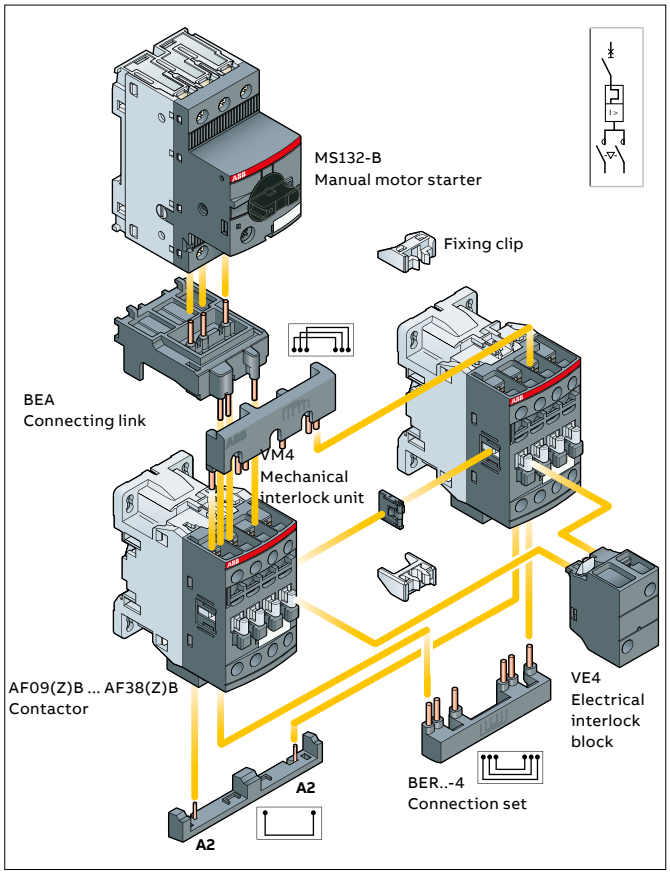
With AF..B contactors - open type version in kit form



Direct-on-line starters

Description

You can easily assemble a direct-on-line starter by using the BEA..-4 connecting link 3-pole insulated. It is used to electrically and mechanically connect MS132-B manual motor starter and AF09(Z)B ... AF38(Z)B contactor, AC or DC operated.



Reversing starters

Description

You can easily assemble reversing starter thanks to our complete range of accessories:

- BEA..-4 connecting link 3-pole insulated: it is used to electrically and mechanically connect MS132-B manual motor starter and AF09(Z)B ... AF38(Z)B contactor, AC or DC operated
- For AF09(Z)B ... AF38(Z)B, use VEM4 mechanical and electrical interlock set for reversing starter in 90 mm width. It includes:
  - VM4 mechanical interlock unit including 2 fixing clips
  - VE4 electrical interlock block with A2-A2 connection.
- BER..-4 connection set: it assures a safe and simple reversing connection between both contactor main terminals.

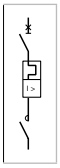
Select now easily and quickly your starter in the following pages for coordination type 1 or 2 at 400 V, 50/60 Hz, Iq = 16 kA or 50 kA up to 15 kW.

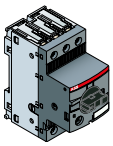
DOL starters protected by MS..B manual motor starters

Coordination type 1

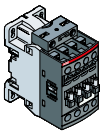
Coordination type 1, AC-3, 16 kA or 50 kA, 400 V, 50/60 Hz

Manual motor starters





Contactors



Accessories

BEA..-4

CA4-10

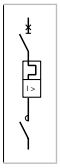
IEC AC-3, 400 V Rated operational power kW	current A	Type	Order code	Current setting range A	Magnetic tripping current A	Supply control voltage Uc (IEC 60077) (1) V DC	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1) V DC	Type	Order code	Allowed setting current A	Type	Order code
0.06	0.2	MS132-0.25B	1SAM350200R1002	0.16...0.25	3.10	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	0.25	BEA16-4	1SBN081306T1000
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.09	0.3	MS132-0.4B	1SAM350200R1003	0.25...0.40	5	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	0.4		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.12	0.44	MS132-0.63B	1SAM350200R1004	0.40...0.63	7.90	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	0.63		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.18	0.6	MS132-0.63B	1SAM350200R1004	0.40...0.63	7.90	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	0.63		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.25	0.85	MS132-1.0B	1SAM350200R1005	0.63...1.00	12.5	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	1		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.37	1.1	MS132-1.6B	1SAM350200R1006	1.00...1.60	20	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	1.6		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.55	1.5	MS132-1.6B	1SAM350200R1006	1.00...1.60	20	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	1.6		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.75	1.9	MS132-2.5B	1SAM350200R1007	1.60...2.50	31.3	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	2.5		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
1.1	2.7	MS132-4.0B	1SAM350200R1008	2.50...4.00	50	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	4		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
1.5	3.6	MS132-4.0B	1SAM350200R1008	2.50...4.00	50	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	4		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
2.2	4.9	MS132-6.3B	1SAM350200R1009	4.00...6.30	78.8	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	6.3		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
3	6.5	MS132-10B	1SAM350200R1010	6.30...10.0	150	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	9		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
4	8.5	MS132-10B	1SAM350200R1010	6.30...10.0	150	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	9		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
5.5	11.5	MS132-12B	1SAM350200R1012	8.00...12.0	180	24, 33, 48	20...60	AF12ZB-30-10-21	1SBL156061R2110	12		
						72, 96, 110	48...130	AF12ZB-30-10-22	1SBL156061R2210			
						220	100...250	AF12ZB-30-10-23	1SBL156061R2310			
7.5	15.5	MS132-16B	1SAM350200R1011	10.0...16.0	240	24, 33, 48	20...60	AF16ZB-30-10-21	1SBL176061R2110	16		
						72, 96, 110	48...130	AF16ZB-30-10-22	1SBL176061R2210			
						220	100...250	AF16ZB-30-10-23	1SBL176061R2310			
11	22	MS132-25B	1SAM350200R1014	20.0...25.0	375	24, 33, 48	20...60	AF26ZB-30-00-21	1SBL236061R2100	25	BEA38-4	1SBN082306T2000
						72, 96, 110	48...130	AF26ZB-30-00-22	1SBL236061R2200		+ CA4-10	1SBN010110R1010
						220	100...250	AF26ZB-30-00-23	1SBL236061R2300			
15	29	MS132-32B	1SAM350200R1015	25.0...32.0	480	24, 33, 48	20...60	AF30ZB-30-00-21	1SBL276061R2100	32		
						72, 96, 110	48...130	AF30ZB-30-00-22	1SBL276061R2200			
						220	100...250	AF30ZB-30-00-23	1SBL276061R2300			

(1) For other control voltages, see "Voltage code table".

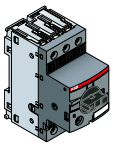
DOL starters protected by MS..B manual motor starters

Coordination type 2

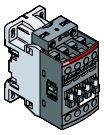
Coordination type 2, AC-3, 16 kA or 50 kA, 400 V, 50/60 Hz



Manual motor starters



Contactors



Accessories

BEA..-4

CA4-10

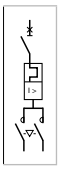
IEC AC-3, 400 V Rated operational power kW	current A	Type	Order code	Current setting range A	Magnetic tripping current A	Supply control voltage Uc (IEC 60077) (1) V DC	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1) V DC	Type (2)	Order code	Allowed setting current A	Type	Order code
0.06	0.2	MS132-0.25B	1SAM350200R1002	0.16...0.25	3.10	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	0.25	BEA16-4	1SBN081306T1000
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.09	0.3	MS132-0.4B	1SAM350200R1003	0.25...0.40	5	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	0.4		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.12	0.44	MS132-0.63B	1SAM350200R1004	0.40...0.63	7.90	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	0.63		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.18	0.6	MS132-0.63B	1SAM350200R1004	0.40...0.63	7.90	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	0.63		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.25	0.85	MS132-1.0B	1SAM350200R1005	0.63...1.00	12.5	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	1		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.37	1.1	MS132-1.6B	1SAM350200R1006	1.00...1.60	20	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	1.6		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.55	1.5	MS132-1.6B	1SAM350200R1006	1.00...1.60	20	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	1.6		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.75	1.9	MS132-2.5B	1SAM350200R1007	1.60...2.50	31.3	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	2.5		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
1.1	2.7	MS132-4.0B	1SAM350200R1008	2.50...4.00	50	24, 33, 48	20...60	AF26ZB-30-00-21	1SBL236061R2100	4	BEA26-4	1SBN082306T1000
						72, 96, 110	48...130	AF26ZB-30-00-22	1SBL236061R2200		+ CA4-10	1SBN010110R1010
						220	100...250	AF26ZB-30-00-23	1SBL236061R2300			
1.5	3.6	MS132-4.0B	1SAM350200R1008	2.50...4.00	50	24, 33, 48	20...60	AF26ZB-30-00-21	1SBL236061R2100	4		
						72, 96, 110	48...130	AF26ZB-30-00-22	1SBL236061R2200			
						220	100...250	AF26ZB-30-00-23	1SBL236061R2300			
2.2	4.9	MS132-6.3B	1SAM350200R1009	4.00...6.30	78.8	24, 33, 48	20...60	AF26ZB-30-00-21	1SBL236061R2100	6.3		
						72, 96, 110	48...130	AF26ZB-30-00-22	1SBL236061R2200			
						220	100...250	AF26ZB-30-00-23	1SBL236061R2300			
3	6.5	MS132-10B	1SAM350200R1010	6.30...10.0	150	24, 33, 48	20...60	AF26ZB-30-00-21	1SBL236061R2100	10		
						72, 96, 110	48...130	AF26ZB-30-00-22	1SBL236061R2200			
						220	100...250	AF26ZB-30-00-23	1SBL236061R2300			
4	8.5	MS132-10B	1SAM350200R1010	6.30...10.0	150	24, 33, 48	20...60	AF26ZB-30-00-21	1SBL236061R2100	10		
						72, 96, 110	48...130	AF26ZB-30-00-22	1SBL236061R2200			
						220	100...250	AF26ZB-30-00-23	1SBL236061R2300			
5.5	11.5	MS132-12B	1SAM350200R1012	8.00...12.0	180	24, 33, 48	20...60	AF26ZB-30-00-21	1SBL236061R2100	12	BEA38-4	1SBN082306T2000
						72, 96, 110	48...130	AF26ZB-30-00-22	1SBL236061R2200		+ CA4-10	1SBN010110R1010
						220	100...250	AF26ZB-30-00-23	1SBL236061R2300			
7.5	15.5	MS132-16B	1SAM350200R1011	10.0...16.0	240	24, 33, 48	20...60	AF30ZB-30-00-21	1SBL276061R2100	16		
						72, 96, 110	48...130	AF30ZB-30-00-22	1SBL276061R2200			
						220	100...250	AF30ZB-30-00-23	1SBL276061R2300			
11	22	MS132-25B	1SAM350200R1014	20.0...25.0	375	24, 33, 48	20...60	AF30ZB-30-00-21	1SBL276061R2100	25		
						72, 96, 110	48...130	AF30ZB-30-00-22	1SBL276061R2200			
						220	100...250	AF30ZB-30-00-23	1SBL276061R2300			
15	29	MS132-32B	1SAM350200R1015	25.0...32.0	480	24, 33, 48	20...60	AF30ZB-30-00-21	1SBL276061R2100	32		
						72, 96, 110	48...130	AF30ZB-30-00-22	1SBL276061R2200			
						220	100...250	AF30ZB-30-00-23	1SBL276061R2300			

(1) For other control voltages, see "Voltage code table".
(2) AF26(Z)B 3-pole contactor can be selected for coordination type 2, 16 kA, 7.5 kW, 400 V - AC-3.

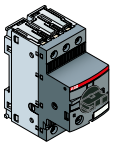
Reversing starters protected by MS..B manual motor starters

Coordination type 1

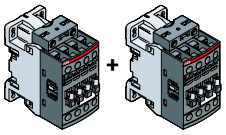
Coordination type 1, AC-3, 16 kA or 50 kA, 400 V, 50/60 Hz



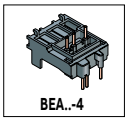
Manual motor starters

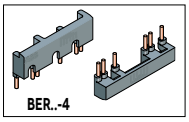


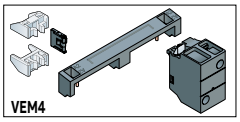
Contactors

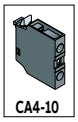


Accessories









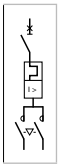
IEC AC-3, 400 V Rated operational power kW	current A	Type	Order code	Current setting range A	Magnetic tripping current A	Supply control voltage Uc (IEC 60077) (1) V DC	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1) V DC	Type	Order code	Allowed setting current A	Type	Order code
0.06	0.2	MS132-0.25B	1SAM350200R1002	0.16...0.25	3.10	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	0.25	BEA16-4	1SBN081306T1000
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210		+ BER16-4	1SBN081311R1000
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310		+ VEM4	1SBN030111R1000
0.09	0.3	MS132-0.4B	1SAM350200R1003	0.25...0.40	5	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	0.4		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.12	0.44	MS132-0.63B	1SAM350200R1004	0.40...0.63	7.90	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	0.63		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.18	0.6	MS132-0.63B	1SAM350200R1004	0.40...0.63	7.90	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	0.63		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.25	0.85	MS132-1.0B	1SAM350200R1005	0.63...1.00	12.5	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	1		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.37	1.1	MS132-1.6B	1SAM350200R1006	1.00...1.60	20	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	1.6		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.55	1.5	MS132-1.6B	1SAM350200R1006	1.00...1.60	20	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	1.6		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.75	1.9	MS132-2.5B	1SAM350200R1007	1.60...2.50	31.3	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	2.5		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
1.1	2.7	MS132-4.0B	1SAM350200R1008	2.50...4.00	50	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	4		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
1.5	3.6	MS132-4.0B	1SAM350200R1008	2.50...4.00	50	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	4		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
2.2	4.9	MS132-6.3B	1SAM350200R1009	4.00...6.30	78.8	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	6.3		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
3	6.5	MS132-10B	1SAM350200R1010	6.30...10.0	150	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	9		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
4	8.5	MS132-10B	1SAM350200R1010	6.30...10.0	150	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	9		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
5.5	11.5	MS132-12B	1SAM350200R1012	8.00...12.0	180	24, 33, 48	20...60	AF12ZB-30-10-21	1SBL156061R2110	12		
						72, 96, 110	48...130	AF12ZB-30-10-22	1SBL156061R2210			
						220	100...250	AF12ZB-30-10-23	1SBL156061R2310			
7.5	15.5	MS132-16B	1SAM350200R1011	10.0...16.0	240	24, 33, 48	20...60	AF16ZB-30-10-21	1SBL176061R2110	16		
						72, 96, 110	48...130	AF16ZB-30-10-22	1SBL176061R2210			
						220	100...250	AF16ZB-30-10-23	1SBL176061R2310			
11	22	MS132-25B	1SAM350200R1014	20.0...25.0	375	24, 33, 48	20...60	AF26ZB-30-00-21	1SBL236061R2100	25	BEA38-4	1SBN082306T2000
						72, 96, 110	48...130	AF26ZB-30-00-22	1SBL236061R2200		+ BER38-4	1SBN082311R1000
						220	100...250	AF26ZB-30-00-23	1SBL236061R2300		+ VEM4	1SBN030111R1000
											+ 2x CA4-10	1SBN010110R1010
15	29	MS132-32B	1SAM350200R1015	25.0...32.0	480	24, 33, 48	20...60	AF30ZB-30-00-21	1SBL276061R2100	32		
						72, 96, 110	48...130	AF30ZB-30-00-22	1SBL276061R2200			
						220	100...250	AF30ZB-30-00-23	1SBL276061R2300			

(1) For other control voltages, see "Voltage code table".

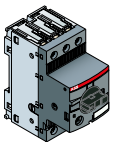
Reversing starters protected by MS..B manual motor starters

Coordination type 2

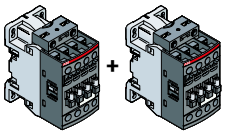
Coordination type 2, AC-3, 16 kA or 50 kA, 400 V, 50/60 Hz



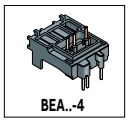
Manual motor starters

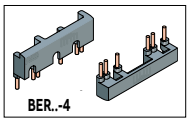


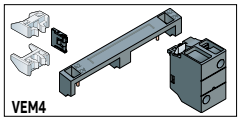
Contactors

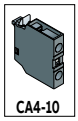


Accessories









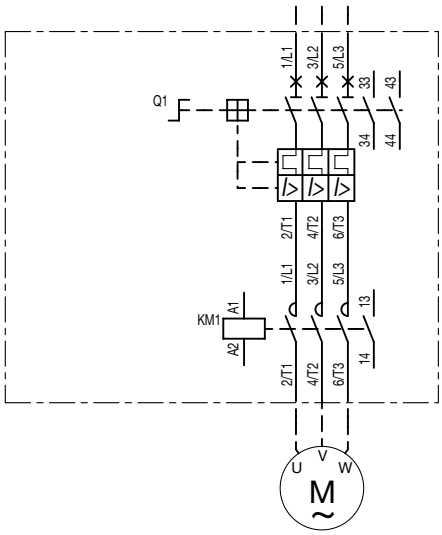
IEC AC-3, 400 V Rated operational power kW	current A	Type	Order code	Current setting range A	Magnetic tripping current A	Supply control voltage Uc (IEC 60077) (1) V DC	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1) V DC	Type (2)	Order code	Allowed setting current A	Type	Order code
0.06	0.2	MS132-0.25B	1SAM350200R1002	0.16...0.25	3.10	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	0.25	BEA16-4	1SBN081306T1000
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210		+ BER16-4	1SBN081311R1000
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310		+ VEM4	1SBN030111R1000
0.09	0.3	MS132-0.4B	1SAM350200R1003	0.25...0.40	5	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	0.4		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.12	0.44	MS132-0.63B	1SAM350200R1004	0.40...0.63	7.90	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	0.63		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.18	0.6	MS132-0.63B	1SAM350200R1004	0.40...0.63	7.90	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	0.63		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.25	0.85	MS132-1.0B	1SAM350200R1005	0.63...1.00	12.5	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	1		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.37	1.1	MS132-1.6B	1SAM350200R1006	1.00...1.60	20	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	1.6		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.55	1.5	MS132-1.6B	1SAM350200R1006	1.00...1.60	20	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	1.6		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
0.75	1.9	MS132-2.5B	1SAM350200R1007	1.60...2.50	31.3	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	2.5		
						72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210			
						220	100...250	AF09ZB-30-10-23	1SBL136061R2310			
1.1	2.7	MS132-4.0B	1SAM350200R1008	2.50...4.00	50	24, 33, 48	20...60	AF26ZB-30-00-21	1SBL236061R2100	4	BEA26-4	1SBN082306T1000
						72, 96, 110	48...130	AF26ZB-30-00-22	1SBL236061R2200		+ BER38-4	1SBN082311R1000
						220	100...250	AF26ZB-30-00-23	1SBL236061R2300		+ VEM4	1SBN030111R1000
1.5	3.6	MS132-4.0B	1SAM350200R1008	2.50...4.00	50	24, 33, 48	20...60	AF26ZB-30-00-21	1SBL236061R2100	4	+ 2x CA4-10	1SBN010110R1010
						72, 96, 110	48...130	AF26ZB-30-00-22	1SBL236061R2200			
						220	100...250	AF26ZB-30-00-23	1SBL236061R2300			
2.2	4.9	MS132-6.3B	1SAM350200R1009	4.00...6.30	78.8	24, 33, 48	20...60	AF26ZB-30-00-21	1SBL236061R2100	6.3		
						72, 96, 110	48...130	AF26ZB-30-00-22	1SBL236061R2200			
						220	100...250	AF26ZB-30-00-23	1SBL236061R2300			
3	6.5	MS132-10B	1SAM350200R1010	6.30...10.0	150	24, 33, 48	20...60	AF26ZB-30-00-21	1SBL236061R2100	10		
						72, 96, 110	48...130	AF26ZB-30-00-22	1SBL236061R2200			
						220	100...250	AF26ZB-30-00-23	1SBL236061R2300			
4	8.5	MS132-10B	1SAM350200R1010	6.30...10.0	150	24, 33, 48	20...60	AF26ZB-30-00-21	1SBL236061R2100	10		
						72, 96, 110	48...130	AF26ZB-30-00-22	1SBL236061R2200			
						220	100...250	AF26ZB-30-00-23	1SBL236061R2300			
5.5	11.5	MS132-12B	1SAM350200R1012	8.00...12.0	180	24, 33, 48	20...60	AF26ZB-30-00-21	1SBL236061R2100	12	BEA38-4	1SBN082306T2000
						72, 96, 110	48...130	AF26ZB-30-00-22	1SBL236061R2200		+ BER38-4	1SBN082311R1000
						220	100...250	AF26ZB-30-00-23	1SBL236061R2300		+ VEM4	1SBN030111R1000
7.5	15.5	MS132-16B	1SAM350200R1011	10.0...16.0	240	24, 33, 48	20...60	AF30ZB-30-00-21	1SBL276061R2100	16	+ 2x CA4-10	1SBN010110R1010
						72, 96, 110	48...130	AF30ZB-30-00-22	1SBL276061R2200			
						220	100...250	AF30ZB-30-00-23	1SBL276061R2300			
11	22	MS132-25B	1SAM350200R1014	20.0...25.0	375	24, 33, 48	20...60	AF30ZB-30-00-21	1SBL276061R2100	25		
						72, 96, 110	48...130	AF30ZB-30-00-22	1SBL276061R2200			
						220	100...250	AF30ZB-30-00-23	1SBL276061R2300			
15	29	MS132-32B	1SAM350200R1015	25.0...32.0	480	24, 33, 48	20...60	AF30ZB-30-00-21	1SBL276061R2100	32		
						72, 96, 110	48...130	AF30ZB-30-00-22	1SBL276061R2200			
						220	100...250	AF30ZB-30-00-23	1SBL276061R2300			

(1) For other control voltages, see "Voltage code table".
(2) AF26ZB 3-pole contactor can be selected for coordination type 2, 16 kA, 7.5 kW, 400 V - AC-3.

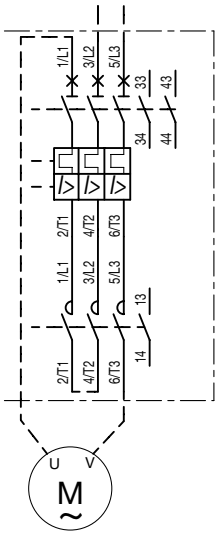
DOL and reversing starters protected by manual motor starters
With AF..B contactors - open type version in kit form
Wiring diagrams

Direct-on-line starters

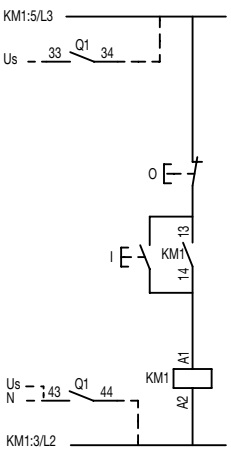
Power circuit



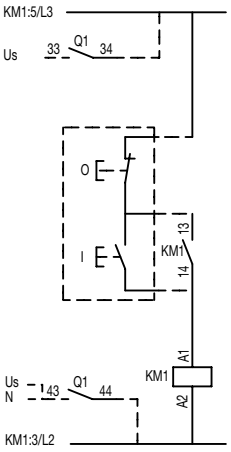
1-phase



AC or DC local control

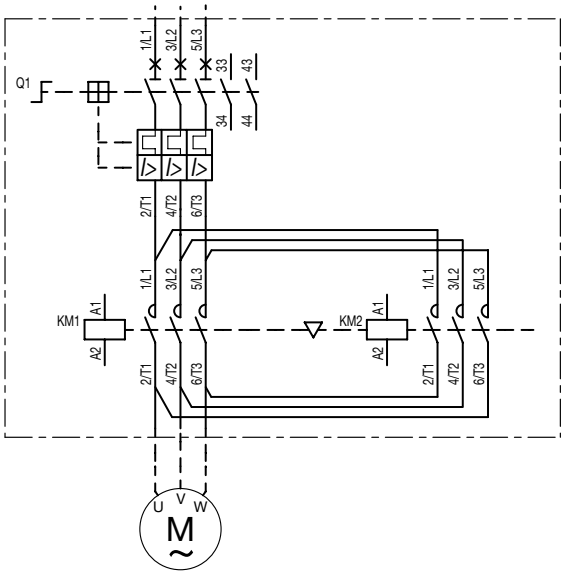


AC or DC remote control

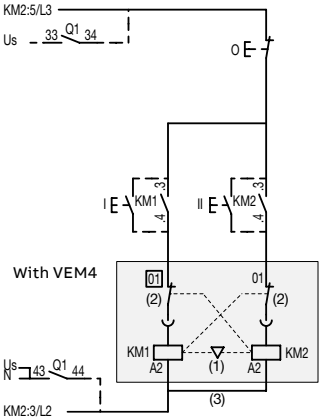


Reversing starters

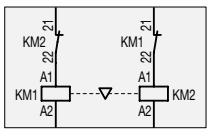
Power circuit



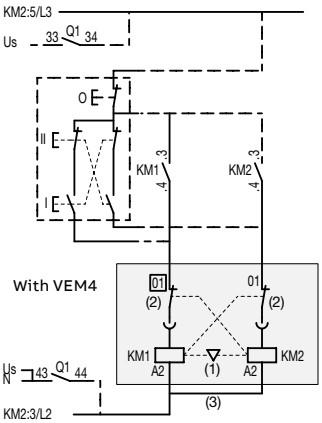
AC or DC local control



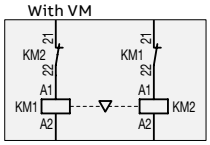
With VM



AC or DC remote control



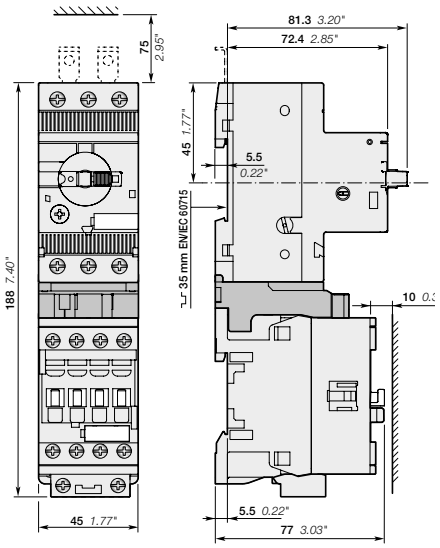
With VM



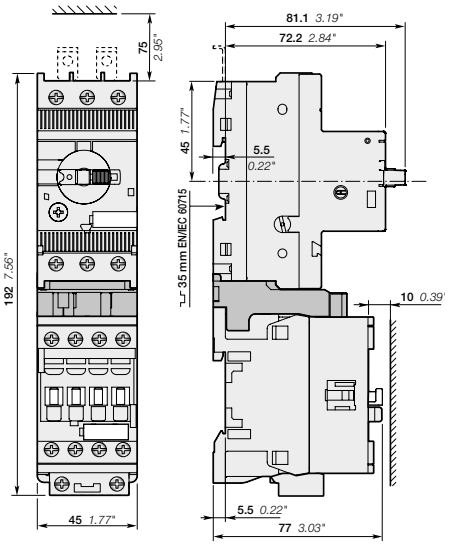
Note: - VEM4 = VM4 (1) + VE4 (2) with A2-A2 (3) connection.

DOL starters protected by M132-B manual motor starters

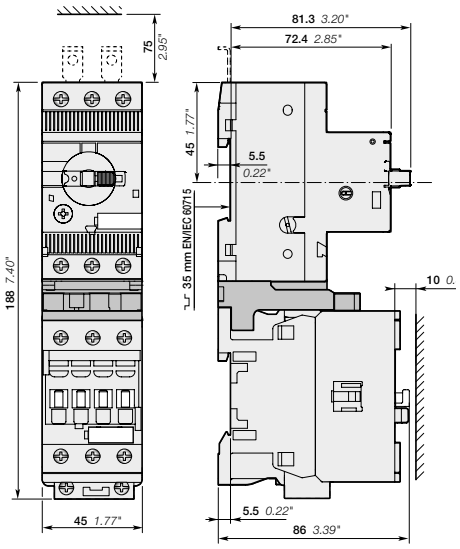
With AF..B contactors - open type version in kit form



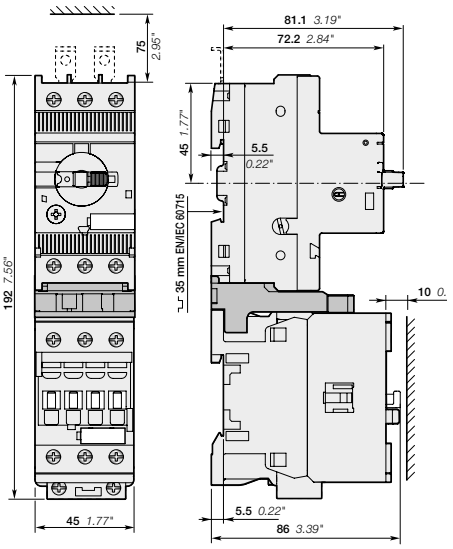
MS132-0.16B ... MS132-10B (+FS116)
+ BEA16-4
+ AF09(Z)B, AF12(Z)B, AF16(Z)B



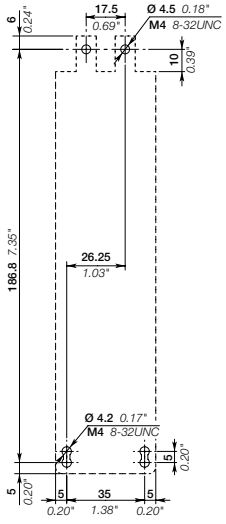
MS132-12B ... MS132-25B (+FS116)
+ BEA16-4
+ AF09(Z)B, AF12(Z)B, AF16(Z)B



MS132-0.16B ... MS132-10B (+FS116)
+ BEA26-4
+ AF26(Z)B, AF30(Z)B, AF38(Z)B



MS132-12B ... MS132-32B (+FS116)
+ BEA38-4
+ AF26(Z)B, AF30(Z)B, AF38(Z)B

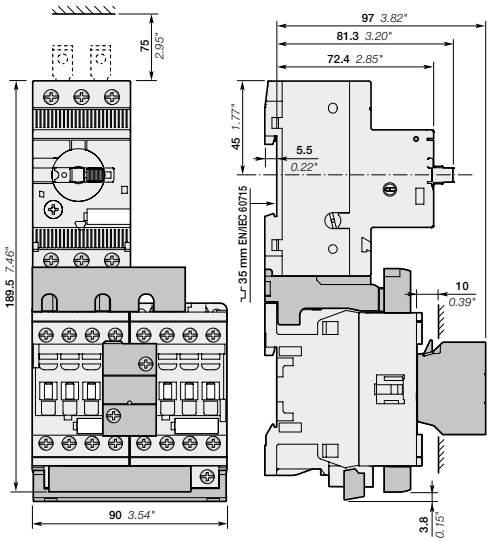


Note: contactor lateral distance to grounded component 2 mm 0.08" min.
When MS132-B is fixed on 35 mm rail, contactor must be fixed by screws according to drilling plan.

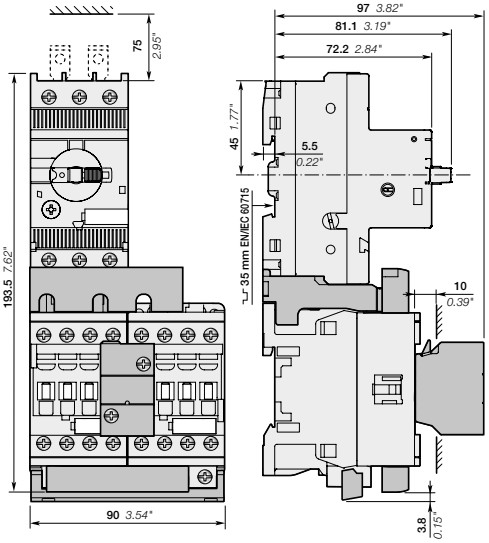
Main dimensions mm, inches

Reversing starters protected by M132-B manual motor starters

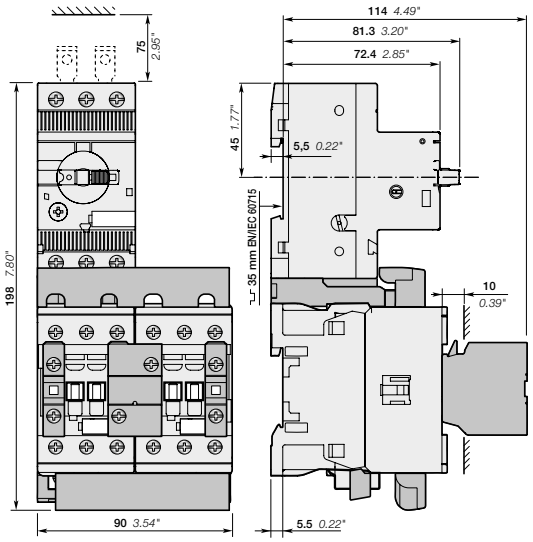
With AF..B contactors - open type version in kit form



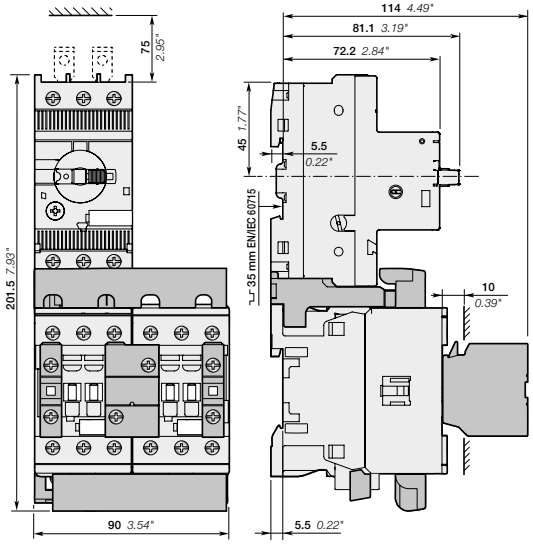
MS132-0.16B ... MS132-10B (+FS116)
+ BEA16-4, BER16-4, VEM4
+ AF09(Z)B, AF12(Z)B, AF16(Z)B

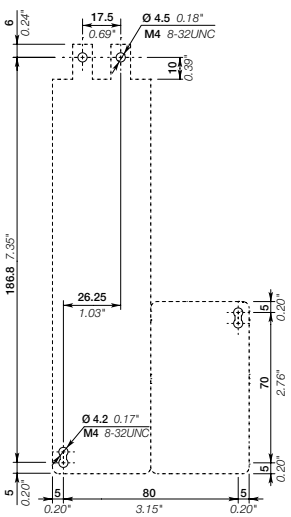


MS132-12B ... MS132-25B (+FS116)
+ BEA16-4, BER16-4, VEM4
+ AF09(Z)B, AF12(Z)B, AF16(Z)B



MS132-0.16B ... MS132-10B (+FS116)
+ BEA26-4, BER38-4, VEM4, CA4-10
+ AF26(Z)B, AF30(Z)B, AF38(Z)B





MS132-12B ... MS132-32B (+FS116)
+ BEA38-4, BER38-4, VEM4, CA4-10
+ AF26(Z)B, AF30(Z)B, AF38(Z)B

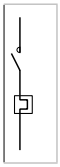
Note: contactor lateral distance to grounded component 2 mm 0.08" min.
When MS132-B is fixed on 35 mm rail, contactor must be fixed by screws according to drilling plan.

Main dimensions mm, inches

DOL and reversing starters protected by overload relays

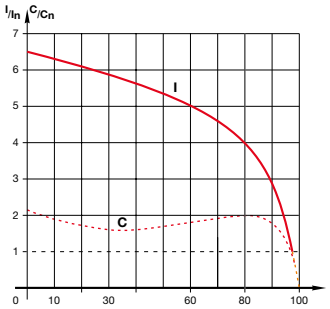
With AF..B contactors - Open type version in kit form

AF09ZB-30-10 + TF42-B



Application

Full voltage direct-on-line and reversing starting for controlling three-phase asynchronous motors is a simple and economic solution characterised by a high starting torque (1.9 to 2.1 times full-speed torque) and a starting current 5.5 to 7 times nominal current.



I = current
C = torque
In = nominal current
Cn = nominal torque

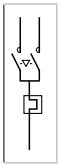
Coordination Types

The contactor, the short-circuit protection device and the thermal overload relay control and protect motors against overload and short-circuits according to coordination types 1 and 2 (IEC 60947-4-1 / EN 60947-4-1) defining the anticipated level of service continuity as follow:

Type 1: In short-circuit conditions, the contactor or starter does not endanger persons or installations and will not be able to then operate without being repaired or having parts replaced.

Type 2: In short-circuit conditions, the contactor or starter does not endanger persons or installations and will be able to operate afterwards. The risk of contacts light welding is acceptable.

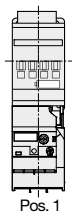
AF09ZB-30-10 + BER16-4 + VEM4 + TF42-B



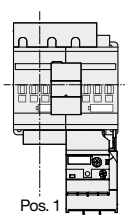
Main Technical Data

Standards		IEC 60947-4-1 / EN 60947-4-1 IEC 60947-5-1 / EN 60947-5-1 IEC 61373 Category 1 Class B Applicable parts of IEC 60077-1/2 and EN 50155
Rated operational voltage Ue max.		690 V - 50/60 Hz
Rated insulation voltage Ui		
acc. to IEC 60947-4-1		690 V
acc. to UL / CSA		600 V
Ambient air temperature		
Close to the device use with TF42-B (acc. to IEC 60947-1)		≤ 60 °C (TF42-B: 38 A above ≤ 50 °C)
Degree of protection		IP20
Switching frequency		Refer to "Switching frequency diagrams" page
Fixing		
On rail acc. to	Contactor	on 35 x 7.5 mm or 35 x 15 mm rail
IEC 60715, EN 60715	Overload relay	fitted on contactor or on separate assembling with DB42 single mounting kit
By screws (not supplied)	Contactor	2 x M4 screws placed diagonally
	Overload relay	fitted on contactor or on separate assembling with DB42 single mounting kit

Mounting positions



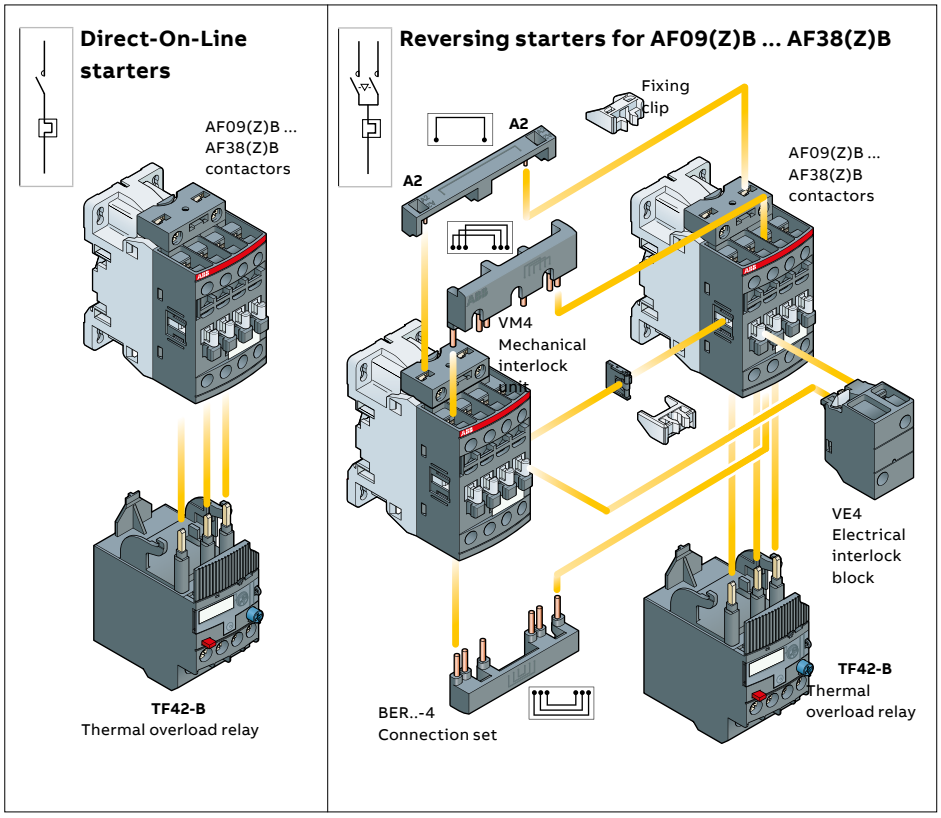
Direct-on-line



Reversing

DOL and reversing starters protected by overload relays

With AF..B contactors - Open type version in kit form



Description

You can easily assemble a direct-on-line starter by connecting AF..B contactor and TF42-B thermal overload relay.

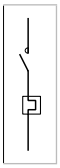
You can also easily assemble reversing starter thanks to our complete range of accessories:

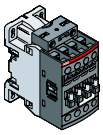
- For AF09(Z)B ... AF38(Z)B, use VEM4 mechanical and electrical interlock set for reversing starter in 90 mm width.
  It includes:
  - VM4 mechanical interlock unit including 2 fixing clips
  - VE4 electrical interlock block with A2-A2 connection.
- BER..-4 connection set: it assures a safe and simple reversing connection between both contactor main terminals.

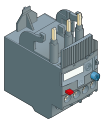
Select now easily and quickly your starter in the following pages at 400 V, up to 18.5 kW.

Direct-on-line starters protected by thermal overload relays

With AF..B contactors - Open type version in kit form





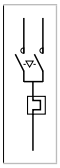


Contactors						Thermal overload relays			Accessories
IEC AC-3, 400 V Rated power	Rated current	Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Type	Order code	Setting ranges	Type	Order code	
kW	A	V DC	V DC			A			
4	8.5	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	7.60...10.0	TF42-10B	1SAZ741201R1043	
		72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210				
		220	100...250	AF09ZB-30-10-23	1SBL136061R2310				
5.5	11.5	24, 33, 48	20...60	AF12ZB-30-10-21	1SBL156061R2110	10.0...13.0	TF42-13B	1SAZ741201R1045	
		72, 96, 110	48...130	AF12ZB-30-10-22	1SBL156061R2210				
		220	100...250	AF12ZB-30-10-23	1SBL156061R2310				
7.5	15.5	24, 33, 48	20...60	AF16ZB-30-10-21	1SBL176061R2110	13.0...16.0	TF42-16B	1SAZ741201R1047	
		72, 96, 110	48...130	AF16ZB-30-10-22	1SBL176061R2210				
		220	100...250	AF16ZB-30-10-23	1SBL176061R2310				
11	22	24, 33, 48	20...60	AF26ZB-30-00-21	1SBL236061R2100	20.0...24.0	TF42-24B	1SAZ741201R1051	
		72, 96, 110	48...130	AF26ZB-30-00-22	1SBL236061R2200				
		220	100...250	AF26ZB-30-00-23	1SBL236061R2300				
15	29	24, 33, 48	20...60	AF30ZB-30-00-21	1SBL276061R2100	29.0...35.0	TF42-35B	1SAZ741201R1053	
		72, 96, 110	48...130	AF30ZB-30-00-22	1SBL276061R2200				
		220	100...250	AF30ZB-30-00-23	1SBL276061R2300				
18.5	35	24, 33, 48	20...60	AF38ZB-30-00-21	1SBL296061R2100	35.0...38.0/40.0	TF42-38B	1SAZ741201R1055	
		72, 96, 110	48...130	AF38ZB-30-00-22	1SBL296061R2200				
		220	100...250	AF38ZB-30-00-23	1SBL296061R2300				

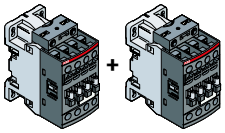
(1) For other control voltages, see "Voltage code table".

Reversing starters protected by thermal overload relays

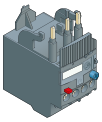
With AF..B contactors - Open type version in kit form



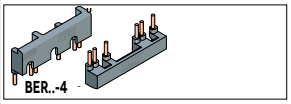
Contactors

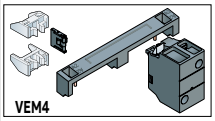


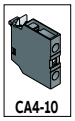
Thermal overload relays



Accessories







IEC AC-3, 400 V Rated power	Rated current	Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Type	Order code	Setting ranges	Type	Order code		Type	Order code
kW	A	V DC	V DC			A					
4	8.5	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	7.60...10.0	TF42-10B	1SAZ741201R1043		BER16-4 + VEM4	1SBN081311R1000 1SBN030111R1000
		72, 96, 110	48...130	AF09ZB-30-10-22	1SBL136061R2210						
		220	100...250	AF09ZB-30-10-23	1SBL136061R2310						
5.5	11.5	24, 33, 48	20...60	AF12ZB-30-10-21	1SBL156061R2110	10.0...13.0	TF42-13B	1SAZ741201R1045			
		72, 96, 110	48...130	AF12ZB-30-10-22	1SBL156061R2210						
		220	100...250	AF12ZB-30-10-23	1SBL156061R2310						
7.5	15.5	24, 33, 48	20...60	AF16ZB-30-10-21	1SBL176061R2110	13.0...16.0	TF42-16B	1SAZ741201R1047			
		72, 96, 110	48...130	AF16ZB-30-10-22	1SBL176061R2210						
		220	100...250	AF16ZB-30-10-23	1SBL176061R2310						
11	22	24, 33, 48	20...60	AF26ZB-30-00-21	1SBL236061R2100	20.0...24.0	TF42-24B	1SAZ741201R1051		BER38-4 + VEM4 + 2xCA4-10	1SBN082311R1000 1SBN030111R1000 1SBN010110R1010
		72, 96, 110	48...130	AF26ZB-30-00-22	1SBL236061R2200						
		220	100...250	AF26ZB-30-00-23	1SBL236061R2300						
15	29	24, 33, 48	20...60	AF30ZB-30-00-21	1SBL276061R2100	29.0...35.0	TF42-35B	1SAZ741201R1053			
		72, 96, 110	48...130	AF30ZB-30-00-22	1SBL276061R2200						
		220	100...250	AF30ZB-30-00-23	1SBL276061R2300						
18.5	35	24, 33, 48	20...60	AF38ZB-30-00-21	1SBL296061R2100	35.0...38.0/40.0	TF42-38B	1SAZ741201R1055			
		72, 96, 110	48...130	AF38ZB-30-00-22	1SBL296061R2200						
		220	100...250	AF38ZB-30-00-23	1SBL296061R2300						

(1) For other control voltages, see "Voltage code table".

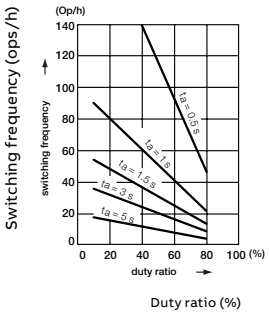
DOL and reversing starters protected by overload relays
With AF..B contactors - Open type version in kit form
Switching frequency diagrams

General

Overload relays cannot be operated at any arbitrary switching frequency in order to avoid tripping. Applications involving up to 15 operations per hour are acceptable. Higher switching frequencies are permitted if the duty ratio and the motor starting time are allowed for and if the motor's making current does not appreciably exceed 6 times the rated operating current. Please refer to the adjacent diagram for guideline values for the permitted switching frequency.

Thermal overload relay

Intermittent periodic duty



ta: motor starting time

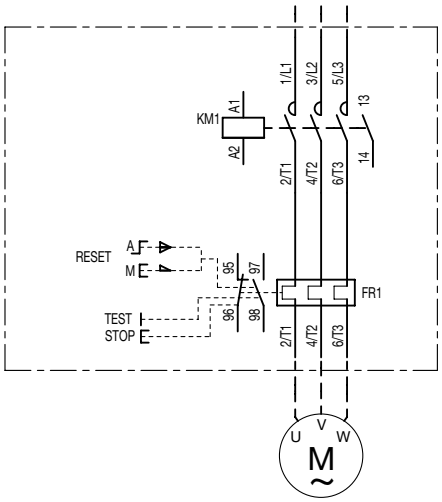
Example:

Starting time of the motor: 1 second - Duty ratio: 40 % means a permitted switching frequency of max. 60 operating cycles per hour.

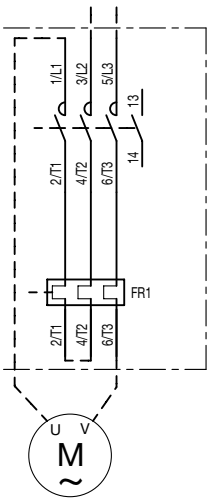
DOL and reversing starters protected by overload relays
With AF..B contactors - Open type version in kit form
Wiring diagrams

Direct-on-line starters

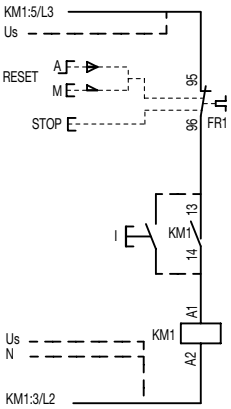
Power circuit



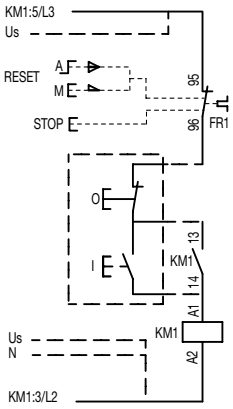
1-phase



AC or DC local control

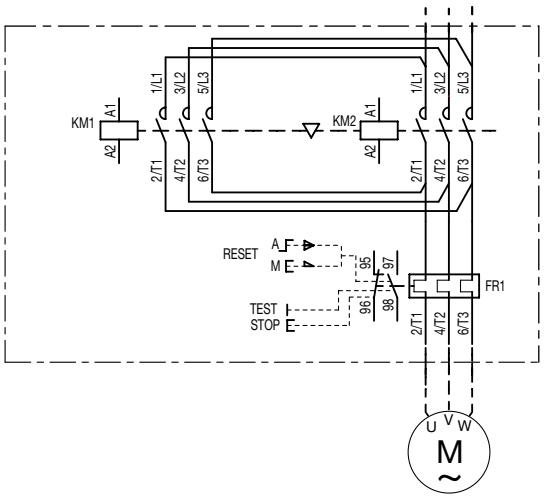


AC or DC remote control

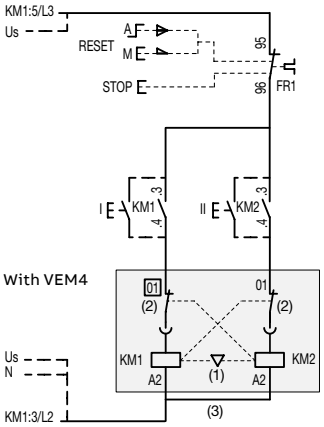


Reversing starters

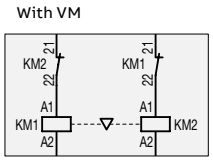
Power circuit



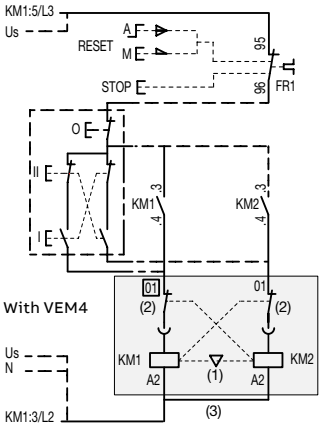
AC or DC local control



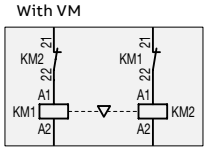
With VM



AC or DC remote control



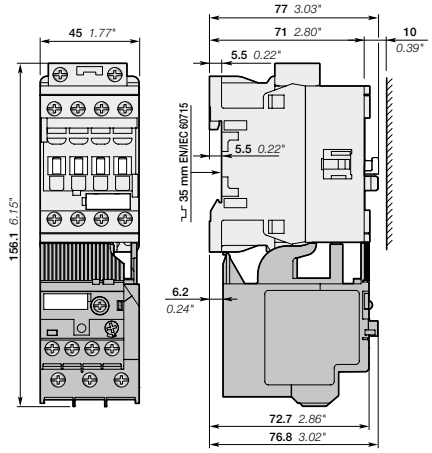
With VM



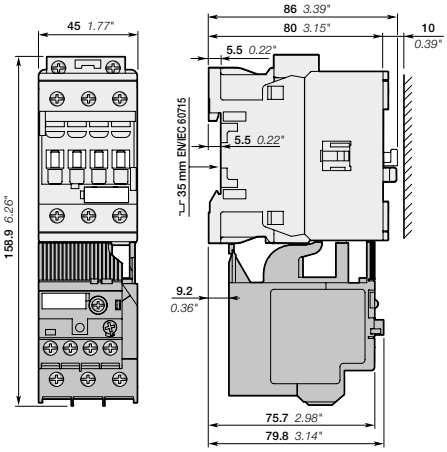
Note: - VEM4 = VM4 (1) + VE4 (2) with A2-A2 (3) connection.

DOL starters protected by thermal overload relays

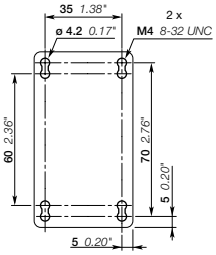
With AF..B contactors - open type version in kit form



AF09(Z)B, AF12(Z)B, AF16(Z)B
+ TF42-B thermal overload relay



AF26(Z)B, AF30(Z)B, AF38(Z)B
+ TF42-B thermal overload relay

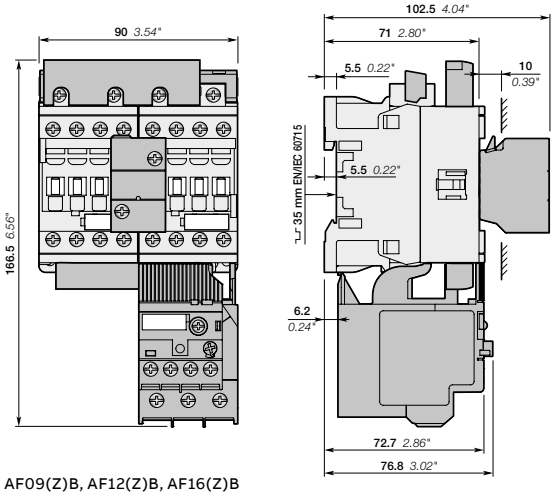


Note: contactor lateral distance to grounded component 2 mm 0.08" min.

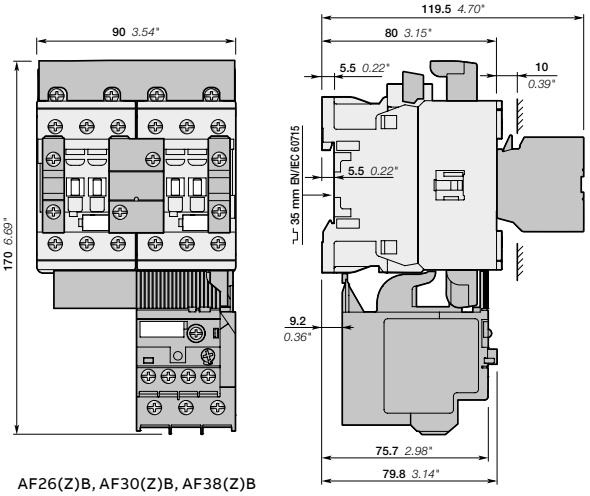
Main dimensions mm, inches

Reversing starters protected by thermal overload relays

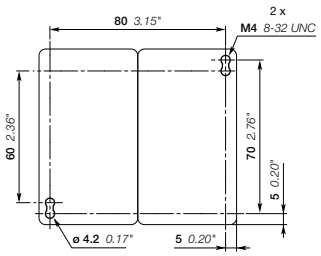
With AF..B contactors - open type version in kit form



AF09(Z)B, AF12(Z)B, AF16(Z)B
+ BER16-4, VEM4
+ TF42-B thermal overload relay



AF26(Z)B, AF30(Z)B, AF38(Z)B
+ BER38-4, VEM4, CA4-10
+ TF42-B thermal overload relay

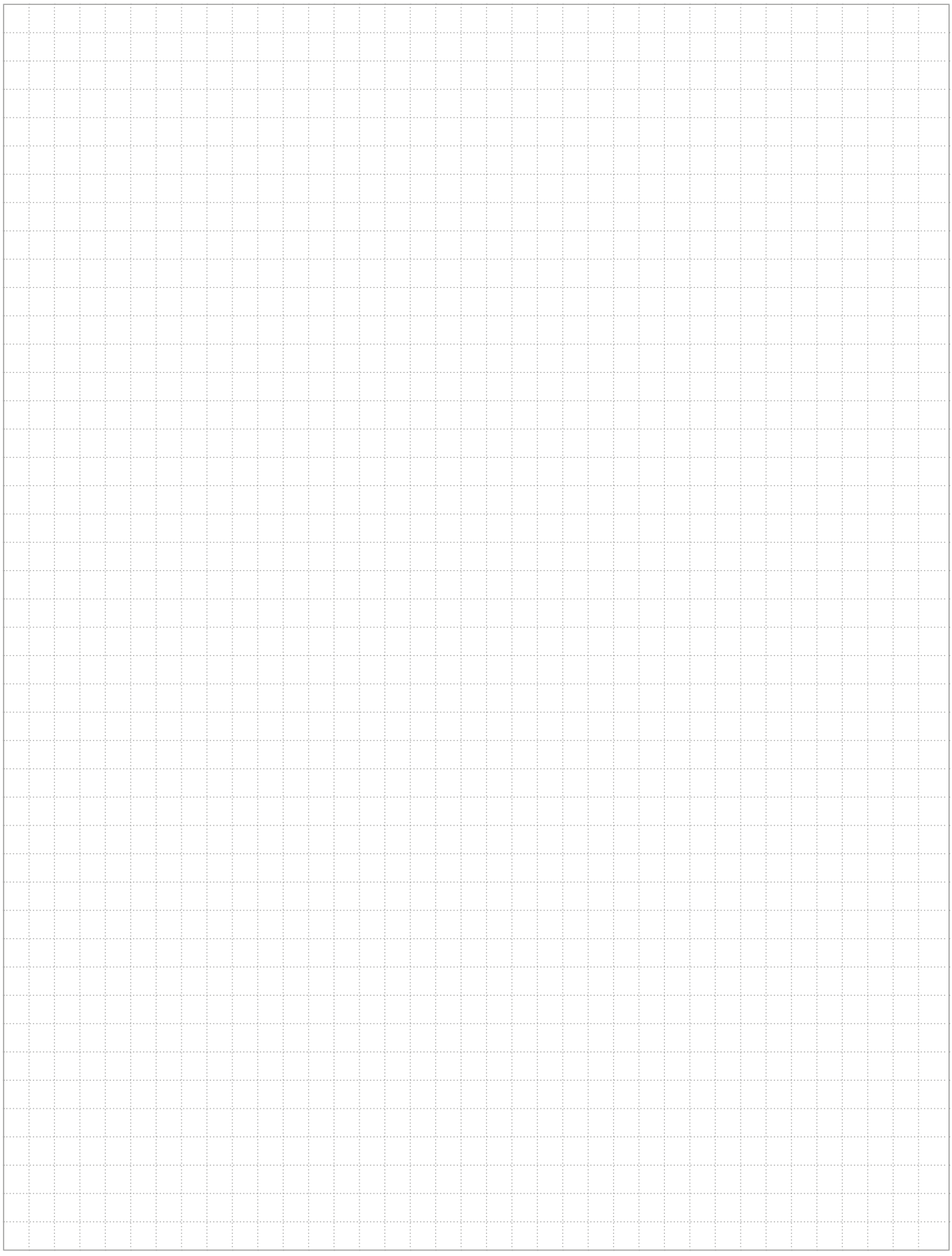


AF09(Z)B, AF12(Z)B, AF16(Z)B, AF26(Z)B, AF30(Z)B, AF38(Z)B

Note: contactor lateral distance to grounded component 2 mm 0.08" min.

Main dimensions mm, inches

Notes



Standards description

9/2 **Motor rated operational powers and currents**

9/3 **Standards description**

Motor rated operational powers and currents

The currents given below concern standard three-phase four-pole cage motors (1500 r.p.m. at 50 Hz 1800 r.p.m. at 60 Hz). These values are given for guidance and may vary according to the motor manufacturer and depending on the number of poles.

IEC	Motor nominal current: standardized values in grey (according to IEC 60947-4-1 Annex G)									
Motor power	220 V	230 V	240 V	380 V	400 V	415 V	440 V	500 V	660 V	690 V
kW	A	A	A	A	A	A	A	A	A	A
0.06	0.37	**0.35**	0.34	0.21	**0.2**	0.19	0.18	**0.16**	0.13	**0.12**
0.09	0.54	**0.52**	0.50	0.32	**0.3**	0.29	0.26	**0.24**	0.18	**0.17**
0.12	0.73	**0.7**	0.67	0.46	**0.44**	0.42	0.39	**0.32**	0.24	**0.23**
0.18	1	**1**	1	0.63	**0.6**	0.58	0.53	**0.48**	0.37	**0.35**
0.25	1.6	**1.5**	1.4	0.9	**0.85**	0.82	0.74	**0.68**	0.51	**0.49**
0.37	2.0	**1.9**	1.8	1.2	**1.1**	1.1	1	**0.88**	0.67	**0.64**
0.55	2.7	**2.6**	2.5	1.6	**1.5**	1.4	1.3	**1.2**	0.91	**0.87**
0.75	3.5	**3.3**	3.2	2.0	**1.9**	1.8	1.7	**1.5**	1.15	**1.1**
1.1	4.9	**4.7**	4.5	2.8	**2.7**	2.6	2.4	**2.2**	1.7	**1.6**
1.5	6.6	**6.3**	6	3.8	**3.6**	3.5	3.2	**2.9**	2.2	**2.1**
2.2	8.9	**8.5**	8.1	5.2	**4.9**	4.7	4.3	**3.9**	2.9	**2.8**
3	11.8	**11.3**	10.8	6.8	**6.5**	6.3	5.7	**5.2**	4	**3.8**
4	15.7	**15**	14.4	8.9	**8.5**	8.2	7.4	**6.8**	5.1	**4.9**
5.5	20.9	**20**	19.2	12.1	**11.5**	11.1	10.1	**9.2**	7	**6.7**
7.5	28.2	**27**	25.9	16.3	**15.5**	14.9	13.6	**12.4**	9.3	**8.9**
11	39.7	**38**	36.4	23.2	**22**	21.2	19.3	**17.6**	13.4	**12.8**
15	53.3	**51**	48.9	30.5	**29**	28	25.4	**23**	17.8	**17**
18.5	63.8	**61**	58.5	36.8	**35**	33.7	30.7	**28**	22	**21**
22	75.3	**72**	69	43.2	**41**	39.5	35.9	**33**	25.1	**24**
30	100	**96**	92	57.9	**55**	53	48.2	**44**	33.5	**32**
37	120	**115**	110	69	**66**	64	58	**53**	40.8	**39**
45	146	**140**	134	84	**80**	77	70	**64**	49.1	**47**
55	177	**169**	162	102	**97**	93	85	**78**	59.6	**57**
75	240	**230**	220	139	**132**	127	116	**106**	81	**77**
90	291	**278**	266	168	**160**	154	140	**128**	97	**93**
110	355	**340**	326	205	**195**	188	171	**156**	118	**113**
132	418	**400**	383	242	**230**	222	202	**184**	140	**134**
160	509	**487**	467	295	**280**	270	245	**224**	169	**162**
200	637	**609**	584	368	**350**	337	307	**280**	212	**203**
250	782	**748**	717	453	**430**	414	377	**344**	261	**250**
315	983	**940**	901	568	**540**	520	473	**432**	327	**313**
355	1109	**1061**	1017	642	**610**	588	535	**488**	370	**354**
400	1255	**1200**	1150	726	**690**	665	605	**552**	418	**400**
500	1545	**1478**	1416	895	**850**	819	745	**680**	515	**493**
560	1727	**1652**	1583	1000	**950**	916	832	**760**	576	**551**
630	1928	**1844**	1767	1116	**1060**	1022	929	**848**	643	**615**
710	2164	**2070**	1984	1253	**1190**	1147	1043	**952**	721	**690**
800	2446	**2340**	2243	1417	**1346**	1297	1179	**1076**	815	**780**
900	2760	**2640**	2530	1598	**1518**	1463	1330	**1214**	920	**880**
1000	3042	**2910**	2789	1761	**1673**	1613	1466	**1339**	1014	**970**

UL/CSA	Motor nominal current: single and three phase (according to UL 60947-4-1A)									
Motor power	120 V 1-ph	200 V 1-ph	200 V 3-ph	208 V 1-ph	208 V 3-ph	220-240 V 1-ph	220-240 V 3-ph	380-415 V 3-ph	440-480 V 3-ph	550-600 V 3-ph
hp	A	A	A	A	A	A	A	A	A	A
1/10	3	–	–	–	–	1.5	–	–	–	–
1/8	3.8	–	–	–	–	1.9	–	–	–	–
1/6	4.4	2.5	–	2.4	–	2.2	–	–	–	–
1/4	5.8	3.3	–	3.2	–	2.9	–	–	–	–
1/3	7.2	4.1	–	4	–	3.6	–	–	–	–
1/2	9.8	5.6	2.5	5.4	2.4	4.9	2.2	1.3	1.1	0.9
3/4	13.8	7.9	3.7	7.6	3.5	6.9	3.2	1.8	1.6	1.3
1	16	9.2	4.8	8.8	4.6	8	4.2	2.3	2.1	1.7
1-1/2	20	11.5	6.9	11	6.6	10	6	3.3	3	2.4
2	24	13.8	7.8	13.2	7.5	12	6.8	4.3	3.4	2.7
3	34	19.6	11	18.7	10.6	17	9.6	6.1	4.8	3.9
5	56	32.2	17.5	30.8	16.7	28	15.2	9.7	7.6	6.1
7-1/2	80	46	25.3	44	24.2	40	22	14	11	9
10	100	57.5	32.2	55	30.8	50	28	18	14	11
15	135	–	48.3	–	46.2	68	42	27	21	17
20	–	–	62.1	–	59.4	88	54	34	27	22
25	–	–	78.2	–	74.8	110	68	44	34	27
30	–	–	92	–	88	136	80	51	40	32
40	–	–	120	–	114	176	104	66	52	41
50	–	–	150	–	143	216	130	83	65	52
60	–	–	177	–	169	–	154	103	77	62
75	–	–	221	–	211	–	192	128	96	77
100	–	–	285	–	273	–	248	165	124	99
125	–	–	359	–	343	–	312	208	156	125
150	–	–	414	–	396	–	360	240	180	144
200	–	–	552	–	528	–	480	320	240	192
250	–	–	–	–	–	–	604	403	302	242
300	–	–	–	–	–	–	722	482	361	289
350	–	–	–	–	–	–	828	560	414	336
400	–	–	–	–	–	–	954	636	477	382
450	–	–	–	–	–	–	1030	–	515	412
500	–	–	–	–	–	–	1180	786	590	472

Standards description

Main particularities of the railway applications

- Control network in DC, with a wide variation in voltage due to battery use, typically 0.7 Uc ... 1.25 Uc (Uc as control voltage).
- In accordance with the train design and the national running rules, the control network can be supplied in AC 50/60 Hz.
- Wide variation of temperature: range of -40 °C to +70 °C to cover all cases all over the world.
- Continuous vibration stress
- Shocks, when trains are formed
- Fire and smoke withstand. Special care being taken for plastic materials for which specific tests are required.

Standards for rolling stock applications

Rolling stock applications need low voltage international standard compliance and dedicated standards - national and international ones - focused on railway environment.

Below parts list the general standards, certificates and rolling stock standards defined for contactors and mini-contactors, manual motor starters, overload relays, contactor relays and mini-contactor relays, electronic relays and control.
For above products' reference and application, please refer to their respective technical data pages.

General standards / certificates

EN / IEC 60947-1	Low-voltage switchgear and controlgear – Part 1: General rules
EN / IEC 60947-2	Low-voltage switchgear and controlgear – Part 2: Circuit breakers
EN / IEC 60947-4-1	Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starter
EN / IEC 60947-5-1	Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements
EN / IEC 61812-1	Time relays for industrial and residential use – Part 1: Requirements and tests
UL 508 and UL 60947-1	UL Standard for safety Low-voltage switchgear and controlgear – Part 1: General rules
UL 508 and UL 60947-4-1	UL Standard for safety Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starter – Electromechanical contactors and motor-starters
UL 508 and UL 60947-5-1	UL Standard for safety Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices
CN/CSA-C22.2 No. 60947-1	CSA Group Low-voltage switchgear and controlgear – Part 1: General rules
CN/CSA-C22.2 No. 60947-4-1	CSA Group Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starter – Electromechanical contactors and motor-starters
CN/CSA-C22.2 No. 60947-5-1	CSA Group Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices
EAC	Certification in Russia
CCC	Certification in China: Compulsory China Certification

Rolling stock standards

IEC 60077-1 & IEC 60077-2	General service conditions and general rules Electro-technical components – General rules
IEC 50155	Electronic equipment used on rolling stock for the relevant parts
IEC 60571	Electronic equipment used on rolling stock for the relevant parts
IEC 61373	Shock and vibration tests
EN 50121-3-2	Electromagnetic Compatibility
EN 50124-1	Insulation coordination – Part 1: Basic requirements Clearances and creepage distances for all electrical and electronic equipment
EN 50125-1	Environmental conditions for equipment – Part 1: Rolling stock and on-board equipment
TR CU 001/2011	Technical Regulation of Custom Union on safety of railway rolling stock

Rolling stock - Fire and smoke standards

European standard	
EN 45545-2	Fire protection on railway vehicles — Part 2 Requirements for fire behavior of materials and components

Note: North american standards, please consult your ABB sales representative.

Standards description

Fire and smoke protection standards

The design of rolling stock and control products used such as contactors, shall incorporate the aim of limiting fire development and minimizing the smoke toxicity in case an ignition event occurs so that an acceptable level of safety is achieved. In the event of a fire, passengers and staff will be able to escape from the fire and smoke unaided and be able to reach a place of safety.

In this regard, the key standards are the fire and smoke protection european standard EN 45545-2.

European standard EN 45545-2 classification

EN 45545 has been developed from existing fire safety regulations for railway vehicles from the International Union of Railways (UIC) and different European countries and specifies the reaction to fire and smoke performance requirements for materials and products used on railway vehicles.

EN 45545-1 defines the combination of the both criteria below, decisive for the classification of the Hazard Level HL1 up to HL3:

- the operating categories of a train and how the train itself is concepted
- the types of environments depending on the length of tunnels

EN 45545-2 classifies control products in table 2 as listed products.

All products used under masses and an exposed area as defined below, can be evaluated with the grouping rules and guarantee an ample fire and smoke protection thanks to comprehensive measurements of oxygen index, density and opacity of smoke.

Contactors and mini-contactors, manual motor starters, overload relays, contactor relays and mini-contactor relays, electronic relays and control reach under following conditions the highest hazard levels HL2 or HL3 for one product or in group mounting:

- an exposed area of each product < 0.2 m²
- grouped plastic materials compliant to criteria R22/24 for interior grouped products and R23/R24 for exterior grouped products.

All products and accessories have been analyzed according to the above standards.

Plastic material tables and certificates are available on request.

Train types	**Tunnel length**	**Operating conceptions**			
		N Standard vehicles	**A** Automatic vehicles without staff on board	**D** 2 level vehicles	**S** Sleeping cars 2 levels or 1 level
1	< 1 km	HL1	HL1	HL1	HL2
2	< 5 km	HL2	HL2	HL2	HL2
3	> 5 km	HL2	HL2	HL2	HL3
4	> 5 km no side evacuation	HL3	HL3	HL3	HL3

For interior

Types of mass for grouped plastic material defined in an exposed surface < 0.2 m²

Global mass				**HL1**	**HL2**	**HL3**
R22	EN ISO 4589-2 OI		Oxygen content	≥ 28 %	≥ 28 %	≥ 32 %
	EN ISO 5659-2: 25 kWm²		DS max.	≤ 600	≤ 300	≤ 150
	EN 17084 or	Method 1: EN ISO 5659-2 Method 2: NF X70-100-2	CITNLP	≤ 1.2	≤ 0.9	≤ 0.75
Remaining mass not R22 classified				**HL1**	**HL2**	**HL3**
R24	≤ 500 g	EN ISO 4589-2 OI	Oxygen content	≥ 28 %	≥ 28 %	≥ 32 %
Remaining mass unclassified				**HL1**	**HL2**	**HL3**
< 100 g				No requirements apply to the materials of this group.		

For exterior

Types of mass for grouped plastic material defined in an exposed surface < 0.2 m²

Global mass				**HL1**	**HL2**	**HL3**
R23	EN ISO 4589-2 OI		Oxygen content	≥ 28 %	≥ 28 %	≥ 32 %
	EN ISO 5659-2: 25 kWm²		DS max.	-	≤ 600	≤ 300
	EN 17084 or	Method 1: EN ISO 5659-2 Method 2: NF X70-100-2	CITNLP	-	≤ 1.8	≤ 1.5
Remaining mass not R23 classified				**HL1**	**HL2**	**HL3**
R24	< 2000 g	EN ISO 4589-2 OI	Oxygen content	≥ 28 %	≥ 28 %	≥ 32 %
Remaining mass unclassified				**HL1**	**HL2**	**HL3**
< 400 g				No requirements apply to the materials of this group.		

Standards description

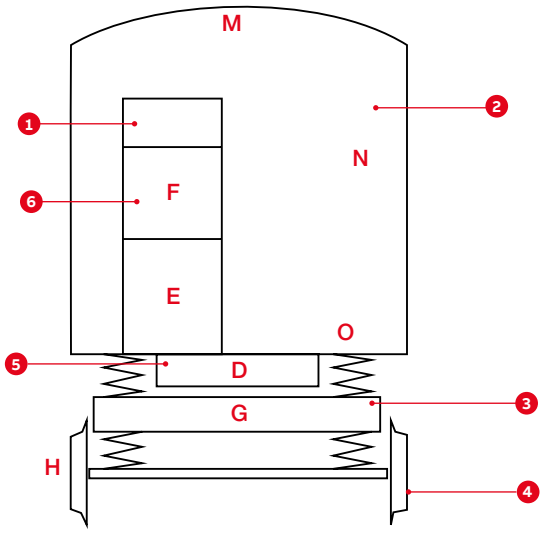
Shock and vibration tests IEC/EN 61373 category 1 class B

This international standard specifies the requirements for testing items of equipment intended for use on railway vehicles which are subsequently subjected to vibrations and shock owing to the nature of railway operational environment.

To gain assurance that the quality of the equipment is acceptable, it has to withstand tests of reasonable duration that simulate the service conditions seen throughout its expected life.

Note: the figure identifies general location of equipment on railway vehicles. Equipment's location within the vehicle: category 1 (body mounted), category 2 (bogie mounted C) and category 3 (axle mounted) divided into 2 subgroups, according to the location of the components:
- class A: cubicles, subassemblies, equipment and components mounted directly on or under the car body.
- class B: anything mounted inside an equipment case which is in turn mounted directly on or under the car body

Category	Class	Location	Description of equipment location
Category 1	Class A	M N O I and J	Components mounted directly on to or under the car body
	Class B	D	Components mounted into an underframe internal cubicle which is in turn fixed to the car body
		K and E	Components mounted into a large internal cubicle which is in turn fixed to the car body
		F	Components mounted into subassemblies which are mounted into a cubicle which is in turn fixed to the car body
Category 2		G	Cubicles, subassemblies, equipment and components, which are mounted on to the bogie of a railway vehicle
Category 3		H	Subassemblies, equipment and components or assemblies, which are mounted on to the axle assembly of a railway vehicle



1. Inside cubicle - I
2. Body
3. Bogie
4. Axle
5. Under frame cubicle - J
6. Subassembly - K

Index

Order code classification

Order code	Type	Page
1SAH102113R9910	MCRC040ATWED-RAIL	5/17
1SAH102114R9910	MCRC040ATWID-RAIL	5/17
1SAH102115R9910	MCRC031ATWED-RAIL	5/17
1SAH102116R9910	MCRC031ATWID-RAIL	5/17
1SAH102117R9910	MCRC022ATWED-RAIL	5/17
1SAH102118R9910	MCRC022ATWID-RAIL	5/17
1SAH102135R9910	MCRC040ARWDD-RAIL	5/21
1SAH102136R9910	MCRC040ARWED-RAIL	5/21
1SAH102137R9910	MCRC040ARWID-RAIL	5/21
1SAH102138R9910	MCRC040ARWJD-RAIL	5/21
1SAH102139R9910	MCRC031ARWDD-RAIL	5/21
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1SAH102141R9910	MCRC031ARWID-RAIL	5/21
1SAH102142R9910	MCRC031ARWJD-RAIL	5/21
1SAH102143R9910	MCRC022ARWDD-RAIL	5/21
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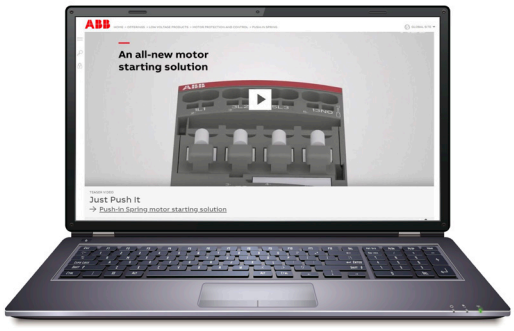

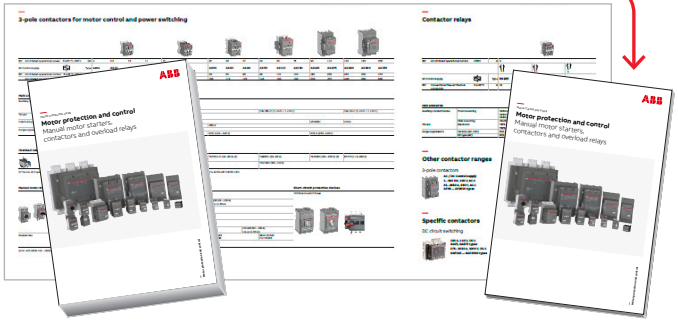

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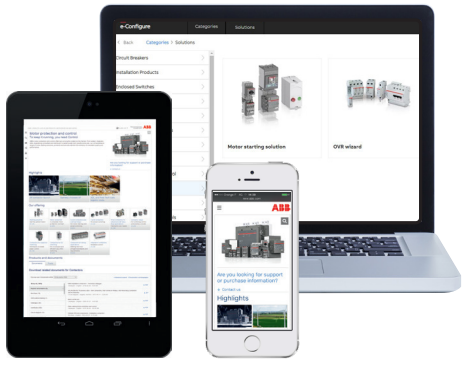

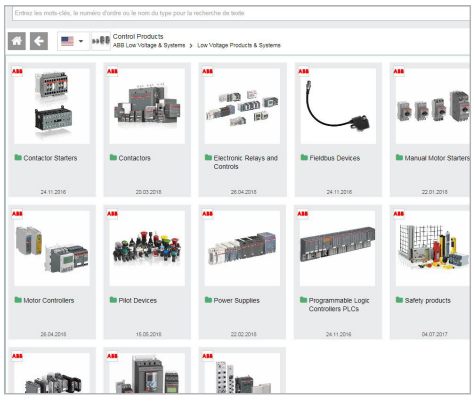

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