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MAIN CATALOG 2025–2026

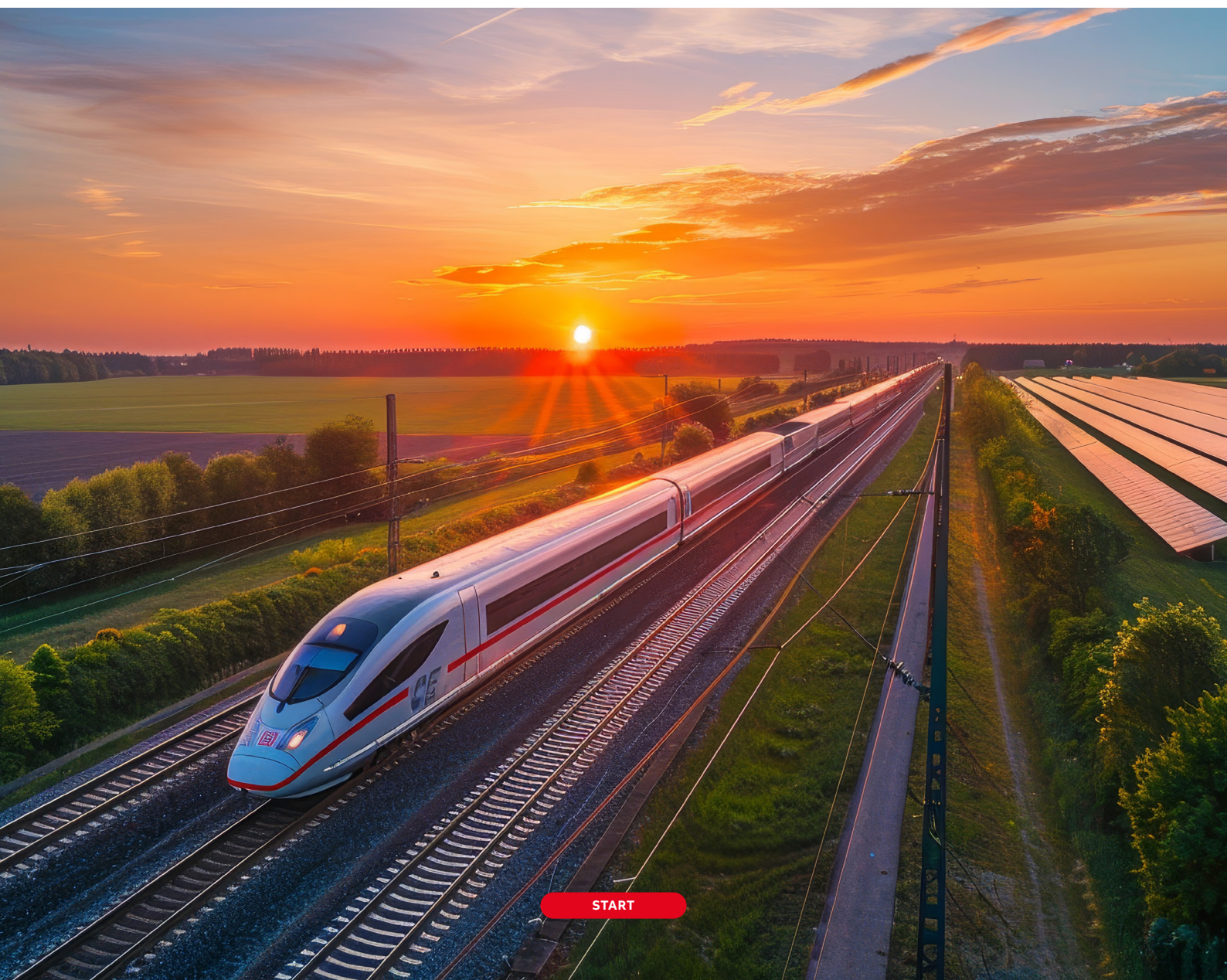
MOTOR CONTROL AND PROTECTION

For Rolling Stock Applications



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

**ENGINEERED
TO OUTRUN**



START

Motor control and protection for rolling stock applications

OVERVIEW

MANUAL MOTOR STARTERS

AF..B, GF..B CONTACTORS AND NF..B CONTACTOR RELAYS CONNECTION WITH STANDARD FERRULES

AF..B..RT CONTACTORS AND NF..B..RT CONTACTOR RELAYS CONNECTION WITH RING TONGUE FERRULES

B, M MINI CONTACTORS K, M MINI CONTACTOR RELAYS

THERMAL OVERLOAD RELAYS

ELECTRONIC RELAYS AND CONTROL

CUSTOMER MADE MOTOR STARTING SOLUTIONS

STANDARDS

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Motor control and protection

Advanced but simple

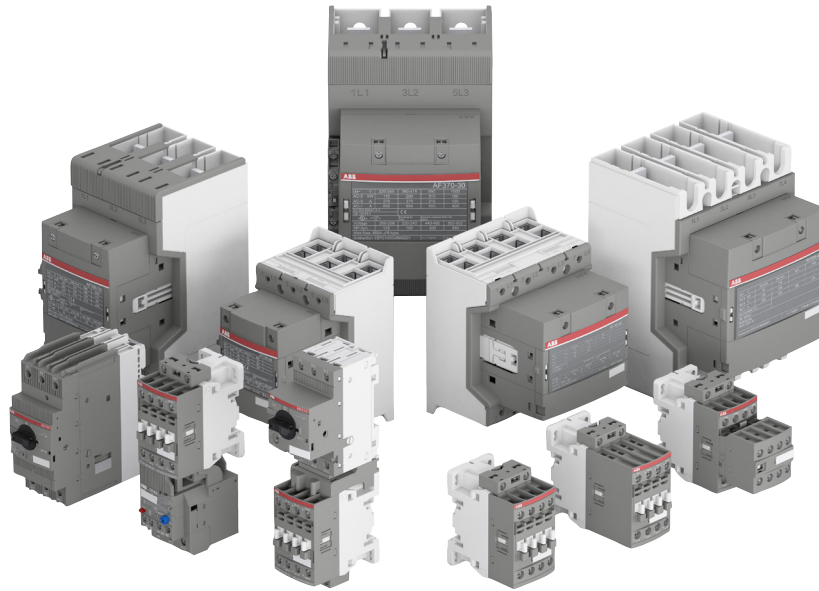


ABB supports the high levels of expectations for safe means of transport. Being a market leader in supplying products and services to rolling stock manufacturers, we are present in more than 100 countries and we can provide strong local support to your projects. With a truly global organization, we are 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

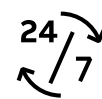
The common accessories range enables an easy and fast compact modular frame starting solutions design and installation in a required reduced space. The optimized contactors coil voltage ranges help to decrease logistics and stocks costs.



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.



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.

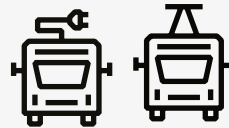
Manual motor starters, contactors, contactor relays, overload relays and electronic relays are used in a wide variety of rolling stock applications.

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.

IEC 60077-1/-2

General service conditions and general rules for electrotechnical components for the applicable parts

Standards in rolling stock applications

EN 45545-2

Fire and smoke protection on railway vehicles

EN 50155

IEC 60571

Electronic equipment used in rolling stock for the relevant parts

EN 50121-3-2

Electromagnetic compatibility

IEC 61373

Resistance to shock and vibrations

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

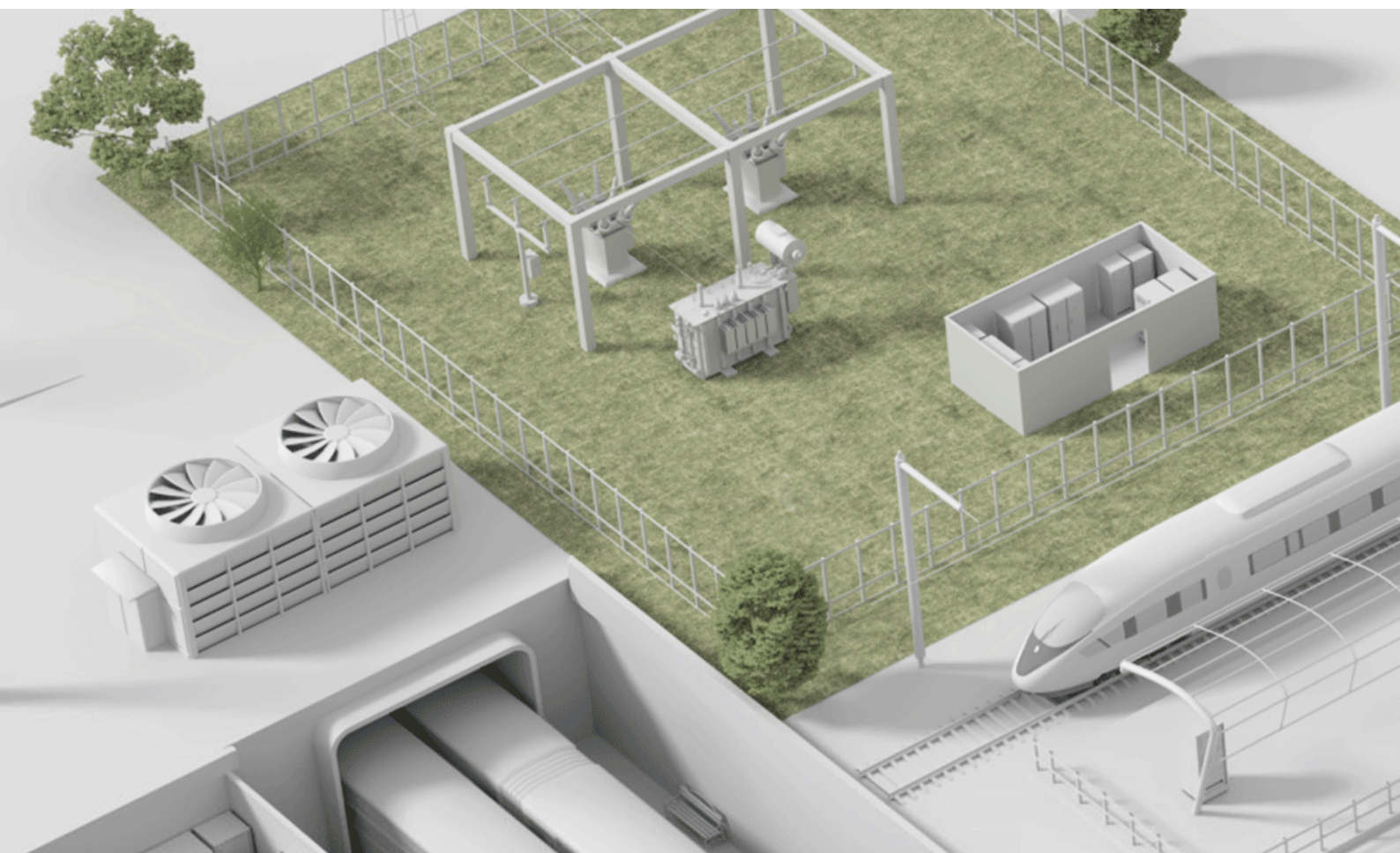
Several types of terminals are available to connect cables with standard ferrules or ring tongue ferrules in regards with material design requirements.

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.



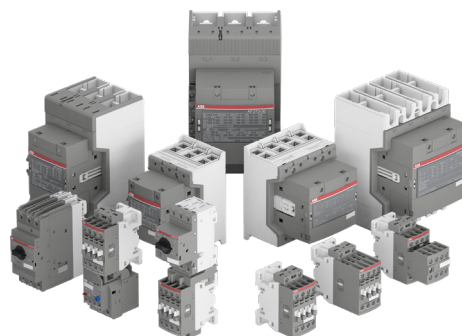
Sustainable mobility for a better world



Manual motor starters

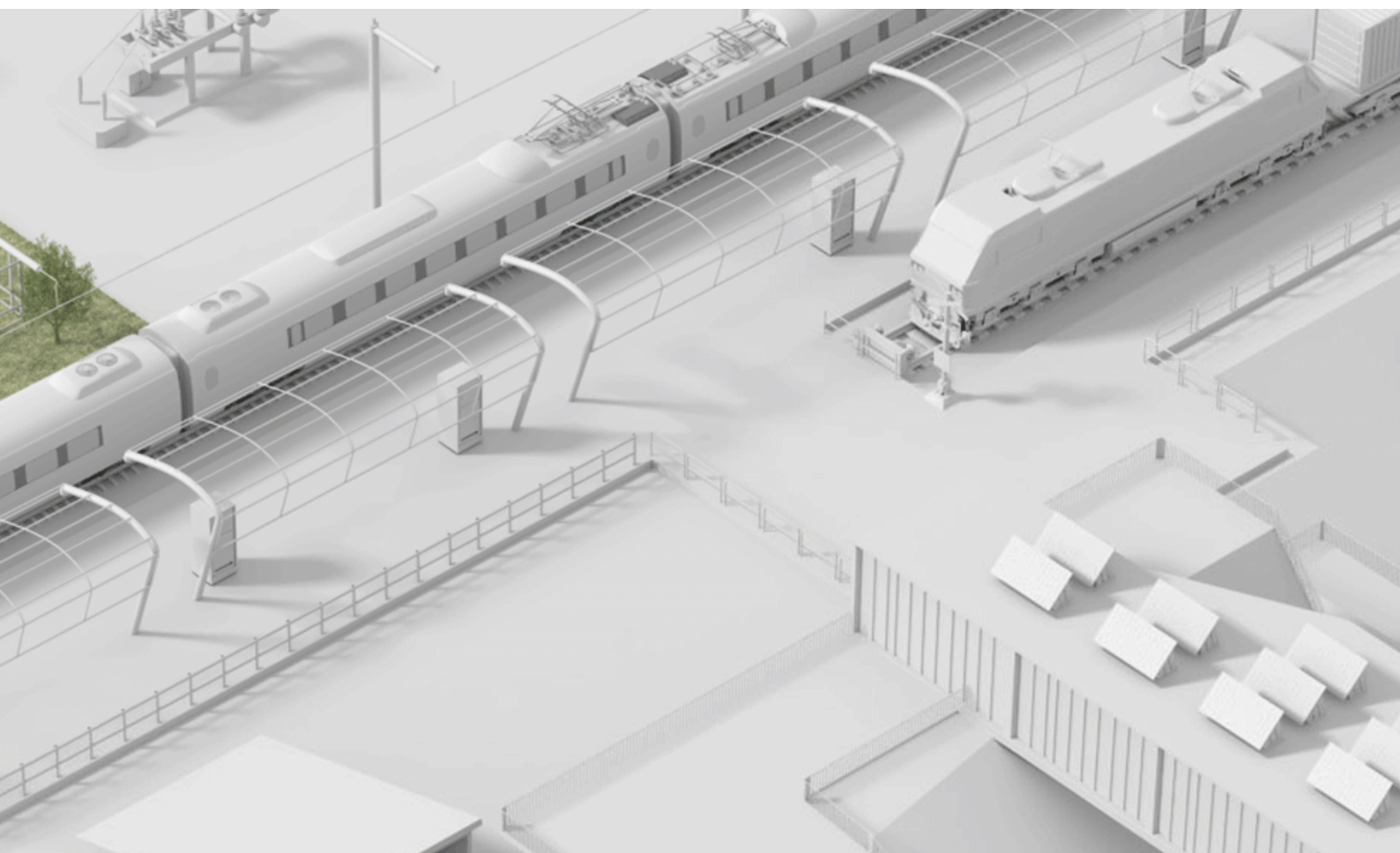
Compact and powerful range for motor protection up to 45 kW (400 V) / 80 A complying with the latest railway rolling stock standards and allowing installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds.

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, technical 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).

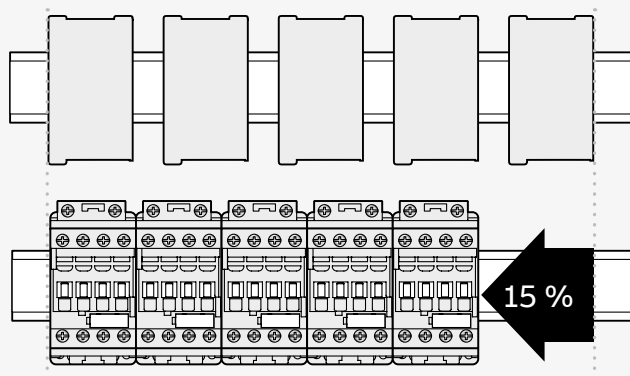
Optimize the number of needed codes by 60%

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

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

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

Conventional DC operated contactors



AF..(Z)B contactors

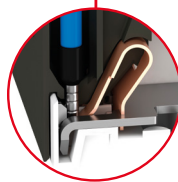
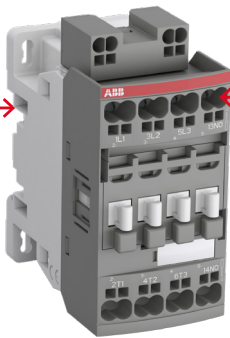
Reduce the size of the installations and minimize the train energy needs

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

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

Push-in Spring terminals for connection with standard ferrules

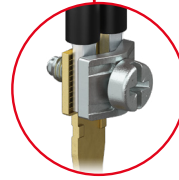
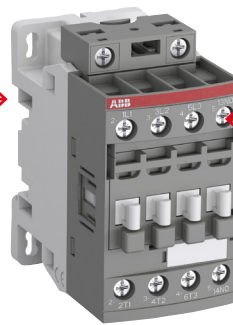
With the new Push-in Spring terminals, one push is all you need for a faster than ever installation, an easier than ever wiring and a reliable as ever connection.



From 9 to 38 A

Screw terminals for connection with standard ferrules

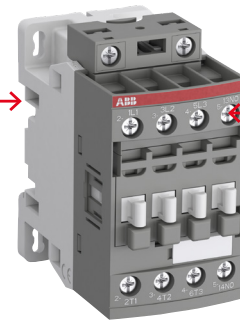
For a safe insertion and wiring of cables.



From 9 to 370 A

Screw terminals for connection with ring tongue ferrules

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



From 9 to 370 A

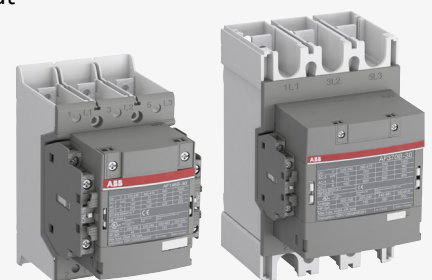
Extend your control circuit possibilities with AF09(Z)B ... AF96B

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.



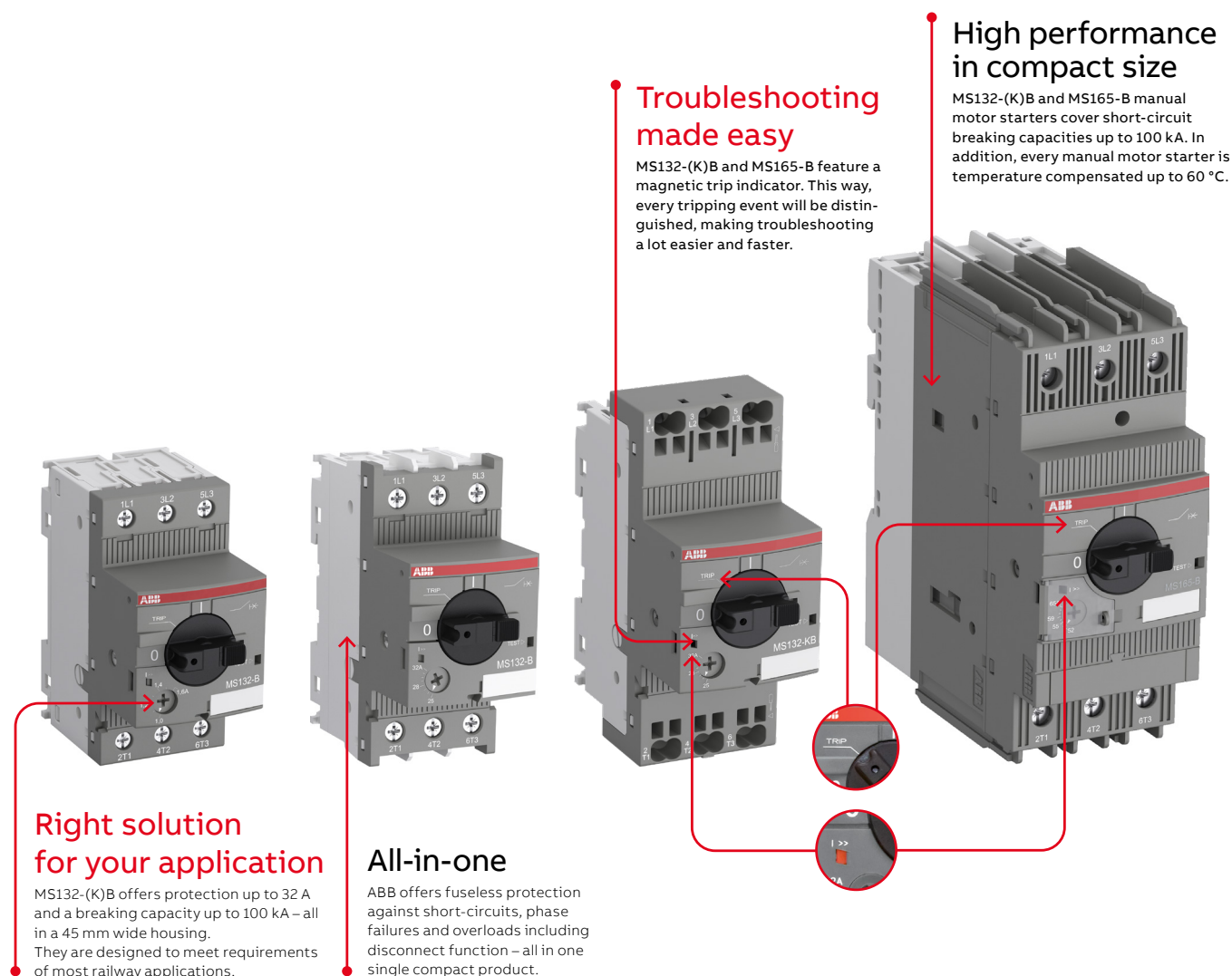
More functionalities with the same compact width for AF116B ... AF370B contactors

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



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.

Troubleshooting made easy

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

High performance in compact size

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



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

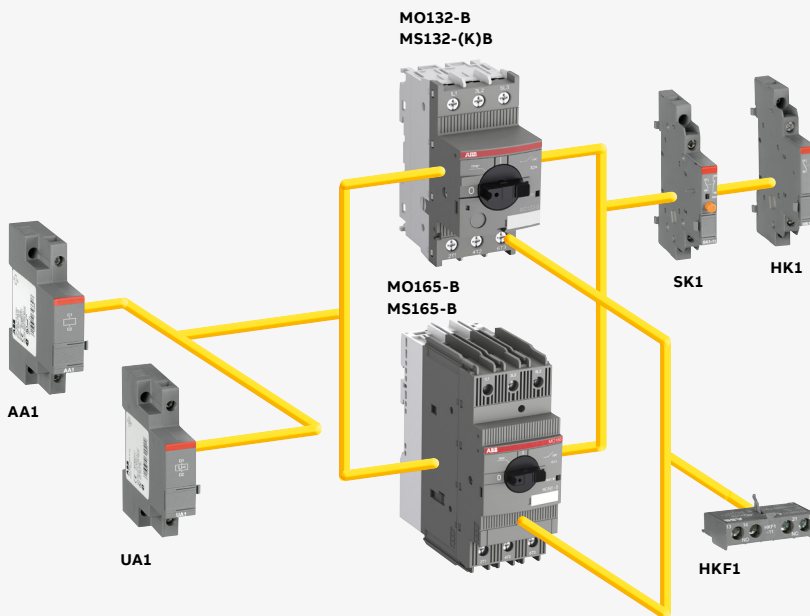
MS132-(K)B/MO132-B/MS165-B/MO165-B comply with the latest IE3 N/H and NE/HE motors. NE/HE requires utilization category AC-3e.



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.



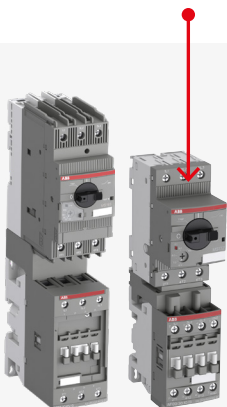
Save wiring time
and avoid mistakes by
using a connecting link



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

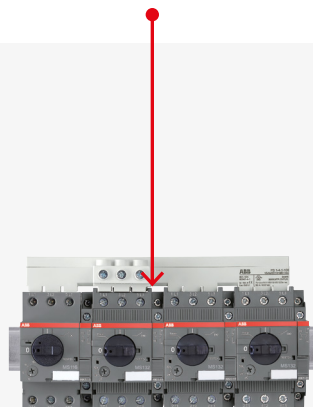


With a lockable handle
maintenance will be safe
for every technician



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.

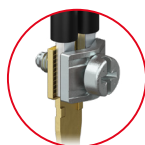
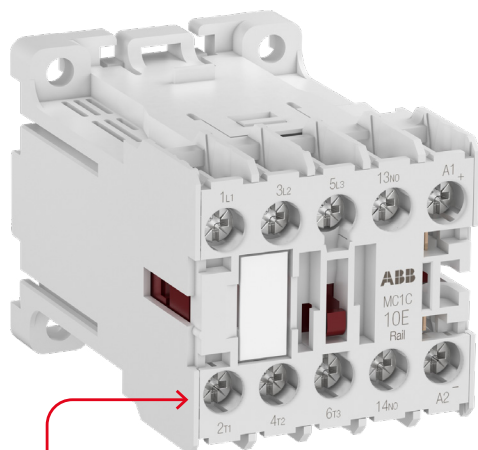


Safety at work

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.

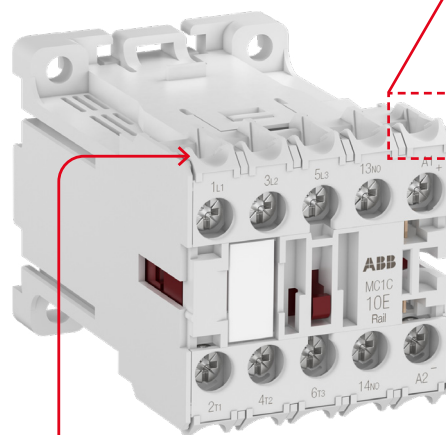
M mini contactors

A performance-dimension optimized solution

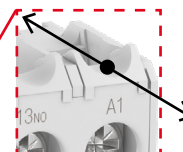


Connection with standard ferrules

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.

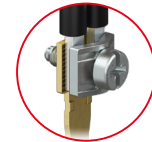


Assemble your reversing starter

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



Connection with standard ferrules

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

Motors control

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



Resistive loads

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



Electronic relays and control

Even under the most extreme conditions



Passenger car

Time relays

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

Single-phase monitoring relays

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



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.



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.

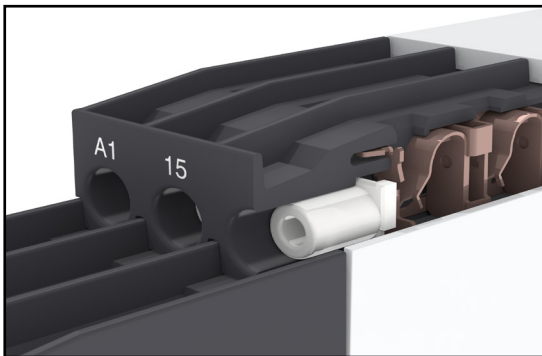
Benefits for train constructors through push-in terminal technology

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.

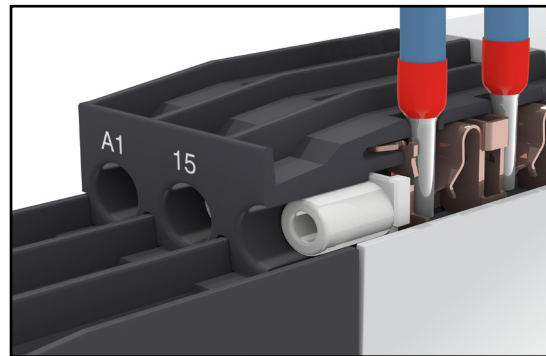
As this is very complex for many of the devices within the train, there are various methods of reducing the work involved:

- 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

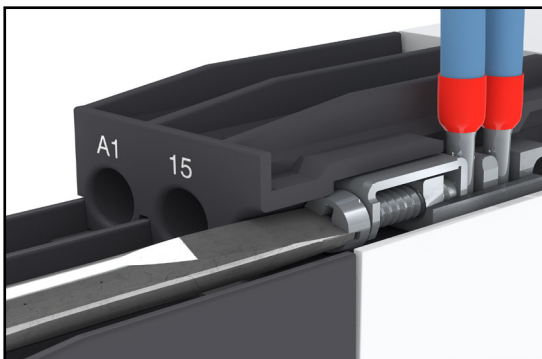
The product range of single-function and multifunctional devices, time relays, single- and three-phase monitoring relays and insulation monitoring relays can combine these options. Thus, instead of individual monitoring relays, it is possible to use a single multifunctional device.



Easy Connect Technology push-in terminals



Tool-free mounting of wires



Wiring of double-chamber cage connection terminals with screw driver

How to use this catalog

Product image

Click on the product to zoom in.

Product type

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

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-30-01RT



AF26ZB-30-00RT

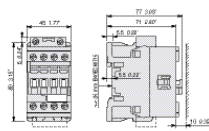
AF09ZB..RT ... AF38ZB..RT 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220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

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

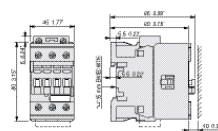
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to European standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 ... 1.25 U_c 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 current ≤ 40 °C	UL / CSA 3-phase motor rating 480 V	General use rating 600 V AC	Supply control voltage U _c (IEC 60077) (1)	Rated control circuit voltage U _c min. ... U _c max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
400 V AC-3	AC-1 kW A	hp	A	VDC	VDC				kg
4	25	5	25	24, 33, 48	20...60	1 0	AF09ZB-30-01RT-21	1SBL136060R2110	0.32
						0 1	AF09ZB-30-01RT-21	1SBL136060R2101	0.33
				72, 96, 110	48...130	1 0	AF09ZB-30-01RT-22	1SBL136060R2210	0.32
						0 1	AF09ZB-30-01RT-22	1SBL136060R2201	0.33
				220	100...250	1 0	AF09ZB-30-01RT-23	1SBL136060R2310	0.32
						0 1	AF09ZB-30-01RT-23	1SBL136060R2301	0.32
5.5	28	7.5	28	24, 33, 48	20...60	1 0	AF12ZB-30-01RT-21	1SBL156060R2110	0.32
						0 1	AF12ZB-30-01RT-21	1SBL156060R2101	0.32
				72, 96, 110	48...130	1 0	AF12ZB-30-01RT-22	1SBL156060R2210	0.32
						0 1	AF12ZB-30-01RT-22	1SBL156060R2201	0.32
				220	100...250	1 0	AF12ZB-30-01RT-23	1SBL156060R2310	0.32
						0 1	AF12ZB-30-01RT-23	1SBL156060R2301	0.32
7.5	30	10	30	24, 33, 48	20...60	1 0	AF16ZB-30-01RT-21	1SBL176060R2110	0.32
						0 1	AF16ZB-30-01RT-21	1SBL176060R2101	0.32
				72, 96, 110	48...130	1 0	AF16ZB-30-01RT-22	1SBL176060R2210	0.32
						0 1	AF16ZB-30-01RT-22	1SBL176060R2201	0.32
				220	100...250	1 0	AF16ZB-30-01RT-23	1SBL176060R2310	0.32
						0 1	AF16ZB-30-01RT-23	1SBL176060R2301	0.32
11	45	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
				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	50	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.



Main dimensions mm, inches



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

BNCB BULBULI - Rev. A



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.

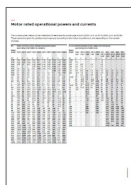
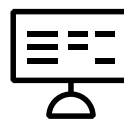


Chart and data of motor rated operational powers and currents are available in the customer made motor starting solutions chapter.



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

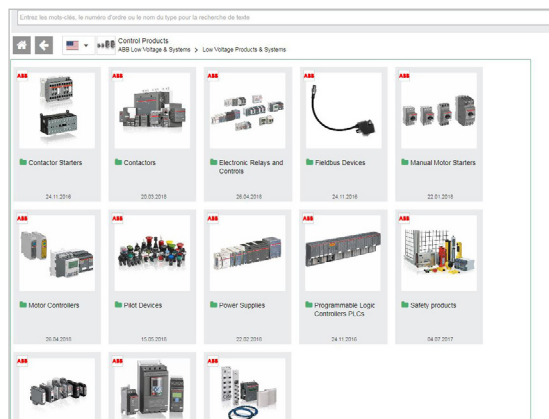
The information contained in this catalog reflects the current state of our knowledge and aims to present our products and their possible applications as defined within the standards. The product data, ratings and utilization conditions are indicated in their respective sections, thus the information 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 deposited with the rules and standards that apply to them.

Main online tools

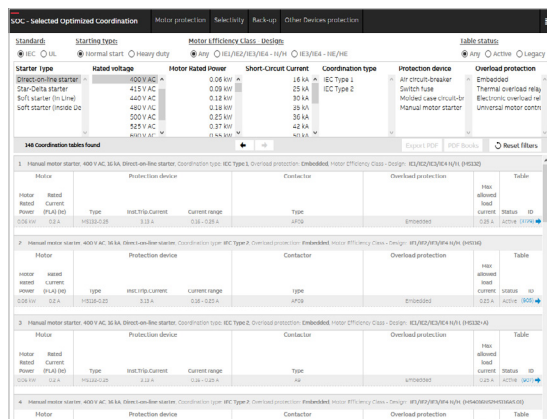
2D and 3D CAD models, ABB CAD Download center



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



Selected Optimized Coordination tables - SOC



Selected Optimized Coordination tables SOC

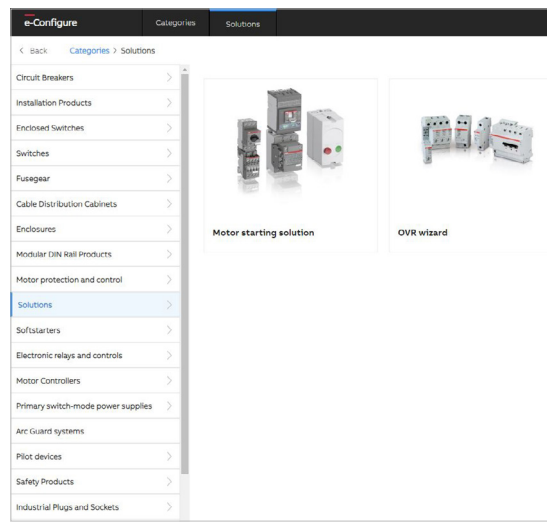


Data sheets, installation instructions, certificates



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

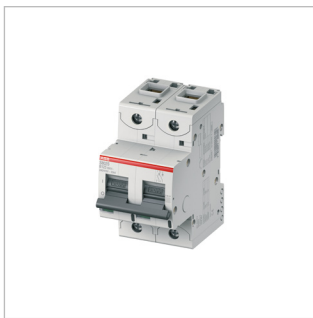


<https://econfigure.xe.abb.com/global/#/categories/cfg-solution-Configurators>



Other products and solutions for rolling stock applications

Working worldwide with leading vehicle manufacturers and transport operators, ABB offers a broad range of low- and medium-voltage solutions not included in this catalog, for rolling stock to suit each of your applications and increase the efficiency of your equipment.



01



02



03

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01
Miniature circuit breakers (MCBs)

—
02
High-performance circuit breakers

—
03
Moulded case circuit breakers



04



05



06

—
04
Residual current devices (RCDs)

—
05
Surge protective devices (SPDs)

—
06
DCBreaks



07

—
07
ABB Ability™



For more information about products and applications.
<https://new.abb.com/railway/abb-solutions-for-transportation-rail-and-infrastructure>

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

2/7 MS165-RTB manual motor starters

Ordering details – 0.16 to 80 A – with electromagnetic protection

2/8 MO132-B manual motor starters magnetic only

2/9 MO165-B manual motor starters magnetic only

2/10 Technical data

2/21 Main accessories



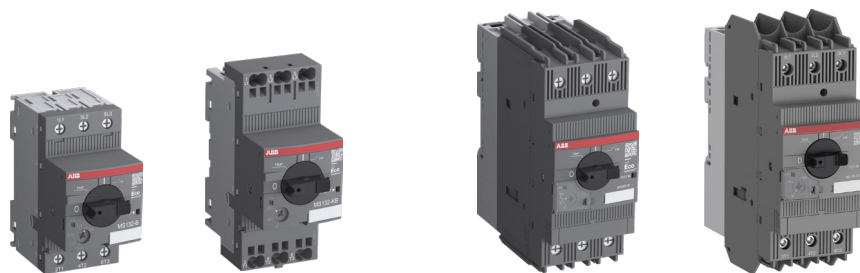
For more information please find our electronic data sheets online, for example:

www.abb.com/productdetails/MS132-0.16B

www.abb.com/productdetails/1SAM350200R1001

Manual motor starters

Overview



Type

MS132-B

MS132-KB

MS165-B

MS165-RTB

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-(RT)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 / MS165-16(RT)B	100 kA	100 kA
7.5 kW	14 ... 20 A	MS165-20(RT)B	100 kA	100 kA
7.5 kW	16...20 A	MS132-20(K)B	100 kA	100 kA
11 kW	18 ... 25 A	MS165-25(RT)B	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	MS165-32(RT)B	100 kA	100 kA
22 kW	30 ... 42 A	MS165-42(RT)B	50 kA	50 kA
22 kW	40 ... 54 A	MS165-54(RT)B	50 kA	30 kA
30 kW	52 ... 65 A	MS165-65(RT)B	50 kA	30 kA
37 kW	62 ... 73 A	MS165-73(RT)B	30 kA	30 kA
45 kW	70 ... 80 A	MS165-80(RT)B	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

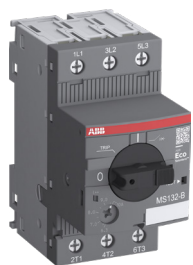
HKF1, HK1
SK1
-
AA1
UA1

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

MS132-B manual motor starters

0.10 to 32 A – with thermal and electromagnetic protection



MS132-10B

2CDC241007V0021



MS132-32B

2CDC241008V0021

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.

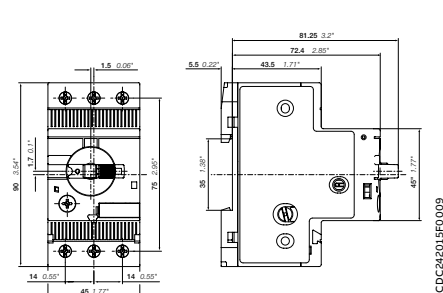
The manual motor starter is suitable for three- and single phase applications. The handle is lockable to protect against unauthorized changes. Auxiliary contacts, signaling contacts, undervoltage releases, shunt trips, power in-feed blocks are available as accessory.

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

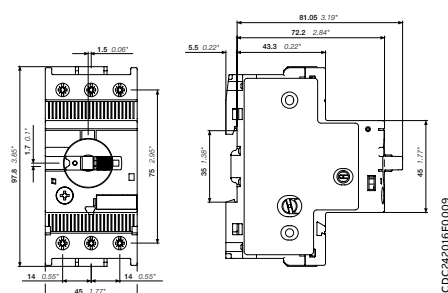
Rated operational power 400 V AC-3, AC-3e kW	Setting range A	Short-circuit breaking capacity Ics at 400 V AC kA	Rated instantaneous short-circuit current setting Ii A	Type	Order code	Weight (1 pce) kg
-	0.10 ... 0.16	100	2.00	MS132-0.16B	1SAM350200R1001	0.215
0.06	0.16 ... 0.25	100	3.10	MS132-0.25B	1SAM350200R1002	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

2CDC242015F0009



MS132-B ≥ 10 A

2CDC242016F0009

Main dimensions mm, inches

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

0.10 to 32 A – with thermal and electromagnetic protection



MS132-KB

2CDC241010V0021

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.

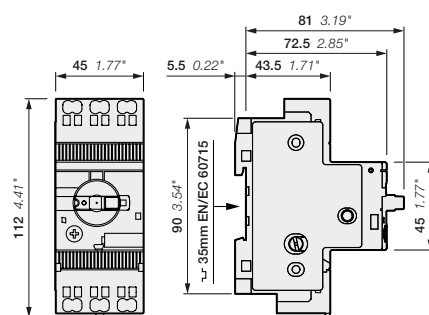
The manual motor starter is suitable for three- and single phase applications. The handle is lockable to protect against unauthorized changes. Auxiliary contacts, signaling contacts, undervoltage releases, shunt trips, power in-feed blocks are available as accessory. These are suitable throughout the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

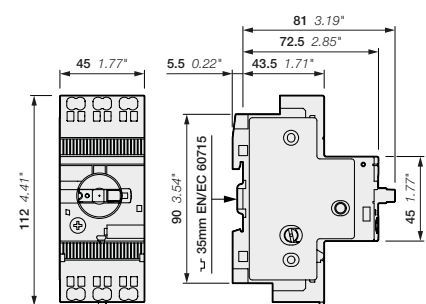
Rated operational power 400 V AC-3, AC-3e kW	Setting range A	Short-circuit breaking capacity Ics at 400 V AC kA	Rated instantaneous short-circuit current setting Ii A	Type	Order code	Weight (1 pce) kg
0.03(1)	0.10 ... 0.16	100	2.00	MS132-0.16KB	1SAM350210R1001	0.256
0.06	0.16 ... 0.25	100	3.10	MS132-0.25KB	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



MS165-65B

2CDC241.01.2V0017

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.

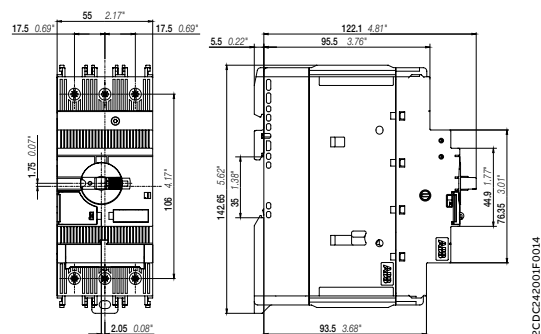
The manual motor starter is suitable for three- and single phase applications. The handle is lockable to protect against unauthorized changes. Auxiliary contacts, signaling contacts, undervoltage releases, shunt trips, power in-feed blocks are available as accessory.

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 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
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

MS165-RTB manual motor starters

10 to 80 A – with thermal and electromagnetic protection



MS165-RTB

9PAA00000236968

MS165-RTB is a compact and powerful range for motor protection up to 45 kW (400 V) / 80 A in width of 55 mm. The reliable ring tongue terminals include non-detachable screws which allow fast and secure tightening of cables with ring ferrules.

MS165-RTB offers 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.

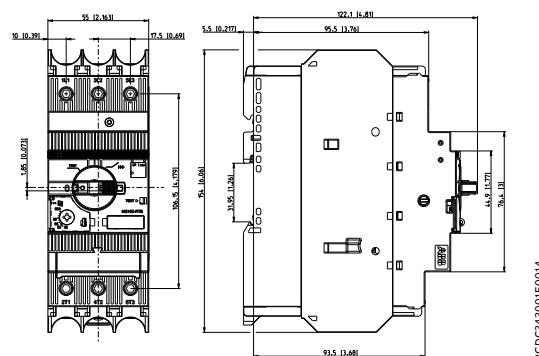
The manual motor starter is suitable for three- and single phase applications. The handle is lockable to protect against unauthorized changes. Auxiliary contacts, signaling contacts, undervoltage releases, shunt trips, power in-feed blocks are available as accessory.

These are suitable throughout the MS132-(K)B/MS165-(RT)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
7.5	10 ... 16	100	240	MS165-16RTB	1SAM451240R1011	0.900
7.5	14 ... 20	100	300	MS165-20RTB	1SAM451240R1012	0.900
11	18 ... 25	100	375	MS165-25RTB	1SAM451240R1013	0.910
15	23 ... 32	100	480	MS165-32RTB	1SAM451240R1014	0.900
22	30 ... 42	50	630	MS165-42RTB	1SAM451240R1015	0.900
22	40 ... 54	30	810	MS165-54RTB	1SAM451240R1016	0.910
30	52 ... 65	30	975	MS165-65RTB	1SAM451240R1017	0.925
37	62 ... 73	30	1022	MS165-73RTB	1SAM451240R1018	0.920
45	70 ... 80	30	1120	MS165-80RTB	1SAM451240R1019	0.920

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



MS165-RTB

Main dimensions mm, inches

MO132-B manual motor starters magnetic only

0.16 to 32 A – with electromagnetic protection



MO132-10B

2CDC241003V0021



MO132-32B

2CDC241004V0021

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.

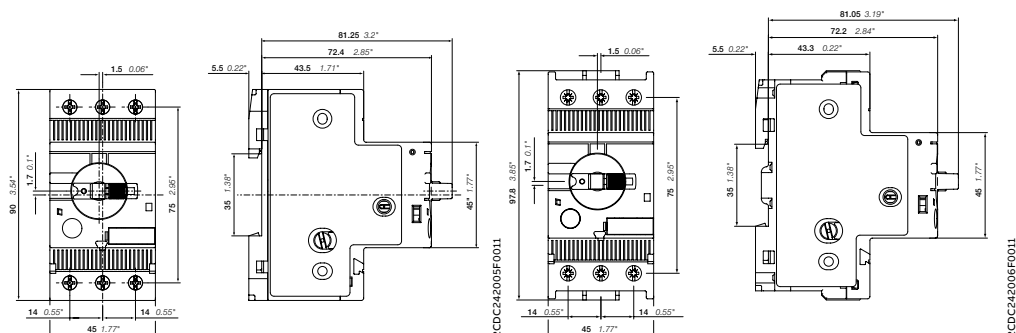
The manual motor starter is suitable for three- and single-phase applications. The handle is lockable to protect against unauthorized changes. Auxiliary contacts, signaling contacts, undervoltage releases, shunt trips, power in-feed blocks are available as accessory.

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



Main dimensions mm, inches

MO165-B manual motor starters magnetic only

16 to 80 A – with electromagnetic protection



MO165-65B

2CDC241015V0016

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.

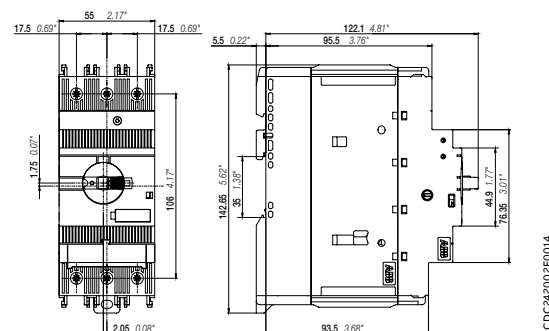
They offer a reliable protection for starters in the event of short-circuit including a reliable indication of fault in a separate window. Further features are the build-in disconnect function, trip-free mechanism and a rotary handle with a clear switch position indication.

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



MO165-B

2CDC241002F0014

Main dimensions mm, inches

Technical data

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

Main circuit – Utilization characteristics according to IEC/EN

Type	MS132-(K)B	MS165-(RT)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	3			
Duty time				
Mechanical durability	100000 cycles	50000 cycles	100000 cycles	50000 cycles
Electrical durability	up to 65A 73 ... 80 A	50000 cycles 25000 cycles (1) 20000 cycles	50000 cycles -	25000 cycles 20000 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 I_e "	See "Rated operational current I_e "	-	See "Rated operational current I_e "
Rated instantaneous short-circuit current setting I_i	See ordering details			
Rated service short-circuit breaking capacity I_{cs}	See table "Short-circuit breaking capacity and back-up fuses"			
Rated ultimate short-circuit breaking capacity I_{cu}	See table "Short-circuit breaking capacity and back-up fuses"			
Rated service short-circuit breaking capacity DC I_{cs} 3 conducting paths in series up to 250 V	10 kA	100 kA	-	100 kA

(1) Value applies for 400V AC-3/AC-3e. Electrical durability for MS165-(RT)B at 690V AC-3/AC-3e: 15000

Short-circuit breaking capacity and back-up fuses

I_{cs} Rated service short-circuit breaking capacity

I_{cu} Rated ultimate short-circuit breaking capacity

I_{cc} 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		
	I_{cs} kA	I_{cu} kA	gG, aM A	I_{cs} kA	I_{cu} kA	gG, aM A	I_{cs} kA	I_{cu} kA	gG, aM A	I_{cs} kA	I_{cu} kA	gG, aM A	I_{cs} kA	I_{cu} 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)

Type	230 V AC			400 V AC			440 V AC			500 V AC			690 V AC			250 V DC		
	I_{cs} kA	I_{cu} kA	gG A	I_{cs} kA	I_{cu} kA	gG A	I_{cs} kA	I_{cu} kA	gG A	I_{cs} kA	I_{cu} kA	gG A	I_{cs} kA	I_{cu} kA	gG A	I_{cs} kA	I_{cu} kA	gG A
MS165-16(RT)B	100	100	- (1)	100	100	- (1)	75	75	125 (2)	20	20	125 (2)	8	8	63 (2)	100	100	- (1)
MS165-20(RT)B	100	100	- (1)	100	100	- (1)	75	75	125 (2)	20	20	125 (2)	8	8	63 (2)	100	100	- (1)
MS165-25(RT)B	100	100	- (1)	100	100	- (1)	50	50	125 (2)	20	20	125 (2)	8	8	80 (2)	100	100	- (1)
MS165-32(RT)B	100	100	- (1)	100	100	- (1)	50	50	125 (2)	20	20	125 (2)	5	5	100 (2)	100	100	- (1)
MS165-42(RT)B	50	50	125 (2)	50	50	125 (2)	50	50	125 (2)	20	20	125 (2)	5	5	100 (2)	100	100	- (1)
MS165-54(RT)B	30	50	125 (2)	30	50	125 (2)	30	45	125 (2)	20	20	125 (2)	5	5	100 (2)	100	100	- (1)
MS165-65(RT)B	30	50	125 (2)	30	50	125 (2)	30	45	125 (2)	20	20	125 (2)	5	5	100 (2)	100	100	- (1)
MS165-73(RT)B	30	30	200 (1)	30	30	200 (1)	6	8	200 (1)	18	18	200 (1)	10	10	160 (1)	100	100	- (1)
MS165-80(RT)B	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, because 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, MS132-B, MS165-(RT)B, MO132-B, MO165-B

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-(RT)B, MO132-B, MO165-B

Main circuit – Utilization characteristics according to UL/CSA

Type	MS132-(K)B	MS165-(RT)B	MO132-B	MO165-B
Standards	UL 60947-4-1, UL 60947-1			
Rated operational voltage U _{eacc.} 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-(RT)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

Technical data

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

UL/CSA Motor ratings, three phase – MS165-(RT)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
MS165-16(RT)B	3	11	73.6	3	10.6	71	5	15.2	92	10	14	81	10	11	64.8
MS165-20(RT)B	5	17.5	105.8	5	16.7	102	5	15.2	92	10	14	81	15	17	93
MS165-25(RT)B	5	17.5	105.8	7 1/2	24.2	140	7 1/2	22	127	15	21	116	20	22	116
MS165-32(RT)B	7 1/2	25.3	146	10	30.8	179	10	28	162	20	27	145	30	32	174
MS165-42(RT)B	10	32.2	186.3	10	30.8	179	15	42	232	30	40	218	40	41	232
MS165-54(RT)B	15	48.3	267	15	46.2	257	20	54	290	40	52	290	50	52	290
MS165-65(RT)B	20	62.1	334	20	59.4	321	20	54	290	50	65	363	60	62	348
MS165-73(RT)B	20	62.1	334	20	59.4	321	25	68	365	50	65	363	60	62	348
MS165-80(RT)B	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.

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

Type	Manual Motor Controllers		for motor disconnect		for group installations		for tap conductor protection in group installations		Manual self-protected Combination Motor Controllers (Type E)	
	Branch circuit protection, max. size per NEC/CEC (1)									
	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
MS165-16(RT)B	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
MS165-20(RT)B			65	30	65	30	65	30	65	30
MS165-25(RT)B			65	30	65	30	65	30	65	30
MS165-32(RT)B			65	30	65	30	65	30	65	30
MS165-42(RT)B			65	30	65	30	65	30	65	-
MS165-54(RT)B			65	30	65	30	65	30	65	-
MS165-65(RT)B			65	30	65	30	65	30	65	-
MS165-73(RT)B			50	10	50	10	50	10	50	-
MS165-80(RT)B			50	10	50	10	50	10	50	-

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

Technical data

MS132-(K)B, MS165-(RT)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 – 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

Technical data

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

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 Branch circuit protection, max. size per NEC/CEC (1)		for motor disconnect		for group installations		for tap conductor protection in group installations		Manual self-protected Combination Motor Controllers (Type E) (2)	
	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, MS165-(RT)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 kA	600Y / 347 V kA	Minimum contactor size	480Y / 277 V kA	600Y / 347 V 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-(RT)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 kA	Minimum contactor size	600Y / 347 V kA	Minimum contactor size	480Y / 277 V kA	Minimum contactor size	600Y / 347 V kA
MS165-16(RT)B	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
MS165-20(RT)B	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
MS165-25(RT)B	AF26(Z)B...AF38(Z)B	65	AF26(Z)B...AF38(Z)B	50	AF26(Z)B...AF38(Z)B	65	AF40(Z)B...AF65(Z)B	30
MS165-32(RT)B	AF26(Z)B...AF38(Z)B	65	AF26(Z)B...AF38(Z)B	50	AF26(Z)B...AF38(Z)B	65	AF40(Z)B...AF65(Z)B	30
MS165-42(RT)B	AF40(Z)B...AF65(Z)B	65	AF40(Z)B...AF65(Z)B	30	AF40(Z)B...AF65(Z)B	65	AF40(Z)B...AF65(Z)B	30
MS165-54(RT)B	AF40(Z)B...AF65(Z)B	65	AF40(Z)B...AF65(Z)B	30	AF40(Z)B...AF65(Z)B	65	AF40(Z)B...AF65(Z)B	30
MS165-65(RT)B	AF40(Z)B...AF65(Z)B	65	AF40(Z)B...AF65(Z)B	30	AF40(Z)B...AF65(Z)B	65	AF40(Z)B...AF65(Z)B	30
MS165-73(RT)B	AF80(Z)B...AF96(Z)B	50	-	-	AF80(Z)B...AF96(Z)B	50	-	-
MS165-80(RT)B	AF80(Z)B...AF96(Z)B	50	-	-	AF80(Z)B...AF96(Z)B	50	-	-

Technical data

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

UL/CSA Maximum short-circuit current ratings – MO132

Type	Manual Motor Controllers		for motor disconnect		for group installations		for tap conductor protection in group installations	
	Branch circuit protection, max. size per NEC/CEC (1)							
	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 kA	600Y / 347 V 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-(RT)B, MO132-B, MO165-B

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

Type	Manual Motor Controllers		for motor disconnect		for group installations		for tap conductor protection in group installations	
	Branch circuit protection, max. size per NEC/CEC (1)							
	Fuses	Circuit breaker	480 V	600 V	480 V	600 V	480 V / 277 V	600 V / 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					
	480 V / 277 V kA	OL Relay	Contactor	600 V / 347 V kA	OL Relay	Contactor
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) (2)	DIN-rail (EN 60715)	DIN-rail (EN 60715)	DIN-rail (EN 60715)
Group mounting		On request (2)	On request (2)	On request (2)	On request (2)
Recommended screw for mounting plate		-	M4	-	M4
Screw torque for mounting plate		-	2 Nm	-	2 Nm
Minimum distance to other units	Horizontal	0 mm	0 mm	0 mm	0 mm
same type	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-(RT)B and MO165-B

(2) Please refer to application note 2CDC131183M0201

Technical data

MS132-(K)B, MS165-(RT)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 mm ²	1 ... 2.5 mm ² 2.5 ... 6 mm ²
 Flexible with ferrule	1 or 2 x	0.75 ... 2.5 mm ²	0.75 ... 6 mm ²
 Flexible with insulated ferrule	1 or 2 x	0.75 ... 2.5 mm ²	0.75 ... 6 mm ²
 Flexible	1 or 2 x	0.75 ... 2.5 mm ²	1 ... 2.5 mm ² 2.5 ... 6 mm ²
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 mm ²	1 ... 2.5 mm ² 2.5 ... 6 mm ²
 Flexible with ferrule	1 or 2 x	0.75 ... 2.5 mm ²	0.75 ... 6 mm ²
 Flexible with insulated ferrule	1 or 2 x	0.75 ... 2.5 mm ²	0.75 ... 6 mm ²
 Flexible	1 or 2 x	0.75 ... 2.5 mm ²	1 ... 2.5 mm ² 2.5 ... 6 mm ²
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	

Technical data

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

General technical data

Type	MS165-RTB	
Pollution degree	3	
Phase loss sensitivity	Yes	
Disconnect function acc. to IEC/EN 60947-2	Yes	
Ambient air temperature		
Operation	Open - compensated	-25 ... +60 °C
	Open	-25 ... +60 °C
	Enclosed (IB132 ⁽¹⁾)	-
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	
Mounting position	Position 1-6 (optional for single mounting)	
Mounting	DIN-rail (EN 60715)	
Group mounting	On request (2)	
Recommended screw for mounting plate	M4	
Screw torque for mounting plate	2 Nm	
Minimum distance to other units	Horizontal	0 mm
same type	Vertical	150 mm
Minimum distance to electrical conductive board	Horizontal, up to 400 V	0 mm
	Horizontal, up to 690 V	> 1.5 mm
	Vertical	75 mm
Degree of protection	Housing	IP20
	Main circuit terminals	IP10 (3)

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

(2) Please refer to application note 2CDC131183M0201

(3) Only with insulated ferrules

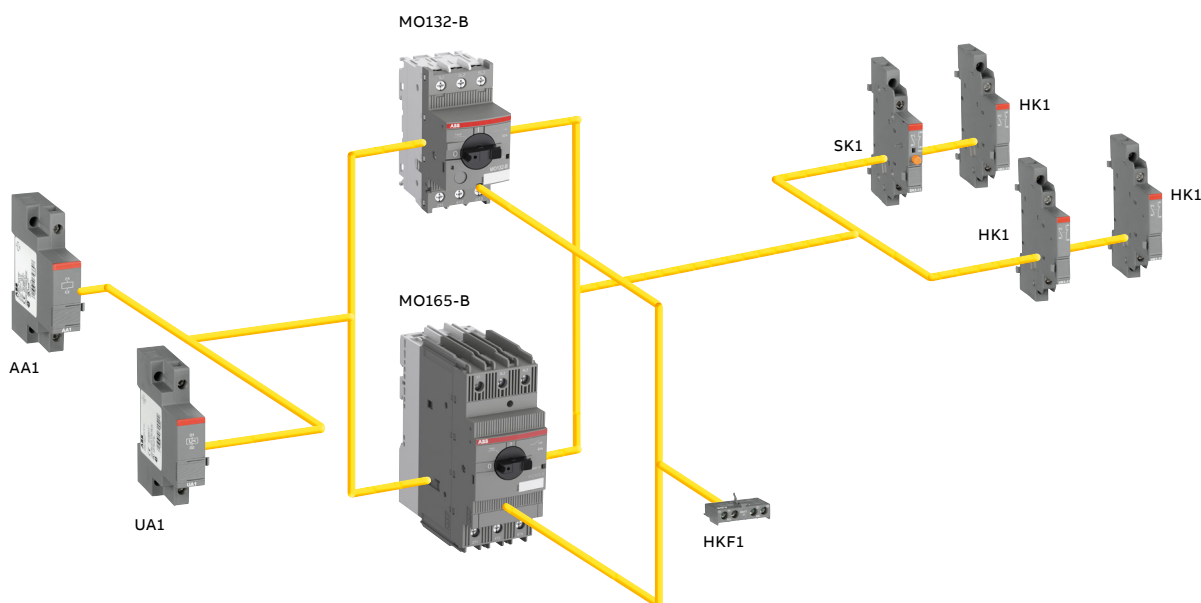
Connecting characteristics

Contactor types	MS165-RTB	
Main terminals		
	Conductors with insulated ring tongue ferrule	
Connecting capacity (min. ... max.)		
Main conductors (poles)		
Flexible with insulated ferrule	1 or 2 x	1 ... 35 mm ²
	d mm	5.5 mm < Ø < 13 mm
	W mm <	16 mm
	C mm <	17.6 mm
	E mm <	6.6 mm or 2 x 3.3 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 16...2
Tightening torque	4 Nm / 35 lb.in	
Screw terminals	Delivered in open position (1)	
Main terminals	allen key size 4	
Screw driver type	Flat Ø 5.5 / Pozidriv 2	

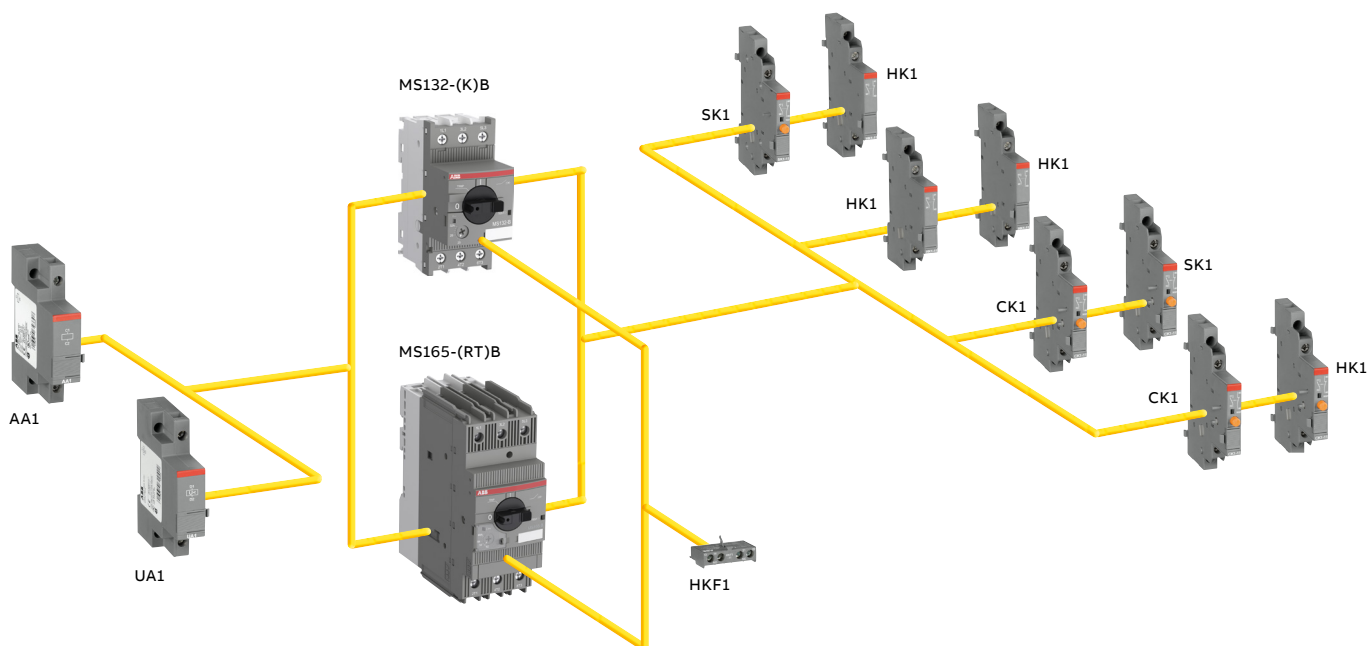
Main accessories

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

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



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



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

Main accessories with screw terminals

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



HKF1-11



HK1-11



SK1-11



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-(RT)B/MO132-B/MO165-B ranges.

Suitable for	Auxiliary contacts N.O.	Auxiliary contacts N.C.	Description	Type	Order code	Pkg qty	Weight (1 pce)
						pce	kg

Auxiliary contacts – mountable on the front

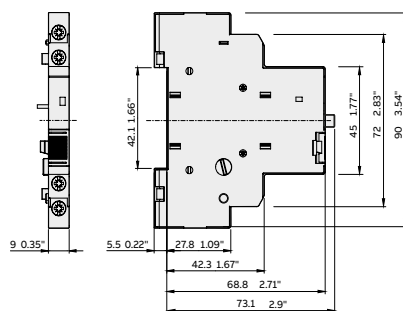
MS132-(K)B,	1	1		HKF1-11	1SAM201901R1001	10	0.015
MS165-(RT)B,	1	0		HKF1-10	1SAM201901R1003	10	0.013
MO132-B,	0	1		HKF1-01	1SAM201901R1004	10	0.013
MO165-B	2	0		HKF1-20	1SAM201901R1002	10	0.015

Auxiliary contacts – mountable on the right

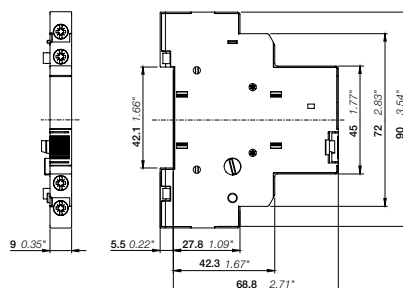
MS132-(K)B,	1	1	max. 2 pieces	HK1-11	1SAM201902R1001	2	0.035
MS165-(RT)B,	2	0	max. 2 pieces	HK1-20	1SAM201902R1002	2	0.035
MO132-B,	0	2	max. 2 pieces	HK1-02	1SAM201902R1003	2	0.035
MO165-B	2	0	with lead contacts	HK1-20L	1SAM201902R1004	2	0.035

Signaling contacts – mountable on the right

MS132-(K)B,	1	1	for tripped alarm, max. 2 pieces	SK1-11	1SAM201903R1001	2	0.035
MS165-(RT)B,	2	0	for tripped alarm, max. 2 pieces	SK1-20	1SAM201903R1002	2	0.035
MO132-B,	0	2	for tripped alarm, max. 2 pieces	SK1-02	1SAM201903R1003	2	0.035
MO165-B							
MS132-(K)B,	1	1	for short-circuit alarm, max. 2 pieces	CK1-11	1SAM301901R1001	2	0.035
MS165-(RT)B	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-(RT)B, MO132-B, MO165-B



AA1-24

1SBFC10121F0014



UA1-24

1SBFC101212F0014

Suitable for	Rated control supply voltage		Type	Order code	Pkg qty	Weight (1 pce)
	50 Hz V AC	60 Hz V AC			pce	kg

Shunt trips – mountable on the left

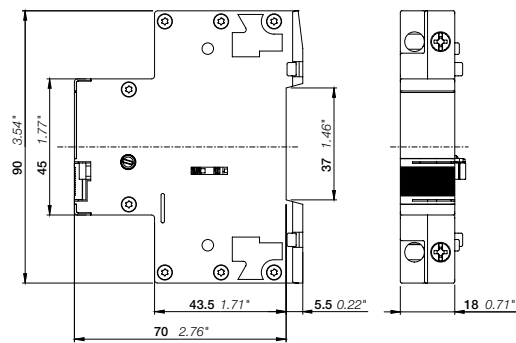
MS132-(K)B, MS165-(RT)B, MO132-B, MO165-B	20 ... 24	20 ... 24	AA1-24	1SAM201910R1001	1	0.100
	110	110	AA1-110	1SAM201910R1002	1	0.100
	200 ... 240	200 ... 240	AA1-230	1SAM201910R1003	1	0.100
	350 ... 415	350 ... 415	AA1-400	1SAM201910R1004	1	0.100

Undervoltage releases – mountable on the left

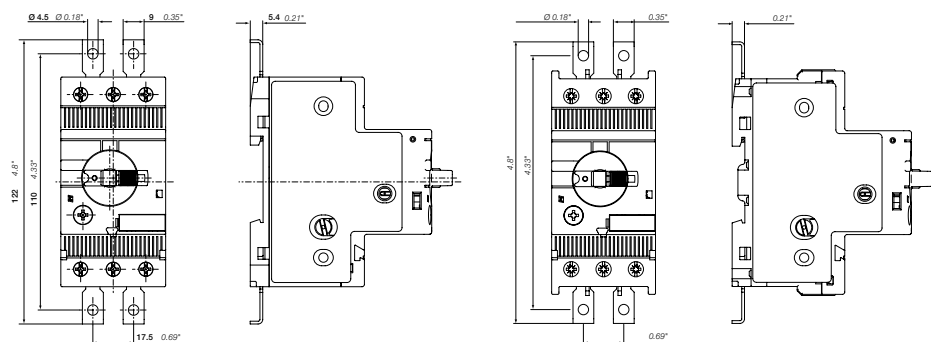
MS132-(K)B, MS165-(RT)B, MO132-B, MO165-B	20	24	UA1-20	1SAM201904R1010	1	0.100
	24	-	UA1-24	1SAM201904R1001	1	0.100
	48	-	UA1-48	1SAM201904R1002	1	0.100
	60	-	UA1-60	1SAM201904R1003	1	0.100
	110	120	UA1-110	1SAM201904R1004	1	0.100
	-	208	UA1-208	1SAM201904R1008	1	0.100
	230	240	UA1-230	1SAM201904R1005	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
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AA1, UA1



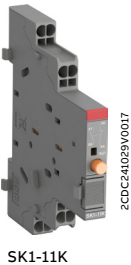
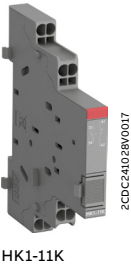
MS132 + FS116 ≤ 10 A

MS132 + FS116 > 10 A

Main dimensions mm, inches

Main accessories with Push-in Spring terminals

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



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-(RT)B range.

Suitable for	Auxiliary contacts N.O.	Auxiliary contacts N.C.	Description	Type	Order code	Pkg qty	Weight (1 pce) kg
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Auxiliary contacts - mountable on the front

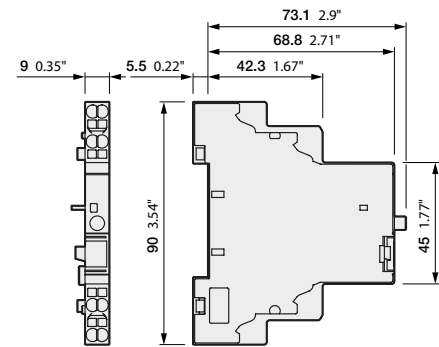
MS132-(K)B,	1	1		HKF1-11K	1SAM201901R1201	10	0.016
MS165-(RT)B, MO132-B, MO165-B.	2	0		HKF1-20K	1SAM201901R1202	10	0.016

Auxiliary contacts - mountable on the right

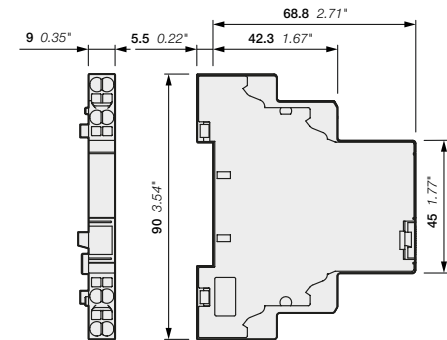
MS132-(K)B,	1	1	max. 2 pieces	HK1-11K	1SAM201902R1201	2	0.035
MS165-(RT)B,	2	0	max. 2 pieces	HK1-20K	1SAM201902R1202	2	0.035
MO132-B,	0	2	max. 2 pieces	HK1-02K	1SAM201902R1203	2	0.035
MO165-B.	2	0	with leading contacts	HK1-20LK	1SAM201902R1204	2	0.035

Signaling contacts - mountable on the right

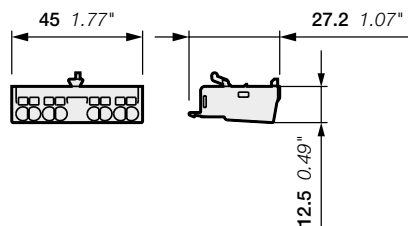
MS132-(K)B,	1	1	for tripped alarm	SK1-11K	1SAM201903R1201	2	0.035
MS165-(RT)B,	2	0	for tripped alarm	SK1-20K	1SAM201903R1202	2	0.035
MO132, MO165	0	2	for tripped alarm	SK1-02K	1SAM201903R1203	2	0.035



SK1-K



HK1-K

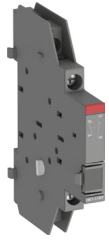


HKF1-K

Main dimensions mm, inches

Main accessories with Ring tongue terminals

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



HK1-RT



SK1-RT



AA1-RT



UA1-RT

Manual motor starters can be equipped with auxiliary contacts for lateral mounting, signaling contacts for lateral mounting, undervoltage releases and shunt trips. The accessories are equipped with Ring tongue terminals including non-detachable screws which allow fast and secure tightening of cables with ring ferrules. The accessories can be fitted wiring free and without change position with the main contacts. The signaling contact SK signals tripping regardless if it was caused by short-circuit or overload. 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-(RT)B/MO132-B/MO165-B ranges.

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 right

MS132-(K)B, MS165-(RT)B, MO132-B, MO165-B	1	1	max. 2 pieces	HKF1-11RT	1SAM201901R1301	2	0.042
	2	0	max. 2 pieces	HKF1-20RT	1SAM201901R1302	2	0.042
	0	2	max. 2 pieces	HKF1-02RT	1SAM201903R1303	2	0.042

Signaling contacts - mountable on the right

MS132-(K)B, MS165-(RT)B, MO132-B, MO165-B	1	1	for tripped alarm	SK1-11RT	1SAM201903R1301	2	0.042
	2	0	for tripped alarm	SK1-20RT	1SAM201903R1302	2	0.042
	0	2	for tripped alarm	SK1-02RT	1SAM201903R1303	2	0.042

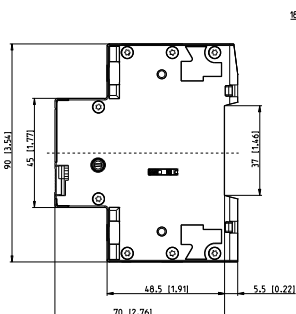
Suitable for	Rated control supply voltage		Type	Order code	Pkg qty	Weight (1 pce)
	50 Hz V AC	60 Hz V AC				kg

Shunt trips - mountable on the left

MS132-(K)B, MS165-(RT)B, MO132-B, MO165-B	20 ... 24	20 ... 24	AA1-24RT	1SAM201910R1301	1	0.102
	110	110	AA1-110RT	1SAM201910R1302	1	0.102
	200 ... 240	200 ... 240	AA1-230RT	1SAM201910R1303	1	0.102
	350 ... 415	350 ... 415	AA1-400RT	1SAM201910R1304	1	0.102

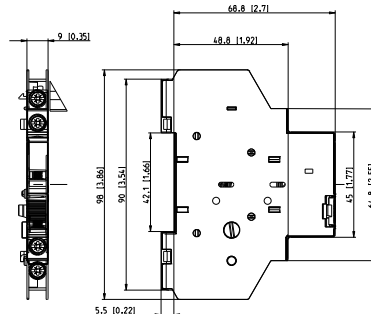
Undervoltage releases - mountable on the left

MS132-(K)B, MS165-(RT)B, MO132-B, MO165-B	20	24	UA1-20RT	1SAM201904R1310	1	0.102
	24	-	UA1-24RT	1SAM201904R1301	1	0.102
	48	-	UA1-48RT	1SAM201904R1302	1	0.102
	60	-	UA1-60RT	1SAM201904R1303	1	0.102
	110	120	UA1-110RT	1SAM201904R1304	1	0.102
	-	208	UA1-208RT	1SAM201904R1308	1	0.102
	230	240	UA1-230RT	1SAM201904R1305	1	0.102
	400	-	UA1-400RT	1SAM201904R1306	1	0.102
	415	480	UA1-415RT	1SAM201904R1307	1	0.102
	-	575	UA1-575RT	1SAM201904R1309	1	0.102

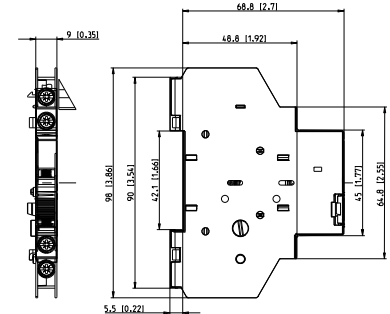


AA1-RT, UA1-RT

Main dimensions mm, inches



HK1-RT



SK1-RT

Main accessories

MS132-(K)B, MS165-(RT)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
	120 V	4 A
	240 V	4 A
	400 V	3 A
	440 V	1 A
		3 A
		-
		1.5 A
		-
		-
I_e / Rated operational current DC-13 acc. to IEC/EN 60947-5-1 for utilization category		
	24 V	2 A
	125 V	0.55 A
	250 V	0.27 A
	440 V, 600 V	0.15 A
		1 A
		0.27 A
		0.11 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

(1) Up to 6A with a mechanical and electrical durability of 40000 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

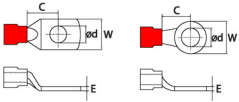
Connecting characteristics - Auxiliary circuit

Type	HK1, SK1, CK1	HKF1
Connecting capacity		
 Rigid	1 or 2 x	1 ... 1.5 mm ² / 0.5 ... 2.5 mm ² (with Push-in Spring terminals)
 Flexible with ferrule	1 or 2 x	0.75 ... 1.5 mm ² / 0.5 ... 2.5 mm ² (with Push-in Spring terminals)
 Flexible with insulated ferrule	1 or 2 x	0.75 ... 1.5 mm ² / 0.5 ... 1.5 mm ² (with Push-in Spring terminals)
 Flexible	1 or 2 x	0.75 ... 1.5 mm ² / 0.5 ... 2.5 mm ² (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-(RT)B..., MO132-B, MO165-B

Connecting characteristics HK1-RT / SK1-RT

Connecting capacity (min. ... max.)		
Main conductors (poles)		
Flexible with insulated ferrule		
	1 or 2 x	0.75 ... 1.5 mm ²
	d mm	3.5 mm < Ø < 6.8 mm
	W mm <	6.9 mm
	C mm <	7 mm
	E mm <	3 mm or 2 x 1.5 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...16
Tightening torque		1.2 Nm
Screw terminals		Delivered in open position, screws of unused terminals must be tightened
All terminals		M3.5
Screw driver type		Flat Ø 5.5 / Pozidriv 2

Main accessories

MS132-(K)B, MS165-(RT)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
	Coil operating voltage	0.85 ... 1.1 x Us
Power consumption	Pull-in	AC on request
		DC 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
	Storage	-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	-	-

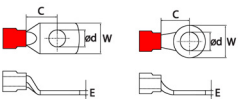
Note : For AA1 please consider 15 min OFF-period after max. 5 s ON-period, for voltages above the rated values.

Connecting characteristics

Auxiliary circuit

Type	UA1	AA1
Connecting capacity		
 Rigid	1 or 2 x 1 ... 4 mm ²	
 Flexible with ferrule	1 or 2 x 0.75 ... 2.5 mm ²	
 Flexible with insulated ferrule	1 x 0.75 ... 2.5 mm ²	
	2 x 0.75 ... 1.5 mm ²	
 Flexible	1 or 2 x 0.75 ... 2.5 mm ²	
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	

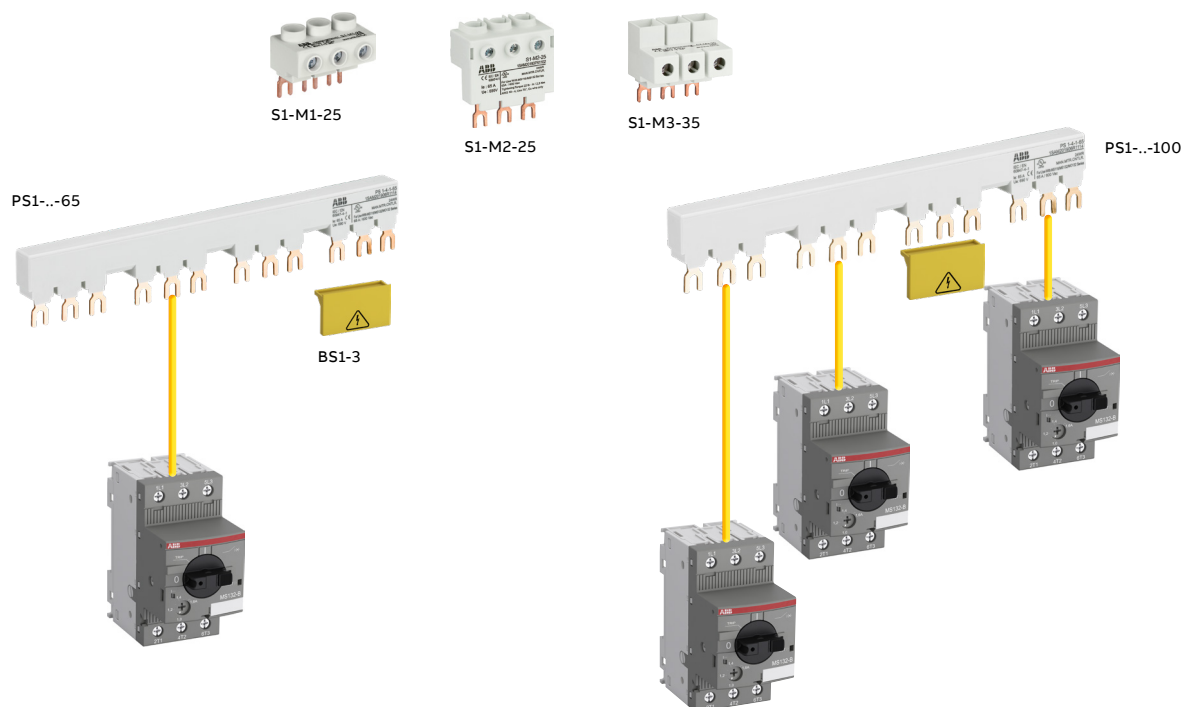
Connecting characteristics UA1-RT / AA1-RT

Connecting capacity (min. ... max.)	
Main conductors (poles)	
Flexible with insulated ferrule	1 or 2 x 0.75 ... 1.5 mm ²
	d mm 3.5 mm < Ø < 6.8 mm
	W mm < 8 mm
	C mm < 7 mm
	E mm < 3 mm or 2 x 1.5 mm
Connection capacity acc. to UL/CSA	1 or 2 x AWG 18...14
Tightening torque	1.2 Nm
Screw terminals	Delivered in open position, screws of unused terminals must be tightened
All terminals	M3.5
Screw driver type	Flat Ø 5.5 / 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)

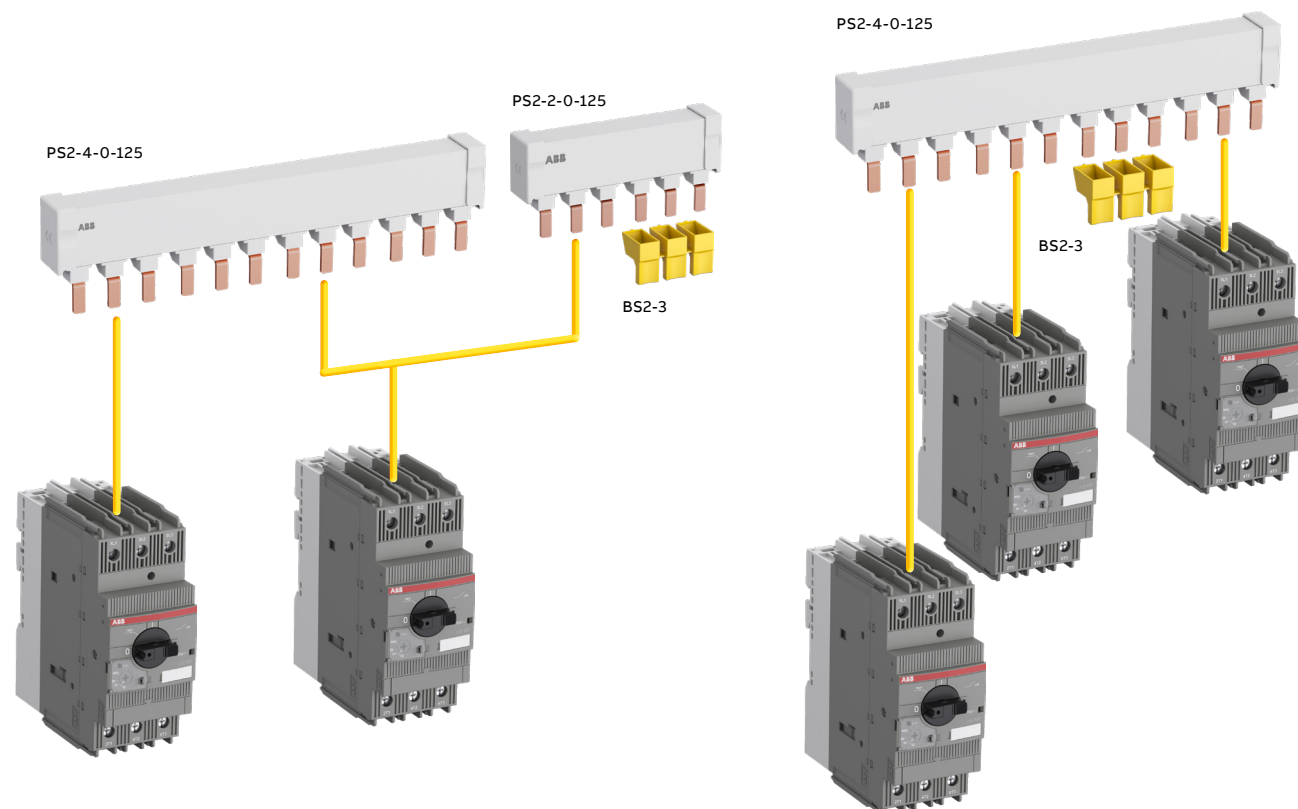


Three-phase busbar up to 65 A

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)

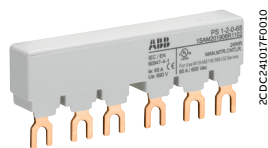


Three-phase busbar up to 125 A

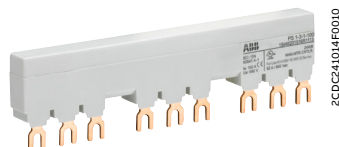
Three-phase busbar up to 125 A

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	Number of manual motor starters	Number of lateral auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce)
	A						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
MS132-B, MO132-B	65	4	2	PS1-4-2-65	1SAM201906R1124	10	0.095
	65	5	2	PS1-5-2-65	1SAM201906R1125	10	0.122
	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	Rated cross section	Mounting form	Type	Order code	Pkg qty	Weight (1 pce)
	A	mm ²					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

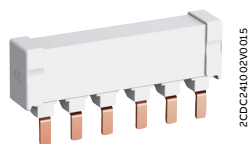
Suitable for	Description	Type	Order code	Pkg qty	Weight (1 pce)
					kg
MS132-B, MO132-B	Protection cover for busbars	BS1-3	1SAM201908R1001	50	0.003
MS132-(K)B, MO132-B,	Screw fixing kit	FS116	1SAM201909R1001	1	0.020
	Padlock + two keys	SA2	GJF1101903R0002	10	0.020

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

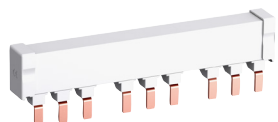
Accessories

MS165-(RT)B, MO165-B



PS2-2-0-125

2CDC24102V0015



PS2-3-0-125

2CDC24103V0015



KA165

2CDC241010V0014



BS2-3

2CDC241001V0015



SA2

2CDC241023F0013



TS2-M3-S1

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	Number of Manual motor starters	Number of lateral auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce)
	A						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
MS165-RTB	Terminal spacer for UL/CSA Type E/F and IEC	TS2-M3-S1	1SAM401924R1301	2	0.01

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			
Shock and vibration withstand acc. to IEC 61373		Category 1, Class B			

Electrical connection - Main circuit

Type	S1-Mx-25	S1-Mx-35
Connecting capacity		
 Rigid	1 x 6 ... 25 mm ²	10 ... 35 mm ²
 Flexible with ferrule	1 x 6 ... 16 mm ²	10 ... 35 mm ²
 Flexible with insulated ferrule	1 x 6 ... 16 mm ²	10 ... 35 mm ²
 Flexible	1 x 6 ... 16 mm ²	10 ... 35 mm ²
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, GF..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
3/49	AF..(Z)B..K 3-pole contactors with Push-in Spring terminals
3/63	AF..(Z)B 4-pole contactors with screw terminals
3/89	NF..(Z)B(..K) contactor relays with screw terminals and Push-in Spring terminals
3/103	GF..B contactors for DC switching
3/111	Accessories
3/129	Terminal marking and positioning
3/135	Dimensions
3/172	Voltage code table

AF..(Z)B(..K), GF..B 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	$\theta \leq 60^\circ\text{C}$, 400 V	kW	4	5.5	7.5	11	15	18.5	18.5	22	30	
UL/CSA	3-phase motor rating	480 V	hp	5	7.5	10	15	20	25	30	40	50	
Contactor type				AF09(Z)B	AF12(Z)B	AF16(Z)B	AF26(Z)B	AF30(Z)B	AF38(Z)B	AF40B	AF52B	AF65B	
				AF09(Z)B..K	AF12(Z)B..K	AF16(Z)B..K	AF26(Z)B..K	AF30(Z)B..K	AF38(Z)B..K				
IEC	AC-3 Rated operational current	$\theta \leq 60^\circ\text{C}$, 400 V	A	9	12	18	26	32	38	40	53	65	
	AC-1 Rated operational current	$\theta \leq 40^\circ\text{C}$, 690 V	A	25	28	30	45	50	50	70	100	105	
		$\theta \leq 60^\circ\text{C}$, 690 V	A	25	28	30	40	42	42	60	80	90	
		$\theta \leq 70^\circ\text{C}$, 690 V	A	22	24	26	32	37	37	50	70	80	
UL/CSA	General use rating	600 V	A	25	28	30	45/42 (1)	50/45 (1)	50/45 (1)	60	80	90	
NEMA	NEMA Size			00	0	–	1	–	–	2	–	–	

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

Main accessories

Auxiliary contact blocks	Front mounting
	Side mounting
Interlocking units	Mechanical
	Mechanical / electrical
Surge suppressors	

CA4, CA4..K, CAT4

CAL4-11, CAL4-11K

VM4

VEM4, VEM4K

Built-in surge protection

VM96-4

–

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	$\theta \leq 40^\circ\text{C}$, 690 V	A	25	30	45	55	70	100	125	
	U _e max. ≤ 690 V, 50/60 Hz	$\theta \leq 60^\circ\text{C}$, 690 V	A	25	30	40	45	60	80	105	
		$\theta \leq 70^\circ\text{C}$, 690 V	A	22	26	32	37	50	70	90	
		600 V	A	25	30	45	55	60	80	105	
UL/CSA	General use rating	600 V	A	25	30	45	55	60	80	105	

Main accessories

Auxiliary contact blocks	Front mounting
	Side mounting
Interlocking units	Mechanical
	Mechanical / electrical
Surge suppressors	

CA4, CA4..K, CAT4

CAL4-11, CAL4-11K

VM4

VEM4

Built-in surge protection

VM96-4

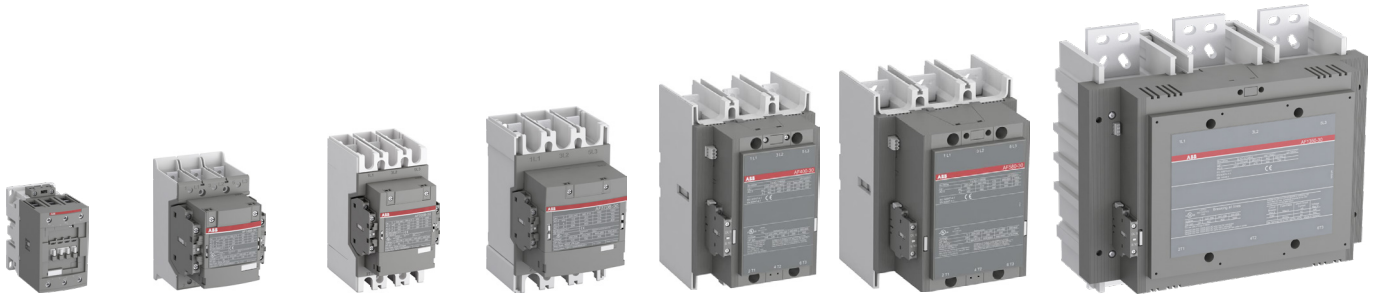
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CA4, CA4..K

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

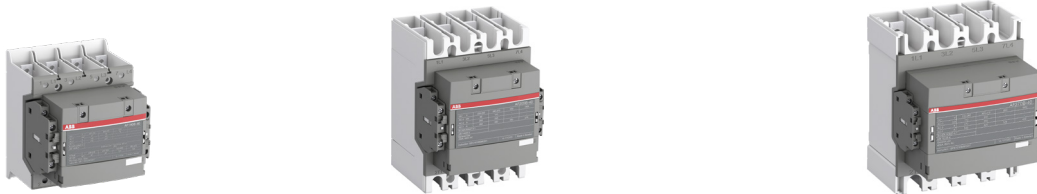


Number of contacts									
IEC	AC-15 Rated operational current	400 V	A	3	3	3	3	3	3
UL/CSA	Pilot Duty			A600, Q600			A600, Q600		
Contactor relay type				NF(Z)B22E	NF(Z)B31E	NF(Z)B40E	NF(Z)B44E	NF(Z)B62E	NF(Z)B80E
				NF(Z)B22EK	NF(Z)B31EK	NF(Z)B40EK	NF(Z)B44EK	NF(Z)B62EK	NF(Z)B80EK



37	45/55	55	75	75	90	110	132	160	200	200	250	315	400	-	475	560	-	-	-
60	60/75	75	100	100	125	150	200	250	300	350	400	500	600	-	800	900	-	-	-
AF80B AF96B		AF116B AF140B		AF146B	AF190B AF205B		AF265B AF305B AF370B			AF400B AF460B		AF580B AF750B AF1250B			AF1350B AF1650B AF2050B AF2650B AF2850B				
80	105	116	140	146	190	205	265	305	370	400	460	580	750	-	860	1060	-	-	-
125	130	160	200	225	275	350	400	500	600	600	700	800	1050	1260	1350	1650	2050	2650	2850
100	105	145	175	200	250	300	350	400	500	500	600	700	875	1040	1150	1450	1750	2350	2600
85	90	130	160	175	200	240	290	325	400	400	480	580	720	875	1100	1270	1500	2120	2300
105	115	160	200	200	250	300	350	400	520	550	650	750	900	1210	1350	1650	3100	27090	2850
3	-	-	4	-	-	-	5	-	-	-	6	-	7	8	-	-	-	-	-

CA4, CA4..K	-		
	CAL19B-11		CAL18B-11
	VM19 (for same size contactors)		VM750H
			VM750V



	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

-			
	CAL19B-11		
	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
3/9	AF40B ... AF96B	DC operated
3/10	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	AF400B ... AF750B	DC operated
3/20	AF400B ... AF750B	AC operated
3/21	AF1250B ... AF2850B	DC operated
3/22	AF1250B ... AF2850B	AC operated
3/26	Technical data	
3/45	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



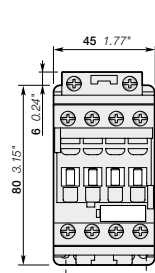
AF26ZB-30-00

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.

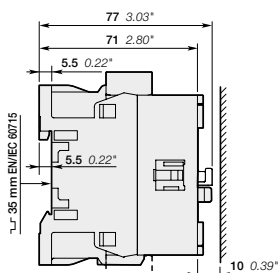
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 ... 1.25 U_c 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	current θ ≤ 40 °C	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
400 V AC-3	AC-1			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
						0 0	AF26ZB-30-00-22	1SBL236061R2200	0.370
				72, 96, 110	48...130	0 0	AF26ZB-30-00-23	1SBL236061R2300	0.370
						0 0	AF30ZB-30-00-21	1SBL276061R2100	0.370
				220	100...250	0 0	AF30ZB-30-00-22	1SBL276061R2200	0.370
						0 0	AF30ZB-30-00-23	1SBL276061R2300	0.370
15	50	20	50	24, 33, 48	20...60	0 0	AF38ZB-30-00-21	1SBL296061R2100	0.370
						0 0	AF38ZB-30-00-22	1SBL296061R2200	0.370
				72, 96, 110	48...130	0 0	AF38ZB-30-00-23	1SBL296061R2300	0.370
						0 0	AF38ZB-30-00-21	1SBL296061R2100	0.370
				220	100...250	0 0	AF38ZB-30-00-22	1SBL296061R2200	0.370
						0 0	AF38ZB-30-00-23	1SBL296061R2300	0.370
18.5	50	25	50	24, 33, 48	20...60	0 0	AF38ZB-30-00-21	1SBL296061R2100	0.370
						0 0	AF38ZB-30-00-22	1SBL296061R2200	0.370
				72, 96, 110	48...130	0 0	AF38ZB-30-00-23	1SBL296061R2300	0.370
						0 0	AF38ZB-30-00-21	1SBL296061R2100	0.370
				220	100...250	0 0	AF38ZB-30-00-22	1SBL296061R2200	0.370
						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



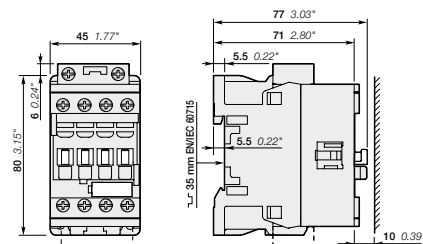
AF26(Z)B-30-00

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.

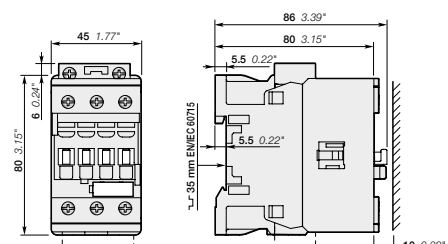
They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC. These contactors are of the block type design with 3 main poles.

- 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 (HL2, HL3 hazard levels)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range $U_{c \min.} \dots U_{c \max.}$ 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 $U_{c \min.} \dots U_{c \max.}$ (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating 480 V	General use rating 600 V AC					
400 V AC-3	AC-1			V AC 50/60 Hz				
kW	A	hp	A					
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
					1 0	AF12ZB-30-10-21	1SBL156061R2110	0.310
					0 1	AF12ZB-30-01-21	1SBL156061R2101	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	AF12ZB-30-10-23	1SBL156061R2301	0.310
					0 1	AF12B-30-10-14	1SBL157061R1410	0.310
					0 1	AF12B-30-01-14	1SBL157061R1401	0.310
					1 0	AF16ZB-30-10-21	1SBL176061R2110	0.310
7.5	30	10	30	24...60	0 1	AF16ZB-30-01-21	1SBL176061R2101	0.310
					1 0	AF16ZB-30-10-22	1SBL176061R2210	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
					0 0	AF26ZB-30-00-21	1SBL236061R2100	0.370
					0 0	AF26ZB-30-00-22	1SBL236061R2200	0.370
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
				250...500	0 0	AF30ZB-30-00-21	1SBL276061R2100	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
				250...500	0 0	AF38ZB-30-00-21	1SBL296061R2100	0.370
18.5	50	25	50	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
				250...500	0 0	AF38B-30-00-14	1SBL297061R1400	0.370



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

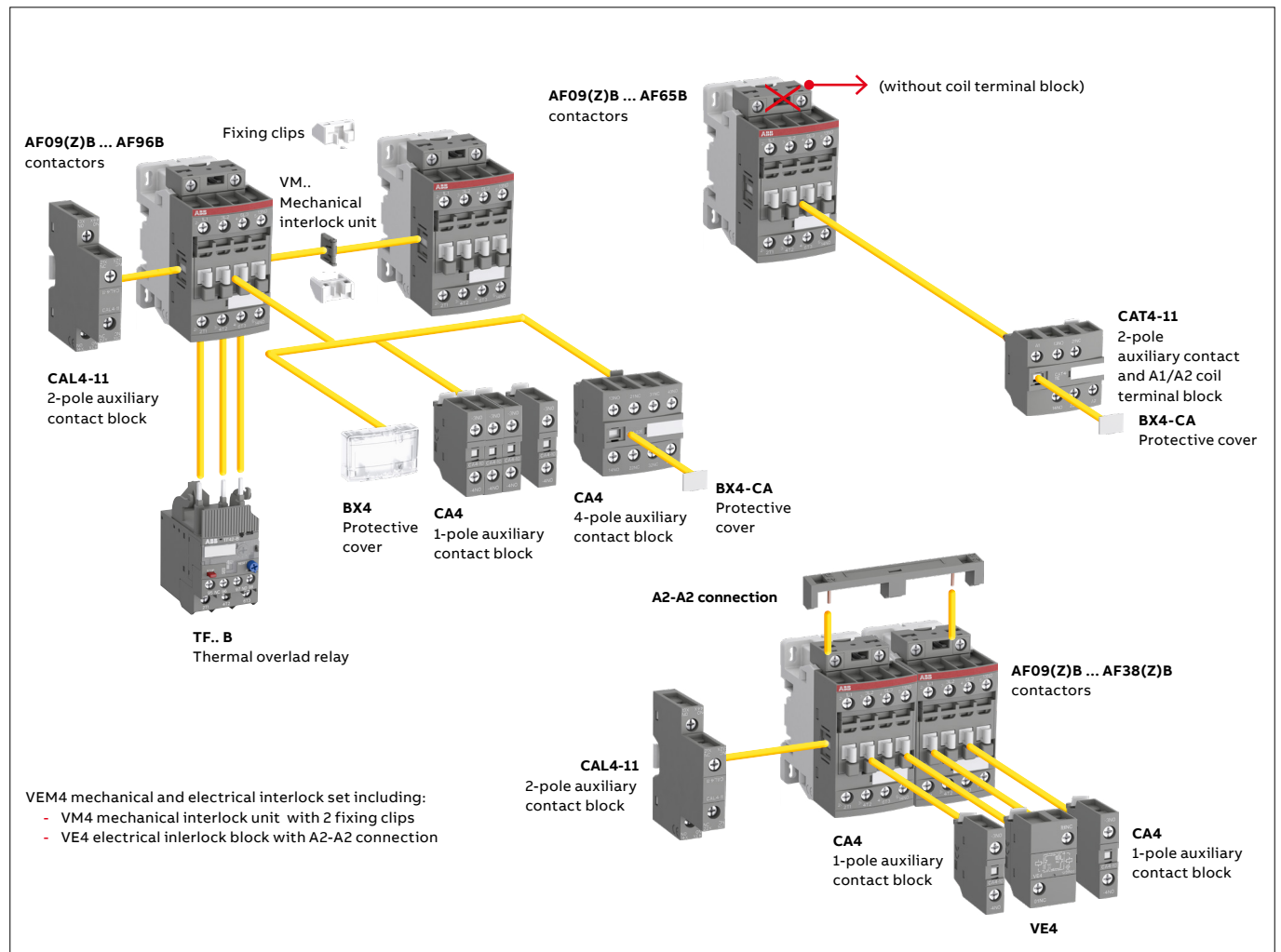


AF26(Z)B, AF30(Z)B, AF38(Z)B

Main dimensions mm, inches

AF09(Z)B ... AF96B 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	Built-in auxiliary contacts	Front-mounted accessories			Side-mounted accessories				
			Auxiliary contact blocks			Electrical and mechanical interlock set (between 2 contactors)	Auxiliary contact blocks			
							Left side	Right side		
			1-pole CA4	2-pole CAT4-11	4-pole CA4	VEM4	2-pole CAL4-11			
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.

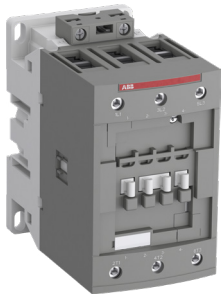
AF40B...AF96B 3-pole contactors

18.5 to 45 kW

DC operated - connection with standard ferrules



AF40B-30-00



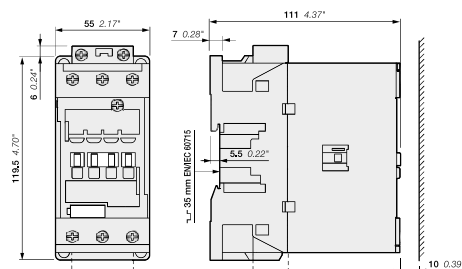
AF80B-30-00

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.

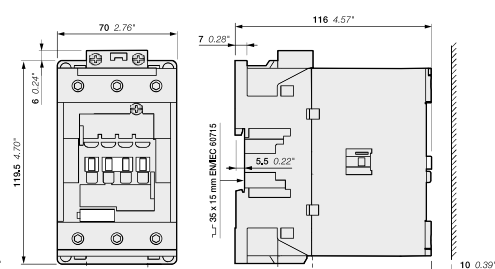
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 ... 1.25 U_c 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 U_c (IEC 60077) (1)	Rated control circuit voltage U_c min. ... U_c max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating 480 V	General use rating 600 V AC						
400 V AC-3	AC-1			V DC	V DC				
kW	A	hp	A						
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

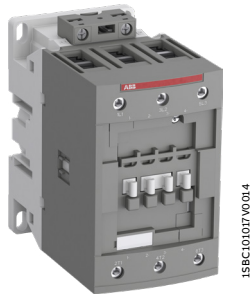
AF40B...AF96B 3-pole contactors

18.5 to 45 kW

AC operated - connection with standard ferrules



AF40B-30-00

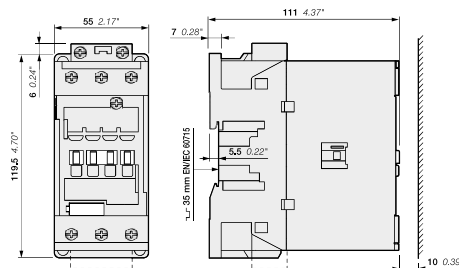


AF80B-30-00

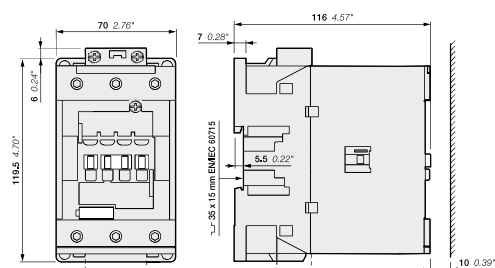
AF40B...AF96B 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC (AF80B... AF96B up 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 sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range $U_{c \min}$... $U_{c \max}$ 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	current θ ≤ 40 °C	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
400 V AC-3	AC-1			V AC 50/60 Hz				kg
kW	A	hp	A					
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



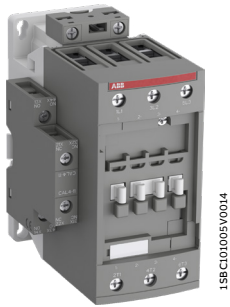
AF80B, AF96B

Main dimensions mm, inches

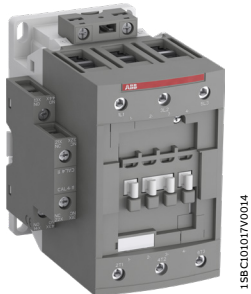
AF40B...AF96B 3-pole contactors

18.5 to 45 kW with 1 N.O. + 1 N.C. auxiliary contacts

DC operated - connection with standard ferrules



AF40B-30-11



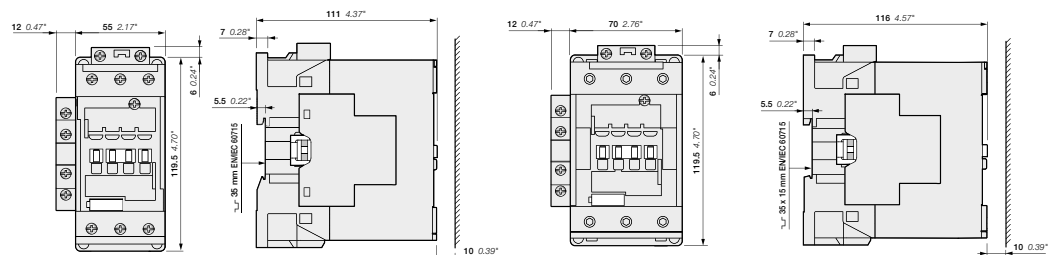
AF80B-30-11

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 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 ... 1.25 U_c 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 U_c (IEC 60077) (1)	Rated control circuit voltage U_c min. ... U_c max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating 480 V	General use rating 600 V AC						
400 V AC-3	AC-1			V DC	V DC				
kW	A	hp	A						
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

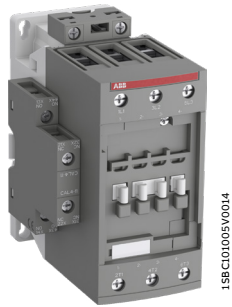
AF80B, AF96B

Main dimensions mm, inches

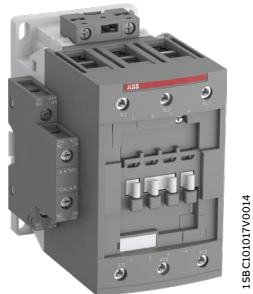
AF40B...AF96B 3-pole contactors

18.5 to 45 kW with 1 N.O. + 1 N.C. auxiliary contacts

AC operated - connection with standard ferrules



AF40B-30-11

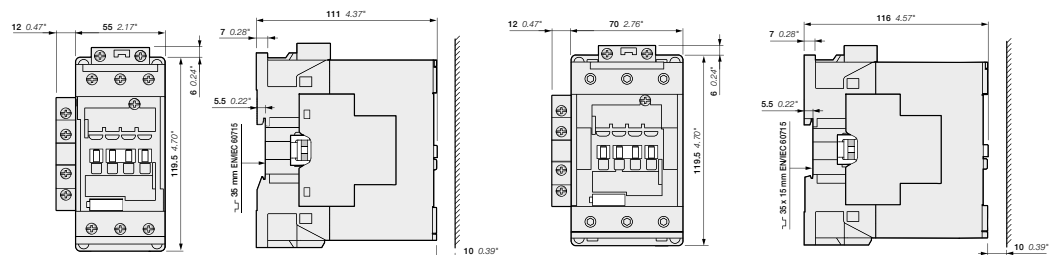


AF80B-30-11

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 sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range $U_c \text{ min.} \dots U_c \text{ max.}$ 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 $+70^\circ\text{C}$
- 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	current θ ≤ 40 °C	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
400 V AC-3 kW	AC-1 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



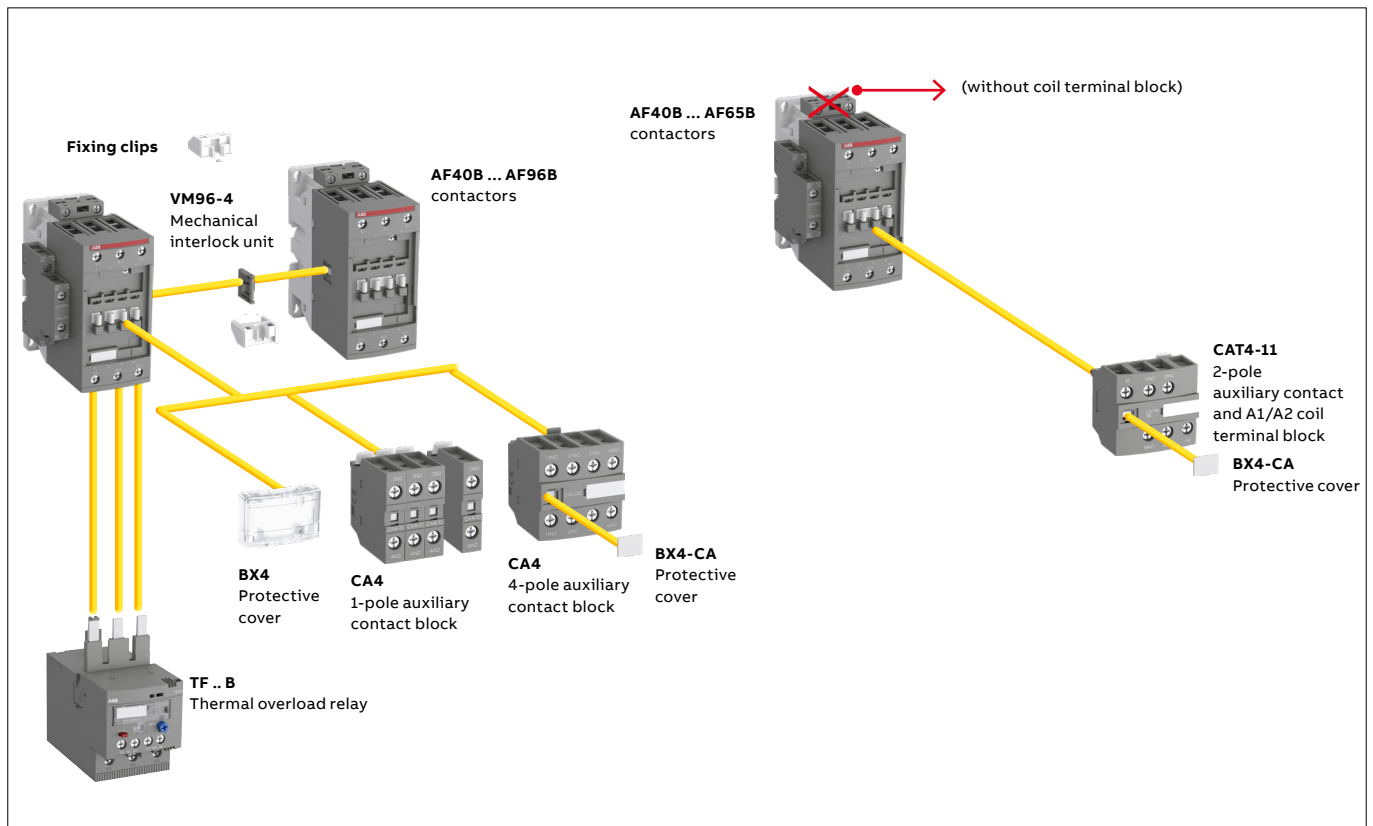
AF40B, AF52B, AF65B

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			Side-mounted accessories			
			Auxiliary contact blocks			Mechanical interlock set (between 2 contactors)	Auxiliary contact blocks		
			1-pole CA4	2-pole CAT4-11	4-pole CA4	VM96-4	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)

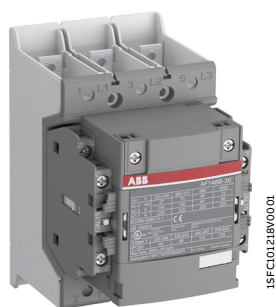
The addition of an overload relay on the contactor does not prevent fitting of many other accessories as shown above.

(2) Direct mounting - No kit required.

AF116B ... AF146B 3-pole contactors

55 to 75 kW

DC operated - connection with standard ferrules



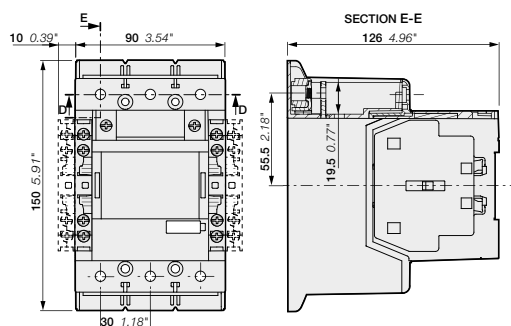
AF146B-30-22

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 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 ... 1.25 U_c 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	current θ ≤ 40 °C	3-phase motor rating 480 V	General use rating 600 V AC						
400 V AC-3	AC-1								
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.



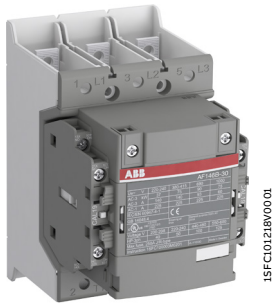
AF116B, AF140B, AF146B-30-22

Main dimensions mm, inches

AF116B ... AF146B 3-pole contactors

55 to 75 kW

AC operated - connection with standard ferrules

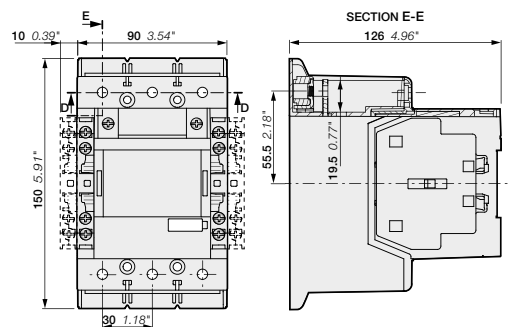


AF146B-30-22

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 $U_{c \min.} \dots U_{c \max.}$ 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 $U_{c \min.} \dots U_{c \max.}$ (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
400 V AC-3	AC-1			V AC 50/60 Hz				kg
kW	A	hp	A					
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



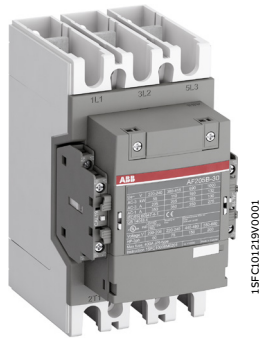
AF116B, AF140B, AF146B-30-22

Main dimensions mm, inches

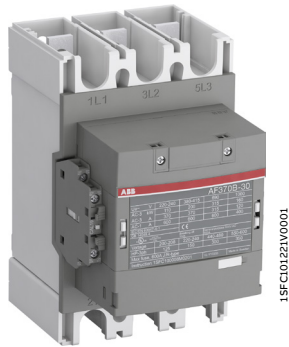
AF190B ... AF370B 3-pole contactors

90 to 200 kW

DC operated - connection with standard ferrules



AF205B-30-22



AF370B-30-22

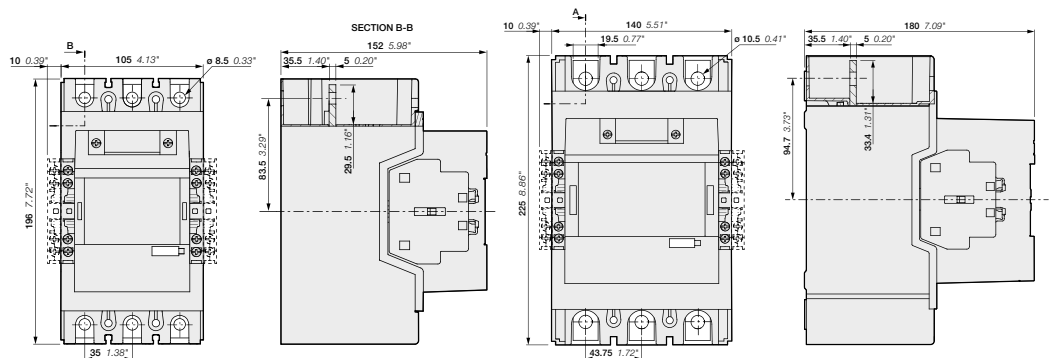
AF190B ... AF370B 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC and up to 220 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	current θ ≤ 40 °C	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
400 V AC-3	AC-1			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

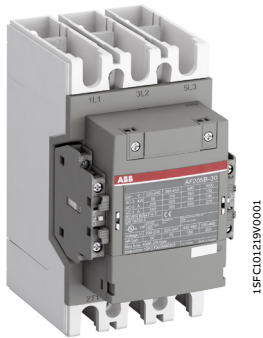
AF265B, AF305B, AF370B-30-22

Main dimensions mm, inches

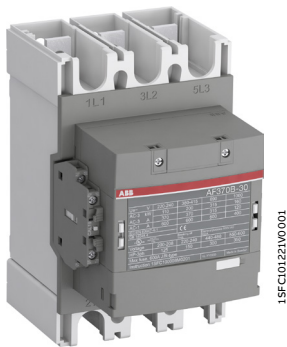
AF190B ... AF370B 3-pole contactors

90 to 200 kW

AC operated - connection with standard ferrules



AF205B-30-22



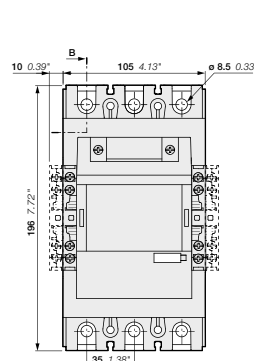
AF370B-30-22

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.

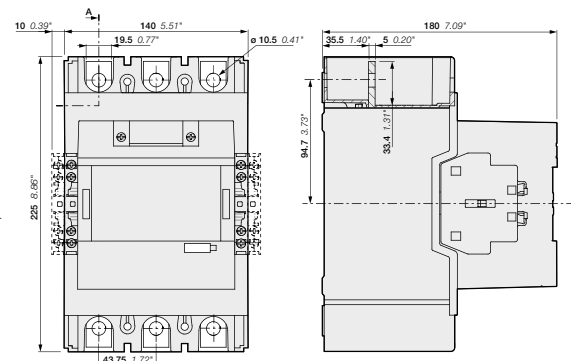
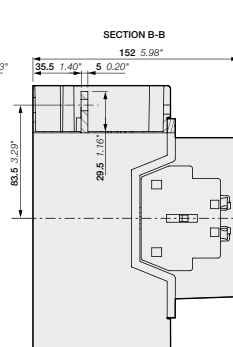
These contactors are of the block type design with 3 main poles.

- 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 $U_{c \min}$... $U_{c \max}$ 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	current θ ≤ 40 °C	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
400 V AC-3 kW	AC-1 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

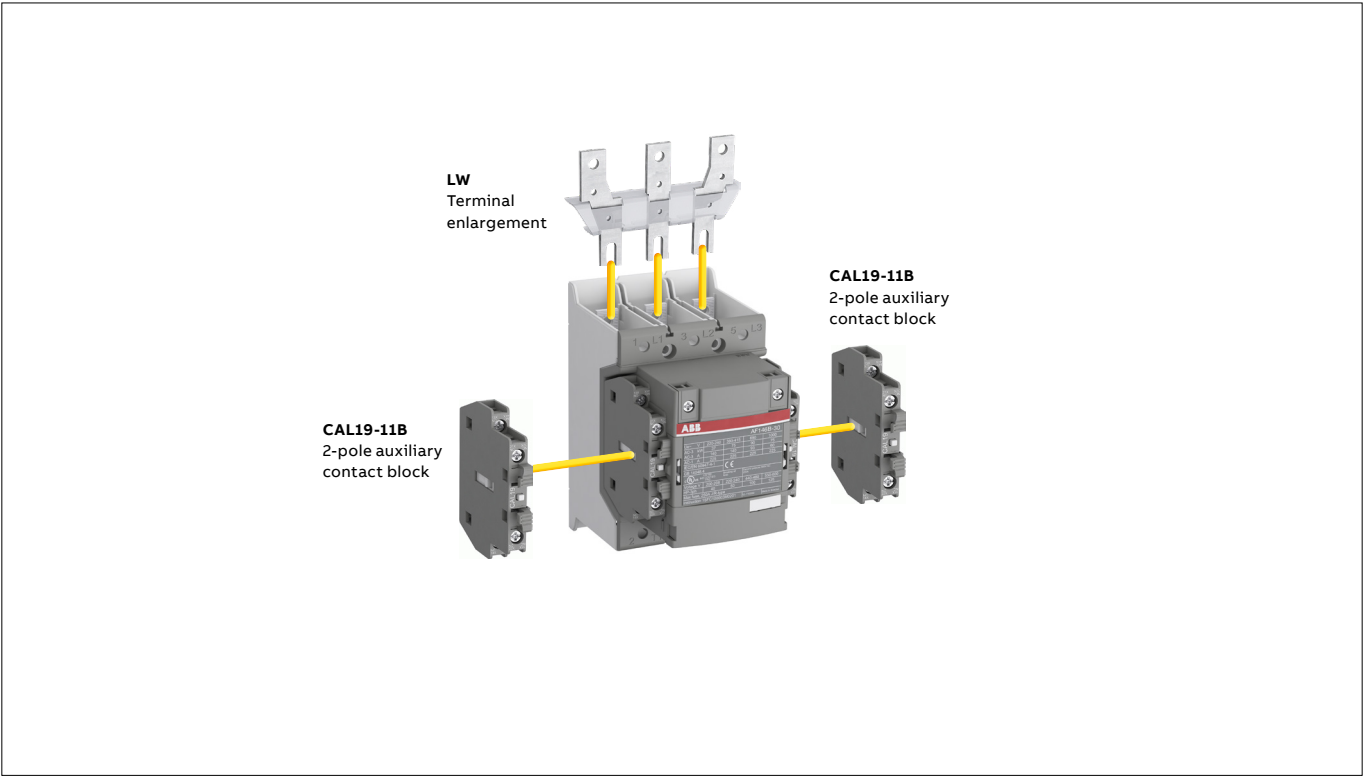


AF265B, AF305B, AF370B-30-22

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

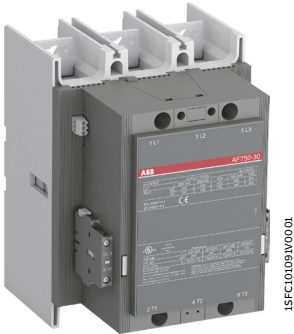
AF400B ... AF750B 3-pole contactors

200 to 400 kW

DC operated - connection with standard ferrules



AF460B-30-22



AF750B-30-22

AF400B ... AF750B 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 600 V DC⁽²⁾.

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 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 ... 1.25 U_c 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 circuit voltage U _c (IEC 60077)	Rated control circuit voltage U _c min. ... U _c 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 AC-3	690 V AC-1	480 V	600 V AC						kg
kW	A	hp	A	V DC	V DC				
200	600	350	550	24 ⁽³⁾ , 28, 32, 36, 48	24...60	2 2	AF400B-30-22-68	1SFL577063R6822 ⁽¹⁾	12.000
				64, 72, 87, 96, 110	48...130	2 2	AF400B-30-22-69	1SFL577063R6922	12.000
				220	100...250	2 2	AF400B-30-22-70	1SFL577063R7022	12.000
250	700	400	650	24 ⁽³⁾ , 28, 32, 36, 48	24...60	2 2	AF460B-30-22-68	1SFL597063R6822 ⁽¹⁾	12.000
				64, 72, 87, 96, 110	48...130	2 2	AF460B-30-22-69	1SFL597063R6922	12.000
				220	100...250	2 2	AF460B-30-22-70	1SFL597063R7022	12.000
315	800	500	750	24 ⁽³⁾ , 28, 32, 36, 48	24...60	2 2	AF580B-30-22-68	1SFL617063R6822 ⁽¹⁾	15.000
				64, 72, 87, 96, 110	48...130	2 2	AF580B-30-22-69	1SFL617063R6922	15.000
				220	100...250	2 2	AF580B-30-22-70	1SFL617063R7022	15.000
400	1050	600	900	24 ⁽³⁾ , 28, 32, 36, 48	24...60	2 2	AF750B-30-22-68	1SFL637063R6822 ⁽¹⁾	15.000
				64, 72, 87, 96, 110	48...130	2 2	AF750B-30-22-69	1SFL637063R6922	15.000
				220	100...250	2 2	AF750B-30-22-70	1SFL637063R7022	15.000

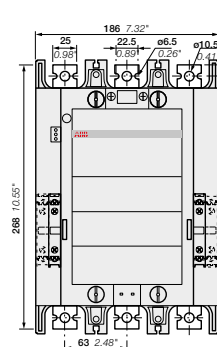
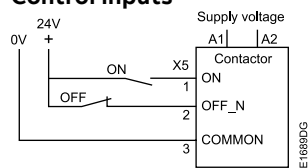
(1) The connection polarities indicated close to the coil terminals must be respected: A1 for the positive pole and A2 for the negative pole.

(2) Up to 850 V DC for AF580B, AF750B.

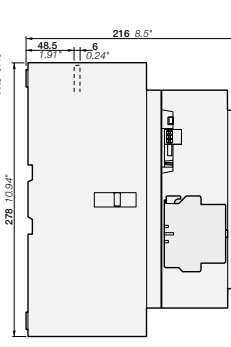
(3) When supplied by generator, alternator or electronic converter

AF400B...AF750B are equipped with low voltage inputs for control, for example by a PLC.

Control inputs



AF400B, AF460B



AF580B, AF750B

Main dimensions mm, inches

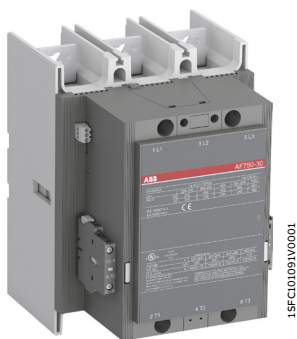
AF400B ... AF750B 3-pole contactors

200 to 400 kW

AC operated - connection with standard ferrules



AF460B-30-22



AF750B-30-22

AF400B ... AF750B 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 600 V DC ⁽¹⁾.

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

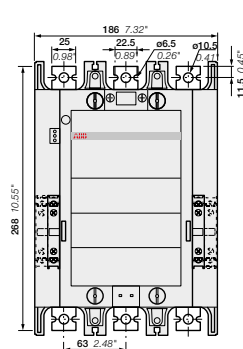
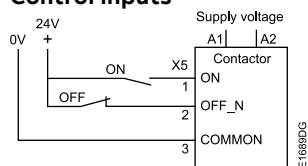
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range $U_c \text{ min.} \dots U_c \text{ max.}$ 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	current $\theta \leq 40\text{ }^{\circ}\text{C}$	3-phase motor rating	General use rating					Pkg (1 pce)
400 V AC-3 kW	690 V AC-1 A	480 V hp	600 V AC A	V AC 50/60 Hz				kg
200	600	350	550	48...130	2 2	AF400B-30-22-69	1SFL577063R6922	12.000
				100...250	2 2	AF400B-30-22-70	1SFL577063R7022	12.000
				250...500	2 2	AF400B-30-22-71	1SFL577063R7122	12.000
250	700	400	650	48...130	2 2	AF460B-30-22-69	1SFL597063R6922	12.000
				100...250	2 2	AF460B-30-22-70	1SFL597063R7022	12.000
				250...500	2 2	AF460B-30-22-71	1SFL597063R7122	12.000
315	800	500	750	48...130	2 2	AF580B-30-22-69	1SFL617063R6922	15.000
				100...250	2 2	AF580B-30-22-70	1SFL617063R7022	15.000
				250...500	2 2	AF580B-30-22-71	1SFL617063R7122	15.000
400	1050	600	900	48...130	2 2	AF750B-30-22-69	1SFL637063R6922	15.000
				100...250	2 2	AF750B-30-22-70	1SFL637063R7022	15.000
				250...500	2 2	AF750B-30-22-71	1SFL637063R7122	15.000

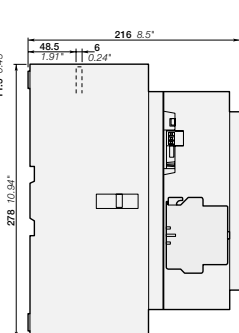
(1) Up to 850 V DC for AF580B, AF750B.

AF400B...AF750B are equipped with low voltage inputs for control, for example by a PLC.

Control inputs



AF400B, AF460B



AF580B, AF750B

Main dimensions mm, inches

AF1250B ... AF2850B 3-pole contactors

475 to 560 kW and 1260 to 2850 A AC-1

DC operated - connection with standard ferrules



AF1250B-30-22

1SFLC101032V0001



AF2650B-30-22

1SFLC101032V0001

AF1250B...AF2850B 3-pole contactors comply with the latest railway rolling stock standards a. They are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC and up to 850 V DC.

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

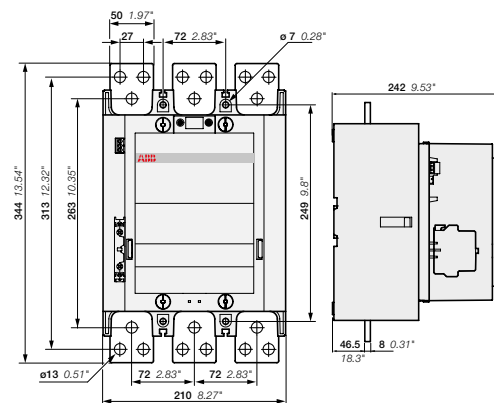
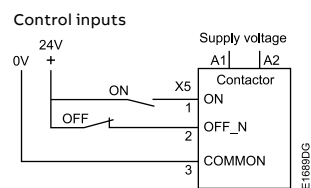
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard, EMC 10V/M for 250-500 V
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL1 hazard level)
- electronic coil interface accepting 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 circuit Uc (IEC60077)	Rated control circuit voltage Uc min. ... Uc max. (IEC60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current $\theta \leq 40^{\circ}\text{C}$ 690 V AC-1	3-phase motor rating 480 V	General use rating 600 V AC ⁽¹⁾						Pkg (1 pce)
kW	A	hp	A	V DC	V DC				kg
-	1250	-	1210	24 ⁽²⁾ , 28, 32, 36, 48	24...60	2 2	AF1250B-30-22-68	1SFL647063R6822	16.000
				64, 72, 87, 96, 110	48...130	2 2	AF1250B-30-22-69	1SFL647063R6922	16.000
				220	100...250	2 2	AF1250B-30-22-70	1SFL647063R7022	16.000
475	1350	800	1350	64, 72, 87, 96, 110	48...122	2 2	AF1350B-30-22-69	1SFL657063R6922	34.000
				220	100...250	2 2	AF1350B-30-22-70	1SFL657063R7022	34.000
560	1650	900	1650	64, 72, 87, 96, 110	48...130	2 2	AF1650B-30-22-69	1SFL677063R6922	35.000
				220	100...250	2 2	AF1650B-30-22-70	1SFL677063R7022	35.000
-	2050	-	2100	64, 72, 87, 96, 110	48...130	2 2	AF2050B-30-22-69	1SFL707063R6922	35.000
				220	100...250	2 2	AF2050B-30-22-70	1SFL707063R7022	35.000
-	2650	-	2700	64, 72, 87, 96, 110	48...130	2 2	AF2650B-30-22-69	1SFL667063R6922	45.000
				220	100...250	2 2	AF2650B-30-22-70	1SFL667063R7022	45.000
-	2850	-	2850	64, 72, 87, 96, 110	48...130	2 2	AF2850B-30-22-69	1SFL687063R6922	45.000
				220	100...250	2 2	AF2850B-30-22-70	1SFL687063R7022	45.000

(1) AF2650B: Maximum operational voltage = 1000 V according to UL / CSA.

(2) When supplied by generator, alternator or electronic converter

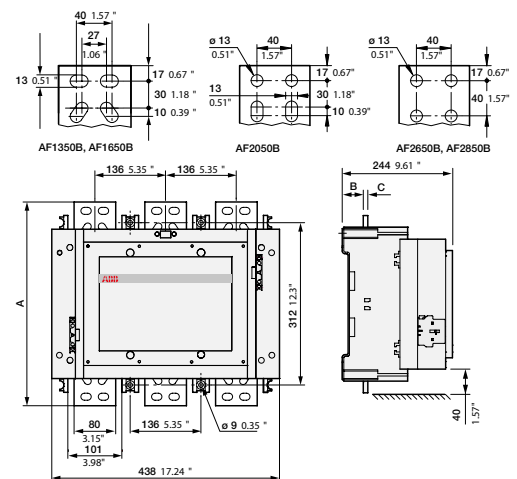
AF1250B ... AF2850B are equipped with low voltage inputs for control, for example by a PLC.



AF1250B

Main dimensions mm, inches

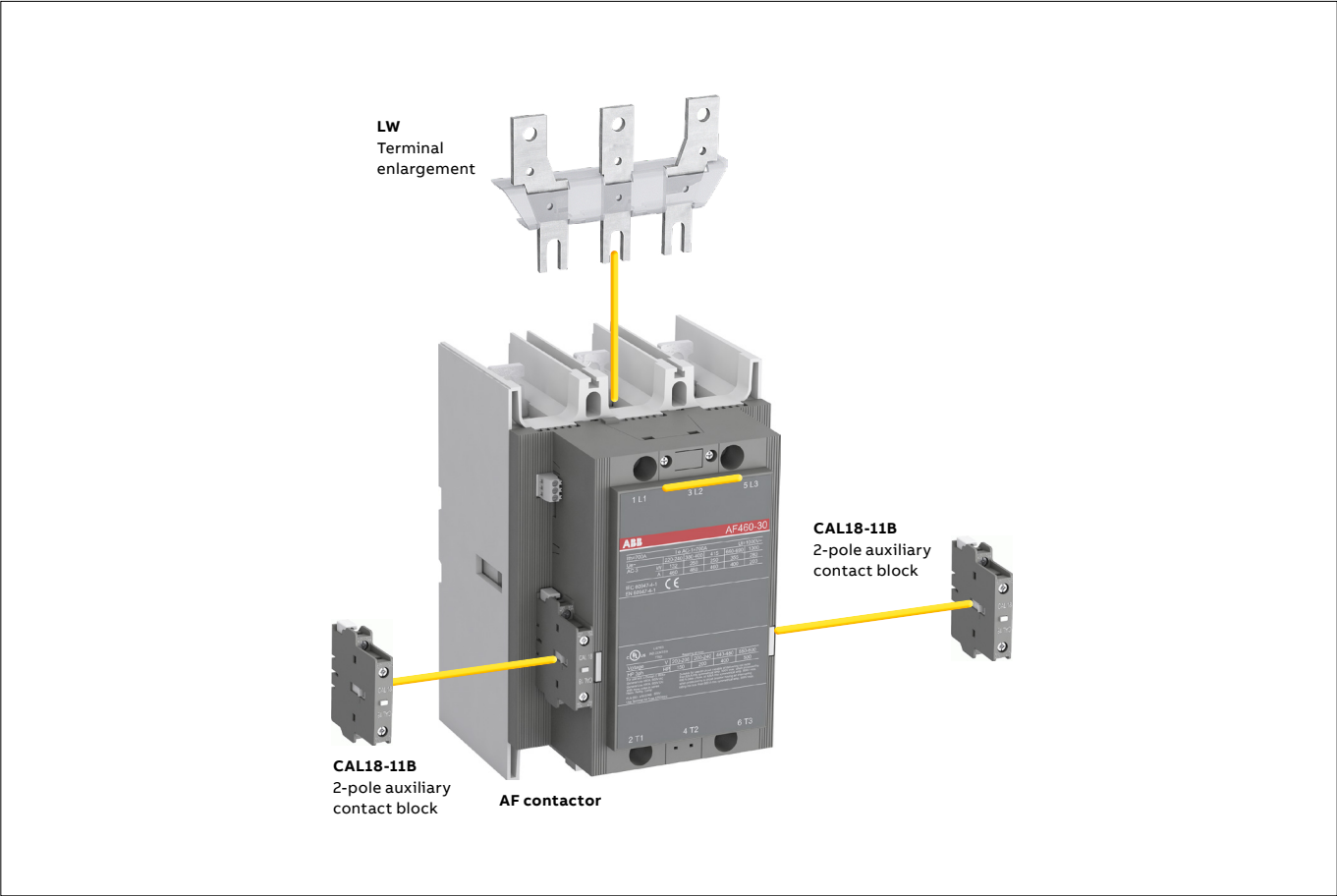
	AF1350B, AF1650B, AF2050B	AF2650B, AF2850B
A	392 mm / 15.43"	422 mm / 16.61"
B	47 mm / 1.85"	53 mm / 2.11"
C	10 mm / 0.39"	25 mm / 0.98"



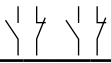
AF1350B, AF1650B, AF2050B, AF2650B, AF2850B

AF400B ... AF2850B 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
			CAL18-11
			CAL18-11B
Contactors + auxiliary contact blocks			
AF400B...AF2850B	3 0	2 2	2 x CAL18-11 included
			+ 2 x CAL18-11B

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 U _e max.	690 V					
Rated frequency (without derating)	50 / 60 Hz					
Conventional free-air thermal current I _{th} acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$	35 A	35 A	35 A	50 A	50 A	50 A
With conductor cross-sectional area	6 mm ²	6 mm ²	6 mm ²	10 mm ²	10 mm ²	10 mm ²
AC-1 Utilization category						
For air temperature close to contactor						
I _e / Rated operational current AC-1						
U _e max. $\leq 690\text{ V}$, 50/60 Hz	$\theta \leq 40^\circ\text{C}$ 25 A	28 A	30 A	45 A	50 A	50 A
	$\theta \leq 60^\circ\text{C}$ 25 A	28 A	30 A	40 A	42 A	42 A
	$\theta \leq 70^\circ\text{C}$ 22 A	24 A	26 A	32 A	37 A	37 A
With conductor cross-sectional area	4 mm ²	6 mm ²	6 mm ²	10 mm ²	10 mm ²	10 mm ²
AC-3, AC-3e Utilization category						
For air temperature close to contactor $\theta \leq 60^\circ\text{C}$						
I _e / Max. rated operational current AC-3, AC-3e (2)						
	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)						
	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 I _e AC-3, 12 x I _e AC-3e acc. to IEC 60947-4-1					
Rated breaking capacity AC-3, AC-3e	8 x I _e AC-3, 8.5 x I _e AC-3e acc. to IEC 60947-4-1					
Short-circuit protection device for contactors without thermal overload relay - Motor protection excluded (3)						
U _e $\leq 500\text{ V}$ AC - gG type fuse	25 A	32 A	32 A	50 A	63 A	63 A
Rated short-time withstand current I _{cw} 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 $\phi = 0.45$	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	I _e / AC-1 0.8 W	1 W	1.2 W	1.8 W	2.4 W	2.4 W
	I _e / 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						
le / 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						
le / 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
	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
	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		le / AC-1 3 W	6.3 W	7 W	7.6 W	8.2 W
	le / 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 U _e 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 I _{th} acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$ With conductor cross-sectional area	160 A 70 mm ²	200 A 95 mm ²	225 A 95 mm ²	275 A 150 mm ²	350 A 240 mm ² (4)	400 A 240 mm ²	500 A 300 mm ² (5)	600 A 2 x 185 mm ² (5)
AC-1 Utilization category								
For air temperature close to contactor								
I _e / Rated operational current AC-1								
U _e max. $\leq 690\text{ V}$, 50/60 Hz	$\theta \leq 40^\circ\text{C}$ 160 A $\theta \leq 60^\circ\text{C}$ 145 A $\theta \leq 70^\circ\text{C}$ 130 A	$\theta \leq 40^\circ\text{C}$ 200 A $\theta \leq 60^\circ\text{C}$ 175 A $\theta \leq 70^\circ\text{C}$ 160 A	$\theta \leq 40^\circ\text{C}$ 225 A $\theta \leq 60^\circ\text{C}$ 200 A $\theta \leq 70^\circ\text{C}$ 175 A	$\theta \leq 40^\circ\text{C}$ 275 A $\theta \leq 60^\circ\text{C}$ 250 A $\theta \leq 70^\circ\text{C}$ 200 A	$\theta \leq 40^\circ\text{C}$ 350 A $\theta \leq 60^\circ\text{C}$ 300 A $\theta \leq 70^\circ\text{C}$ 275 A	$\theta \leq 40^\circ\text{C}$ 400 A $\theta \leq 60^\circ\text{C}$ 350 A $\theta \leq 70^\circ\text{C}$ 290 A	$\theta \leq 40^\circ\text{C}$ 500 A $\theta \leq 60^\circ\text{C}$ 400 A $\theta \leq 70^\circ\text{C}$ 325 A	$\theta \leq 40^\circ\text{C}$ 600 A $\theta \leq 60^\circ\text{C}$ 500 A $\theta \leq 70^\circ\text{C}$ 400 A
I _e / Rated operational current AC-1 U _e max. $\leq 1000\text{ V}$, 50/60 Hz	$\theta \leq 40^\circ\text{C}$ – $\theta \leq 60^\circ\text{C}$ – $\theta \leq 70^\circ\text{C}$ –	$\theta \leq 40^\circ\text{C}$ – $\theta \leq 60^\circ\text{C}$ – $\theta \leq 70^\circ\text{C}$ –	$\theta \leq 40^\circ\text{C}$ 225 A $\theta \leq 60^\circ\text{C}$ 200 A $\theta \leq 70^\circ\text{C}$ 175 A	$\theta \leq 40^\circ\text{C}$ 250 A $\theta \leq 60^\circ\text{C}$ 225 A $\theta \leq 70^\circ\text{C}$ 185 A	$\theta \leq 40^\circ\text{C}$ 275 A $\theta \leq 60^\circ\text{C}$ 250 A $\theta \leq 70^\circ\text{C}$ 200 A	$\theta \leq 40^\circ\text{C}$ 350 A $\theta \leq 60^\circ\text{C}$ 300 A $\theta \leq 70^\circ\text{C}$ 240 A	$\theta \leq 40^\circ\text{C}$ 375 A $\theta \leq 60^\circ\text{C}$ 325 A $\theta \leq 70^\circ\text{C}$ 260 A	$\theta \leq 40^\circ\text{C}$ 400 A $\theta \leq 60^\circ\text{C}$ 350 A $\theta \leq 70^\circ\text{C}$ 290 A
With conductor cross-sectional area	70 mm ²	95 mm ²	95 mm ²	150 mm ²	240 mm ² (4)	240 mm ²	300 mm ² (5)	2 x 185 mm ² (5)
AC-3 Utilization category								
For air temperature close to contactor $\theta \leq 60^\circ\text{C}$ I _e / 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
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
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 I _e AC-3 acc. to IEC 60947-4-1							
Rated breaking capacity AC-3	8 x I _e AC-3 acc. to IEC 60947-4-1							
Short-circuit protection device for contactors without thermal overload relay - Motor protection excluded (3)								
U _e $\leq 500\text{ V}$ 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 I _{cw} at 40 °C ambient temperature, in free air from a cold state	1 s 1300 A 10 s 928 A 30 s 536 A 1 min 379 A 15 min 160 A	1460 A 1168 A 674 A 477 A 200 A	1460 A 1168 A 674 A 477 A 225 A	1900 A 1520 A 878 A 621 A 275 A	2050 A 1640 A 947 A 670 A 350 A	2650 A 2120 A 1224 A 865 A 400 A	3050 A 2440 A 1409 A 996 A 500 A	3700 A 2960 A 1709 A 1208 A 600 A
Maximum breaking capacity cos $\theta = 0.45$ (cos $\theta = 0.35$ for I _e > 100 A)	at 440 V 2000 A at 690 V 1000 A	at 440 V 3000 A at 690 V 1500 A	at 440 V 3000 A at 690 V 1500 A	at 440 V 3300 A at 690 V 2200 A	at 440 V 3500 A at 690 V 2500 A	at 440 V 3800 A at 690 V 3300 A	at 440 V 4600 A at 690 V 3800 A	at 440 V 5000 A at 690 V 4000 A
Power dissipation per pole	I _e / AC-1 12 W I _e / AC-3 6 W	I _e / AC-1 18 W I _e / AC-3 9 W	I _e / AC-1 23 W I _e / AC-3 10 W	I _e / AC-1 15 W I _e / AC-3 7 W	I _e / AC-1 25 W I _e / AC-3 8 W	I _e / AC-1 32 W I _e / AC-3 14 W	I _e / AC-1 50 W I _e / AC-3 19 W	I _e / AC-1 72 W I _e / AC-3 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 275 A use terminal enlargements or terminal extensions.

(5) For currents above 450 A use terminal enlargements or terminal extensions.

AF400B ... AF750B 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	AF400B	AF460B	AF580B	AF750B
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1, IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), EN 50155 (applicable parts)			
Fire and smoke		EN 45545 (HL2)			
Rated operational voltage U _e max.		1000 V			
Rated frequency (without derating)		50/60 Hz			
Conventional free-air thermal current I _{th}					
acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$		600 A	700 A	800 A	1050 A
With conductor cross-sectional area (3)		2x185 mm ²	2x240 mm ²	2x240 mm ²	800 mm ² (4)
AC-1 Utilization category					
For air temperature close to contactor					
le / Rated operational current AC-1	$\theta \leq 40^\circ\text{C}$	600 A	700 A	800 A	1050 A
U _e max. $\leq 690\text{ V}$, 50/60 Hz	$\theta \leq 55^\circ\text{C}$	500 A	600 A	700 A	875 A
	$\theta \leq 70^\circ\text{C}$	400 A	480 A	580 A	720 A
le / Rated operational current AC-1	$\theta \leq 40^\circ\text{C}$	600 A	700 A	800 A	1000 A
U _e max. $\leq 1000\text{ V}$, 50/60 Hz	$\theta \leq 55^\circ\text{C}$	500 A	600 A	700 A	875 A
	$\theta \leq 70^\circ\text{C}$	400 A	480 A	580 A	720 A
With conductor cross-sectional area		2x185 mm ²	2x240 mm ²	2x240 mm ²	800 mm ² (4)
AC-3 Utilization category					
For air temperature close to contactor $\theta \leq 55^\circ\text{C}$					
le / Max. rated operational current AC-3 (1)					
	220-230-240 V	400 A	460 A	580 A	750 A
	380-400 V	400 A	460 A	580 A	750 A
	415 V	400 A	460 A	580 A	750 A
	440 V	400 A	460 A	580 A	750 A
	500 V	400 A	460 A	580 A	750 A
	690 V	350 A	400 A	500 A	650 A
	1000 V	155 A	200 A	250 A	300 A
Rated operational power AC-3 (1)					
	220-230-240 V	110 kW	132 kW	160 kW	220 kW
	380-400 V	200 kW	250 kW	315 kW	400 kW
	415 V	220 kW	250 kW	355 kW	425 kW
	440 V	220 kW	250 kW	355 kW	450 kW
	500 V	250 kW	315 kW	400 kW	520 kW
	690 V	315 kW	355 kW	500 kW	600 kW
	1000 V	220 kW	280 kW	355 kW	400 kW
Rated making capacity AC-3		10 x I _e AC-3 acc. to IEC 60947-4-1			
Rated breaking capacity AC-3		8 x I _e AC-3 acc. to IEC 60947-4-1			
Short-circuit protection device for contactors without thermal overload relay					
Motor protection excluded (2)					
U _e $\leq 500\text{ V}$ AC - gG type fuse		630 A	800 A	1000 A	1000 A
Rated short-time withstand current I _{cw} at 40 °C ambient temperature, in free air from a cold state	1 s	4600 A	4600 A	7000 A	7000 A
	10 s	4400 A	4400 A	6400 A	6400 A
	30 s	3100 A	3100 A	4500 A	4500 A
	1 min	2500 A	2500 A	3500 A	3500 A
	15 min	840 A	840 A	1300 A	1300 A
Maximum breaking capacity					
cos $\phi = 0.45$	at 440 V	4000 A	5000 A	6000 A	7500 A
(cos $\phi = 0.35$ for I _e > 100 A)	at 690 V	3500 A	4500 A	5000 A	7000 A
Power dissipation per pole	I _e / AC-1	30 W	42 W	32 W	50 W
	I _e / AC-3	16 W	21 W	17 W	28 W
Max. electrical switching frequency	AC-1	300 cycles/h		300 cycles/h	
	AC-3	300 cycles/h		300 cycles/h	
	AC-2, AC-4	60 cycles/h		60 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".

For AC-3e utilization category, please consult your ABB local sales organization.

(2) For the protection of motor starters against short circuits, see "Coordination with short-circuit protection devices".

(3) Conductors with preparation.

(4) Max. connection bar width 50 mm.

(5) Max. connection bar width 100 mm.

AF1250B ... AF2850B 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	AF1250B	AF1350B	AF1650B	AF2050B	AF2650B	AF2850B
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1, IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), EN 50155 (applicable parts)					
Fire and smoke		EN 45545 HL2 EN 45545 HL1					
Rated operational voltage U_e max.		1000 V					
Rated frequency (without derating)		50/60 Hz					
Conventional free-air thermal current I_{th} acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$		1260 A	1350 A	1650 A	2050 A	2650 A	2850 A
With conductor cross-sectional area (3)		1000 mm ² (4)	1000 mm ² (5)	1500 mm ² (5)	2000 mm ² (5)	3000 mm ² (5)	3000 mm ² (5)
AC-1 Utilization category							
For air temperature close to contactor							
I_e / Rated operational current AC-1	$\theta \leq 40^\circ\text{C}$	1260 A	1350 A	1650 A	2050 A	2650 A	2850 A
U_e max. ≤ 690 V, 50/60 Hz	$\theta \leq 55^\circ\text{C}$	1040 A	1150 A	1450 A	1750 A	2350 A	2600 A
	$\theta \leq 70^\circ\text{C}$	875 A	1000 A	1270 A	1500 A	2120 A	2300 A
I_e / Rated operational current AC-1	$\theta \leq 40^\circ\text{C}$	1260 A	1350 A	1650 A	2050 A	2650 A	2850 A
U_e max. ≤ 1000 V, 50/60 Hz	$\theta \leq 55^\circ\text{C}$	1040 A	1150 A	1450 A	1750 A	2350 A	2600 A
	$\theta \leq 70^\circ\text{C}$	875 A	1000 A	1270 A	1500 A	2120 A	2300 A
With conductor cross-sectional area		1000 mm ² (4)	1000 mm ² (5)	1500 mm ² (5)	2000 mm ² (5)	3000 mm ² (5)	3000 mm ² (5)
AC-3 Utilization category							
For air temperature close to contactor $\theta \leq 55^\circ\text{C}$							
I_e / Max. rated operational current AC-3							
	220-230-240 V	–	860 A	1060 A	1060 A	–	–
	380-400 V	–	860 A	1060 A	1060 A	–	–
	415 V	–	860 A	1060 A	1060 A	–	–
	440 V	–	860 A	1060 A	1060 A	–	–
	500 V	–	800 A	970 A	970 A	–	–
	690 V	–	800 A	970 A	970 A	–	–
	1000 V	–	375 A	400 A	425 A	–	–
Rated operational power AC-3							
	220-230-240 V	–	257 kW	315 kW	–	–	–
	380-400 V	–	475 kW	560 kW	–	–	–
	415 V	–	500 kW	630 kW	630 kW	–	–
	440 V	–	560 kW	710 kW	710 kW	–	–
	500 V	–	560 kW	710 kW	–	–	–
	690 V	–	800 kW	1000 kW	1000 kW	–	–
	1000 V	–	560 kW	600 kW	630 kW	–	–
Rated making capacity AC-3		10 x I_e AC-3, 12 x I_e AC-3e acc. to IEC 60947-4-1					
Rated breaking capacity AC-3		8 x I_e AC-3, 8.5 x I_e AC-3e acc. to IEC 60947-4-1					
Rated short-time withstand current I_{cw} at 40 °C ambient temperature, in free air from a cold state	1 s	8000 A	10000 A	12000 A	12000 A	12000 A	12000 A
	10 s	7200 A	8000 A	10000 A	10000 A	10000 A	10000 A
	30 s	5200 A	6000 A	7500 A	7500 A	7500 A	7500 A
	1 min	4000 A	4500 A	5500 A	5500 A	5500 A	5500 A
	15 min	1500 A	1600 A	2200 A	2200 A	2800 A	3000 A
Maximum breaking capacity							
$\cos \phi = 0.45$	at 440 V	7500 A	10000 A	12000 A	8400 A	8400 A	8400 A
($\cos \phi = 0.35$ for $I_e > 100$ A)	at 690 V	7000 A	–	–	–	–	–
Power dissipation per pole	I_e / AC-1	80 W	80 W	80 W	125 W	200 W	200 W
	I_e / AC-3	–	50 W	50 W	–	–	–
Max. electrical switching frequency	AC-1	300 cycles/h	60 cycles/h		60 cycles/h	15 cycles/h	15 cycles/h
	AC-3	–	60 cycles/h		–	–	–
	AC-2, AC-4	–	60 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".

(3) Conductors with preparation.

(4) Max. connection bar width 50 mm.

(5) Max. connection bar width 100 mm.

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

Technical data

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

Contactors 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

Contactors 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

Contactors 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
	220-240 V AC	104 A	130 A	130 A	154 A	192 A	248 A	312 A
	440-480 V AC	96 A	124 A	124 A	156 A	180 A	240 A	302 A
	550-600 V AC	99 A	125 A	125 A	144 A	192 A	242 A	289 A
Horse power rating (1)	200-208 V AC	30 hp	40 hp	40 hp	50 hp	60 hp	75 hp	100 hp
	220-240 V AC	40 hp	50 hp	50 hp	60 hp	75 hp	100 hp	125 hp
	440-480 V AC	75 hp	100 hp	100 hp	125 hp	150 hp	200 hp	250 hp
	550-600 V AC	100 hp	125 hp	125 hp	150 hp	200 hp	250 hp	300 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.

AF400B ... AF750B 3-pole contactors

Technical data

Main pole - Utilization characteristics according to UL / CSA

Contactor types	AC / DC operated	AF400B	AF460B	AF580B	AF750B
Standards		UL 60947-1 / 60947-4-1 and CSA C 22.2 N°60947-1 / 60947-4-1			
Maximum operational voltage		1 000 V			
UL / CSA general use rating					
1000 V AC		550 A	650 A	750 A	900 A
3 poles in serie	600 V DC	550 A	650 A	750 A	900 A
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	358.8 A	414 A	552 A	692.3 A
	220-240 V AC	360 A	480 A	604 A	722 A
	440-480 V AC	414 A	477 A	590 A	722 A
	550-600 V AC	382 A	472 A	578 A	672 A
Horse power rating (1)	200-208 V AC	125 hp	150 hp	200 hp	250 hp
	220-240 V AC	150 hp	200 hp	250 hp	300 hp
	440-480 V AC	350 hp	400 hp	500 hp	600 hp
	550-600 V AC	400 hp	500 hp	600 hp	700 hp
Short-circuit protection device for contactors without thermal overload relay - Motor protection excluded					
Fuse rating		1000 A		1200 A	
Fuse type, 600 V		L			
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".

AF1250B ... AF2850B 3-pole contactors

Technical data

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

Contactor types	AC / DC operated	AF1250B	AF1350B	AF1650B	AF2050B	AF2650B	AF2850B
Standards		UL 60947-1 / 60947-4-1 and CSA C 22.2 N°60947-1 / 60947-4-1					
Maximum operational voltage		1000 V					
UL / CSA general use rating							
1000 V AC		1210 A	1350 A	1650 A	2100 A	2700 A	2850 A
3 poles in serie	600 V DC	1210 A	–	–	–	–	–
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	–	954 A	1030 A	–	–	–
	220-240 V AC	–	954 A	1030 A	–	–	–
	440-480 V AC	–	954 A	1030 A	–	–	–
	550-600 V AC	–	944 A	1050 A	–	–	–
Horse power rating (1)	200-208 V AC	–	–	–	–	–	–
	220-240 V AC	–	400 hp	450 hp	–	–	–
	440-480 V AC	–	800 hp	900 hp	–	–	–
	550-600 V AC	–	1000 hp	1150 hp	–	–	–
Short-circuit protection device for contactors without thermal overload relay - Motor protection excluded							
Fuse rating		1200 A	Please consult us for coordination with circuit-breaker				
Fuse type, 600 V		L					
Maximum electrical switching frequency							
For general use		300 cycles/h	60 cycles/h			15 cycles/h	15 cycles/h
For motor use		300 cycles/h	60 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 ... AF38(Z)B 3-pole contactors

Technical data

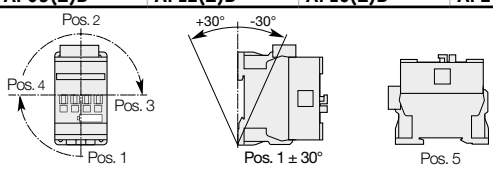
General technical data

Contactors types	AF09(Z)B	AF12(Z)B	AF16(Z)B	AF26(Z)B	AF30(Z)B	AF38(Z)B
Rated insulation voltage U_i	690 V					
acc. to IEC 60947-4-1	600 V					
acc. to UL / CSA	6 kV					
Rated impulse withstand voltage U_{imp}	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					
	Without thermal overload relay					
Storage	-20...+60 °C					
	-40...+70 °C					
	-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

Contactors types	AF09(Z)B	AF12(Z)B	AF16(Z)B	AF26(Z)B	AF30(Z)B	AF38(Z)B
Coil operating limits	DC supply					
acc. to IEC 60947-4-1	(AF..ZB) at $\theta \leq 70^\circ\text{C}$ $0.85 \times U_{c \min} \dots 1.1 \times U_{c \max}$ (AF..B) at $\theta \leq 60^\circ\text{C}$ $0.85 \times U_{c \min} \dots 1.1 \times U_{c \max}$; at $\theta \leq 70^\circ\text{C}$ $0.85 \times U_{c \min} \dots U_{c \max}$					
	AC supply					
	at $\theta \leq 60^\circ\text{C}$ $0.85 \times U_{c \min} \dots 1.1 \times U_{c \max}$; at $\theta \leq 70^\circ\text{C}$ $0.85 \times U_{c \min} \dots U_{c \max}$					
Rated control circuit voltage U_c	(AF..ZB) 20...250 V DC; (AF..ZB) 24 ... 250 V AC; (AF..B) 250 ... 500 V AC					
Coil consumption						
DC control voltage						
20...60 V DC	Average pull-in value					
	13 VA / W					
	Average holding value					
	1.8 W					
48...130 V DC	Average pull-in value					
	14 VA / W					
	Average holding value					
	1.9 W					
100...250 V DC	Average pull-in value					
	14 VA / W					
	Average holding value					
	2 W					
AC control voltage 50/60 Hz						
24...60 V AC	Average pull-in value					
	25 VA					
	Average holding value					
	2.4 VA / 1.7 W					
48...130 V AC	Average pull-in value					
	21 VA					
	Average holding value					
	3 VA / 1.7 W					
100...250 V AC	Average pull-in value					
	18 VA					
	Average holding value					
	3.5 VA / 2 W					
250...500 V AC	Average pull-in value					
	37 VA					
	Average holding value					
	5.9 VA / 2.7 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	$\leq 60\%$ of $U_{c \min}$					
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

Contactors types	AF09(Z)B	AF12(Z)B	AF16(Z)B	AF26(Z)B	AF30(Z)B	AF38(Z)B
Mounting positions						
Mounting distances	Max. N.C. built-in add-on N.C. auxiliary contacts: see accessory fitting details for a 3-pole contactor AF09(Z)B ... AF38(Z)B					
Fixing	The contactors can be assembled side by side					
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

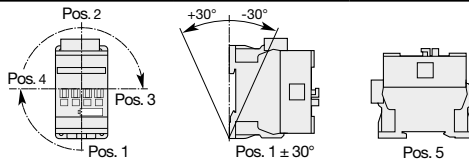
General technical data

Contactors 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	5 million operating cycles				
Maximum switching frequency	3600 cycles/h				
Shock and vibration withstand acc. to IEC 61373	Category 1, class B				

Magnet system characteristics

Contactors types	AF40B	AF52B	AF65B	AF80B	AF96B
Coil operating limits					
AC supply	At $\theta \leq 70^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$.				
DC supply	At $\theta \leq 70^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$.				
Rated control circuit voltage U_c	24...500 V AC, 20 ... 250 V DC				
Coil consumption					
DC control voltage					
20...60 V DC	Average pull-in value	31 VA / W		51 VA / W	
	Average holding value	1.4 W		1.5 W	
48...130 V DC	Average pull-in value	52 VA / W		74 VA / W	
	Average holding value	1.8 W		1.6 W	
100...250 V DC	Average pull-in value	30 VA / W		44 VA / W	
	Average holding value	1.7 W		1.8 W	
AC control voltage 50/60 Hz					
24...60 V AC	Average pull-in value	92 VA		125 VA	
	Average holding value	3.3 VA / 1.3 W		3.4 VA / 1.4 W	
48...130 V AC	Average pull-in value	67 VA		100 VA	
	Average holding value	2.8 VA / 1.7 W		2.7 VA / 1.6 W	
100...250 V AC	Average pull-in value	49 VA		75 VA	
	Average holding value	3.9 VA / 1.6 W		4.0 VA / 2.1 W	
250...500 V AC	Average pull-in value	60 VA		85 VA	
	Average holding value	6.4 VA / 2.4 W		6.2 VA / 2.4 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	$\leq 60\%$ of $U_c \text{ min}$.				
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

Contactors 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

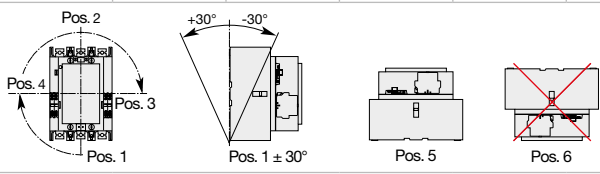
Contact types	AF116B	AF140B	AF146B	AF190B	AF205B	AF265B	AF305B	AF370B
Rated insulation voltage U_i	1000 V							
acc. to IEC 60947-4-1	600 V							
acc. to UL / CSA	8 kV							
Rated impulse withstand voltage U_{imp}	8 kV							
Electromagnetic compatibility	Devices complying with IEC/EN 60947-1 - Environment A							
Pollution degree	3							
Ambient air temperature close to contactor								
Operation	Fitted with thermal overload relay							
	Without thermal overload relay							
Storage	-25 to +55 °C							
	-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

Contractor types		AF116B	AF140B	AF146B	AF190B	AF205B	AF265B	AF305B	AF370B
Coil operating limits		AC supply							
acc. to IEC 60947-4-1		DC supply							
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	420 VA/W			370 VA/W		980 VA/W		
	Average holding value	2.7 W			2.5 W		2.9 W		
48...130 V DC	Average pull-in value	435 VA/W			465 VA/W		1225 VA/W		
	Average holding value	2.4 W			2.5 W		2 W		
100...250 V DC	Average pull-in value	275 VA/W			360 VA/W		720 VA/W		
	Average holding value	2.8 W			3.5 W		4.2 W		
250...500 V DC	Average pull-in value	820 VA/W			680 VA/W (1)		1515 VA/W (3)		
	Average holding value	4.3 W			4.1 W		4.1 W		
AC control voltage 50/60 Hz									
24...60 V AC	Average pull-in value	305 VA			245 VA		695 VA		
	Average holding value	4.9 VA / 2.75W			10 VA / 2.4W		10 VA / 2.7 W		
48...130 V AC	Average pull-in value	320 VA			340 VA		975 VA		
	Average holding value	15.1 VA / 2.4W			14.5 VA / 2.5 W		23.2 VA / 2.1 W		
100...250 V AC	Average pull-in value	220 VA			285 VA		590 VA		
	Average holding value	30.7 VA / 2.7 W			26.8 VA / 2.4 W		32 VA / 4.1 W		
250...500 V AC	Average pull-in value	275 VA			260 VA		685 VA (2)		
	Average holding value	33.2 VA / 4.4 W			18.6 VA / 4.1 W		27.5 VA / 4.1 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		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		

1) Current peak up to 2.5 A can occur during pull-in 2) Current peak up to 7.4 A can occur during pull-in 3) Current peak up to 6 A can occur during pull-in

Mounting characteristics and conditions for use

Contact 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				

AF400B ... AF750B 3-pole contactors

Technical data

General technical data

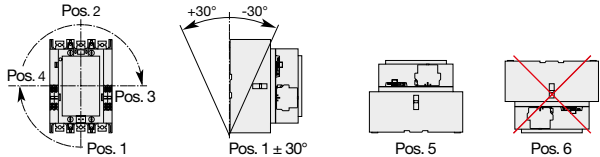
Contactors types	AC / DC operated	AF400B	AF460B	AF580B	AF750B
Rated insulation voltage U_i		1000 V			
acc. to IEC 60947-4-1		600 V			
acc. to UL / CSA					
Rated impulse withstand voltage U_{imp}		8 kV			
Electromagnetic compatibility		AF contactors complying with IEC 60947-1 / EN 60947-1 - Environment A			
Pollution degree		3			
Ambient air temperature close to contactor					
Operation	Fitted with electronic overload relay	-25 to +70 °C			
	Without electronic 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		3 millions operating cycles (contacts needs to be replaced every 0,75 millions operating cycles)			
Max. switching frequency		300 cycles/h			
Vibration acc to IEC 61373		Category 1, class B			

Magnet system characteristics

Contactors types	AC / DC operated	AF400B	AF460B	AF580B	AF750B
Coil operating limits	AC supply	At $\theta \leq 70$ °C $0.85 \times U_c \min \dots 1.1 \times U_c \max$			
acc. to IEC 60947-4-1	DC supply	At $\theta \leq 70$ °C $0.80 \times U_c \min \dots 1.1 \times U_c \max$			
Rated control circuit voltage U_c (1)		48...500 V AC, 24...500 V DC			
Coil consumption					
DC control voltage					
24...60 V DC	Average pull-in value	1250 VA/W		1135 VA/W	
	Average holding value	4.1 W		4.5 W	
48...130 V DC	Average pull-in value	2335 VA/W		2335 VA/W	
	Average holding value	3.9 W		3.9 W	
100...250 V DC	Average pull-in value	1100 VA/W		1235 VA/W	
	Average holding value	4.3 W		4.1 W	
250 ... 500 V DC	Average pull-in value	1320 VA/W (4)		1460 VA/W	
	Average holding value	4.9 W		4.8 W	
AC control voltage 50/60 Hz					
48...130 V AC	Average pull-in value	1965 VA		1940 VA	
	Average holding value	16.4 VA / 4.2 W		15.2 VA / 4.2 W	
100...250 V AC	Average pull-in value	990 VA		1000 VA	
	Average holding value	31 VA / 4.6 W		36.5 VA / 4.4 W	
250 ... 500 V AC	Average pull-in value	1185 VA		1030 VA	
	Average holding value	16.4 VA / 6.6 W		22.5 VA / 6.3 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 / 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 $U_c \min$.			
Operating time					
Coil supply between A1 - A2					
Between coil energization and:	Main contact closing	50...120 ms			
Between coil de-energization and:	Main contact opening	33...70 ms			

4) Current peak up to 4.9 A can occur during pull-in

Mounting characteristics and conditions for use

Contactors types	AC / DC operated	AF400B	AF460B	AF580B	AF750B
Mounting positions					
Mounting distances		Max. add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 3-pole contactor AF400B...AF2850B The contactors can be assembled side by side			
Fixing					
On rail according to IEC 60715, EN 60715		-			
By screws		4 x M5		4 x M6	

AF1250B ... AF2850B 3-pole contactors

Technical data

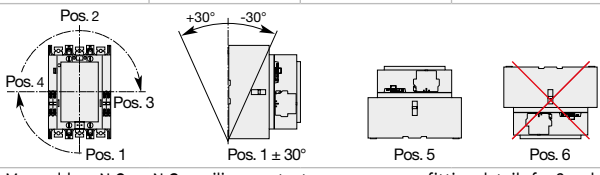
General technical data

Contactor types	AC / DC operated	AF1250B	AF1350B	AF1650B	AF2050B	AF2650B	AF2850B
Rated insulation voltage U_i		1000 V					
acc. to IEC 60947-4-1		600 V	1000 V				
acc. to UL / CSA							
Rated impulse withstand voltage U_{imp}		8 kV					
Electromagnetic compatibility		AF contactors complying with IEC/EN 60947-1 - Environment A					
Pollution degree		3					
Ambient air temperature close to contactor							
Operation	Fitted with electronic overload relay	-25 to +70 °C					
	Without electronic 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		0.5 million operating cycles				0.3 million operating cycles	
Max. switching frequency		300 cycles/h	60 cycles/h				
Shock and vibration withstand							
acc to IEC 61373		Category 1, class B					

Magnet system characteristics

Contactor types	AC / DC operated	AF1250B	AF1350B	AF1650B	AF2050B	AF2650B	AF2850B
Coil operating limits	AC supply						
acc. to IEC 60947-4-1	DC supply						
Rated control circuit voltage U_c		48...500 V AC, 24...500 V DC	48...250V AC or DC				
Coil consumption							
DC control voltage							
24...60 V DC	Average pull-in value	1135 VA/W	-				
	Average holding value	4.5 W	-				
48...130 V DC	Average pull-in value	2335 VA/W	2260 VA/W				
	Average holding value	3.9 W	20.3 W				
100...250 V DC	Average pull-in value	1235 VA/W	2865 VA/W				
	Average holding value	4.1 W	14.1 W				
250 ... 500 V DC	Average pull-in value	1460 VA/W	-				
	Average holding value	4.8 W	-				
AC control voltage 50/60 Hz							
48...130 V AC	Average pull-in value	1940 VA	1985 VA				
	Average holding value	15.2 VA / 4.2 W	44.9 VA / 20 W				
100...250 V AC	Average pull-in value	1000 VA	2545 VA				
	Average holding value	36.5 VA / 4.4 W	75.7 VA / 14.8 W				
250 ... 500 V AC	Average pull-in value	1030 VA	-				
	Average holding value	22.5 VA / 6.3 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 / 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 U_c min.					
Operating time							
Coil supply between A1 - A2							
Between coil energization and:	Main contact closing	50...120 ms	50...80 ms				
Between coil de-energization and:	Main contact opening	33...70 ms	35...55 ms				

Mounting characteristics and conditions for use

Contactor types	AC / DC operated	AF1250B	AF1350B	AF1650B	AF2050B	AF2650B	AF2850B
Mounting positions							
Mounting distances		Max. add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 3-pole contactor AF400B ... AF2850B					
Fixing		The contactors can be assembled side by side					
On rail according to IEC 60715, EN 60715		-					
By screws		4 x M6	4 x M8				

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

Technical data

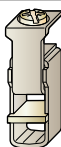
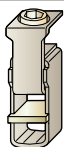
Connecting characteristics

Contact 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 ($\leq 4 \text{ mm}^2$)	1 x	1...6 mm ²		2.5...10 mm ²		
 Stranded ($\geq 1 \text{ mm}^2$)	2 x	1...6 mm ²		2.5...10 mm ²		
 Flexible with non insulated ferrule	1 x	0.75...6 mm ²		1.5...10 mm ²		
	2 x	0.75...6 mm ²		1.5...10 mm ²		
 Flexible with insulated ferrule	1 x	0.75...4 mm ²		1.5...10 mm ²		
	2 x	0.75...2.5 mm ²		1.5...4 mm ²		
 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 mm ²				
	2 x	1...2.5 mm ²				
 Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²				
	2 x	0.75...2.5 mm ²				
 Flexible with insulated ferrule	1 x	0.75...2.5 mm ²				
	2 x	0.75...1.5 mm ²				
 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

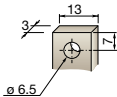
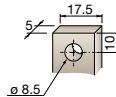
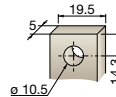
Connecting characteristics

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 ($\geq 6 \text{ mm}^2$)	1 x	6...35 mm ²			6...70 mm ²
			2 x	6...35 mm ²			6...50 mm ²
	Flexible with non insulated ferrule		1 x	4...35 mm ²			6...50 mm ²
			2 x	4...35 mm ²			6...50 mm ²
	Flexible with insulated ferrule		1 x	4...35 mm ²			6...50 mm ²
			2 x	4...35 mm ²			6...50 mm ²
	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 mm ²			
			2 x	1...2.5 mm ²			
	Flexible with non insulated ferrule		1 x	0.75...2.5 mm ²			
			2 x	0.75...2.5 mm ²			
	Flexible with insulated ferrule		1 x	0.75...2.5 mm ²			
			2 x	0.75...1.5 mm ²			
	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

Contactors 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 mm ²			6...150 mm ²		16...300 mm ²		
	Clamp type		LD... (1)			1SDA066917R1		1SDA055016R1		
	Tightening torque		8 Nm			14 Nm		25 Nm		
	Cu cable - Stranded	2 x	10...95 mm ²			50...120 mm ²		70...185 mm ²		
	Clamp type		LD... (1)			1SFN074709R1000 LZ185-2C/120		1SCA022194R0890 OZXB4		
	Tightening torque		8 Nm			16 Nm		22 Nm		
	Al cable - Stranded	1 x	-			95...185 mm ²		185...240 mm ²		
	Clamp type		-			1SDA054988R1		1SDA055020R1		
	Tightening torque		-			31 Nm		43 Nm		
	Cu cable - Flexible	1 x	10...70 mm ²			6...120 mm ²		16...240 mm ²		
	Clamp type		LD... (1)			1SDA066917R1		1SDA055016R1		
	Tightening torque		8 Nm			14 Nm		25 Nm		
	Cu cable - Flexible	2 x	10...70 mm ²			50...95 mm ²		70...185 mm ²		
	Clamp type		LD... (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... (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... (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 mm ²							
		2 x	1...4 mm ²							
	Flexible	1 x	0.75...2.5 mm ²							
		2 x	0.75...2.5 mm ²							
	Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²							
		2 x	0.75...2.5 mm ²							
	Flexible with insulated ferrule	1 x	0.75...2.5 mm ²							
		2 x	0.75...2.5 mm ²							
	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							

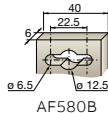
(1) LD... not included for AF116B ... AF146B.

(2) Available in North America only.

AF400B ... AF750B 3-pole contactors

Technical data

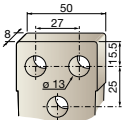
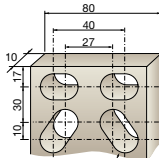
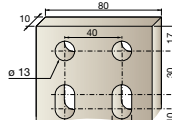
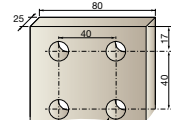
Connecting characteristics

Contactor types	AC / DC operated		AF400B	AF460B	AF580B	AF750B
Main terminals						
Flat type					AF580B AF750B	
Connection capacity (min. ... max.)						
Main conductors (poles)						
	Cu cable - Stranded	2 x	240 mm ²		-	
	Clamp type		1SDA013922R1		-	
	Tightening torque		35 Nm		-	
	Cu cable - Stranded	3 x	-	185 mm ²		
	Clamp type		-	1SDA013956R1		
	Tightening torque		35 Nm	45 Nm		
	Al cable - Stranded	2 x	240 mm ²		-	
	Clamp type		1SDA013922R1		-	
	Tightening torque		35 Nm		-	
		3 x	-		185 mm ²	
	Clamp type		-		1SDA013956R1	
	Tightening torque		35 Nm		45 Nm	
	Lugs	L ≤	47 mm		50 mm	
		Ø >	10 mm		12 mm	
	Tightening torque		35 Nm / 310 lb.in		45 Nm / 398 lb.in	
Connection capacity acc. to UL / CSA			2 x	250-500 MCM alt. 2/0 AWG-500 MCM	-	
	Clamp type		ATK580/2		-	
	Tightening torque		275 lb.in		-	
Connection capacity acc. to UL / CSA			3 x	2/0 AWG-400 MCM	2/0 AWG-500 MCM	
	Clamp type		K6TJ		ATK750/3	
	Tightening torque		275 lb.in		375 lb.in	
Auxiliary conductors (coil terminals)						
	Rigid Solid/Stranded	1 x	1...4 mm ²			
		2 x	1...4 mm ²			
	Flexible	1 x	0.75...2.5 mm ²			
		2 x	0.75...2.5 mm ²			
	Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²			
		2 x	0.75...2.5 mm ²			
	Flexible with insulated ferrule	1 x	0.75...2.5 mm ²			
		2 x	0.75...2.5 mm ²			
	Lugs	L ≤	8 mm			
		l >	3.7 mm			
Connection capacity acc. to UL / CSA			1 or 2 x	AWG 18...14		
Tightening torque		Recommended	1.00 Nm / 9 lb.in			
		Max.	1.20 Nm			
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529						
Main terminals			IP00			
Coil terminals			IP20			
Screw terminals						
Main terminals			M10	M12		
			Screws and bolts			
Coil terminals (delivered in open position)			M3.5			
Screwdriver type			Flat Ø 5.5 mm / Pozidriv 2			

AF1250B ... AF2850B 3-pole contactors

Technical data

Connecting characteristics

Contactor types	AC / DC operated	AF1250B	AF1350B	AF1650B	AF2050B	AF2650B	AF2850B
Main terminals							
Flat type							
							
		AF1250B	AF1350B, AF1650B		AF2050B	AF2650B, AF2850B	
Connection capacity (min. ... max.)							
Main conductors (poles)							
	Cu cable - Stranded	2 x	-				
	Clamp type		-				
	Tightening torque		-				
	Cu cable - Stranded	3 x	-				
	Clamp type		-				
	Tightening torque		-				
	Al cable - Stranded	2 x	-				
	Clamp type		-				
	Tightening torque		-				
		3 x	-				
	Clamp type		-				
	Tightening torque		-				
	Lugs	L ≤	50 mm	100 mm			
		Ø >	12 mm				
	Tightening torque		45 Nm / 398 lb.in				
Connection capacity acc. to UL / CSA		2 x	2// 3 x 0.25 in	4/0 AWG - 500 MCM		4//4 x 0.25 in	
	Clamp type		bars, use LW1250	ATK1350 ATK1350/4	ATK1350	bars	
	Tightening torque			375 lb.in		-	
Connection capacity acc. to UL / CSA		3 x	2/0 AWG-500 MCM	1/0-750 MCM		-	
	Clamp type		-	K8TL, K8TM, ATK1650/4	K8TL, K8TM, ATK1650/4, ATK1650/6	-	
	Tightening torque		375 lb.in	500 lb.in		-	
Auxiliary conductors (coil terminals)							
	Rigid Solid/Stranded	1 x	1...4 mm ²				
		2 x	1...4 mm ²				
	Flexible	1 x	0.75...2.5 mm ²				
		2 x	0.75...2.5 mm ²				
	Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²				
		2 x	0.75...2.5 mm ²				
	Flexible with insulated ferrule	1 x	0.75...2.5 mm ²				
		2 x	0.75...2.5 mm ²				
	Lugs	L ≤	8 mm				
		l >	3.7 mm				
Connection capacity acc. to UL / CSA		1 or 2 x	AWG 18...14				
Tightening torque		Recommended	1.00 Nm / 9 lb.in				
		Max.	1.20 Nm				
Degree of protection							
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529							
Main terminals		IP00					
Coil terminals		IP20					
Screw terminals							
Main terminals		M12					
		Screws and bolts					
Coil terminals (delivered in open position)		M3.5					
Screwdriver type		Flat Ø 5.5 mm / Pozidriv 2					

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

Technical data

Built-in auxiliary contacts according to IEC

Contactors types	AF09(Z)B	AF12(Z)B	AF16(Z)B	AF40B	AF52B	AF65B	AF80B	AF96B
Rated operational voltage U _e max.	690 V							
Rated frequency (without derating)	50 / 60 Hz							
Conventional free air thermal current I _{th} - θ ≤ 40 °C	16 A							
I _e / 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 I _e AC-15 acc. to IEC 60947-5-1							
Breaking capacity AC-15	10 x I _e AC-15 acc. to IEC 60947-5-1							
I _e / 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 I _{cw}	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

Contactors 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							

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 I_c is the current to be broken by the contactor and I_e the rated operational current normally drawn by the load, then:

- Categories AC-1 and AC-3 $I_c = I_e$
- Category AC-2 $I_c = 2.5 \times I_e$
- Category AC-4 $I_c = 6 \times I_e$

Generally speaking $I_c = m \times I_e$ 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 I_c . 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	U_e
Current normally drawn	I_e (U_e / I_e / kW relation for motors, see "Motor rated operational powers and currents")
Utilization category	AC-1, AC-2, AC-3 or AC-4
Breaking current	$I_c = I_e$ for AC-1 and for AC-3 ; $I_c = 2.5 \times I_e$ for AC-2 ; $I_c = 6 \times I_e$ 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 (I_c ; N).

Electrical durability forecast and contactor selection for mixed duty motor control: AC-3 ($I_c = I_e$) type switching off while "motor running" and, occasionally, AC-4 ($I_c = 6 \times I_e$) type switching off while "motor accelerating"

Characteristics	Load to be controlled
Operational voltage	U_e
Current normally drawn while "motor running"	I_e (U_e / I_e / 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	$I_c = I_e$
Breaking current for AC-4 while "motor accelerating"	$I_c = 6 \times I_e$
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 (U_e / I_e) 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 $I_c = I_e$ (AC-3)
 - The number of operating cycles B for $I_c = 6 \times I_e$ (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 combined 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.

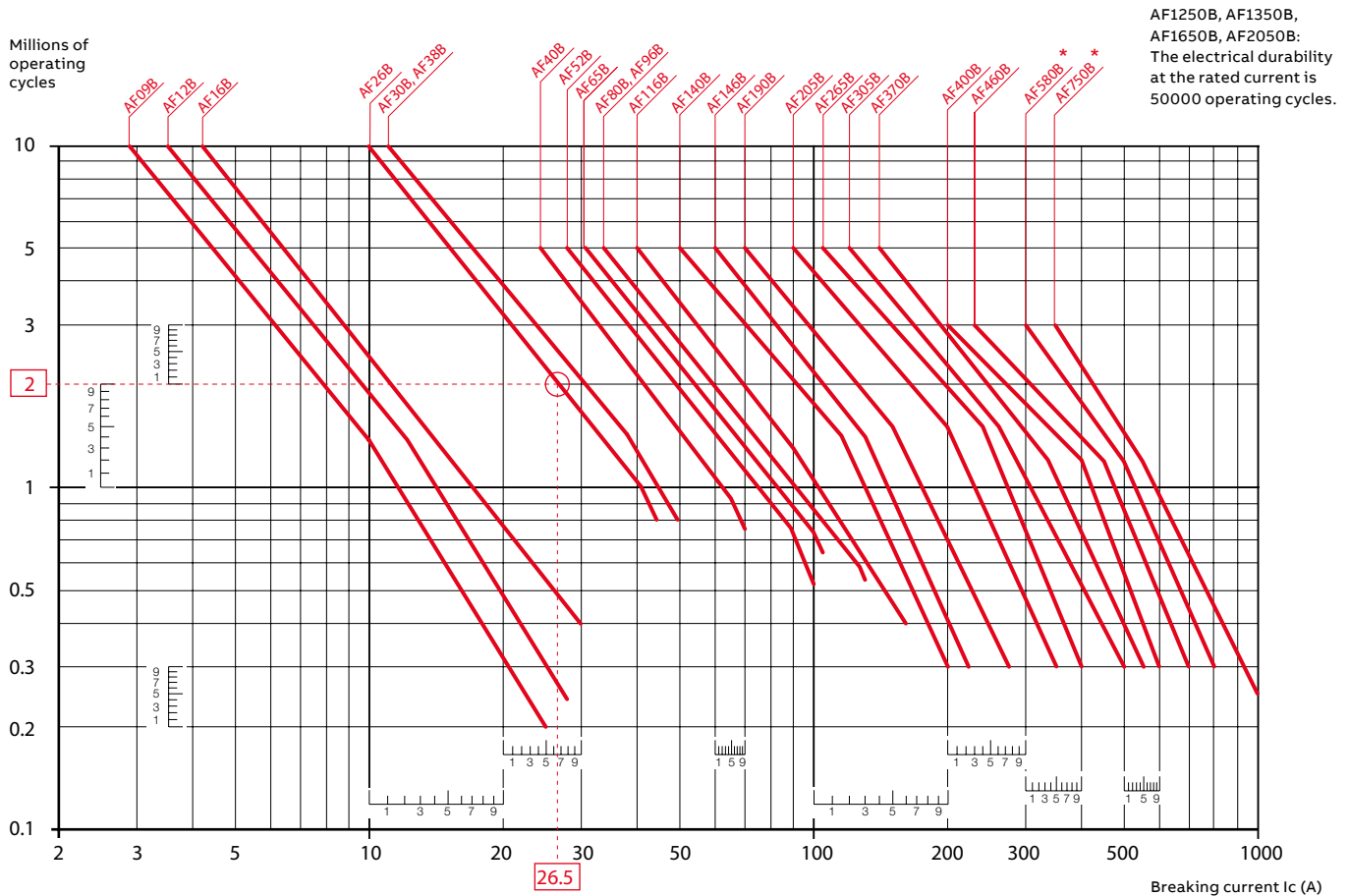
3-pole contactors

Electrical durability

Electrical durability for AC-1 utilization category - $U_e \leq 690$ V

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

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



Note: * For AF580 and AF750 contacts needs to be replaced after 750k operations.

Example:

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

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

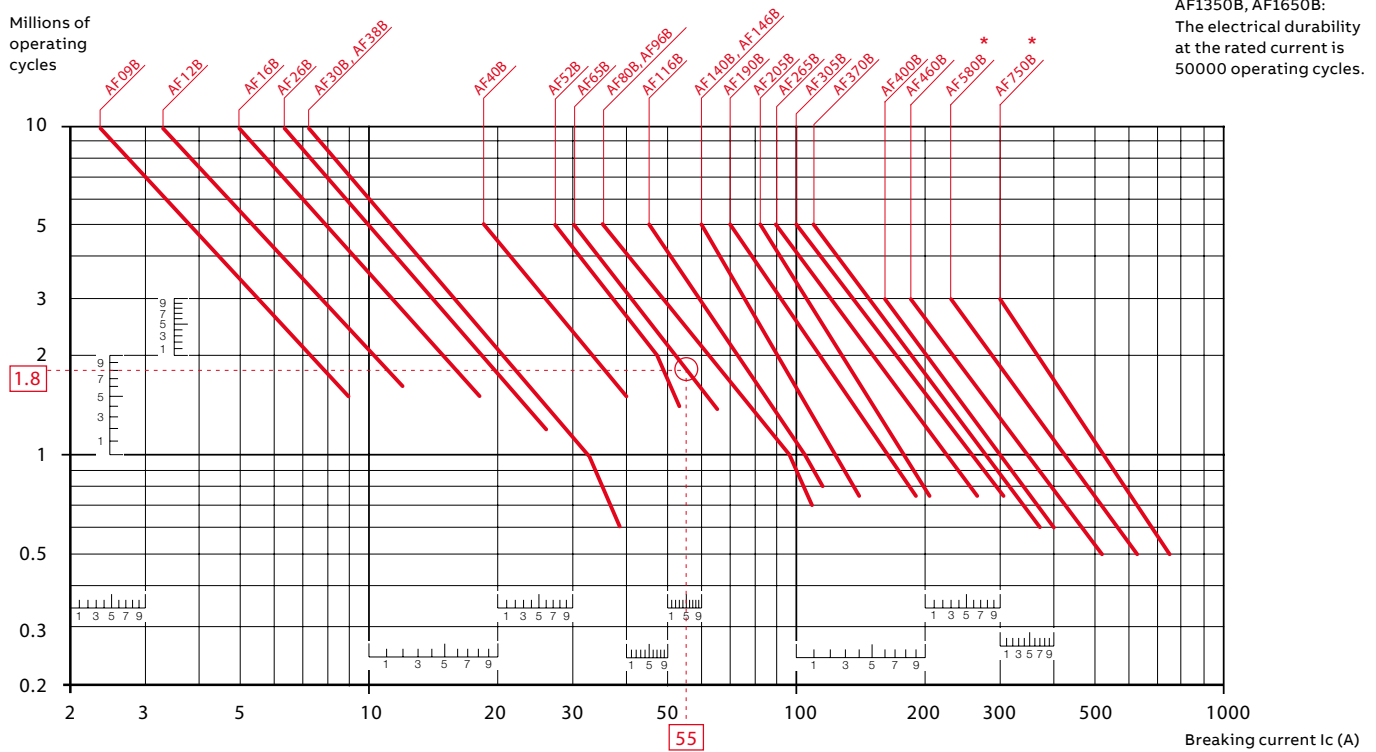
3-pole contactors

Electrical durability

Electrical durability for AC-3 utilization category - $U_e \leq 440$ V.

Switching cage motors: starting and switching off running motors. The breaking current I_c for AC-3 is equal to the rated operational current I_e (I_e = motor full load current).

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



Example:

Motor power 30 kW for AC-3 - $U_e = 400$ V and $I_e = 55$ A utilization – Electrical durability required = 1.8 million operating cycles. For AC-3: $I_c = I_e$. Select the AF65 contactor at intersection "O" (55 A / 1.8 million operating cycles) on the curves (AC-3 - $U_e \leq 440$ V).



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

Push-in Spring terminals

3/50	AF09ZB..K ... AF38ZB..K	DC operated
3/51	AF09(Z)B..K ... AF38(Z)B..K	AC operated
3/53	Technical data	
3/58	Electrical durability	



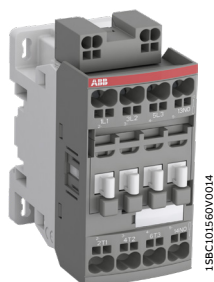
For direct product details information, use product type or order code, ex:

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

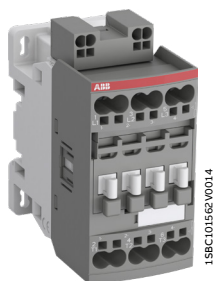
AF09ZB..K ... AF38ZB..K 3-pole contactors - with Push-in Spring terminals

4 to 18.5 kW

DC operated



AF09ZB-30-10K

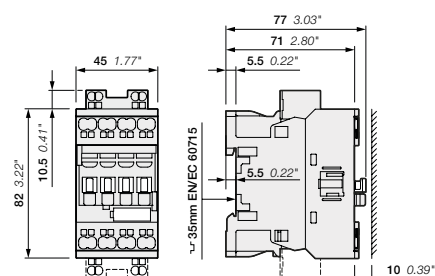


AF26ZB-30-00K

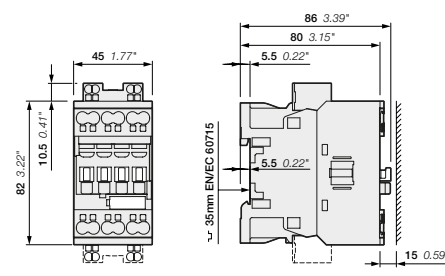
AF09ZB..K ... AF38ZB..K 3-pole contactors with Push-in Spring terminals comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits 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 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 U_c ... 1.25 U_c 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 (IEC 60077)	Rated control circuit voltage U_c min. ... U_c max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power	3-phase motor current $\theta \leq 40^\circ\text{C}$	General use rating	Rated control circuit voltage U_c (IEC 60077)	Rated control circuit voltage U_c min. ... U_c max. (IEC 60947-4-1)			Pkg (1 pce)
400 V	AC-3	480 V	600 V AC	V DC	V DC		kg
4	25	5	25	24, 33, 48	20 ... 60	1 0	AF09ZB-30-10K-21 1SBL136063R2110 0.315
				72, 96, 110	48 ... 130	0 1	AF09ZB-30-01K-21 1SBL136063R2101 0.315
				220	100 ... 250	1 0	AF09ZB-30-10K-22 1SBL136063R2210 0.315
						0 1	AF09ZB-30-01K-22 1SBL136063R2201 0.315
						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
				72, 96, 110	48 ... 130	0 1	AF12ZB-30-01K-21 1SBL156063R2101 0.315
				220	100 ... 250	1 0	AF12ZB-30-10K-22 1SBL156063R2210 0.315
						0 1	AF12ZB-30-01K-22 1SBL156063R2201 0.315
						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
				72, 96, 110	48 ... 130	0 1	AF16ZB-30-01K-21 1SBL176063R2101 0.315
				220	100 ... 250	1 0	AF16ZB-30-10K-22 1SBL176063R2210 0.315
						0 1	AF16ZB-30-01K-22 1SBL176063R2201 0.315
						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

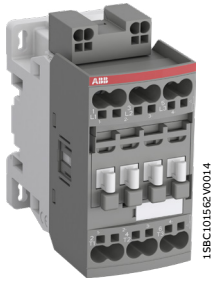
AF09(Z)B..K ... AF38(Z)B..K 3-pole contactors - with Push-in Spring terminals

4 to 18.5 kW

AC operated



AF09(Z)B-30-10K

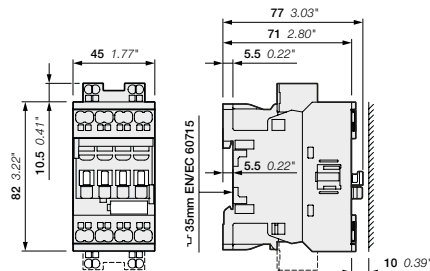


AF26(Z)B-30-00K

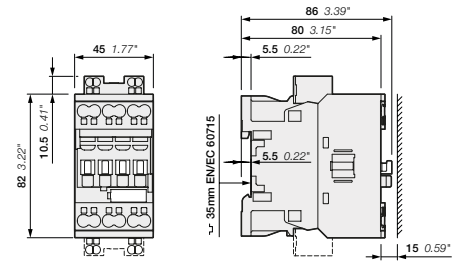
AF09(Z)B..K ... AF38(Z)B..K 3-pole contactors with Push-in Spring terminals comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power 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	
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 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	
				24 ... 60	0 0	AF30ZB-30-00K-21	1SBL276063R2100	0.360	
				48 ... 130	0 0	AF30ZB-30-00K-22	1SBL276063R2200	0.360	
15	50	20	45	100 ... 250	0 0	AF30ZB-30-00K-23	1SBL276063R2300	0.360	
				250 ... 500	0 0	AF30B-30-00K-14	1SBL277063R1400	0.370	
				24 ... 60	0 0	AF38ZB-30-00K-21	1SBL296063R2100	0.360	
				48 ... 130	0 0	AF38ZB-30-00K-22	1SBL296063R2200	0.360	
18.5	50	25	45	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

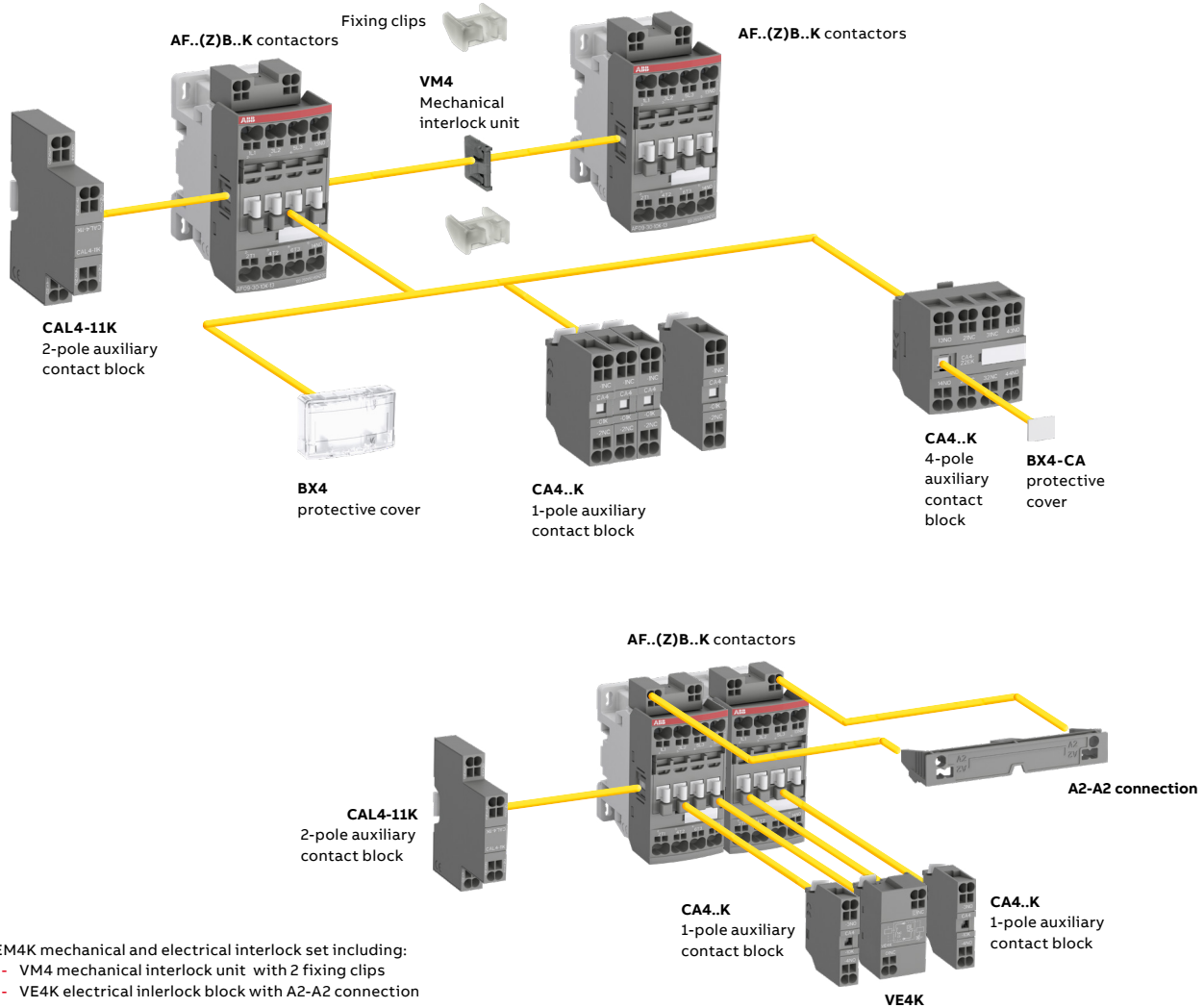
Main dimensions mm, inches

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



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			Side-mounted accessories	
			Auxiliary contact blocks		Electrical and mechanical interlock set (between 2 contactors)	Auxiliary contact blocks	
			1-pole CA4..K	4-pole CA4..K	VM4K	Left side	Right side
						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, $\theta \leq 40^\circ\text{C}$	35 A	35 A	35 A	50 A	50 A	50 A
With conductor cross-sectional area	6 mm ²	6 mm ²	6 mm ²	10 mm ²	10 mm ²	10 mm ²
AC-1 Utilization category						
For air temperature close to contactor						
Ie / Rated operational current AC-1						
Ue max. $\leq 690\text{ V}$, 50/60 Hz	$\theta \leq 40^\circ\text{C}$ 25 A	28 A	30 A	45 A	50 A	50 A
	$\theta \leq 60^\circ\text{C}$ 25 A	28 A	30 A	40 A	42 A	42 A
	$\theta \leq 70^\circ\text{C}$ 22 A	24 A	26 A	32 A	37 A	37 A
With conductor cross-sectional area	4 mm ²	6 mm ²	6 mm ²	10 mm ²	10 mm ²	10 mm ²
AC-3, AC-3e Utilization category						
For air temperature close to contactor $\theta \leq 60^\circ\text{C}$						
Ie / Max. rated operational current AC-3, AC-3e (2)						
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)						
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 $\theta \leq 40^\circ\text{C}$)						
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 $\leq 500\text{ V AC}$ - 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 $\phi = 0.45$	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	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
2 poles in serie	160 V DC	25 A	28 A	30 A	42 A	45 A
3 poles in serie	240 V DC	25 A	28 A	30 A	42 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
	240 V AC	10 A	12 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
	240 V AC	1-1/2 hp	2 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
	220-240 V AC	6.8 A	9.6 A	15.2 A	22 A	28 A
	440-480 V AC	7.6 A	11 A	14 A	21 A	27 A
	550-600 V AC	9 A	11 A	17 A	22 A	27 A
Horse power rating (1)	200-208 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp
	220-240 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp
	440-480 V AC	5 hp	7-1/2 hp	10 hp	15 hp	20 hp
	550-600 V AC	7-1/2 hp	10 hp	15 hp	20 hp	25 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
	250 V DC	8.5 A	12.2 A	12.2 A	20 A	29 A
Horse power rating	125 V DC	1 hp	1-1/2 hp	2 hp	3 hp	3 hp
	250 V DC	2 hp	3 hp	3 hp	5 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

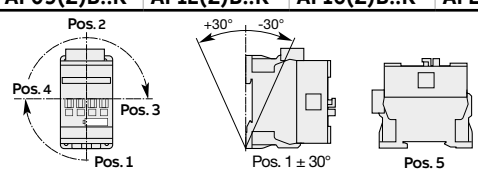
General technical data

Contactors 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 U_i	690 V					
acc. to IEC 60947-4-1	600 V					
acc. to UL / CSA	6 kV					
Rated impulse withstand voltage U_{imp}	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					
Storage	-40 ... +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	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	DC supply	(AF..ZB) at $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... 1.1 x Uc max (AF..B) at $\theta \leq 60\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... 1.1 x Uc max; at $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... Uc max					
acc. to IEC 60947-4-1	AC supply	at $\theta \leq 60\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... 1.1 x Uc max; at $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... Uc max					
Rated control circuit voltage Uc		(AF...ZB)20...250 V DC; (AF..ZB) 24 ... 250 V AC; (AF..B) 250 ... 500 V AC					
Coil consumption							
DC control voltage							
20...60 V DC	Average pull-in value	13 VA / W					
	Average holding value	1.8 W					
48...130 V DC	Average pull-in value	14 VA / W					
	Average holding value	1.9 W					
100...250 V DC	Average pull-in value	14 VA / W					
	Average holding value	2 W					
AC control voltage 50/60 Hz							
24...60 V AC	Average pull-in value	25 VA					
	Average holding value	2.4 VA / 1.7 W					
48...130 V AC	Average pull-in value	21 VA					
	Average holding value	3 VA / 1.7 W					
100...250 V AC	Average pull-in value	18 VA					
	Average holding value	3.5 VA / 2 W					
250...500 V AC	Average pull-in value	37 VA					
	Average holding value	5.9 VA / 2.7 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		$\leq 60\%$ 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

Contactors 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 ($\leq 2.5 \text{ mm}^2$)	1 x	1 ... 6 mm ²		1 ... 10 mm ²	
		Stranded ($\geq 4 \text{ mm}^2$)	2 x	1 ... 6 mm ²		1 ... 10 mm ²	
	Flexible		1 x	1 (push-in) / 0.5 (spring) ... 4 mm ²		1 ... 6 mm ²	
	with non insulated ferrule		2 x	1 (push-in) / 0.5 (spring) ... 4 mm ²		1 ... 6 mm ²	
	Flexible with insulated ferrule		1 x	1 (push-in) / 0.5 (spring) ... 4 mm ²		1 ... 6 mm ²	
			2 x	1 (push-in) / 0.5 (spring) ... 2.5 mm ²		1 ... 6 mm ²	
	Flexible without ferrule		1 x	(spring) 0.5 ... 4 mm ²		(spring) 1 ... 6 mm ²	
			2 x	(spring) 0.5 ... 4 mm ²		(spring) 1 ... 6 mm ²	
Connection capacity acc. to UL/CSA (Solid $\leq$ AWG 14)		1 or 2 x	AWG 18 ... 10			AWG 18 ... 8	
Stripping length			12 mm			14 mm	
Auxiliary conductors (built-in auxiliary terminals + coil terminals)							
	Rigid solid		1 x	1 ... 2.5 mm ²			
			2 x	1 ... 2.5 mm ²			
	Flexible with		1 x	1 (push-in) / 0.5 (spring) ... 2.5 mm ²			
	non insulated ferrule		2 x	1 (push-in) / 0.5 (spring) ... 2.5 mm ²			
	Flexible with insulated ferrule		1 x	1 (push-in) / 0.5 (spring) ... 1.5 mm ²			
			2 x	1 (push-in) / 0.5 (spring) ... 1.5 mm ²			
	Flexible without ferrule		1 x	(spring) 0.5 ... 2.5 mm ²			
			2 x	(spring) 0.5 ... 2.5 mm ²			
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 $\varnothing 3 \text{ mm} \times 0.5 \text{ mm}$				

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 U _e max.	690 V					
Rated frequency (without derating)	50 / 60 Hz					
Conventional free air thermal current I _{th} - θ ≤ 40 °C	16 A					
I _e / 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 I _e AC-15 acc. to IEC 60947-5-1					
Breaking capacity AC-15	10 x I _e AC-15 acc. to IEC 60947-5-1					
I _e / 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 I _{cw}	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 I_c is the current to be broken by the contactor and I_e the rated operational current normally drawn by the load, then:

- Categories AC-1 and AC-3 $I_c = I_e$
- Category AC-2 $I_c = 2.5 \times I_e$
- Category AC-4 $I_c = 6 \times I_e$

Generally speaking $I_c = m \times I_e$ 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 I_c . 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	U_e
Current normally drawn	I_e (U_e / I_e / kW relation for motors, see "Motor rated operational powers and currents")
Utilization category	AC-1, AC-2, AC-3 or AC-4
Breaking current	$I_c = I_e$ for AC-1 and for AC-3 ; $I_c = 2.5 \times I_e$ for AC-2 ; $I_c = 6 \times I_e$ 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 (I_c ; N).

Electrical durability forecast and contactor selection for mixed duty motor control: AC-3 ($I_c = I_e$) type switching off while "motor running" and, occasionally, AC-4 ($I_c = 6 \times I_e$) type switching off while "motor accelerating"

Characteristics	Load to be controlled
Operational voltage	U_e
Current normally drawn while "motor running"	I_e (U_e / I_e / 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	$I_c = I_e$
Breaking current for AC-4 while "motor accelerating"	$I_c = 6 \times I_e$
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 (U_e / I_e) 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 $I_c = I_e$ (AC-3)
 - The number of operating cycles B for $I_c = 6 \times I_e$ (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 combined 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.

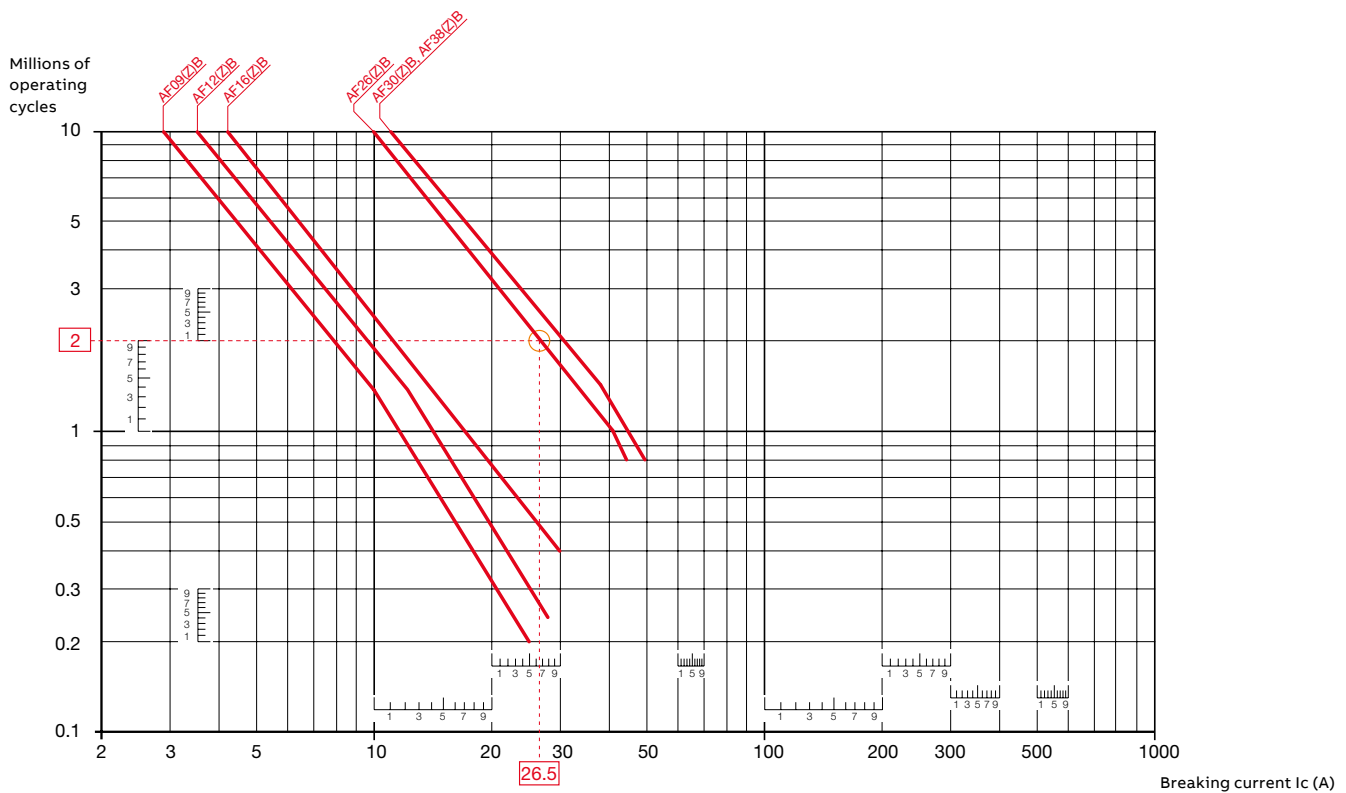
AF09(Z)B... AF38(Z)B... 3-pole contactors - with Push-in Spring terminals

Electrical durability

Electrical Durability for AC-1 Utilization Category - $U_e \leq 690$ V.

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

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



Example:

$I_c / AC-1 = 26.5$ 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).

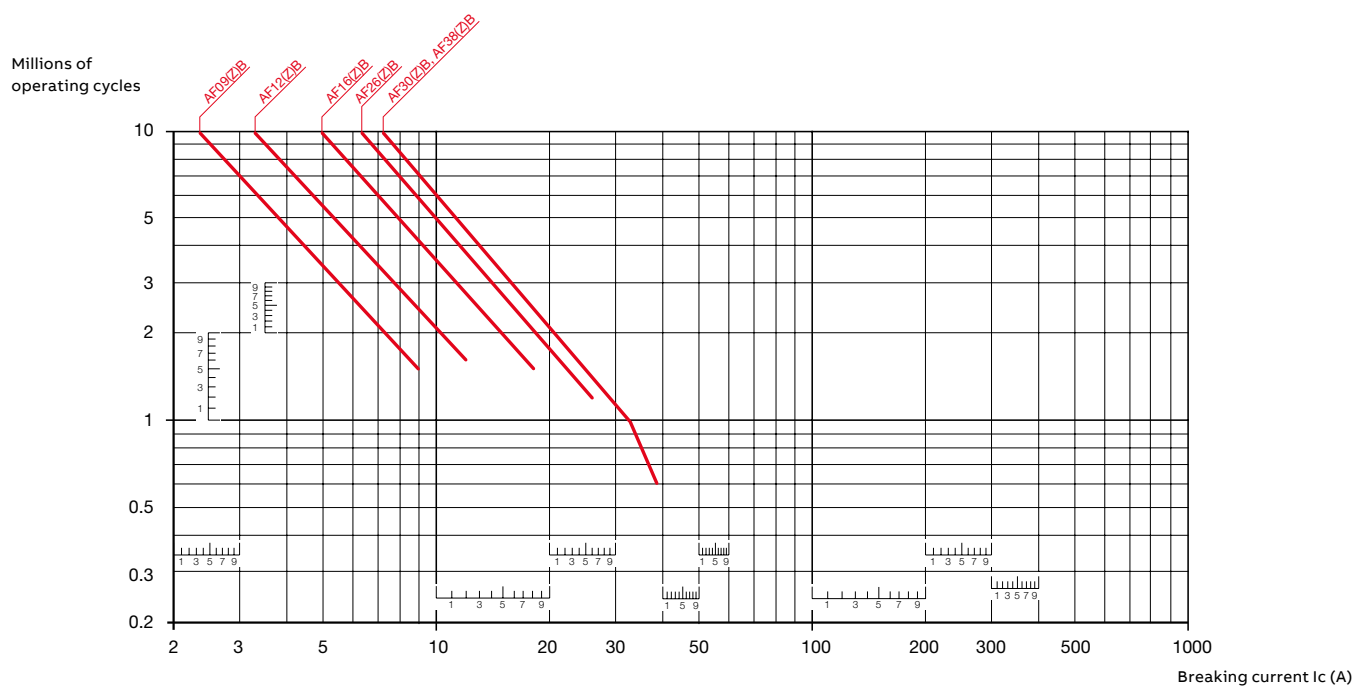
AF09(Z)B...K ... AF38(Z)B...K 3-pole contactors - with Push-in Spring terminals

Electrical durability

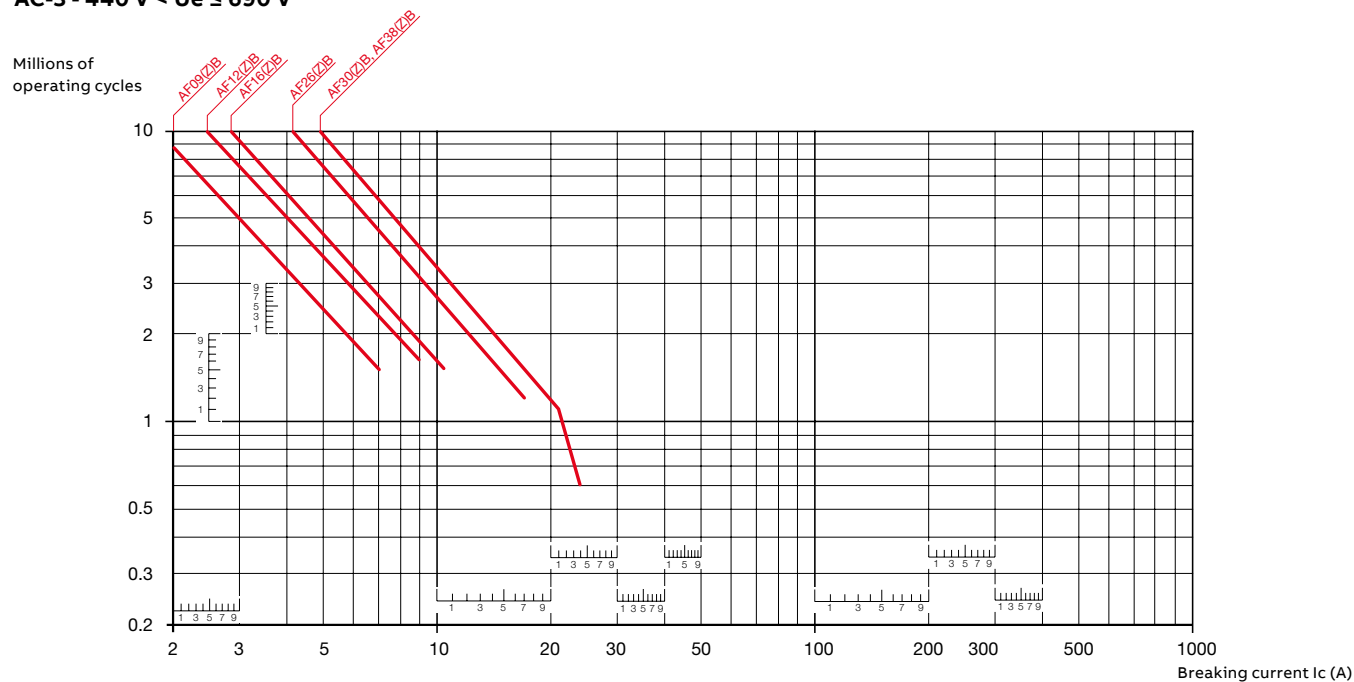
Electrical Durability for AC-3 Utilization Category

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

AC-3 - $U_e \leq 440$ V



AC-3 - 440 V < $U_e \leq 690$ V



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

Electrical durability

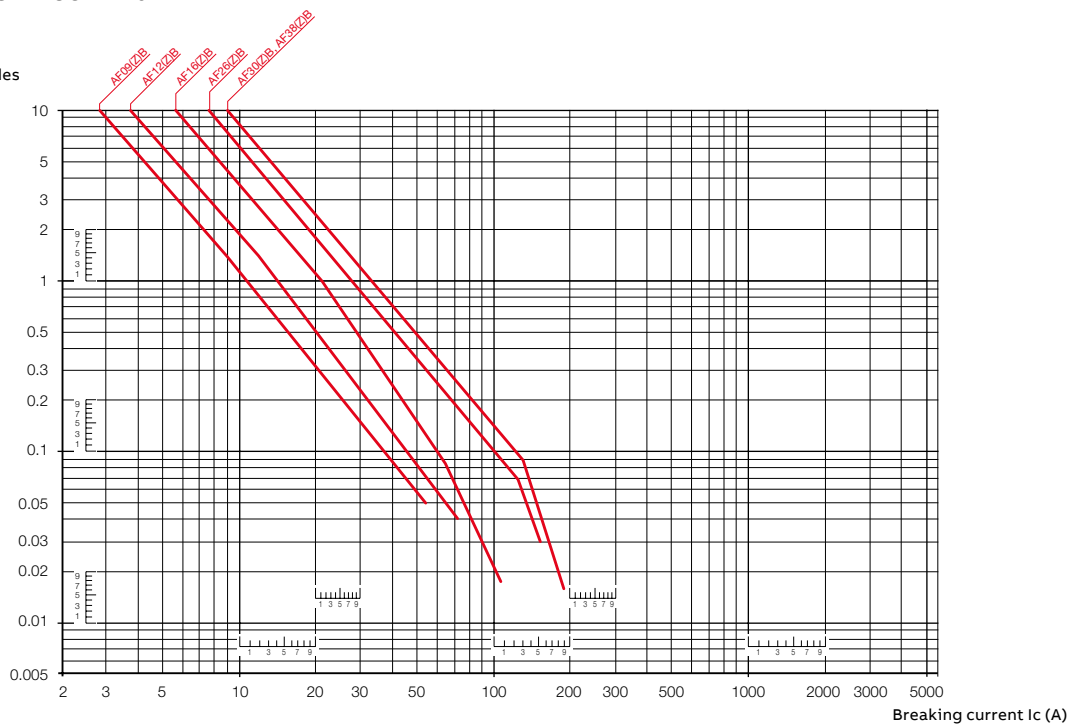
Electrical Durability for AC-2 or AC-4 Utilization Category

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

Ambient temperature $\leq 60^\circ\text{C}$. Maximum electrical switching frequency: see "Technical Data".

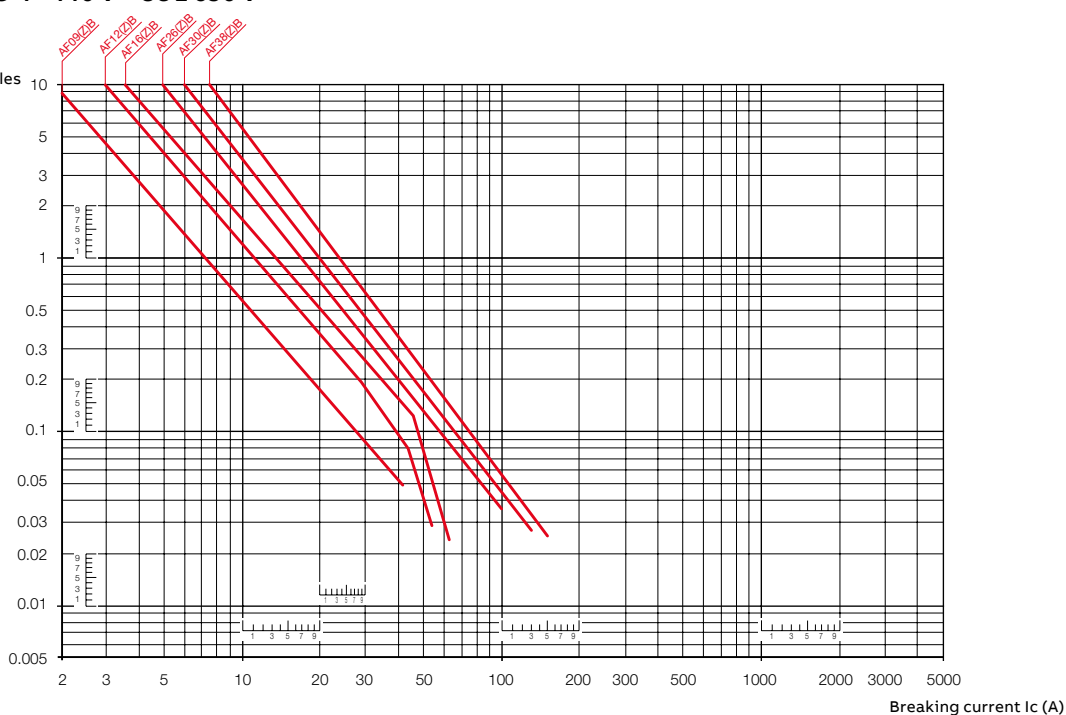
AC-2 or AC-4 - $U_e \leq 440\text{ V}$

Millions of
operating cycles



AC-2 or AC-4 - $440\text{ V} < U_e \leq 690\text{ V}$

Millions of
operating cycles





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

3/64	AF09ZB ... AF38ZB	DC operated
3/65	AF09(Z)B ... AF38(Z)B	AC operated
3/66	AF40B...AF80B	DC operated
3/67	AF40B...AF80B	AC operated
3/69	AF116B ... AF140B	DC operated
3/70	AF116B ... AF140B	AC operated
3/72	AF190B ... AF370B	DC operated
3/73	AF190B ... AF370B	AC operated
3/74	Technical data	
3/83	Electrical durability	
3/85	Contactors for DC switching application	



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

or www.abb.com/productdetails/AF09ZB-30-10-21
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 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 ... 1.25 U_c 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 U_c (IEC 60077) (1)	Rated control circuit voltage U_c min. ... U_c max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current $\theta \leq 40^\circ\text{C}$ AC-1	General use rating 600 V AC						Pkg (1 pce)
A	A	V DC	V DC				kg

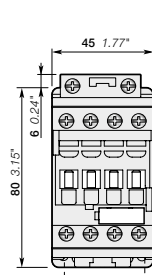
4 N.O. main poles

25	25	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	0 0 0 0 0 0	AF09ZB-40-00-21 AF09ZB-40-00-22 AF09ZB-40-00-23	1SBL136261R2100 1SBL136261R2200 1SBL136261R2300	0.310 0.310 0.310
30	30	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	0 0 0 0 0 0	AF16ZB-40-00-21 AF16ZB-40-00-22 AF16ZB-40-00-23	1SBL176261R2100 1SBL176261R2200 1SBL176261R2300	0.310 0.310 0.310
45	45	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	0 0 0 0 0 0	AF26ZB-40-00-21 AF26ZB-40-00-22 AF26ZB-40-00-23	1SBL236261R2100 1SBL236261R2200 1SBL236261R2300	0.410 0.410 0.410
55	55	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	0 0 0 0 0 0	AF38ZB-40-00-21 AF38ZB-40-00-22 AF38ZB-40-00-23	1SBL296261R2100 1SBL296261R2200 1SBL296261R2300	0.410 0.410 0.410

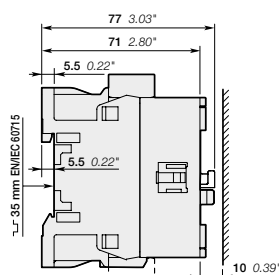
2 N.O. + 2 N.C. main poles

25	25	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	0 0 0 0 0 0	AF09ZB-22-00-21 AF09ZB-22-00-22 AF09ZB-22-00-23	1SBL136561R2100 1SBL136561R2200 1SBL136561R2300	0.310 0.310 0.310
30	30	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	0 0 0 0 0 0	AF16ZB-22-00-21 AF16ZB-22-00-22 AF16ZB-22-00-23	1SBL176561R2100 1SBL176561R2200 1SBL176561R2300	0.310 0.310 0.310
45	45	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	0 0 0 0 0 0	AF26ZB-22-00-21 AF26ZB-22-00-22 AF26ZB-22-00-23	1SBL236561R2100 1SBL236561R2200 1SBL236561R2300	0.410 0.410 0.410
55	55	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	0 0 0 0 0 0	AF38ZB-22-00-21 AF38ZB-22-00-22 AF38ZB-22-00-23	1SBL296561R2100 1SBL296561R2200 1SBL296561R2300	0.410 0.410 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



AF26ZB-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 $U_c \text{ min.} \dots U_c \text{ max.}$ 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 $+70^\circ \text{C}$
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

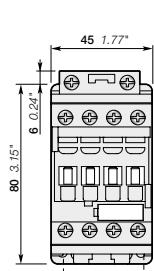
IEC	UL / CSA	Rated control circuit voltage $U_c \text{ min.} \dots U_c \text{ max.}$ (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current $\theta \leq 40^\circ \text{C}$ AC-1 A	General use rating 600 V AC A	V AC 50/60 Hz				Pkg (1 pce) kg

4 N.O. main poles

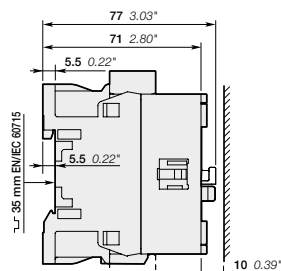
25	25	24...60	0 0	AF09ZB-40-00-21	1SBL136261R2100	0.310
		48...130	0 0	AF09ZB-40-00-22	1SBL136261R2200	0.310
		100...250	0 0	AF09ZB-40-00-23	1SBL136261R2300	0.310
		250...500	0 0	AF09B-40-00-14	1SBL137261R1400	0.310
30	30	24...60	0 0	AF16ZB-40-00-21	1SBL176261R2100	0.310
		48...130	0 0	AF16ZB-40-00-22	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

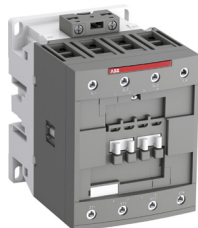
70 to 125 A AC-1

DC operated - connection with standard ferrules



AF40B-40-00

1SBLC101045V001.4



AF80B-40-00

1SBLC101048V001.4

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-inductive 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 $\theta \leq 40^\circ\text{C}$ AC-1	General use rating 600 V AC	V DC	V DC				Pkg (1 pce) kg
A	A	V DC	V DC				

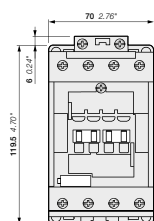
4 N.O. main poles

70	60	24, 33, 48	20...60	0 0	AF40B-40-00-11	1SBL347261R1100	1.02
		72, 96, 110	48...130	0 0	AF40B-40-00-12	1SBL347261R1200	1.02
		220	100...250	0 0	AF40B-40-00-13	1SBL347261R1300	1.02
100	80	24, 33, 48	20...60	0 0	AF52B-40-00-11	1SBL367261R1100	1.02
		72, 96, 110	48...130	0 0	AF52B-40-00-12	1SBL367261R1200	1.02
		220	100...250	0 0	AF52B-40-00-13	1SBL367261R1300	1.02
125	105	24, 33, 48	20...60	0 0	AF80B-40-00-11	1SBL397261R1100	1.24
		72, 96, 110	48...130	0 0	AF80B-40-00-12	1SBL397261R1200	1.24
		220	100...250	0 0	AF80B-40-00-13	1SBL397261R1300	1.440

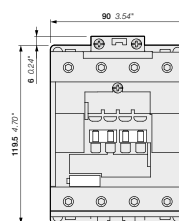
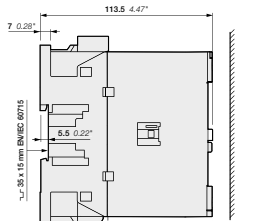
2 N.O. + 2 N.C. main poles

70	60	24, 33, 48	20...60	0 0	AF40B-22-00-11	1SBL347561R1100	1.02
		72, 96, 110	48...130	0 0	AF40B-22-00-12	1SBL347561R1200	1.02
		220	100...250	0 0	AF40B-22-00-13	1SBL347561R1300	1.02
100	80	24, 33, 48	20...60	0 0	AF52B-22-00-11	1SBL367561R1100	1.02
		72, 96, 110	48...130	0 0	AF52B-22-00-12	1SBL367561R1200	1.02
		220	100...250	0 0	AF52B-22-00-13	1SBL367561R1300	1.02
125	105	24, 33, 48	20...60	0 0	AF80B-22-00-11	1SBL397561R1100	1.24
		72, 96, 110	48...130	0 0	AF80B-22-00-12	1SBL397561R1200	1.24
		220	100...250	0 0	AF80B-22-00-13	1SBL397561R1300	1.24

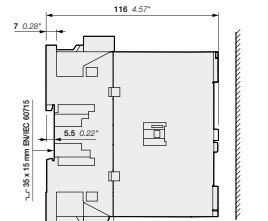
(1) Other control voltages, see voltage code table.



AF40B, AF52B



AF80B

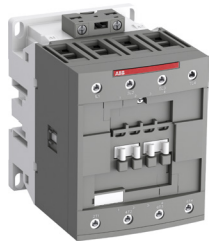


Main dimensions mm, inches

AF40B ... AF80B 4-pole contactors

70 to 125 A AC-1

AC operated - connection with standard ferrules



AF80B-40-00

1SBL100149V0014

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-inductive 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 sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range $U_c \text{ min.} \dots U_c \text{ max.}$ 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 $+70^\circ\text{C}$
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

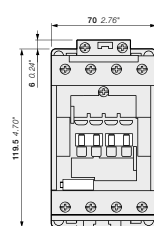
IEC	UL / CSA	Rated control circuit voltage $U_c \text{ min.} \dots U_c \text{ max.}$ (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current $\theta \leq 40^\circ\text{C}$ AC-1	General use rating 600 V AC					Pkg (1 pce)
A	A	V AC 50/60 Hz				kg

4 N.O. main poles

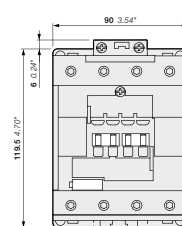
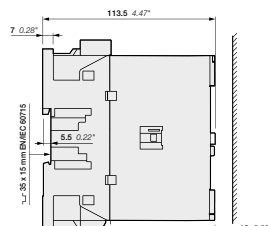
70	60	24...60	0 0	AF40B-40-00-11	1SBL347261R1100	1.02
		48...130	0 0	AF40B-40-00-12	1SBL347261R1200	1.02
		100...250	0 0	AF40B-40-00-13	1SBL347261R1300	1.02
		250...500	0 0	AF40B-40-00-14	1SBL347261R1400	1.02
100	80	20...60	0 0	AF52B-40-00-11	1SBL367261R1100	1.02
		48...130	0 0	AF52B-40-00-12	1SBL367261R1200	1.02
		100...250	0 0	AF52B-40-00-13	1SBL367261R1300	1.02
		250...500	0 0	AF52B-40-00-14	1SBL367261R1400	1.02
125	105	20...60	0 0	AF80B-40-00-11	1SBL397261R1100	1.24
		48...130	0 0	AF80B-40-00-12	1SBL397261R1200	1.24
		100...250	0 0	AF80B-40-00-13	1SBL397261R1300	1.24
		250...500	0 0	AF80B-40-00-14	1SBL397261R1400	1.24

2 N.O. + 2 N.C. main poles

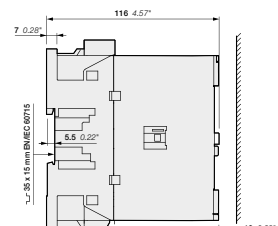
70	60	20...60	0 0	AF40B-22-00-11	1SBL347561R1100	1.02
		48...130	0 0	AF40B-22-00-12	1SBL347561R1200	1.02
		100...250	0 0	AF40B-22-00-13	1SBL347561R1300	1.02
		250...500	0 0	AF40B-22-00-14	1SBL347561R1400	1.02
100	80	20...60	0 0	AF52B-22-00-11	1SBL367561R1100	1.02
		48...130	0 0	AF52B-22-00-12	1SBL367561R1200	1.02
		100...250	0 0	AF52B-22-00-13	1SBL367561R1300	1.02
		250...500	0 0	AF52B-22-00-14	1SBL367561R1400	1.02
125	105	20...60	0 0	AF80B-22-00-11	1SBL397561R1100	1.24
		48...130	0 0	AF80B-22-00-12	1SBL397561R1200	1.24
		100...250	0 0	AF80B-22-00-13	1SBL397561R1300	1.24
		250...500	0 0	AF80B-22-00-14	1SBL397561R1400	1.24



AF40B, AF52B



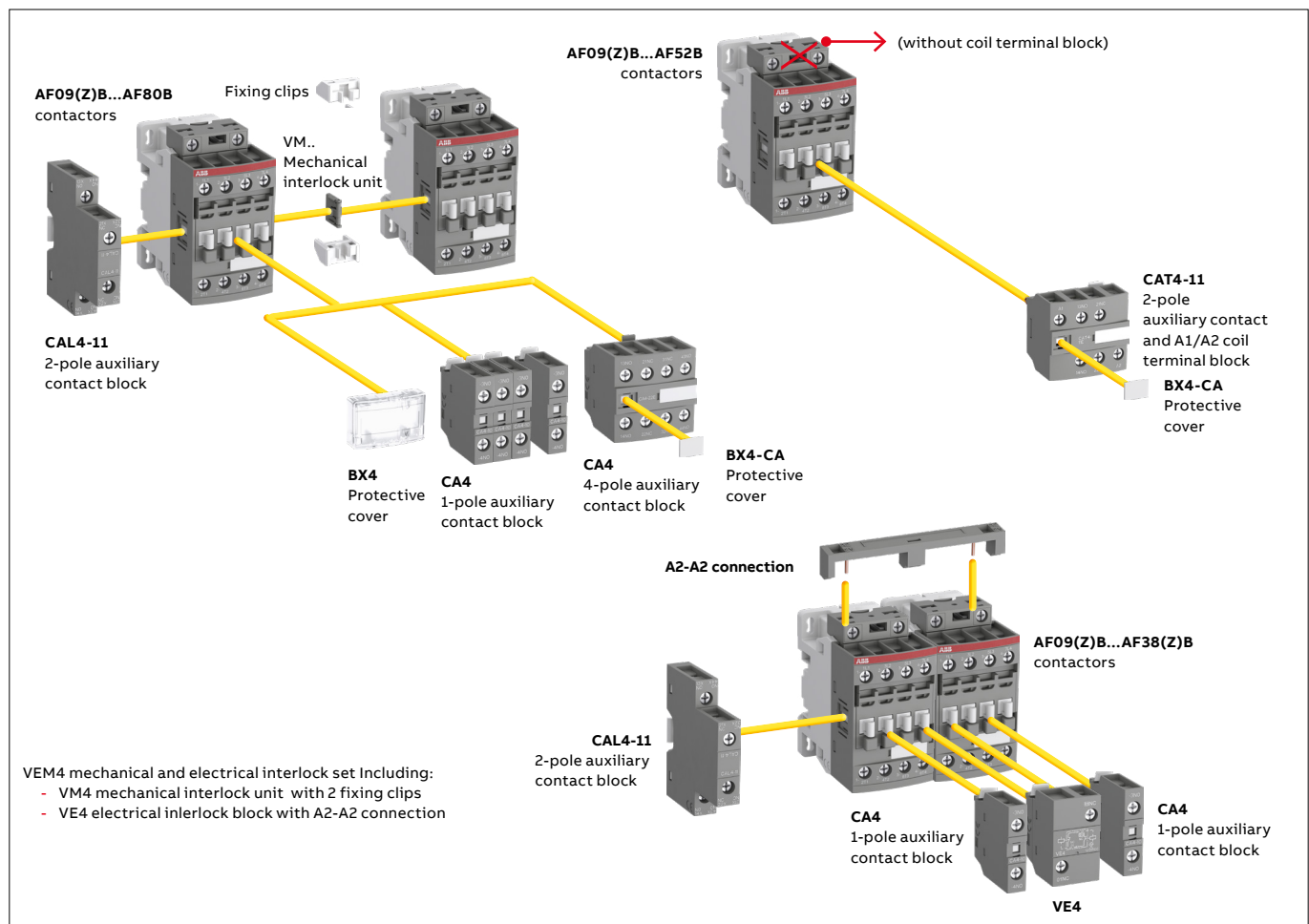
AF80B



Main dimensions mm, inches

AF09(Z)B ... AF80B 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				Side-mounted accessories	
			Auxiliary contact blocks			Electrical and mechanical interlock set VEM... / Mechanical interlock set V (between 2 contactors)	Auxiliary contact blocks	
			1-pole CA4	2-pole CAT4-11	4-pole CA4	VEM4 VM	Left side	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	+1	-
AF26(Z)B ... AF38(Z)B	4 0	0 0 (2)	2 max.	or 1	-	- +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	+1
AF80B	4 0	0 0	4 max.	-	or 1	- +1	+1	+1
AF40B, AF52B	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.

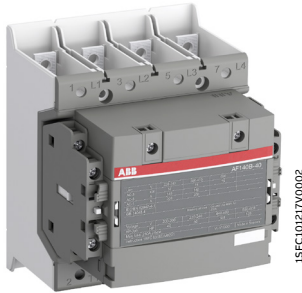
(2) Including add-on contacts: 3 N.C. auxiliary contacts max. on positions 1, 2, 3, 4 and 2 N.C. auxiliary contacts max. on positions 1 ±30°, 5.

(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



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.

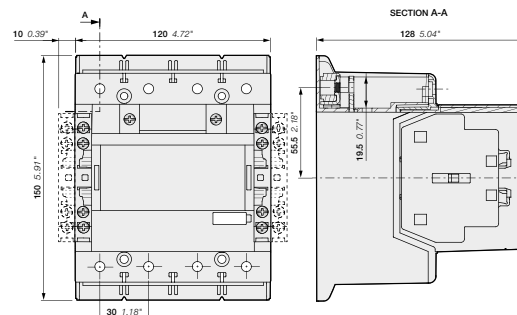
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting a wide DC control voltage range (0.85 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 ... 1.25 U_c 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 U_c (IEC 60077) (1)	Rated control circuit voltage U_c min. ... U_c max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current $\theta \leq 40^\circ\text{C}$ AC-1 A	General use rating 600 V AC A	V DC	V DC				Pkg (1 pce) kg

4 N.O. main poles

160	160	24, 33, 48	20...60	2 2	AF116B-40-22-11	1SFL427263R1122	2.190
		64, 72, 87, 96	48...130	2 2	AF116B-40-22-12	1SFL427263R1222	2.190
		110, 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
		64, 72, 87, 96	48...130	2 2	AF140B-40-22-12	1SFL447263R1222	2.190
		110, 220	100...250	2 2	AF140B-40-22-13	1SFL447263R1322	2.190

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



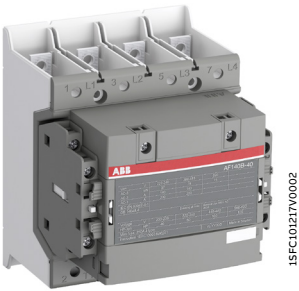
AF116B, AF140B-40-22

Main dimensions mm, inches

AF116B ... AF140B 4-pole contactors

160 to 200 A AC-1

AC operated - connection with standard ferrules

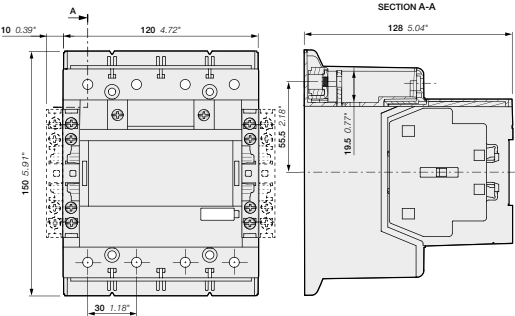


AF140B-40-22

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 $U_{c\ min.} \dots U_{c\ max.}$ 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 $U_{c\ min.} \dots U_{c\ max.}$ (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current $\theta \leq 40\ ^\circ C$ 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-40-22-11	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

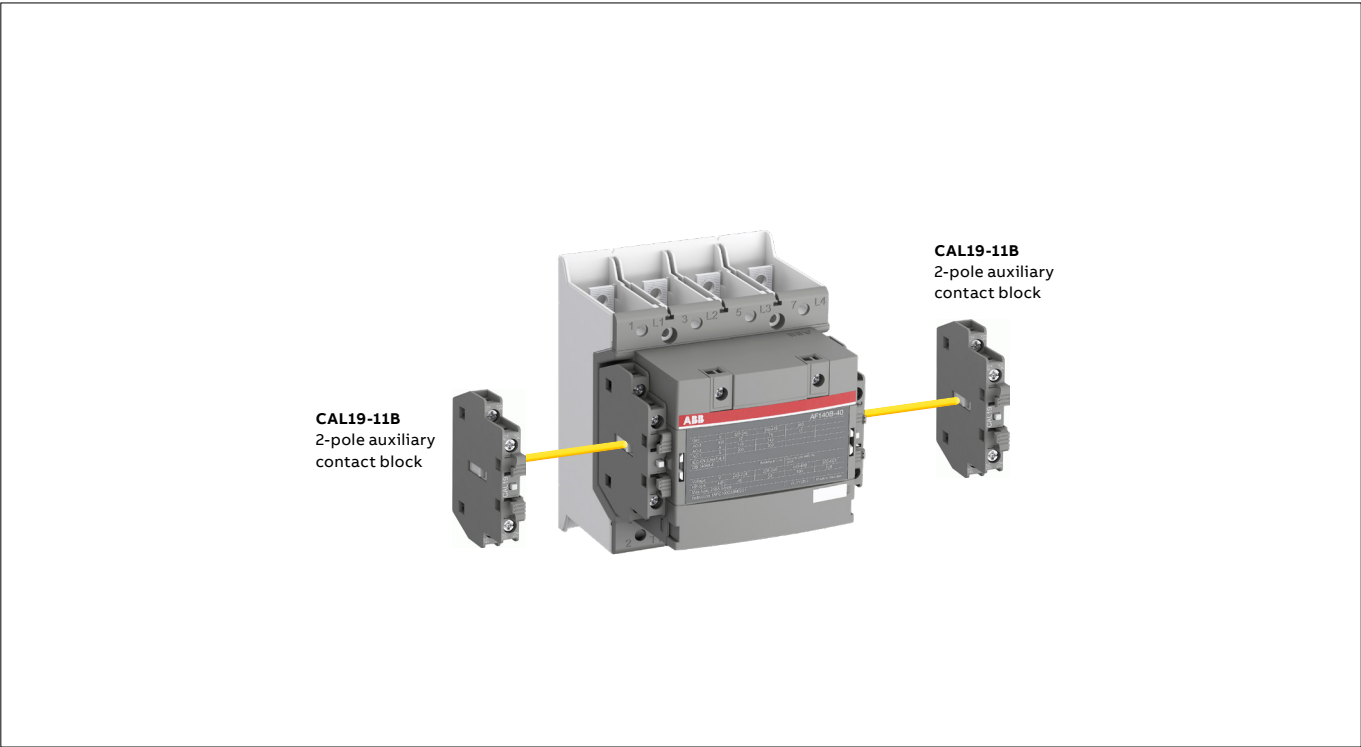


AF116B, AF140B-40-22

Main dimensions mm, inches

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

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 ... AF65(Z)B-30-00RT	1 1 - -	CA4-11ERT	1SBN010155R1011	1	0.040
AF09(Z)B ... AF52(Z)B-40-00RT					
AF09(Z)B ... AF52(Z)B-22-00RT					
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 ... AF96(Z)B-30-00RT	2 2 - -	CA4-22ERT	1SBN010142R1022	1	0.050
AF09(Z)B ... AF80(Z)B-40-00RT	3 1 - -	CA4-31ERT	1SBN010142R1031	1	0.050
AF09(Z)B ... AF80(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

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
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

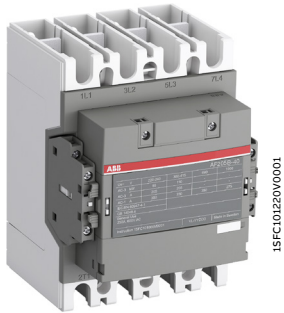
AF09(Z)B ... AF16(Z)B-30-10RT	1 1 - -	CAT4-11MRT	1SBN010154R1111	1	0.045
AF26(Z)B ... AF38(Z)B-30-00RT	1 1 - -	CAT4-11ERT	1SBN010154R1011	1	0.045
AF09(Z)B ... AF38(Z)B-40-00RT					
AF09(Z)B ... AF38(Z)B-22-00RT					

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

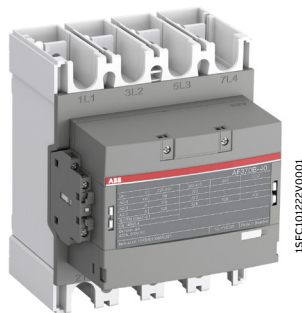
AF190B ... AF370B 4-pole contactors

275 to 525 A AC-1

AC operated - connection with standard ferrules



AF205B-40-22

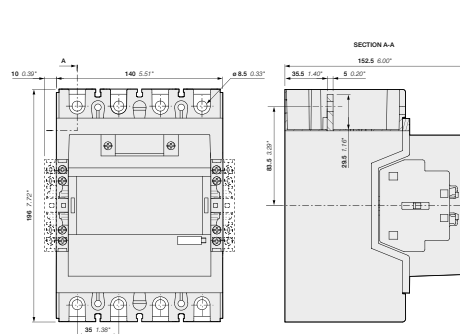


AF370B-40-22

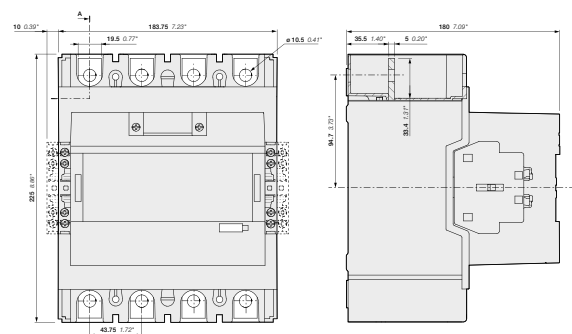
AF190B ... AF370B 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling 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 $U_c \text{ min.} \dots U_c \text{ max.}$ 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 $+70^\circ\text{C}$
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC	UL / CSA	Rated control circuit voltage $U_c \text{ min.} \dots U_c \text{ max.}$ (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current $\theta \leq 40^\circ\text{C}$ AC-1 A	General use rating 600 V AC A					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

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"

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

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 pole80 V DC	25 A (1)	30 A (1)	45 A	55 A	60 A	80 A	105 A
2 poles in serie160 V DC	25 A (1)	30 A (1)	45 A	55 A	60 A	80 A	105 A
3 poles in serie240 V DC	25 A	30 A	45 A	55 A	60 A	80 A	105 A
4 poles in serie320 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	525 A	
Ue max. ≤ 690 V, 50/60 Hz		θ ≤ 60 °C	145 A	175 A	250 A	300 A	350 A	425 A	
		θ ≤ 70 °C	130 A	160 A	200 A	240 A	290 A	350 A	
Ie / Rated operational current AC-1		θ ≤ 40 °C	–	–	250 A	275 A	350 A	400 A	
Ue max. ≤ 1000 V, 50/60 Hz		θ ≤ 60 °C	–	–	225 A	250 A	300 A	325 A	
		θ ≤ 70 °C	–	–	185 A	200 A	240 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
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						

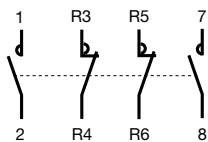
AF09(Z)B ... AF80B 4-pole contactors

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 U_i acc. to IEC 60947-4-1	690 V						1000 V
acc. to UL / CSA	600 V						
Rated impulse withstand voltage U_{imp}	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 million operating cycles				5 million 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



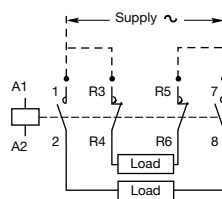
These contactors are suitable for controlling 2 separate circuits, i.e. 2 loads with 2 separate supplies, or 1 circuit comprising 2 separate loads with a single supply (see diagrams below). When the contactor operates there is no mechanical overlapping between the N.O. poles and the N.C. poles: **BREAK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



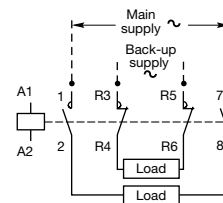
These contactors are not suitable for a reversing starter or for controlling a single load from 2 separate supplies.

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

Contactors types	AF116B	AF140B	AF190B	AF205B	AF265B	AF305B	AF370B
Rated insulation voltage U_i							
acc. to IEC 60947-4-1	1000 V						
acc. to UL / CSA	600 V						
Rated impulse withstand voltage U_{imp}	8 kV						
Electromagnetic compatibility	Devices complying with IEC/EN 60947-1 - Environment A EN 50121-3-2						
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						

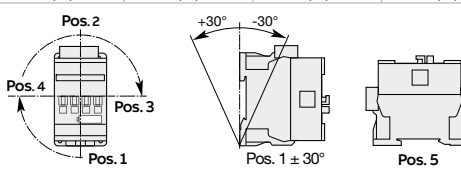
AF09(Z)B ... AF80B 4-pole contactors

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 $\theta \leq 70\text{ }^{\circ}\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max.}$				at $\theta \leq 70\text{ }^{\circ}\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$		
	AC supply	at $\theta \leq 60\text{ }^{\circ}\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$				at $\theta \leq 70\text{ }^{\circ}\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$		
		at $\theta \leq 70\text{ }^{\circ}\text{C}$ $0.85 \times U_c \text{ min} \dots U_c \text{ max}$						
Rated control circuit voltage U_c		(AF...ZB) 24...250 V AC, AF...B 250...500 V AC, (AF...ZB) 20...250 V DC				24 ... 500 V AC		
Coil consumption								
DC control voltage								
20 ... 60 V DC	Average pull-in value	13 VA / W				51 VA / W		
	Average holding value	1.8 W				1.5 W		
48 ... 130 V DC	Average pull-in value	14 VA / W				74 VA / W		
	Average holding value	1.9 W				1.6 W		
100 ... 250 V DC	Average pull-in value	14 VA / W				44 VA / W		
	Average holding value	2 W				1.8 W		
AC control voltage 50/60 Hz								
24 ... 60 V AC	Average pull-in value	25 VA				125 VA		
	Average holding value	2.4 VA / 1.8 W				3.4 VA / 1.4 W		
48 ... 130 V AC	Average pull-in value	21 VA				100 VA		
	Average holding value	3 VA / 1.7 W				2.7 VA / 1.6 W		
100 ... 250 V AC	Average pull-in value	18 VA				75 VA		
	Average holding value	3.5 VA / 2 W				4.0 VA / 2.1 W		
250 ... 500 V AC	Average pull-in value	37 VA				85 VA		
	Average holding value	5.9 VA / 2.7 W				6.2 VA / 2.4 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		$\leq 60\text{ }\%$ of $U_c \text{ min.}$						
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

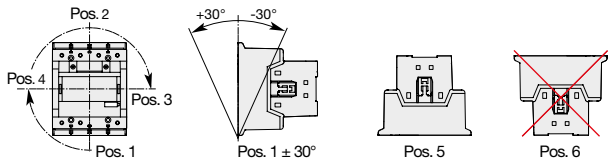
Contractor types		AF116B	AF140B	AF190B	AF205B	AF265B	AF305B	AF370B
Coil operating limits		AC supply	At $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... 1.1 x Uc max					
acc. to IEC 60947-4-1		DC supply	At $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.80 x Uc min ... 1.1 x Uc max					
Rated control circuit voltage Uc		24...500 V AC, 20...500 V DC						
Coil consumption								
DC control voltage								
20...60 V DC	Average pull-in value	420 VA/W		370 VA/W		980 VA/W		
	Average holding value	2.7 W		2.5 W		2.9 W		
48...130 V DC	Average pull-in value	435 VA/W		465 VA/W		1225 VA/W		
	Average holding value	2.4 W		2.5 W		2.0 W		
100...250 V DC	Average pull-in value	275 VA/W		360 VA/W		720 VA/W		
	Average holding value	2.8 W		3.5 W		4.2 W		
250...500 V DC	Average pull-in value	820 VA/W		680 VA/W (1)		1515 VA/W (3)		
	Average holding value	4.3 W		4.1 W		4.1 W		
AC control voltage 50/60 Hz								
24...60 V AC	Average pull-in value	305 VA		245 VA		695 VA		
	Average holding value	4.9 VA / 2.75 W		10 VA / 2.4 W		10 VA / 2.7 W		
48...130 V AC	Average pull-in value	320 VA		340 VA		975 VA		
	Average holding value	15.1 VA / 2.4 W		14.5 VA / 2.5 W		23.2 VA / 2.1 W		
100...250 V AC	Average pull-in value	220 VA		285 VA		590 VA		
	Average holding value	30.7 VA / 2.7 W		26.8 VA / 2.4 W		32 VA / 4.1 W		
250...500 V AC	Average pull-in value	275 VA		260 VA		685 VA (2)		
	Average holding value	33.2 VA / 4.4 W		18.6 VA / 4.1 W		27.5 VA / 4.1 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		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		

1) Current peak up to 2.5 A can occur during pull-in

2) Current peak up to 7.4 A can occur during pull-in

3) Current peak up to 6 A can occur during pull-in

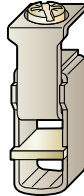
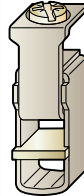
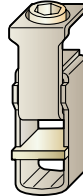
Mounting characteristics and conditions for use

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

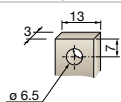
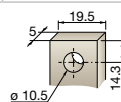
Connecting characteristics

Contactors 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 ($\leq 4 \text{ mm}^2$) Stranded ($\geq 1 \text{ mm}^2$)	1 x 2 x	1...6 mm ²	1.5...16 mm ²	6...35 mm ²	6...70 mm ²	
				1...6 mm ²	1.5...16 mm ²	6...35 mm ²	6...50 mm ²	
	Flexible with non insulated ferrule		1 x	0.75...6 mm ²	1.5...16 mm ²	4...35 mm ²	6...50 mm ²	
			2 x	0.75...6 mm ²	1.5...16 mm ²	4...35 mm ²	6...50 mm ²	
	Flexible with insulated ferrule		1 x	0.75...4 mm ²	1.5...16 mm ²	4...35 mm ²	6...50 mm ²	
			2 x	0.75...2.5 mm ²	1.5...16 mm ²	4...35 mm ²	6...50 mm ²	
	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 mm ²					
		2 x	1...2.5 mm ²					
	Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²					
		2 x	0.75...2.5 mm ²					
	Flexible with insulated ferrule	1 x	0.75...2.5 mm ²					
		2 x	0.75...1.5 mm ²					
	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 mm ²		6...150 mm ²		16...300 mm ²	
Clamp type		LD... included (1)		1SDA066917R1		1SDA055016R1	
Tightening torque		8 Nm		14 Nm		25 Nm	
 Cu cable - Stranded	2 x	10...95 mm ²		50...120 mm ²		70...185 mm ²	
Clamp type		LD... (1)		1SFN074709R1000 LZ185-2C/120		1SCA022194R0890 OZXB4	
Tightening torque		8 Nm		16 Nm		22 Nm	
 Al cable - Stranded	1 x	–		95...185 mm ²		185...240 mm ²	
Clamp type		–		1SDA054988R1		1SDA055020R1	
Tightening torque		–		31 Nm		43 Nm	
 Cu cable - Flexible	1 x	10...70 mm ²		6...120 mm ²		16...240 mm ²	
Clamp type		LD... (1)		1SDA066917R1		1SDA055016R1	
Tightening torque		8 Nm		14 Nm		25 Nm	
 Cu cable - Flexible	2 x	10...70 mm ²		50...95 mm ²		70...185 mm ²	
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... (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... (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 mm ²					
	2 x	1...4 mm ²					
 Flexible	1 x	0.75...2.5 mm ²					
	2 x	0.75...2.5 mm ²					
 Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²					
	2 x	0.75...2.5 mm ²					
 Flexible with insulated ferrule	1 x	0.75...2.5 mm ²					
	2 x	0.75...2.5 mm ²					
 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, 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 I_c is the current to be broken by the contactor and I_e the rated operational current normally drawn by the load, then $I_c = I_e$ 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 I_c .

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 U_e
- Current normally drawn I_e
- Utilization category AC-1
- Breaking current $I_c = I_e$ 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 ($I_c ; N$).

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 combined 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.

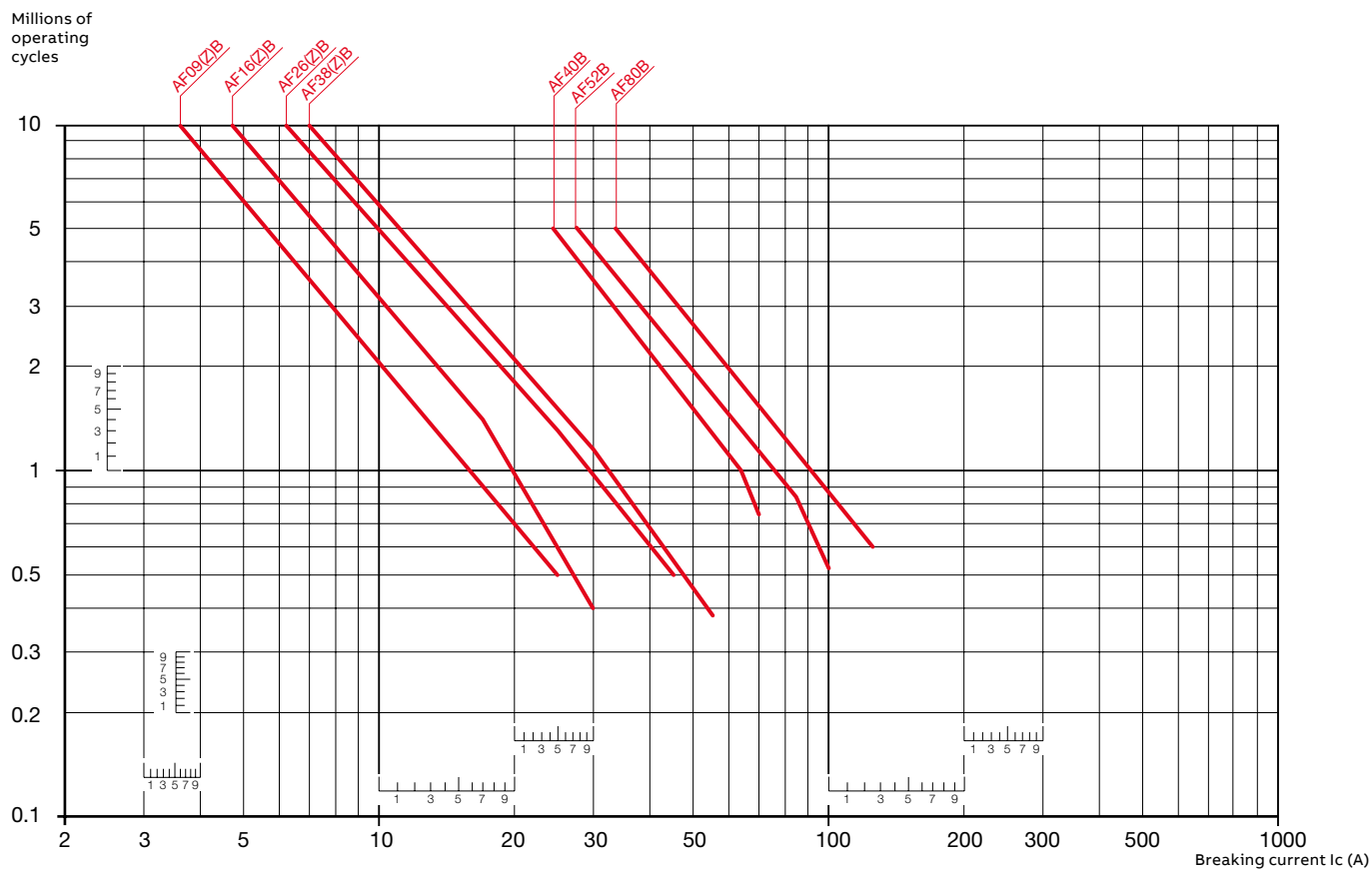
AF09(Z)B ... AF370B 4-pole contactors

Electrical durability

Electrical durability for AC-1 utilization category - $U_e \leq 690\text{ V}$

Switching non-inductive or slightly inductive loads. The breaking current I_c 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) = $\text{mH}/\Omega = \text{ms}$) 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 ($L/R \leq 1 \text{ ms}$)
- DC-3 shunt motors: starting, plugging, inching, dynamic breaking of DC motors ($L/R \leq 2 \text{ ms}$)
- DC-5 series motors: starting, plugging, inching, dynamic breaking of DC motors ($L/R \leq 7.5 \text{ ms}$).

The higher the time constant value is, the more difficult it is to break the arc.

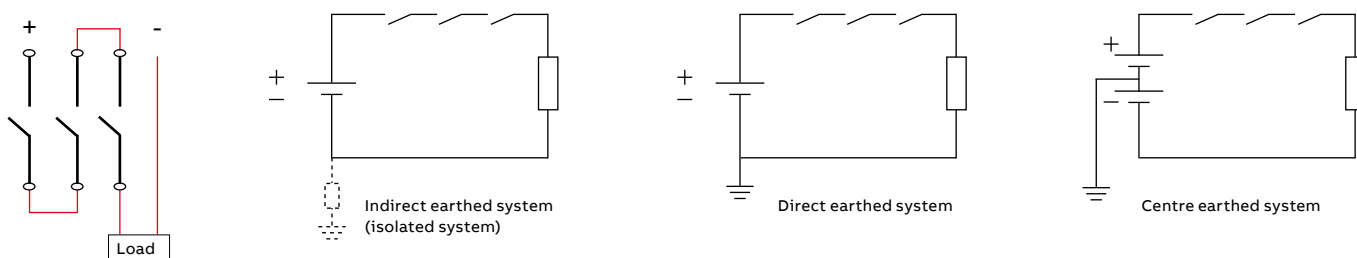
The addition of a resistor in parallel with an inductive winding helps in the elimination of the arcs, by reducing the time constant.

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.

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.

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 ($L/R \approx 1$ ms), inductive loads such as shunt motors ($L/R \approx 2$ ms) or series motors ($L/R \approx 7.5$ 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).

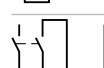
Technical data

- The tables indicate for the standard contactors the I_e 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 U_e 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

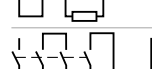
Utilization category DC-1, $L/R \leq 1$ ms

	≤ 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, $L/R \leq 2$ 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, $L/R \leq 7.5$ 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 screw terminals and Push-in Spring terminals

Screw terminals

- 3/90** NFZB 4-pole and 8-pole DC operated
- 3/91** NF(Z)B 4-pole and 8-pole AC operated
- 3/93** Technical data

Push-in Spring terminals

- 3/96** NFZB..K 4-pole and 8-pole DC operated
- 3/97** NF(Z)B..K 4-pole and 8-pole AC operated
- 3/99** Technical data



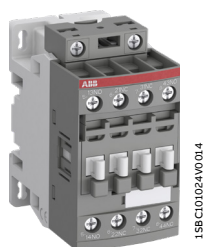
For direct product details information, use product type or order code, ex:

www.abb.com/productdetails/NFZB22EK-21

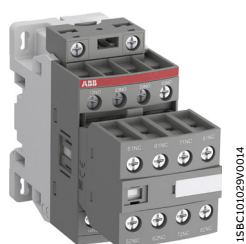
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NFZB 4 and 8-pole contactor relays

DC operated - connection with standard ferrules



NFZB22E



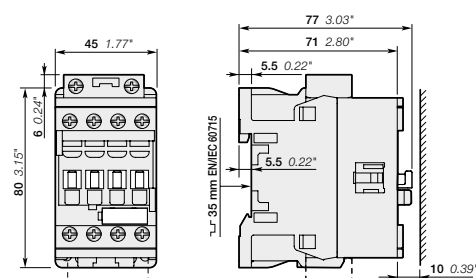
NFZB44E

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.

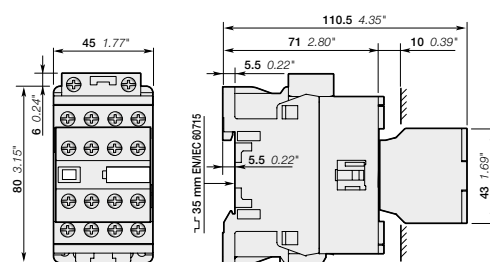
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 ... 1.25 U_c 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 U_c (IEC 60077) (1) V DC	Rated control circuit voltage U_c min. ... U_c max. (IEC 60947-4-1) V DC	Type	Order code	Weight Pkg (1 pce) 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

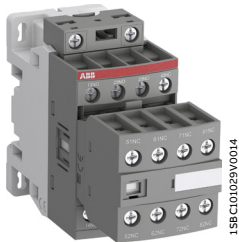
Main dimensions mm, inches

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

AC operated - connection with standard ferrules



NFZB22E

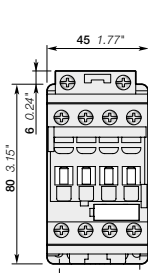


NFZB44E

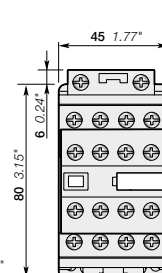
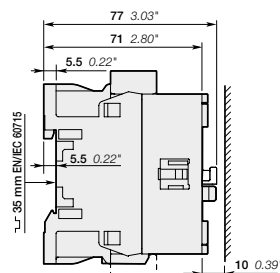
NF(Z)B contactor relays comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are used for switching auxiliary and control circuits. These contactor relays are of the block type design 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 $U_c \text{ min.} \dots U_c \text{ max.}$ 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 $+70^\circ \text{C}$
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

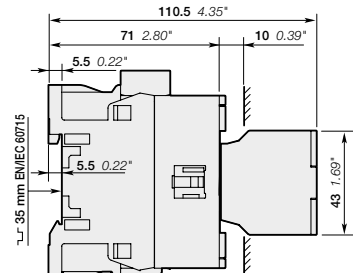
Number of contacts	Rated control circuit voltage $U_c \text{ min.} \dots U_c \text{ max.}$ (IEC 60947-4-1) V AC 50/60 Hz	Type	Order code	Weight Pkg (1 pce) kg
	24...60	NFZB22E-21	1SBH136061R2122	0.310
	48...130	NFZB22E-22	1SBH136061R2222	0.310
	100...250	NFZB22E-23	1SBH136061R2322	0.310
	250...500	NFB22E-14	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



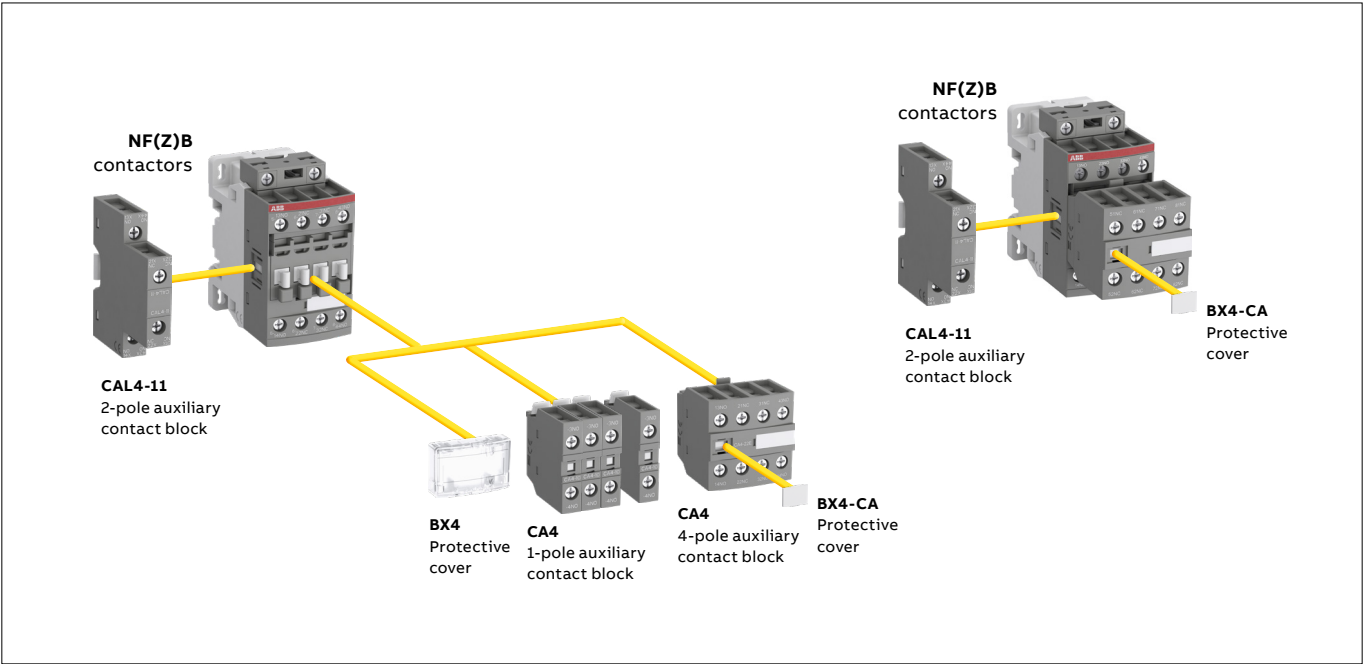
NF(Z)B44E, NF(Z)B62E, NF(Z)B80E



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				Side-mounted accessories	
		Auxiliary contact blocks				Auxiliary contact blocks	
		1-pole CA4	4-pole CA4			2-pole CAL4-11	
						Left side	Right side
NF(Z)B 4-pole contactor relays							
NF(Z)B	2 2 E (1)	4 max.	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	1	-				
	7 1 E						
	3 3 / 1 1						
	5 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 U_e max.	690 V	
Rated frequency (without derating)	50 / 60 Hz	
Conventional free-air thermal current - $I_{th} \theta \leq 40^\circ\text{C}$	16 A	
I_e / 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 I_e AC-15 acc. to IEC 60947-5-1	
Breaking capacity AC-15	10 x I_e AC-15 acc. to IEC 60947-5-1	
I_e / 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 I_{cw}	for 1.0 s	100 A
at 40 °C ambient temperature, in free air	for 0.1 s	140 A
from a cold state		
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	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	
acc. to annex L of IEC 60947-5-1		

(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

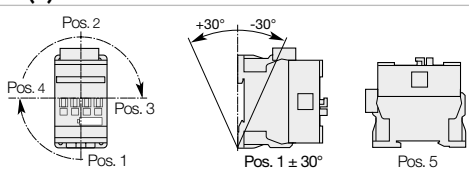
General technical data

Contactor relay types	NF(Z)B
Rated insulation voltage U_i acc. to IEC 60947-5-1	690 V
acc. to UL / CSA	600 V
Rated impulse withstand voltage U_{imp}	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 60947-4-1	DC supply (AF..ZB) at $\theta \leq 70^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$ AC supply at $\theta \leq 60^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$ at $\theta \leq 70^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots U_c \text{ max}$
Rated control circuit voltage U_c	(NF...ZB) 20...250 V DC; (N..ZB) 24 ... 250 V AC; (NF..B) 250 ... 500 V AC
Coil consumption	
DC control voltage	
20...60 V AC	Average pull-in value 13 VA / W Average holding value 1.8 W
48...130 V AC	Average pull-in value 14 VA / W Average holding value 1.9 W
100...250 V AC	Average pull-in value 14 VA / W Average holding value 2 VA
AC control voltage 50/60 Hz	
24...60 V AC	Average pull-in value 25 VA Average holding value 2.4 VA / 1.7 W
48...130 V AC	Average pull-in value 21 VA Average holding value 3 VA / 1.7 W
100...250 V AC	Average pull-in value 18 VA Average holding value 3.5 VA / 2 W
250...500 V AC	Average pull-in value 37 VA Average holding value 5.9 VA / 2.7 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	$\leq 60\%$ of $U_c \text{ min}$.
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

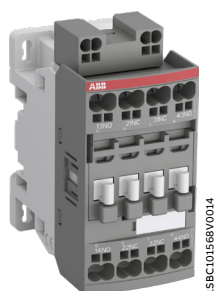
Technical data

Connecting characteristics

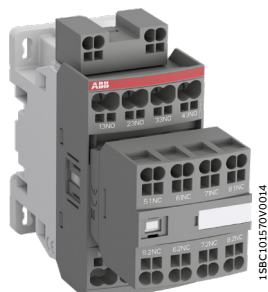
Contactor types		NF(Z)B	
Main terminals			
		Screw terminals with cable clamp	
Connection capacity (min. ... max.)			
Pole and coil terminals			
	Rigid Solid/Stranded	1 x	1...2.5 mm ²
		2 x	1...2.5 mm ²
	Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²
		2 x	0.75...2.5 mm ²
	Flexible with insulated ferrule	1 x	0.75...2.5 mm ²
		2 x	0.75...1.5 mm ²
	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 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 U_c ... 1.25 U_c 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.

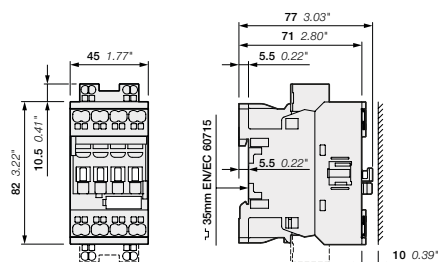
Number of contacts	Supply control voltage U_c (IEC 60077)	Rated control circuit voltage U_c min. ... U_c max	Type	Order code	Weight
	V DC	V DC			Pkg (1 pce) kg

4-pole contactor relays

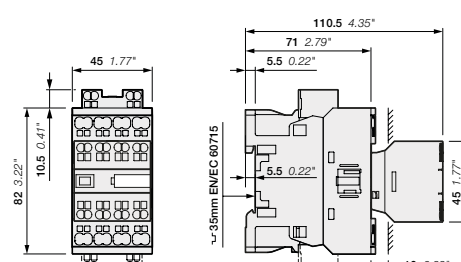
	24, 33, 48	20...60	NFZB22EK-21	1SBH136063R2122	0.315
	72, 96, 110	48...130	NFZB22EK-22	1SBH136063R2222	0.315
	220	100...250	NFZB22EK-23	1SBH136063R2322	0.315
	24, 33, 48	20...60	NFZB31EK-21	1SBH136063R2131	0.315
	72, 96, 110	48...130	NFZB31EK-22	1SBH136063R2231	0.315
	220	100...250	NFZB31EK-23	1SBH136063R2331	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

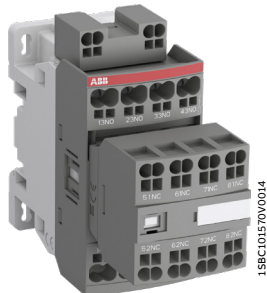
Main dimensions mm, inches

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.

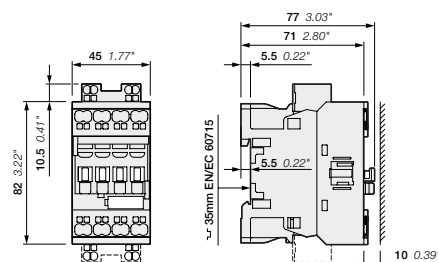
Number of contacts	Rated control circuit voltage Uc min. ... Uc max.	Type	Order code	Weight Pkg (1 pce) kg
	V AC 50/60 Hz			

4-pole contactor relays

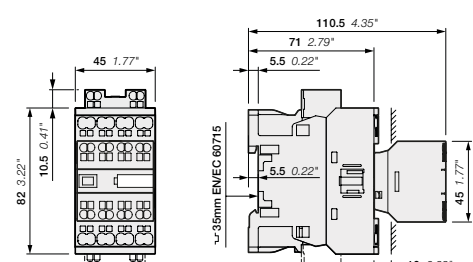
	24...60	NFZB22EK-21	1SBH136063R2122	0.315
	48...130	NFZB22EK-22	1SBH136063R2222	0.315
	100...250	NFZB22EK-23	1SBH136063R2322	0.315
	250...500	NFB22EK-14	1SBH137063R1422	0.325
	24...60	NFZB31EK-21	1SBH136063R2131	0.315
	48...130	NFZB31EK-22	1SBH136063R2231	0.315
	100...250	NFZB31EK-23	1SBH136063R2331	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

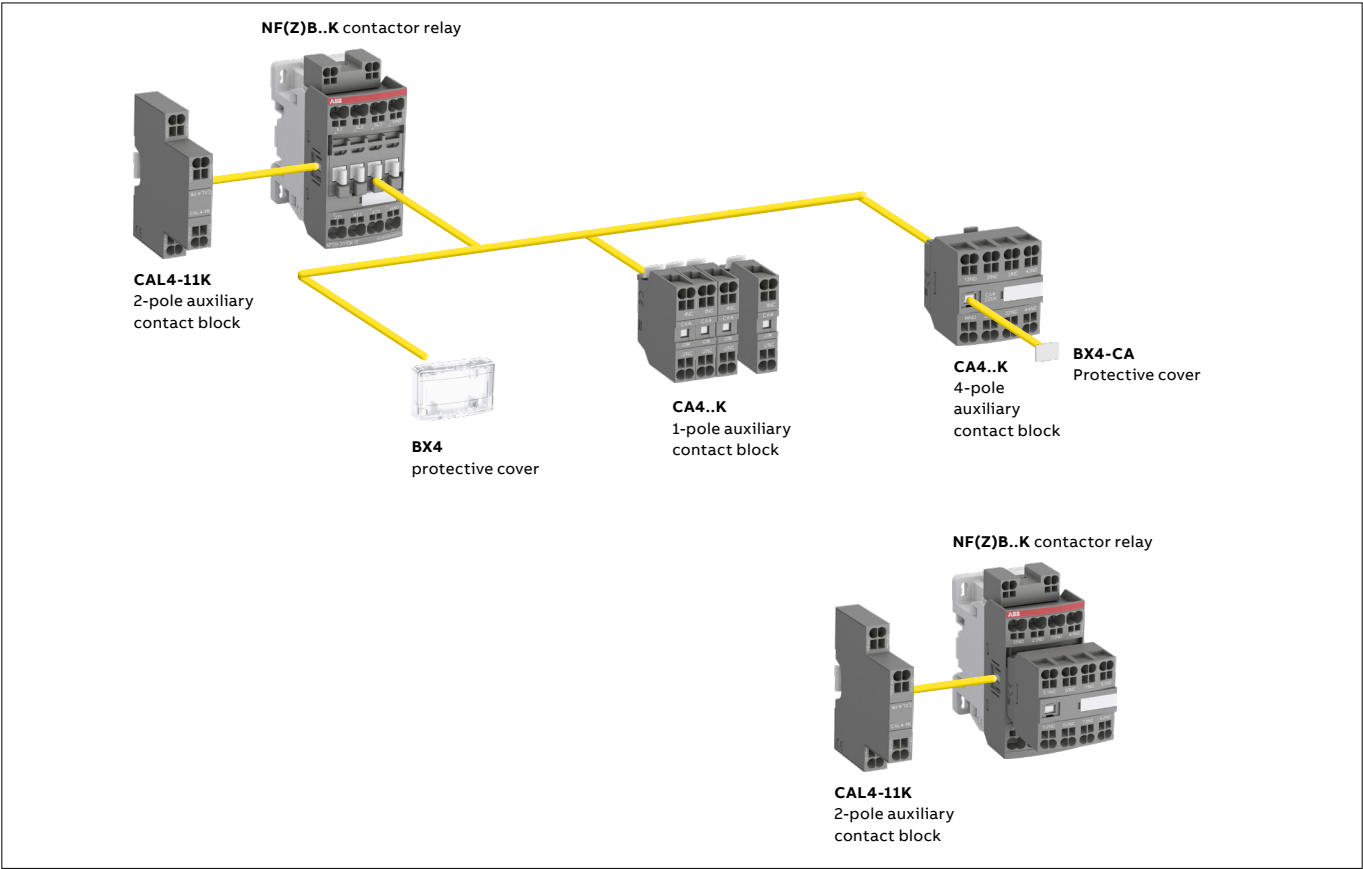


NF(Z)B44EK, NF(Z)B62EK, NF(Z)B80EK

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		Side-mounted accessories	
			Auxiliary contact blocks		Auxiliary contact blocks	
			1-pole CA4..K	4-pole CA4..K	2-pole CAL4-11K	
					Left side	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
	4 0	EK (2)				+ 1
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 positions 1+/-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 U _e max.	690 V	
Rated frequency (without derating)	50 / 60 Hz	
Conventional free air thermal current I _{th} - θ ≤ 40 °C	16 A	
I _e / 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 I _e AC-15 acc. to IEC 60947-5-1	
Breaking capacity AC-15	10 x I _e AC-15 acc. to IEC 60947-5-1	
I _e / 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 I _{cw}	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	Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts	
acc. to annex L of IEC 60947-5-1	(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 U_i	
acc. to IEC 60947-5-1	690 V
acc. to UL / CSA	600 V
Rated impulse withstand voltage U_{imp} .	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	Category 1, class B
acc. to IEC 61373	

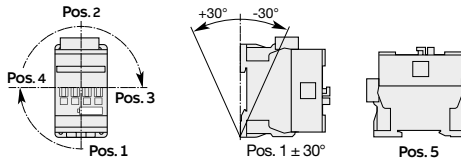
Magnet system characteristics

Contactor types	NF(Z)B ..K
Coil operating limits	DC supply (AF..ZB) at $\theta \leq 70^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$
acc. to IEC 60947-4-1	AC supply at $\theta \leq 60^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$ at $\theta \leq 70^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots U_c \text{ max}$
Rated control circuit voltage U_c	(AF...ZB)20...250 V DC; (AF..ZB) 24 ... 250 V AC; (AF..B) 250 ... 500 V AC
Coil consumption	
DC control voltage	
20...60 V AC	Average pull-in value 13 VA / W Average holding value 1.8 W
48...130 V AC	Average pull-in value 14 VA / W Average holding value 1.9 W
100...250 V AC	Average pull-in value 14 VA / W Average holding value 2 VA
AC control voltage 50/60 Hz	
24...60 V AC	Average pull-in value 25 VA Average holding value 2.4 VA / 1.7 W
48...130 V AC	Average pull-in value 21 VA Average holding value 3 VA / 1.7 W
100...250 V AC	Average pull-in value 18 VA Average holding value 3.5 VA / 2 W
250...500 V AC	Average pull-in value 37 VA Average holding value 5.9 VA / 2.7 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	$\leq 60\%$ of $U_c \text{ min.}$
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	
Mounting distances	Max. add-on N.C. auxiliary contacts: see accessory fitting details for a NF(Z)B..K contactor relay 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 mm ²
 Flexible with non insulated ferrule	2 x	1 ... 2.5 mm ²
 Flexible with non insulated ferrule	1 x	1 (push-in) / 0.5 (spring) ... 2.5 mm ²
 Flexible with insulated ferrule	2 x	1 (push-in) / 0.5 (spring) ... 2.5 mm ²
 Flexible with insulated ferrule	1 x	1 (push-in) / 0.5 (spring) ... 1.5 mm ²
 Flexible without ferrule	2 x	1 (push-in) / 0.5 (spring) ... 1.5 mm ²
 Flexible without ferrule	1 x	(spring) 0.5 ... 2.5 mm ²
 Flexible without ferrule	2 x	(spring) 0.5 ... 2.5 mm ²
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



GF..B Contactors for DC switching

Screw terminals

3/104	GF875B..GF1325B	DC operated - with 2 N.O. + 2 N.C.
3/105	GF875B..GF1325B	AC operated - with 2 N.O. + 2 N.C.
3/106	Technical data	



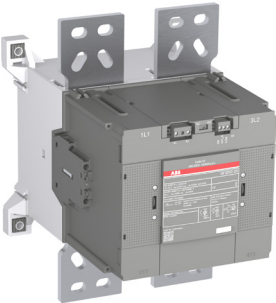
For direct product details information, use product type or order code, ex:

www.abb.com/productdetails/CA4-10-T

www.abb.com/productdetails/1SBN010110T1010

GF875B ... GF1325B

875 to 1325 A DC with 2 N.O. + 2 N.C. auxiliary contacts
DC operated - connection with standard ferrules

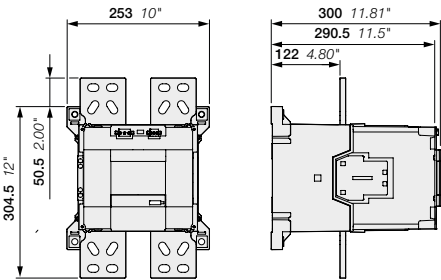


GF1050B-30-22

- GF875B ... GF1325B contactors comply with the latest railway rolling stock standards. These contactors are of the block type design with 2 main poles. The main poles are fitted with special arcing contacts enabling bi-directional breaking of currents up to 750 V DC per pole.
- 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 (HL1 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)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current $\theta \leq 40\text{ }^{\circ}\text{C}$ 1500 V DC-PV3 A	General use rating $\theta \leq 40\text{ }^{\circ}\text{C}$ 1500 V DC A	V DC	V DC				Pkg (1 pce) kg
875	210	24 ⁽¹⁾ , 28, 32, 36, 48	24...60	2 2	GF875B-20-22-51	1SFL617763R5122	14.3
		64, 72, 87, 96, 110	48...130	2 2	GF875B-20-22-52	1SFL617763R5222	14.3
		220	100...250	2 2	GF875B-20-22-53	1SFL617763R5322	14.3
1050	210	24 ⁽¹⁾ , 28, 32, 36, 48	24...60	2 2	GF1050B-20-22-51	1SFL637763R5122	14.3
		64, 72, 87, 96, 110	48...130	2 2	GF1050B-20-22-52	1SFL637763R5222	14.3
		220	100...250	2 2	GF1050B-20-22-53	1SFL637763R5322	14.3
1325	210	24 ⁽¹⁾ , 28, 32, 36, 48	24...60	2 2	GF1325B-20-22-51	1SFL647763R5122	14.3
		64, 72, 87, 96, 110	48...130	2 2	GF1325B-20-22-52	1SFL647763R5222	14.3
		220	100...250	2 2	GF1325B-20-22-53	1SFL647763R5322	14.3

(1) When supplied by generator, alternator or electronic converter

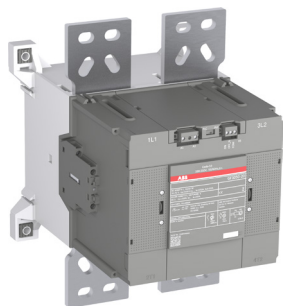


GF875B, GF1050B, GF1325B
Main dimensions mm, inches

GF875B ... GF1325B

875 to 1325 A DC with 2 N.O. + 2 N.C. auxiliary contacts

AC operated - connection with standard ferrules

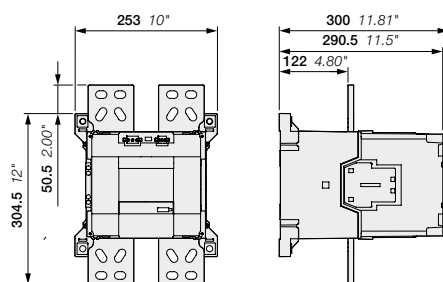


GF1050B-30-22

GF875B ... GF1325B contactors comply with the latest railway rolling stock standards. These contactors are of the block type design with 2 main poles. The main poles are fitted with special arcing contacts enabling bi-directional breaking of currents up to 750 V DC per pole.

- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range $U_c \text{ min.} \dots U_c \text{ max.}$ 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)
- 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 (HL1 hazard level)
- built-in surge suppression
- side by side mounting without restriction from -40°C up to $+70^\circ\text{C}$
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC	UL/CSA	Rated control circuit voltage $U_c \text{ min.} \dots U_c \text{ max. (IEC 60947-4-1)}$	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current $\theta \leq 40^\circ\text{C}$ 1500 V DC-PV3	General use rating $\theta \leq 40^\circ\text{C}$ 1500 V DC					Pkg (1 pce)
A	A	V AC 50/60 Hz				kg
875	210	24...60	2 2	GF875B-20-22-51	1SFL617763R5122	14.3
		48...130	2 2	GF875B-20-22-52	1SFL617763R5222	14.3
		100...250	2 2	GF875B-20-22-53	1SFL617763R5322	14.3
1050	210	24...60	2 2	GF1050B-20-22-51	1SFL637763R5122	14.3
		48...130	2 2	GF1050B-20-22-52	1SFL637763R5222	14.3
		100...250	2 2	GF1050B-20-22-53	1SFL637763R5322	14.3
1325	210	24...60	2 2	GF1325B-20-22-51	1SFL647763R5122	14.3
		48...130	2 2	GF1325B-20-22-52	1SFL647763R5222	14.3
		100...250	2 2	GF1325B-20-22-53	1SFL647763R5322	14.3



GF875B, GF1050B, GF1325B

Main dimensions mm, inches

GF875B ... GF1325B contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	GF875B	GF1050B	GF1325B
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1, IEC 60077-1 (applicable parts), IEC 60077-2 (applicable parts), EN 50155 (applicable parts)		
Fire and smoke		EN 45545-2 (HL1)		
Rated operational voltage U _e max.		1500 V DC		
Rated frequency (without derating)		50 / 60 Hz		
Conventional free-air thermal current I _{th} acc. to IEC 60947-4-1				
For air temperature close to contactor	θ ≤ 60 °C	875 A	1050 A	1325 A
	θ ≤ 70 °C	650 A	850 A	1050 A
With conductor cross-sectional area		600 mm ²	800 mm ²	1000 mm ²
Maximum electrical switching frequency		15 cycles/h		

Main pole - Utilization characteristics according to UL / CSA

Contactor types	AC / DC operated	GF875B	GF1050B	GF1325B
Standards		UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A		
Thermal current I _{th}		875 A	1050 A	1325 A
DC general use acc. to UL60947-4-1, U _e max. ≤ 1500		210 A	210 A	210 A

General technical data

Contactor types	AC / DC operated	GF875B	GF1050B	GF1325B
Rated insulation voltage U _i		1500 V		
acc. to IEC 60947-4-1		1500 V		
acc. to UL		1500 V		
Rated impulse withstand voltage U _{imp} .		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)		2000 m		
Mechanical durability				
	Number of operating cycles	50 000 operating cycles		
	Maximum switching frequency	15 cycles/h		
	Shock and vibration withstand acc to IEC 61373	Category 1, class B		

GF875B ... GF1325B contactors

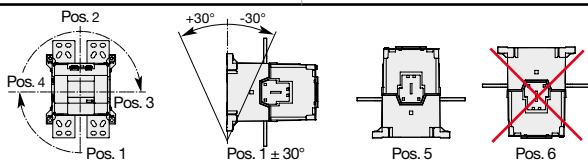
Technical data

Magnet system characteristics

Contactor types		AC / DC operated	GF875B	GF1050B	GF1325B
Coil operating limits acc. to IEC 60947-4-1		AC or DC supply	At $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.85 x Uc min...1.1 x Uc max.		
Rated control circuit voltage Uc		Coil Consumption (1)			
DC control voltage					
24...60 V DC	Max. pull-in value	880 VA/W			
	Max. holding value	5 W			
48...130 V DC	Max. pull-in value	1155 VA/W			
	Max. holding value	2.9 W			
100...250 V DC	Max. pull-in value	770 VA/W			
	Max. holding value	4.1 W			
AC control voltage 50/60 Hz					
24...60 V AC	Max. pull-in value	420 VA			
	Max. holding value	11.6 VA / 4.8 W			
48...130 V DC	Max. pull-in value	935 VA			
	Max. holding value	20.5 VA / 2.8 W			
100...250 V AC	Max. pull-in value	615 VA			
	Max. holding value	18.6 VA / 3.9 W			
Drop-out voltage according to "GF Magnetic system"		55 % of Uc min.			
Operating time					
Coil supply between A1 - A2					
Between coil energization and:	Main contact opening	50...120 ms			
Between coil de-energization and:	Main contact closing	33...70 ms			

(1) Internal measurement for indication.
Official values pending.

Mounting characteristics and conditions for use

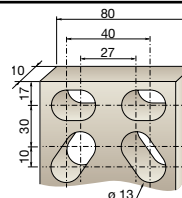
Contactor types	AC / DC operated	GF875B	GF1050B	GF1325B
Mounting positions				
				
Control voltage / Ambient temperature				
Mounting positions		1, $1 \pm 30^\circ$, 2, 3, 4, 5 at $\theta \leq 70^\circ\text{C}$		
positions		6		
Fixing by screws		4 x M5		

GF875B ... GF1325B contactors

Technical data

Connecting characteristics

Contactor types		AC / DC operated	GF875B	GF1050B	GF1325B
Main terminals					
Flat type					
Connection capacity (min. ... max.)					
Main conductors (poles)					
 Bars or lugs		L ≤	100 mm		
		Ø >	12 mm		
Connection capacity acc. to UL/CSA		1 or 2 x	busbars only		
Tightening torque		Recommended	45 Nm / 398 lb.in		
		Max.	49 Nm		
Auxiliary conductors					
 Rigid Solid/Stranded		1 x	1...4 mm ² (coil terminals : 2.5 mm ²)		
		2 x	1...4 mm ² (coil terminals : 1.5 mm ²)		
 Flexible with ferrule		1 x	0.75...2.5 mm ²		
		2 x	0.75...2.5 mm ²		
 Lugs		L ≤	8 mm		
		l >	3.7 mm		
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18...14		
Tightening torque		Recommended	1.00 Nm / 9 lb.in		
		Max.	1.20 Nm		
Degree of protection					
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529					
Main terminals			IP00		
Coil terminals			IP00		
Screw terminals					
Main terminals			M12		
			Screws and bolts		
Coil terminals (delivered in open position)			M3.5		
Screwdriver type			Flat Ø 5.5 mm / Pozidriv 2		



Accessories for AF..B, GF..B contactors and NF..B contactor relays

Connection with standard ferrules

- 3/112** Auxiliary contact blocks with screw terminals
- 3/114** Auxiliary contact blocks with Push-in Spring terminals
- 3/120** Interlocks
- 3/122** Connection set
- 3/123** Other accessories
- 3/126** Spare parts for AF116B..(RT) ... AF146B..(RT) contactors

Auxiliary contact blocks for AF09(Z)B ... AF2850B contactors

Connection with standard ferrules



CA4-10-T

1SBC100001V0014



CA4-22E

1SBC100006V0014



CAL4-11-T

1SBC100007V0014



CAT4-11E

1SBC100002V0014

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 ... AF2850B 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	0 4	- -	CA4-04E	1SBN010140R1004	1	0.055
AF09(Z)B ... AF16(Z)B-40-00						
AF40B...AF80B-40-00						
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			1	1	-	-	CAL4-11-T	1SBN010120T1011	10	0.040
NF(Z)B										
AF116B ... AF370B	1st block		1	1	-	-	CAL19-11	1SFN010820R1011	2	0.040
	2nd block		1	1	-	-	CAL19-11B	1SFN010820R3311	2	0.040
AF400B ... AF2850	1st block		1	1	-	-	CAL18-11	1SFN010720R1011	2	0.040
	2nd block		1	1	-	-	CAL18-11B	1SFN010720R3311	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	1 1	- -	CAT4-11E	1SBN010151R1011	1	0.040
AF09(Z)B ... AF40(Z)B-22-00						
AF26(Z)B ... AF38(Z)B-30-00						
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 U_i acc. to IEC 60947-5-1	690 V	
Rated impulse withstand voltage U_{imp}	6 kV	
Rated operational voltage U_e max.	24 ... 690 V	
Conventional thermal current $I_{th} - \theta \leq 40^\circ\text{C}$	16 A	
Rated frequency (without derating)	50 / 60 Hz	
I_e / 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 I_e AC-15 acc. to IEC 60947-5-1	
Breaking capacity	10 x I_e AC-15 acc. to IEC 60947-5-1	
I_e / 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 I_{cw} $\theta \leq 40^\circ\text{C}$	for 1.0 s	100 A
	for 0.1 s	140 A
Minimum switching capacity with failure rate acc. to IEC 60947-5-4	12 V / 3 mA	
Power dissipation per pole at 6 A	10^{-7}	
Mechanical durability	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 mm ²
	2 x	1...2.5 mm ²
 Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²
	2 x	0.75...2.5 mm ²
 Flexible with insulated ferrule	1 x	0.75...2.5 mm ²
	2 x	0.75...1.5 mm ²
 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	

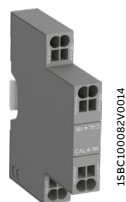
Auxiliary contact blocks with Push-in Spring terminals



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
	2 2	CA4-22EK	1SBN010146R1022	1	0.050
AF26(Z)B...K ... AF96B-30-00	3 1	CA4-31EK	1SBN010146R1031	1	0.050
AF09(Z)B ... AF80B-40-00	4 0	CA4-40EK	1SBN010146R1040	1	0.050
AF09(Z)B ... AF80B-22-00	1 3	CA4-13NK	1SBN010146R1213	1	0.050
4-pole NF(Z)B...K	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
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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 U_i acc. to IEC 60947-5-1		690 V
Rated impulse withstand voltage U_{imp} .		6 kV
Rated operational voltage U_e max.		690 V
Conventional thermal current $I_{th} - \theta \leq 40^\circ\text{C}$		16 A
Rated frequency (without derating)		50 / 60 Hz
le / 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 I_e AC-15
Breaking capacity acc. to IEC 60947-5-1		10 x I_e AC-15
le / 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 I_{cw}		
$\theta = 40^\circ\text{C}$		
	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}
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		Additional N.O. or N.C. auxiliary contacts (CA4, CAL4) are mechanically linked contacts.
acc. to annex L of IEC 60947-5-1		
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 mm ²
		2 x 1 ... 2.5 mm ²
	Flexible with ferrule	1 x 1 (push-in) / 0.5 (spring) ... 2.5 mm ²
		2 x 1 (push-in) / 0.5 (spring) ... 2.5 mm ²
	Flexible with insulated ferrule	1 x 1 (push-in) / 0.5 (spring) ... 1.5 mm ²
		2 x 1 (push-in) / 0.5 (spring) ... 1.5 mm ²
	Flexible without ferrule	1 x (spring) 0.5 ... 2.5 mm ²
		2 x (spring) 0.5 ... 2.5 mm ²
Connection capacity acc. to UL/CSA		1 or 2 x AWG 18 ... 14
Stripping length		10 mm
Degree of protection		IP20
acc. to IEC/EN 60947-1 and IEC/EN 60529		
Screwdriver type		Flat Ø 3 mm x 0.5 mm

Auxiliary contact blocks for AF116B ... AF2850B contactors

Connection with standard ferrules

Technical data

Types	CAL19, CAL19-11B	CAL18-11, CAL18-11B, CAL18-11RT, CAL18-11B-RT
Contact utilization characteristics according to IEC		
Standards	IEC/EN 60947-5-1	
Rated insulation voltage U_i acc. to IEC 60947-5-1	690 V	
Rated impulse withstand voltage U_{imp}	6 kV	
Rated operational voltage U_e max.	24...690 V AC	
Conventional thermal current I_{th} - $\theta \leq 40^\circ\text{C}$	16 A	
Rated frequency (without derating)	50/60 Hz	
I_e / 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 I_e AC-15	
Breaking capacity acc. to IEC 60947-5-1	10 x I_e AC-15	
I_e / 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 I_{cw} $\theta = 40^\circ\text{C}$	for 1.0 s 100 A for 0.1 s 140 A	
Minimum switching capacity with failure rate acc. to IEC 60947-5-4	24 V / 50 mA	24 V / 50 mA (0.5 million of operating cycles)
Power dissipation per pole at 6 A	$\leq 10-6$	
Mechanical durability Number of operating cycles	0.15 W	
	3 millions (A/AF400 ... AF750)	
	5 millions operating cycles	
Max. switching frequency	300 cycles/h	0.5 million (AF1250 ... AF2050)
Max. electrical switching frequency	300 cycles/h	3600 cycles/h
	AC-15	1200 cycles/h
	DC-13	900 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 mm ²
 Flexible with non insulated ferrule	2 x 1...4 mm ²
 Flexible with insulated ferrule	1 x 0.75...2.5 mm ²
 Flexible with insulated ferrule	2 x 0.75...2.5 mm ²
 Flexible with insulated ferrule	1 x 0.75...2.5 mm ²
 Flexible with insulated ferrule	2 x 0.75...2.5 mm ²
 Lugs	$L \leq$ 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 contact blocks for GF875B ... GF1325B contactors

Technical data

Type		CAL20-11, CAL20-11B
Contact utilization characteristics according to IEC		
Standards		IEC 60947-5-1 and 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 θ = 40 °C	for 1.0 s	100 A
	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	3 millions
	Max. switching frequency	300 cycles/h
Max. electrical switching frequency	AC-15	300 cycles/h
	DC-13	300 cycles/h

Contact utilization characteristics according to UL / CSA

Standards	UL 508, CSA C22.2 N°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 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/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 60947-1 / EN 60947-1 and IEC 60529 / 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 ... AF96B and NF(Z)B contactor relays

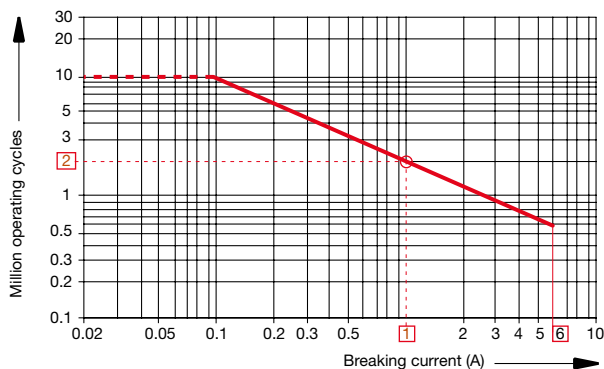
Electrical durability

Electrical durability for AC-15 utilization category

AC-15 utilization category according to IEC/EN 60947-5-1:

- making current: $10 \times I_e$ with $\cos \phi = 0.7$ and U_e
- breaking current: I_e with $\cos \phi = 0.4$ and U_e .

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.

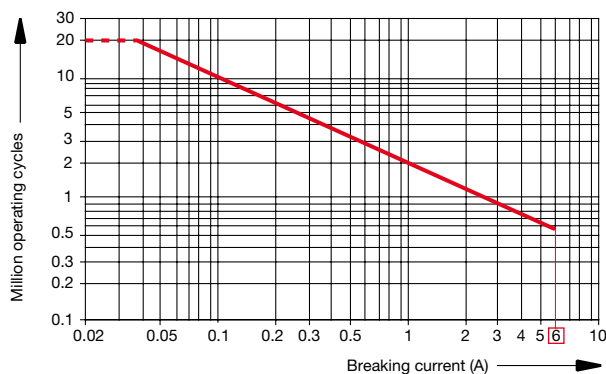


- AF09(Z)B ... AF96B contactor built-in auxiliary contacts
- CA4, CAT4 and CAL4 add-on auxiliary contacts.

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.

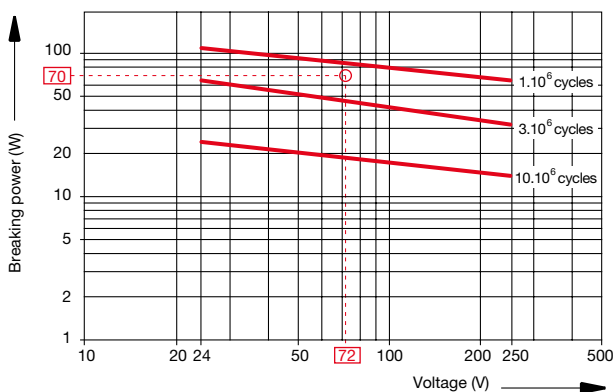


NF(Z)B contactor relays.

(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 I_e and U_e .



- AF09(Z)B ... AF96B contactor built-in auxiliary contacts
- CA4, CAT4 and CAL4 add-on auxiliary contacts
- NF(Z)B contactor relays.

Example:

Control of DC electro-magnet:

U_e 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 ... AF2850B contactors

Electrical durability

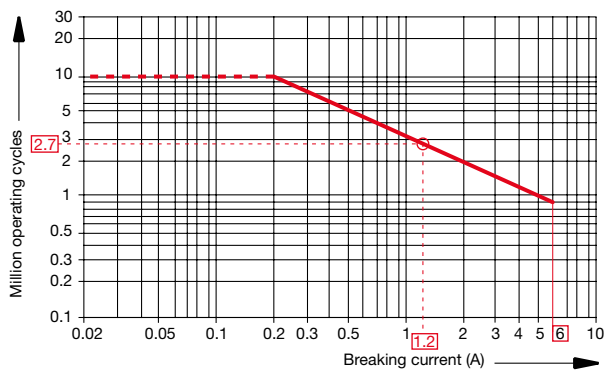
Electrical durability for AC-15 utilization category

AC-15 utilization category according to IEC/EN 60947-5-1:

- making current: $10 \times I_e$ with $\cos \phi = 0.7$ and U_e
- breaking current: I_e with $\cos \phi = 0.4$ and U_e .

These 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...AF2850B, GF875B...GF1325B contactors auxiliary contacts
- 2-pole CAL18, CAL19 and CAL20 add-on auxiliary contacts

Example:

Breaking current = 1.2 A

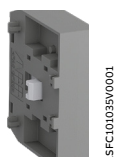
On the opposite curve at intersection "O" 1.2 A the corresponding value for the electrical durability is approximately 2.7 millions operating cycles.

Interlocks

Connection with standard ferrules



VM4



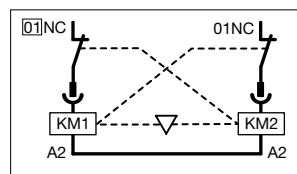
VM19

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	VM4	1SBN030105T1000	10	0.005
AF09(Z)B ... AF38(Z)B-40-00				
AF40B ... AF96B-30	VM96-4	1SBN033405T1000	1	0.006
AF40B ... AF80B-40-00				
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
AF265B...AF370B and AF400B...AF460B	VM370/400	1SFN035403R1000	1	0.100
AF400B...AF1250B	VM750H	1SFN035700R1000	1	0.200
AF1350B...AF2650B	VM1650H	1SFN036503R1001	1	6.000



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.

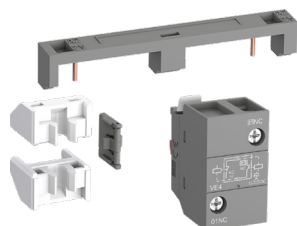
Fixing the electrical interlock block to the contactor front face connects the 2 built-in N.C. interlocking contacts with the two coils. VE4(K) block must be used with A2-A2 connection to respect the electrical connection diagram.

For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce)
					kg

Mechanical and electrical interlock set for AF..(Z)B with screw terminals

For same size contactors:

AF09(Z)B ... AF16(Z)B-30-...	0 2	VEM4	1SBN030111R1000	1	0.035
AF26(Z)B ... AF38(Z)B-30-00					
AF09(Z)B, AF16(Z)B-40-00					
AF26(Z)B, AF38(Z)B-40-00					



VEM4

1SBC100011V0014



VEM4K

1SBC100083V0014



BB4

1SBC100013V0014

Mechanical and electrical interlock set for AF..(Z)B..K with Push-in Spring terminals

For same size contactors:

AF09(Z)B..K ... AF16(Z)B..K	02	VEM4K	1SBN030113R1000	1	0.030
AF26(Z)B..K ... AF38(Z)B..K					

Fixing clips

AF09(Z)B ... AF38(Z)B..(K), AF40B ... AF96B	BB4	1SBN110120W1000	50	0.002
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VM.. 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
	Max. mechanical switching frequency	1800 cycles/h
		1 million operating cycles
		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 U_i acc. to IEC 60947-5-1	690 V	
Rated impulse withstand voltage U_{imp}	6 kV	
Rated control voltage U_c	20...500 V DC	
	DC control voltage	20...500 V DC
Conventional thermal current I_{th} - $\theta \leq 40\text{ }^{\circ}\text{C}$	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

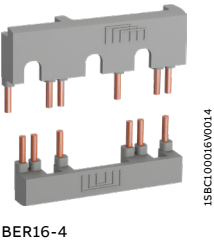
Connecting characteristics

Types	VEM4
Connection capacity (min. ... max.)	
 Rigid Solid/Stranded	1 x 1...2.5 mm ²
 Flexible with non insulated ferrule	2 x 1...2.5 mm ²
 Flexible with non insulated ferrule	1 x 0.75...2.5 mm ²
 Flexible with non insulated ferrule	2 x 0.75...2.5 mm ²
 Flexible with insulated ferrule	1 x 0.75...2.5 mm ²
 Flexible with insulated ferrule	2 x 0.75...1.5 mm ²
 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	IP20
acc. to IEC/EN 60947-1 and IEC/EN 60529	
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 mm ²
 Flexible with ferrule	2 x 1...2.5 mm ²
 Flexible with ferrule	1 x 1 (push-in) / 0.5 (spring) ...2.5 mm ²
 Flexible with ferrule	2 x 1 (push-in) / 0.5 (spring) ...2.5 mm ²
 Flexible with insulated ferrule	1 x 1 (push-in) / 0.5 (spring) ...1.5 mm ²
 Flexible with insulated ferrule	2 x 1 (push-in) / 0.5 (spring) ...1.5 mm ²
 Flexible without ferrule	1 x (spring) 0.5 ...2.5 mm ²
 Flexible without ferrule	2 x (spring) 0.5 ...2.5 mm ²
Connection capacity acc. to UL/CSA	1 or 2 x AWG 18...14
Stripping length	10 mm
Degree of protection	IP20
acc. to IEC/EN 60947-1 and IEC/EN 60529	
Screwdriver type	Flat Ø 3 mm x 0.5 mm

Connection sets for reversing contactors

Connection with standard ferrules



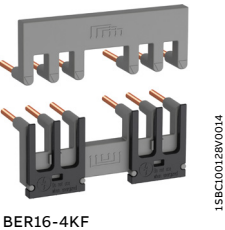
Connection sets for reversing contactors with screw terminals

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



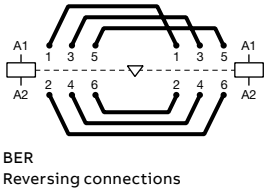
Connection sets for reversing contactors with Push-in Spring terminals

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



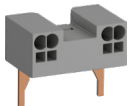
Other accessories

Connection with standard ferrules



LDC4

1SBCL00020V0014



LDC4K

1SBCL00090V0014



BX4

1SBCL00021V0014



BX4-CA

1SBCL00023V0014



BA4

1SNCL60101F0014

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
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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
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With Push-in Spring terminals

AF09(Z)B ... AF96B NF(Z)B	LDC4K	1SBN070159T1000	10	0.010
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Protective covers

Sealable and transparent protective covers BX4 and non-removable BX4-CA to protect the devices against accidental contact.

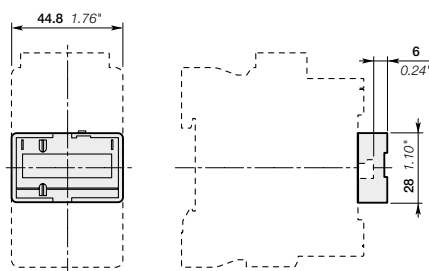
AF09(Z)B ... AF96B 1-stack contactors and NF(Z)B contactor relays	BX4	1SBN110108T1000	10	0.006
For 4-pole CA4 and 2-pole CAT4 auxiliary contact blocks	BX4-CA	1SBN110109W1000	50	0.001

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
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BX4

Main dimensions mm, inches

Other accessories

Connection with standard ferrules



BP38-4

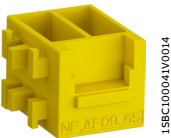
Mounting pieces

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
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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)

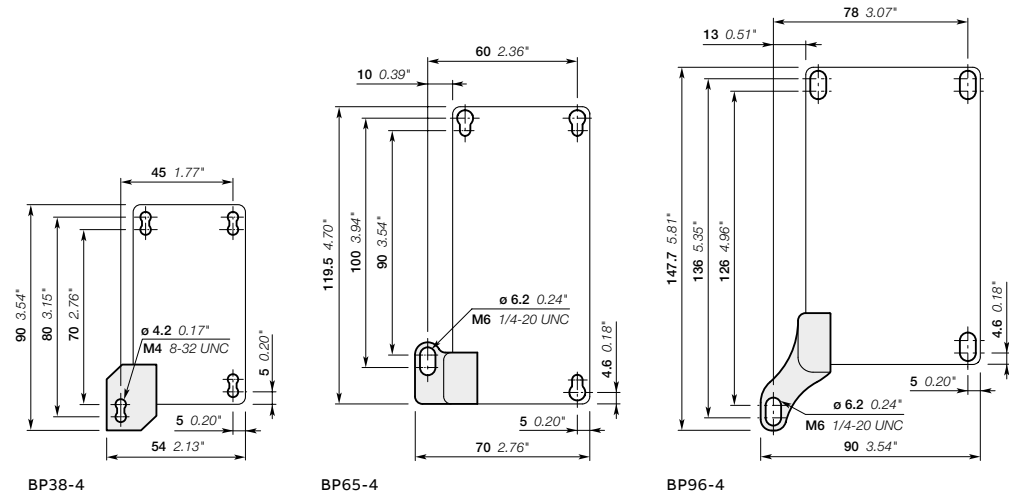
Test block

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
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BDT4
For AF80(B), AF96(B)



Main dimensions mm, inches

Other accessories

Connection with standard ferrules



LT370-30C

1SFC1041V0001



LX140

1SFC1010-49V0001

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
AF400B, AF460B with cable clamps	LT460-AC	1SFN125701R1000	2	0.100
AF400B, AF460B with compression lugs	LT460-AL	1SFN125703R1000	2	0.800
AF580B, AF750B with cable clamps	LT750-AC	1SFN126101R1000	2	0.120
AF580B, AF1250B with compression lugs	LT750-AL	1SFN126103R1000	2	0.825

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
AF580B, AF750B	13	40 x 6	LW750	1SFN076107R1000	1	1.230
AF1250B	13	50 x 10	LW1250	1SFN076407R1000	1	2.000

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
AF400B, AF460B	10.5	25 x 5	LX460	1SFN075710R1000	1	0.500
AF580B, AF750B	13	40 x 6	LX750	1SFN076110R1000	1	0.850

(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 control circuit Voltage U _c		Type	Order code	Pkg qty	Weight (1 pce) kg
	V 50/60Hz	V DC				
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
AF190B/AF205B	24...60	20...60	ZAF205B-11	1SFN154870R1106	1	0.856
	48...130	48...130	ZAF205B-12	1SFN154870R1206	1	0.831
	100...250	100...250	ZAF205B-13	1SFN154870R1306	1	0.823
	250...500	250...500	ZAF205B-14	1SFN154870R1406	1	0.818
AF265B/AF305B/AF370B	24...60	20...60	ZAF370-11	1SFN155470R1106	1	1,262
	48...130	48...130	ZAF370-12	1SFN155470R1206	1	1,316
	100...250	100...250	ZAF370-13	1SFN155470R1306	1	1,036
	250...500	250...500	ZAF370-14	1SFN155470R1406	1	1,006
AF400B/AF460B	–	24...60	ZAF460	1SFN155770R6806	1	0.525
	48...130	48...130	ZAF460	1SFN155770R6906	1	0.525
	100...250	100...250	ZAF460	1SFN155770R7006	1	0.525
	250...500	250...500	ZAF460	1SFN155770R7106	1	0.525
AF580B...AF1250B	–	24...60	ZAF750	1SFN156170R6806	1	1,335
	48...130	48...130	ZAF750	1SFN156170R6906	1	1,335
	100...250	100...250	ZAF750	1SFN156170R7006	1	1,335
	250...500	250...500	ZAF750	1SFN156170R7106	1	1,335
AF1350B...AF2050B	48...130	48...130	ZAF1650-69	1SFN156570R6926	1	0.900
	100...250	100...250	ZAF1650-70	1SFN156570R7026	1	0.900
	48...130	48...130	ZP1650 ⁽²⁾	1SFN166521R1069	1	0.300
	100...250	100...250	ZP1650-70	1SFN166521R1070	1	0.300
AF1650B...AF2850B	48...130	48...130	ZAF2650	1SFN156670R6926	1	0.900
	100...250	100...250	ZAF2650-70 ⁽¹⁾	1SFN156670R7026	1	0.900
	48...130	48...130	ZP2650-69 ⁽²⁾	1SFN166621R1069	1	0.300
	100...250	100...250	ZP2650-70 ⁽²⁾	1SFN166621R1070	1	0.300
4-pole contactors with standard ferrules connection						
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
AF190B/AF205B	24...60	20...60	ZAF205-40-11	1SFN154870R1146	1	0.864
	48...130	48...130	ZAF205-40-12	1SFN154870R1246	1	0.841
	100...250	100...250	ZAF205-40-13	1SFN154870R1346	1	0.839
	250...500	250...500	ZAF205-40-14	1SFN154870R1446	1	0.834
AF265B/AF305B/AF370B	24...60	20...60	ZAF370-40-11	1SFN155470R1146	1	1,272
	48...130	48...130	ZAF370-40-12	1SFN155470R1246	1	1,328
	100...250	100...250	ZAF370-40-13	1SFN155470R1346	1	1,052
	250...500	250...500	ZAF370-40-14	1SFN155470R1446	1	1,032

1 One set of two coil

2 Printed circuit board

Electronic Module

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

For contactors	Rated control circuit		Type	Order code	Pkg qty	Weight (1 pce) kg
	Voltage Uc	V DC				

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
AF190B/AF205B	24...60	20...60	ZP205-11	1SFN164823R1011	1	0.61
	48...130	48...130	ZP205-12	1SFN164823R1012	1	0.61
	100...250	100...250	ZP205-13	1SFN164823R1013	1	0.61
	250...500	250...500	ZP205-14	1SFN164823R1014	1	0.62
AF265B/AF305B/AF370B	24...60	20...60	ZP370-11	1SFN165423R1011	1	0.696
	48...130	48...130	ZP370-12	1SFN165423R1012	1	0.704
	100...250	100...250	ZP370-13	1SFN165423R1013	1	0.694
	250...500	250...500	ZP370-14	1SFN165423R1014	1	0.694

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
AF190B/AF205B	24...60	20...60	ZPT205-11	1SFN165224R1011	1	0.618
	48...130	48...130	ZPT205-12	1SFN165224R1012	1	0.620
	100...250	100...250	ZPT205-13	1SFN165224R1013	1	0.626
	250...500	250...500	ZPT205-14	1SFN165224R1014	1	0.636
AF265B/AF305B/AF370B	24...60	20...60	ZPT370-11	1SFN166024R1011	1	0.706
	48...130	48...130	ZPT370-12	1SFN166024R1012	1	0.716
	100...250	100...250	ZPT370-13	1SFN166024R1013	1	0.710
	250...500	250...500	ZPT370-14	1SFN166024R1014	1	0.720

Only suitable for AF190B...AF370B contactors that are "Made in Sweden" produced after 2018-09-01 (01/09/18).



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

Terminal marking and positioning

- 3/130** AF..B 3-pole contactors
- 3/132** AF..B 4-pole contactors
- 3/133** NF..B contactor relays
- 3/134** Add-on auxiliary contacts

Dimensions

- 3/135** AF..B 3-pole contactors
- 3/162** AF..B 4-pole contactors
- 3/170** NF..B contactor relays

- 3/172** **Voltage code table**

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

www.abb.com/productdetails/CA4-10-T

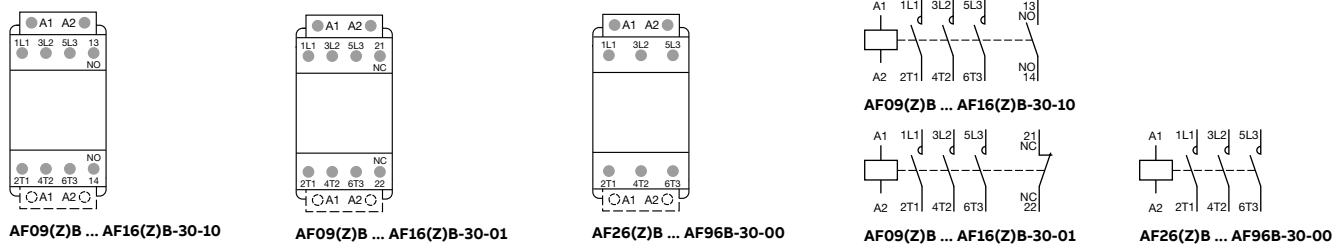
www.abb.com/productdetails/1SBN010110T1010

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

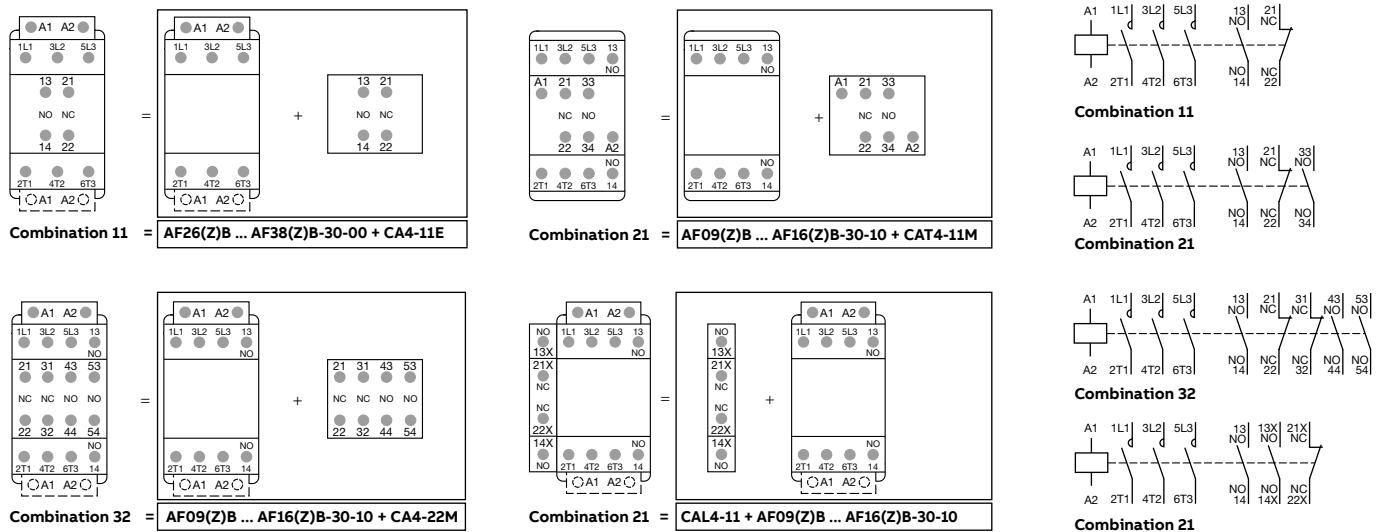
Terminal marking and positioning

AF09(Z)B ... AF96B contactors

Standard devices without addition of auxiliary contacts

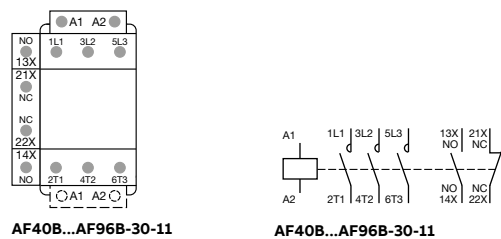


Other possible contact combinations with auxiliary contacts added by the user



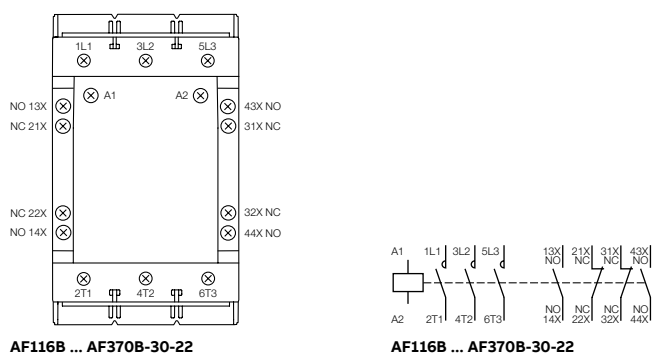
AF40B...AF96B contactors

Standard devices with factory mounted auxiliary contacts



AF116B ... AF370B contactors

Standard devices with factory mounted auxiliary contacts

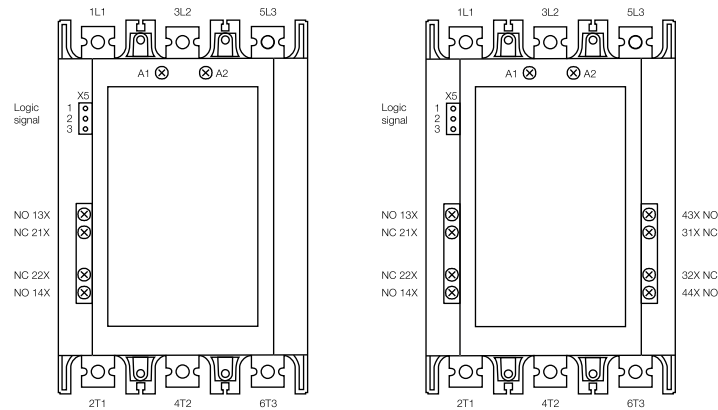


AF400B ... AF2850B 3-pole contactors

Terminal marking and positioning

AF400B ... AF1250B contactors - AC/DC operated

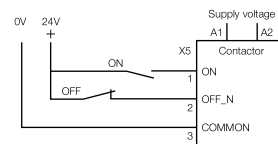
Standard devices without addition of auxiliary contacts



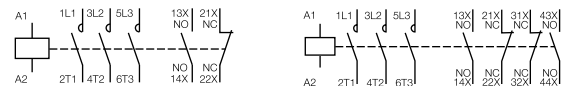
AF400B ... AF1250B-30-11

AF400B ... AF1250B-30-22

Control with logic signal



AF400B ... AF1250B-30-11, AF400 B ... AF1250B-30-22

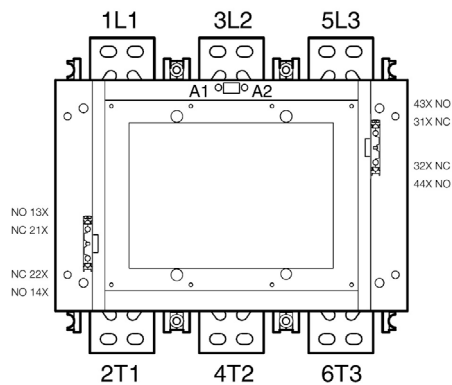


AF400B ... AF1250B-30-11

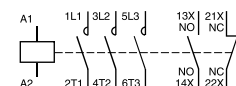
AF400B ... AF1250B-30-22

AF1350B ... AF2850B contactors - AC/DC operated

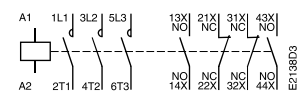
Standard devices without addition of auxiliary contacts



AF1350B ... AF2850B-30-11

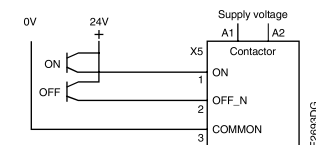


AF1350B ... AF2850B-30-11



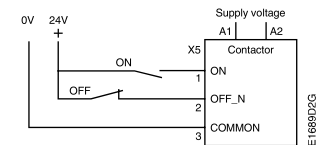
AF1350B ... AF2850B-30-22

Wiring diagrams when used with transistor output



AF1350B, AF1650B

when used with transistor output

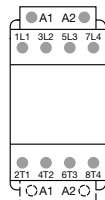


AF09(Z)B ... AF370B 4-pole contactors

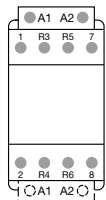
Terminal marking and positioning

AF09(Z)B ... AF80B contactors

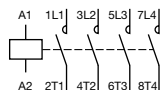
Standard devices without addition of auxiliary contacts



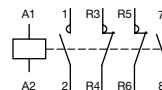
AF09(Z)B ... AF80B-40-00



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

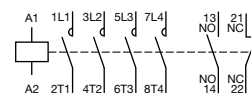
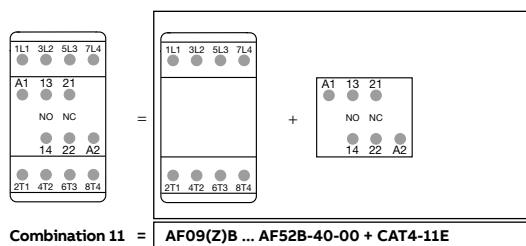


AF09(Z)B ... AF80B-40-00

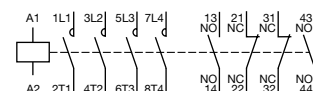
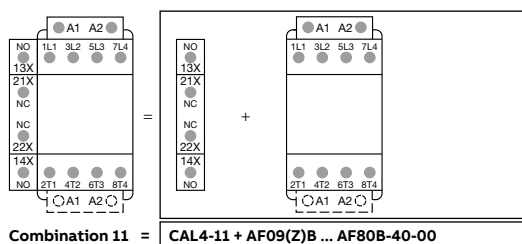
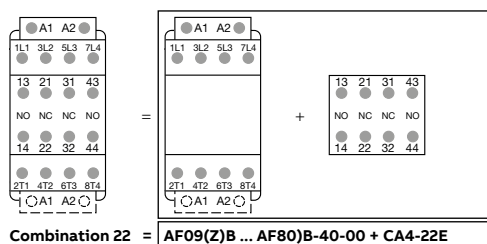


AF09(Z)B ... AF80B-22-00

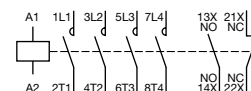
Other possible contact combinations with auxiliary contacts added by the user



Combination 11



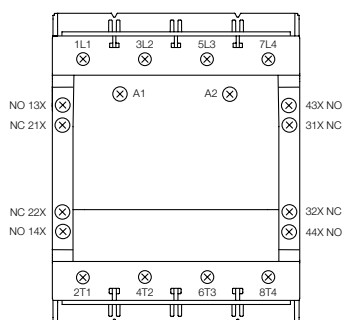
Combination 22



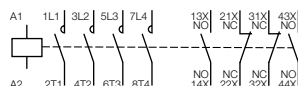
Combination 11

AF116B ... AF370B contactors

Standard devices with factory mounted auxiliary contacts



AF116B ... AF370B-40-22



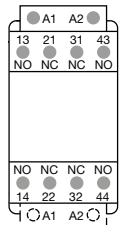
AF116B ... AF370B-40-22

NF(Z)B contactor relays

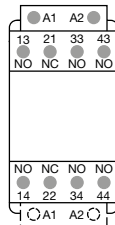
Terminal marking and positioning

NF(Z)B contactors

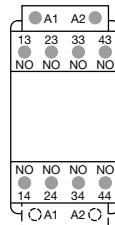
Standard devices without addition of auxiliary contacts



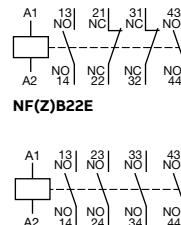
NF(Z)B22E



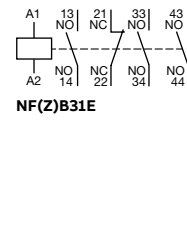
NF(Z)B31E



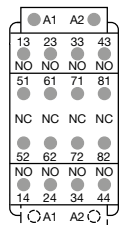
NF(Z)B40E



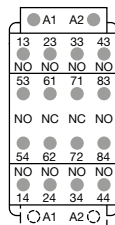
NF(Z)B22E



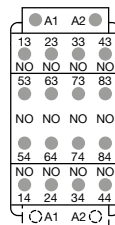
NF(Z)B31E



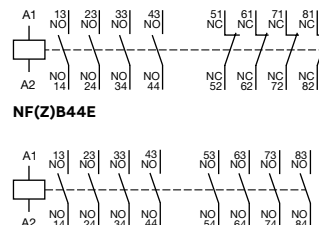
NF(Z)B44E



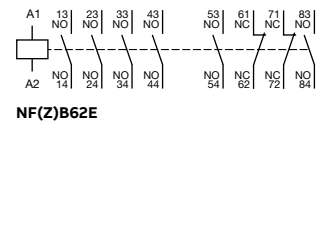
NF(Z)B62E



NF(Z)B80E



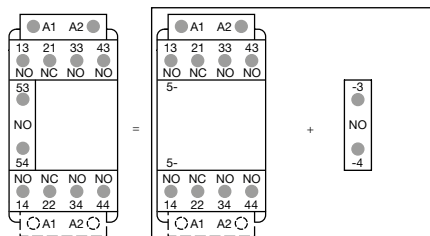
NF(Z)B44E



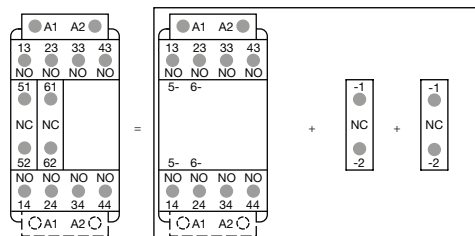
NF(Z)B62E

NF(Z)B80E

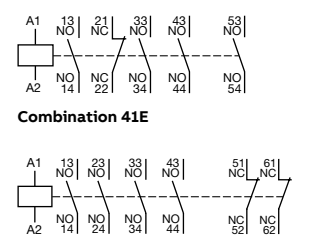
Other possible contact combinations with auxiliary contacts added by the user



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

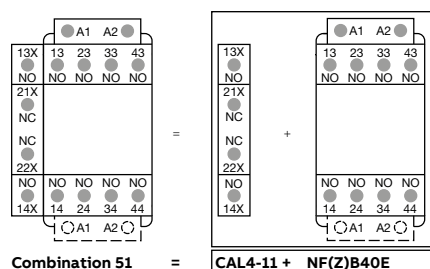


Combination 42 = NF(Z)B40E + CA4-01+CA4-01

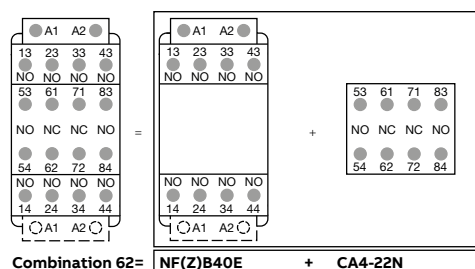


Combination 41E

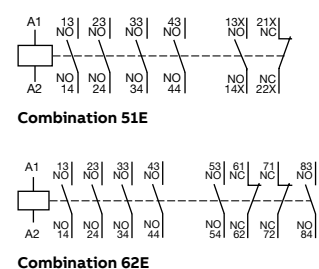
Combination 42E



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



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



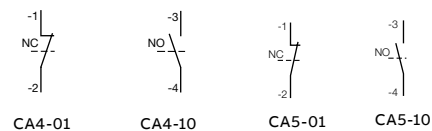
Combination 51E

Combination 62E

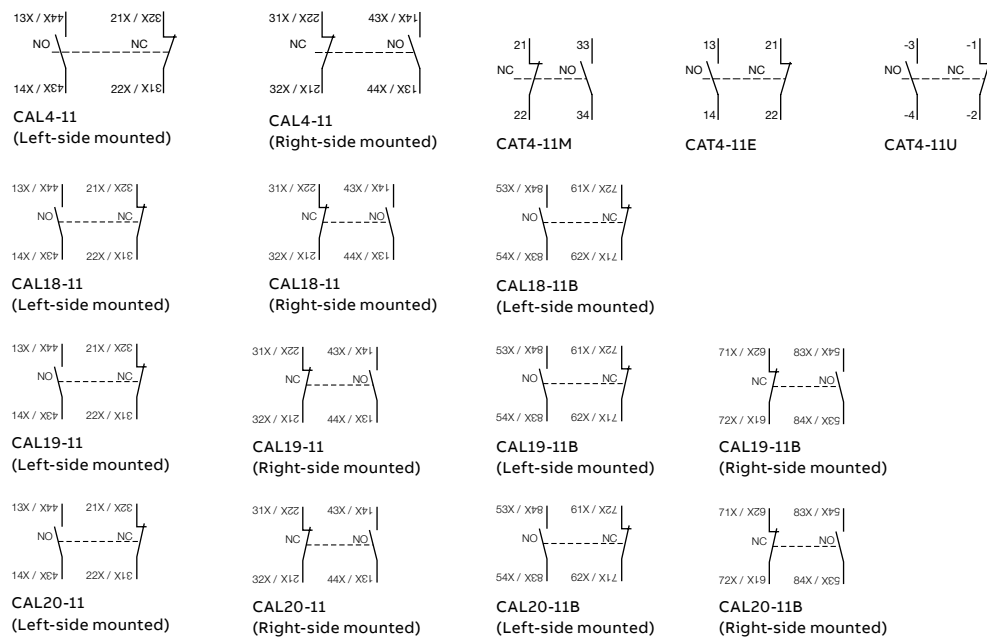
Add-on auxiliary contacts

Terminal marking and positioning

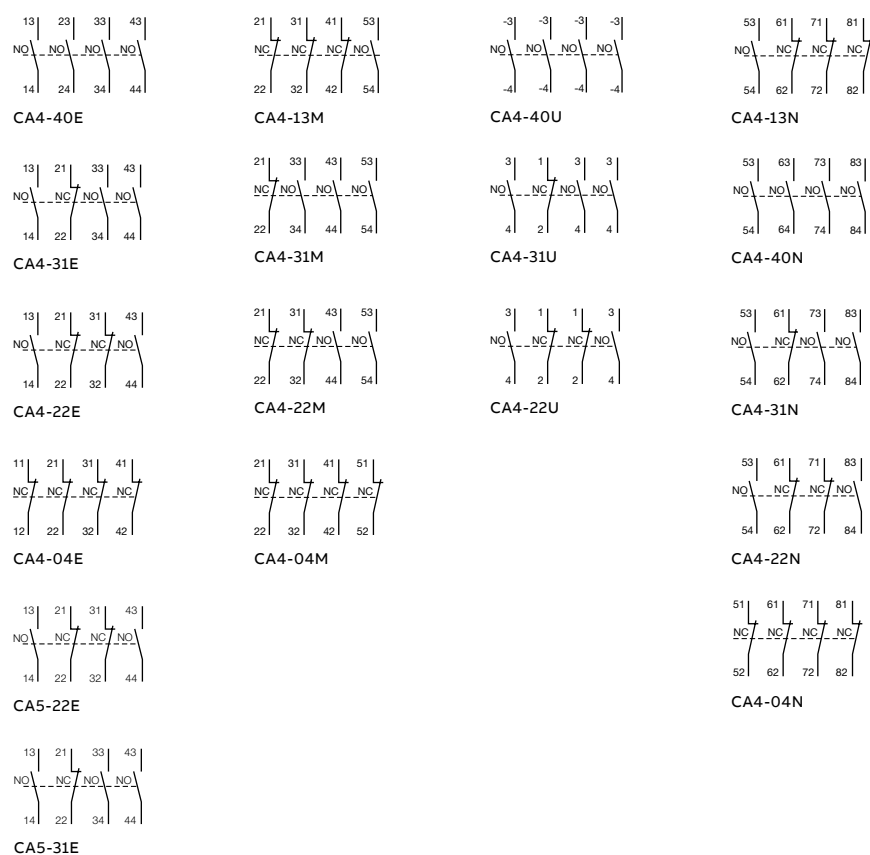
1-pole auxiliary contacts



2-pole auxiliary contacts

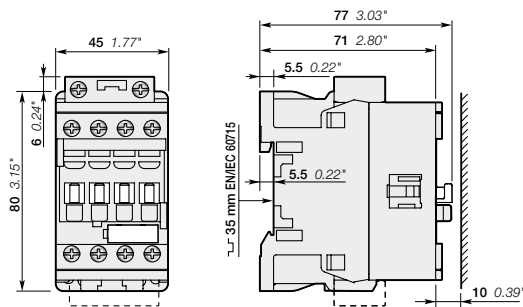


4-pole auxiliary contacts

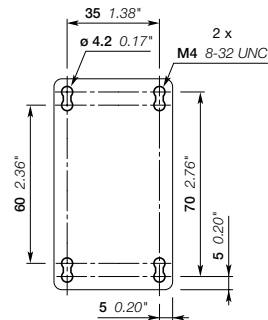


AF09(Z)B, AF12(Z)B, AF16(Z)B 3-pole contactors

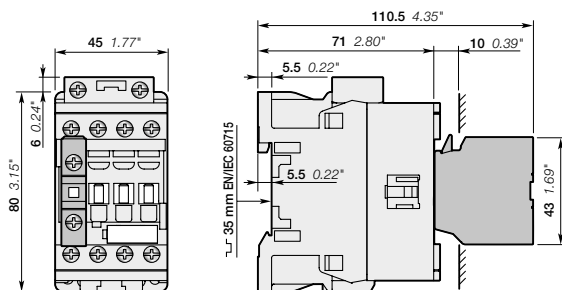
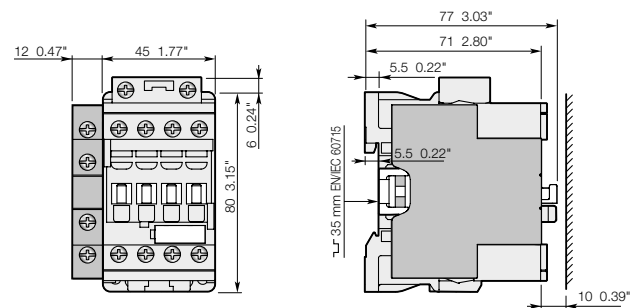
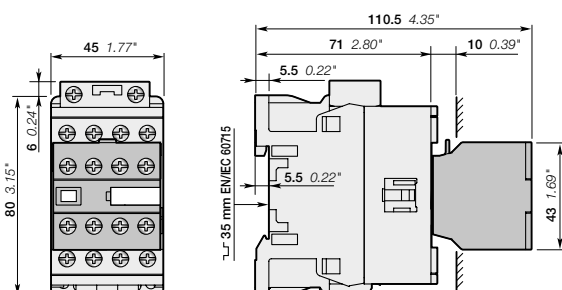
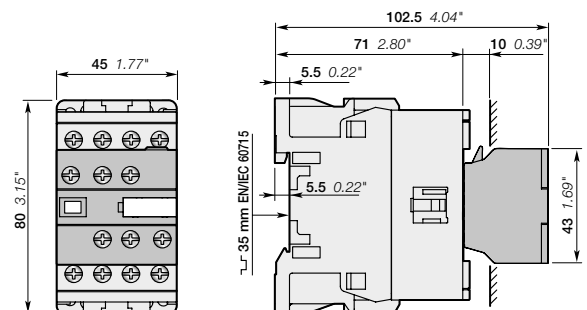
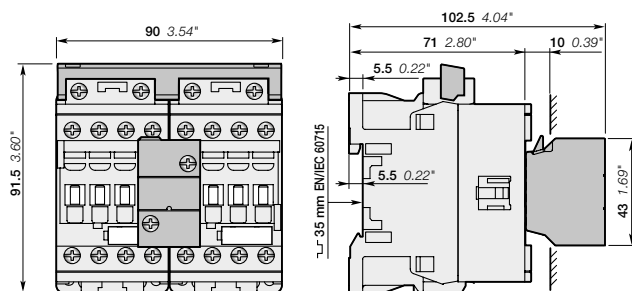
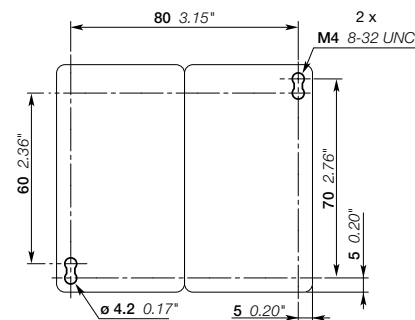
Dimensions



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



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

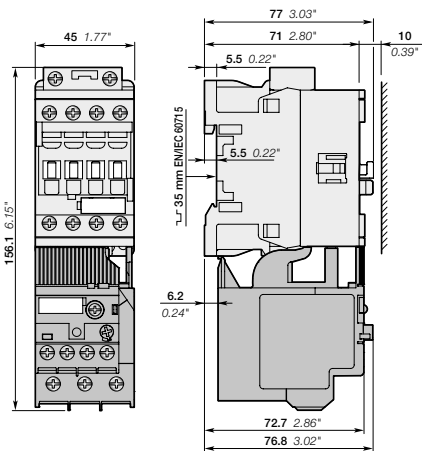
AF09(Z)B, AF12(Z)B, AF16(Z)B
+ CA4 1-pole auxiliary contact blockAF09(Z)B, AF12(Z)B, AF16(Z)B
+ CAL4-11 2-pole auxiliary contact blockAF09(Z)B, AF12(Z)B, AF16(Z)B
+ CA4 4-pole auxiliary contact blockAF09(Z)B, AF12(Z)B, AF16(Z)B
+ CAT4 2-pole auxiliary contact and coil terminal blockAF09(Z)B, AF12(Z)B, AF16(Z)B
+ VEM4 mechanical and electrical interlock setAF09(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.

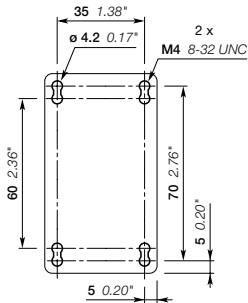
Main dimensions mm, inches

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



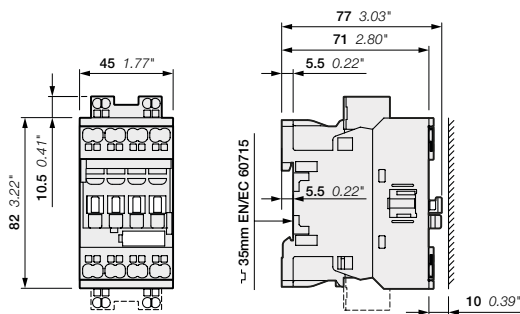
AF09(Z)B, AF12(Z)B, AF16(Z)B
+ TF42B

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

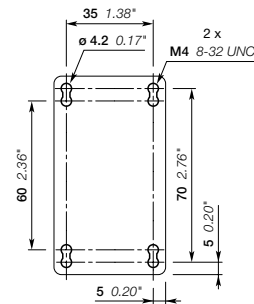
Main dimensions mm, inches

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

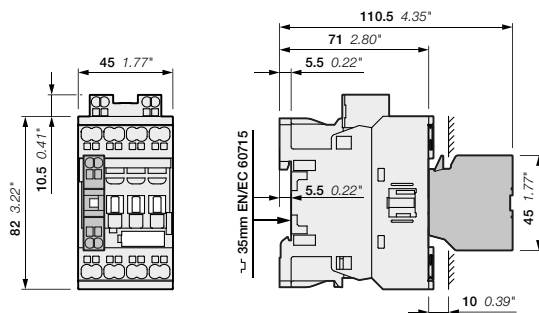
Dimensions



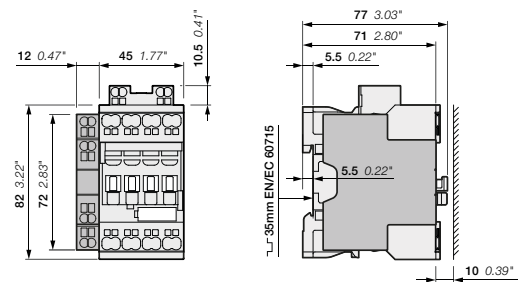
AF09(Z)B..K, AF12(Z)B..K, AF16(Z)B..K



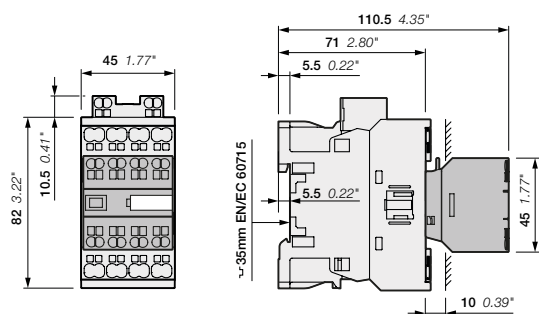
AF09(Z)B..K, AF12(Z)B..K, AF16(Z)B..K



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



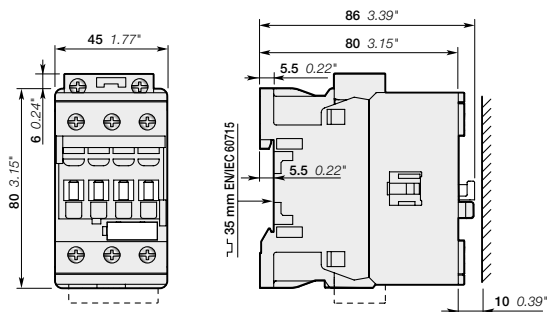
AF09(Z)B..K, AF12(Z)B..K, AF16(Z)B..K
+ CA4..K 4-pole auxiliary contact block

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

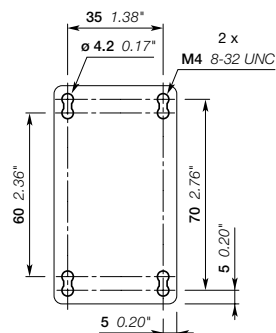
Main dimensions mm, inches

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

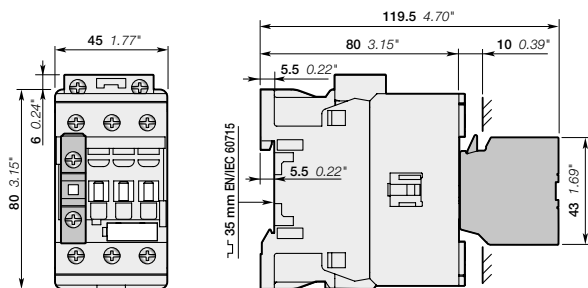
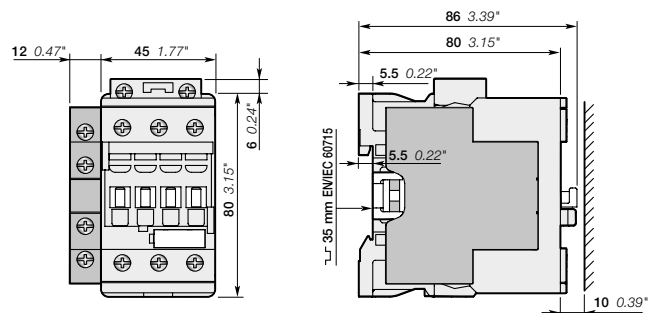
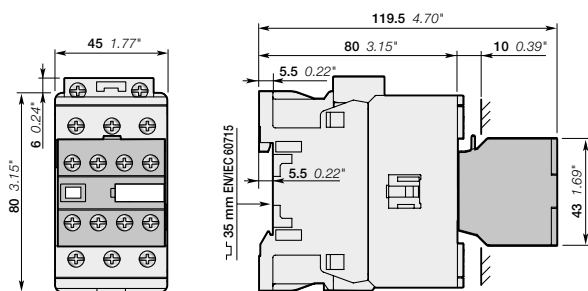
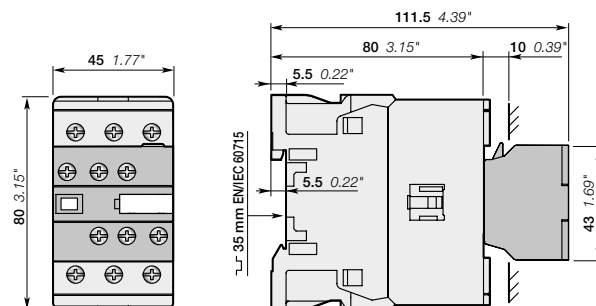
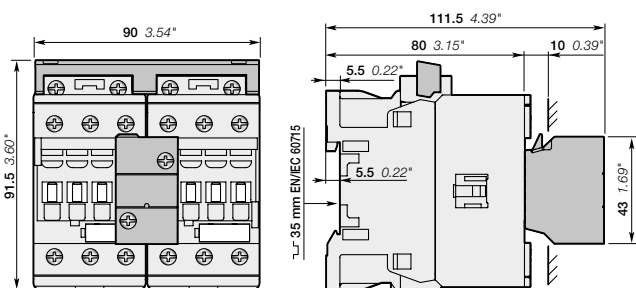
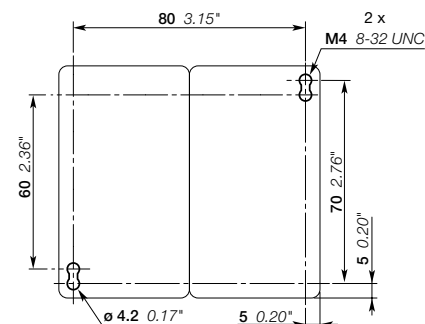
Dimensions



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



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

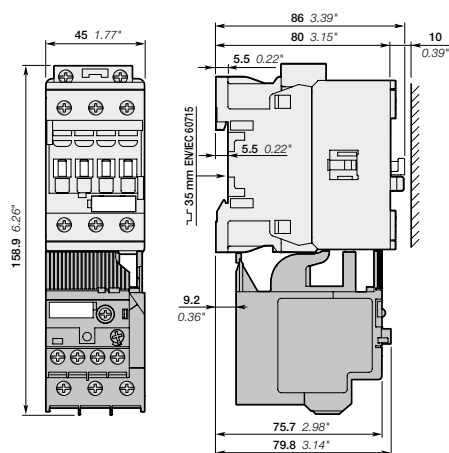
AF26(Z)B, AF30(Z)B, AF38(Z)B
+ CA4 1-pole auxiliary contact blockAF26(Z)B, AF30(Z)B, AF38(Z)B
+ CAL4-11 2-pole auxiliary contact blockAF26(Z)B, AF30(Z)B, AF38(Z)B
+ CA4 4-pole auxiliary contact blockAF26(Z)B, AF30(Z)B, AF38(Z)B
+ CAT4 2-pole auxiliary contact and coil terminal blockAF26(Z)B, AF30(Z)B, AF38(Z)B
+ VEM4 mechanical and electrical interlock setAF26(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.

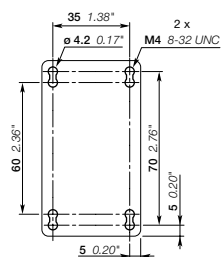
Main dimensions mm, inches

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



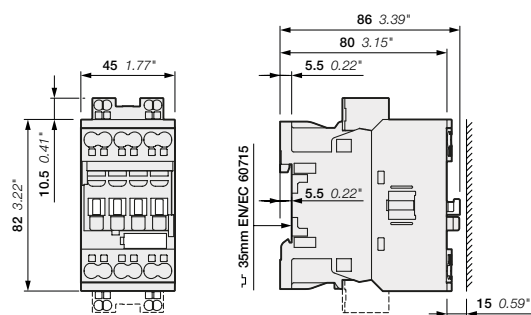
AF26(Z)B, AF30(Z)B, AF38(Z)B
+ TF42B

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

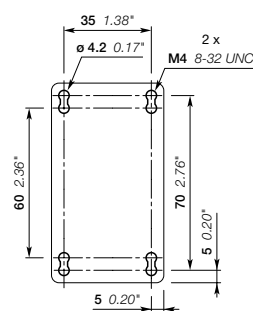
Main dimensions mm, inches

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

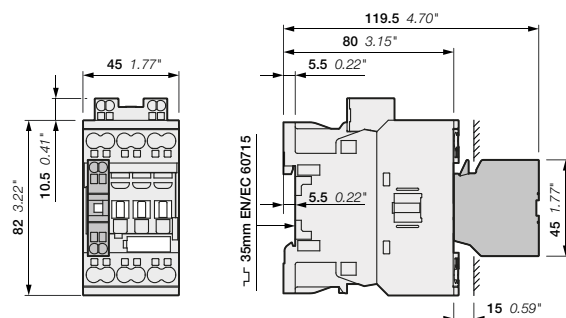
Dimensions



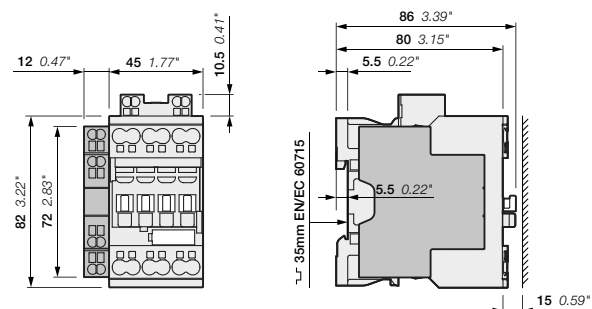
AF26(Z)B..K, AF30(Z)B..K, AF38(Z)B..K



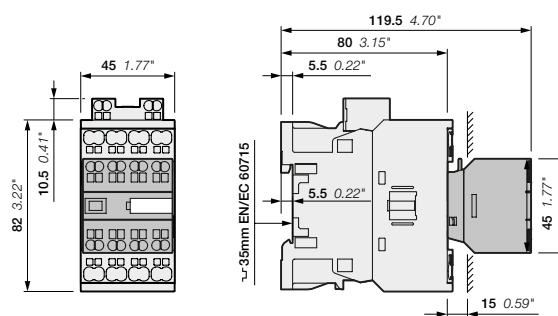
AF26(Z)B..K, AF30(Z)B..K, AF38(Z)B..K



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



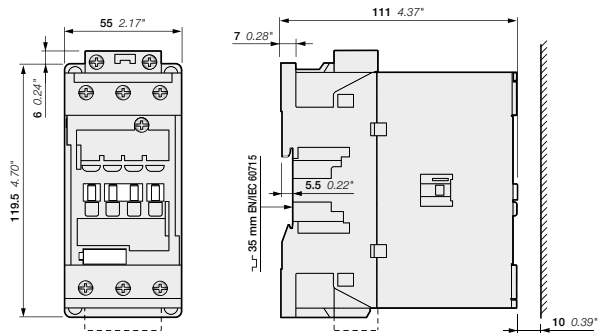
AF26(Z)B..K, AF30(Z)B..K, AF38(Z)B..K
+ CA4..K 4-pole auxiliary contact block

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

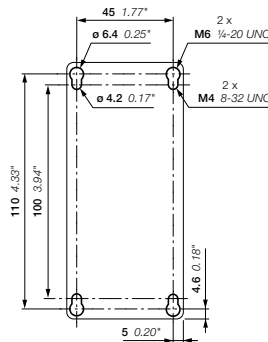
Main dimensions mm, inches

AF40B ... AF65B 3-pole contactors

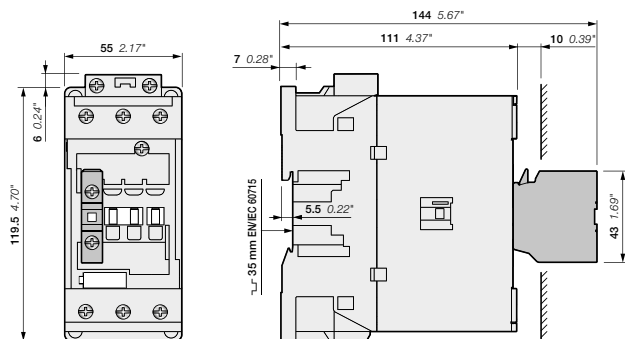
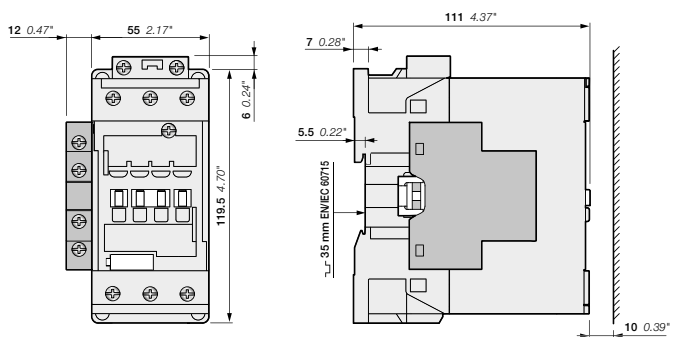
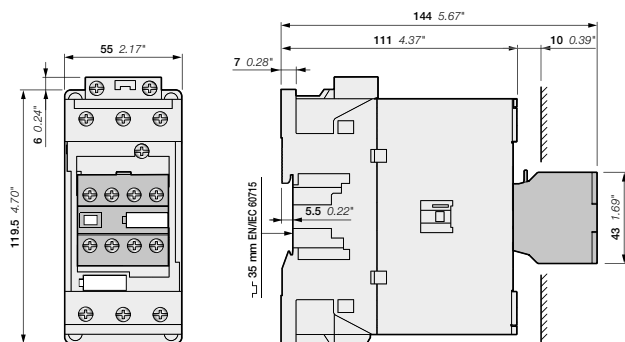
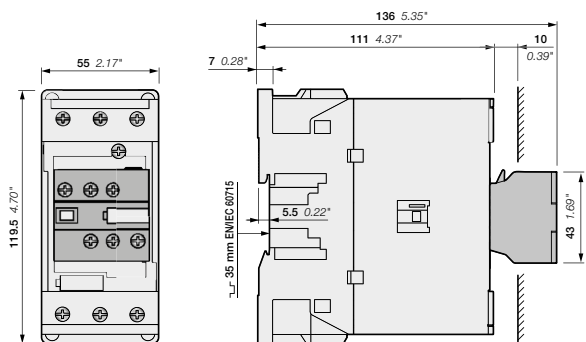
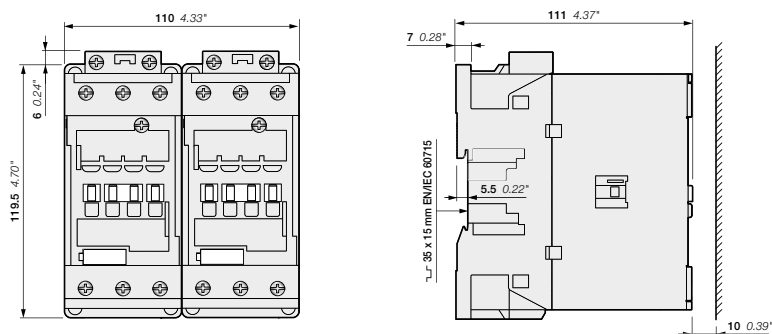
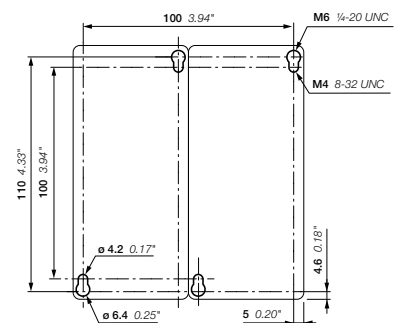
Dimensions



AF40B, AF52B, AF65B



AF40B, AF52B, AF65B

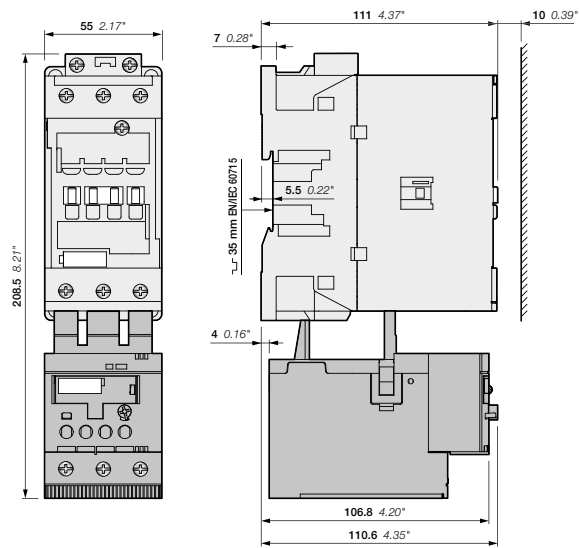
AF40B, AF52B, AF65B
+ CA4 1-pole auxiliary contact blockAF40B, AF52B, AF65B-30-00 + CAL4-11 2-pole auxiliary contact block
AF40B, AF52B, AF65B-30-11AF40B, AF52B, AF65B
+ CA4 4-pole auxiliary contact blockAF40B, AF52B, AF65B
+ CAT4 2-pole auxiliary contact and coil terminal blockAF40B, AF52B, AF65B
+ VM96-4 mechanical interlock unitAF40B, AF52B, AF65B
+ VM96-4 mechanical interlock unit

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

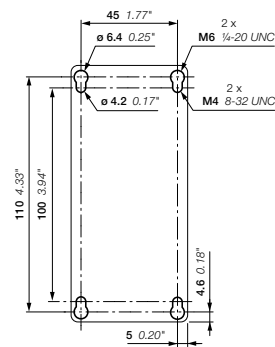
Main dimensions mm, inches

AF40B ... AF65B 3-pole contactors

Dimensions



AF40B, AF52B, AF65B
+ TF65B thermal overload relay



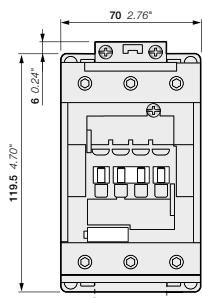
AF40B, AF52B, AF65B
+ TF65B

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

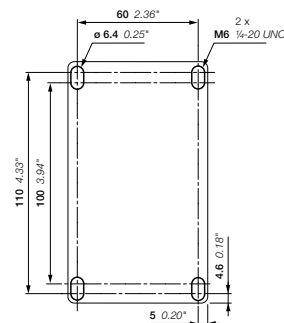
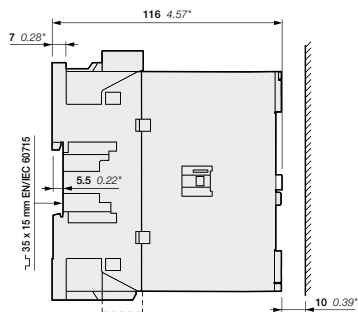
Main dimensions mm, inches

AF80B ... AF96B 3-pole contactors

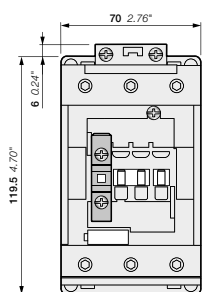
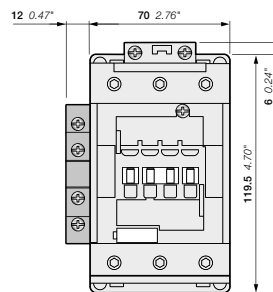
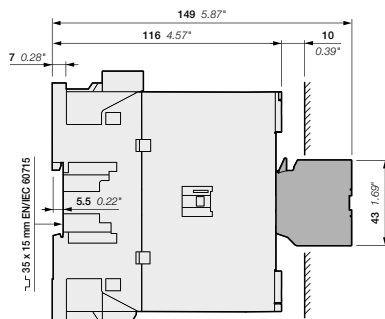
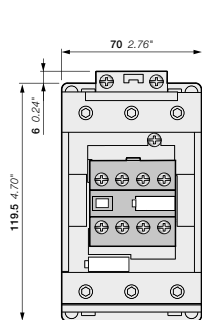
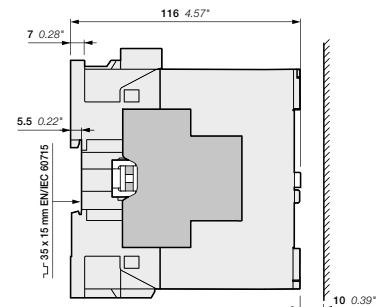
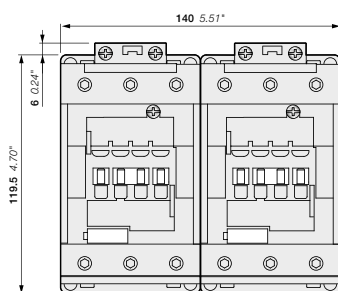
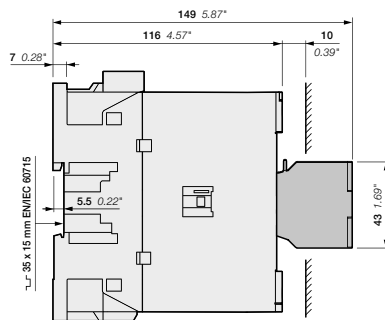
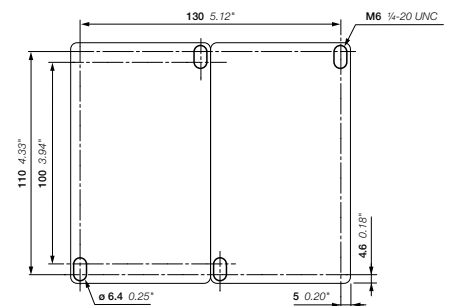
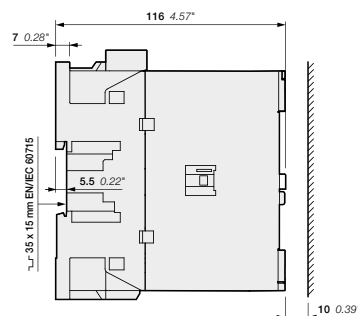
Dimensions



AF80B, AF96B



AF80B, AF96B

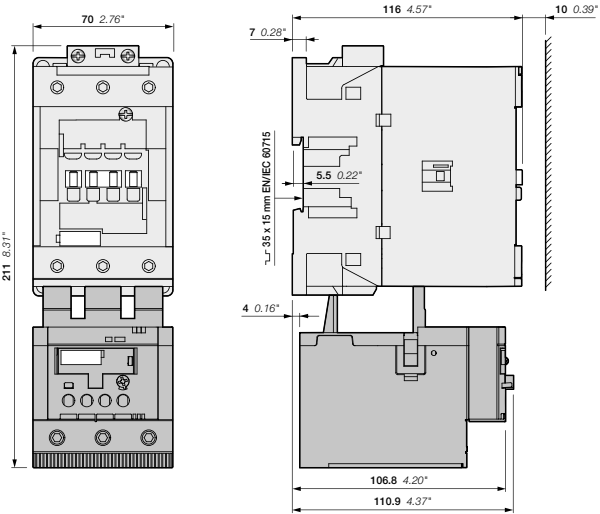
AF80B, AF96B
+ CA4 1-pole auxiliary contact blockAF80B, AF96B-30-00 + CAL4-11 2-pole auxiliary contact block
AF80B, AF96B-30-11AF80B, AF96B
+ CA4 4-pole auxiliary contact blockAF80B, AF96B
+ VM96-4 mechanical interlock unitAF80B, AF96B
+ VM96-4 mechanical interlock unit

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

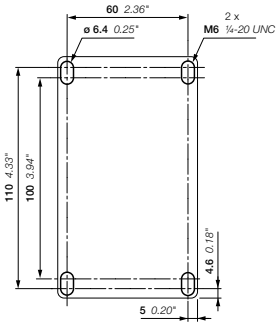
Main dimensions mm, inches

AF80B ... AF96B 3-pole contactors

Dimensions



AF80B, AF96B
+ TF96B thermal overload relay



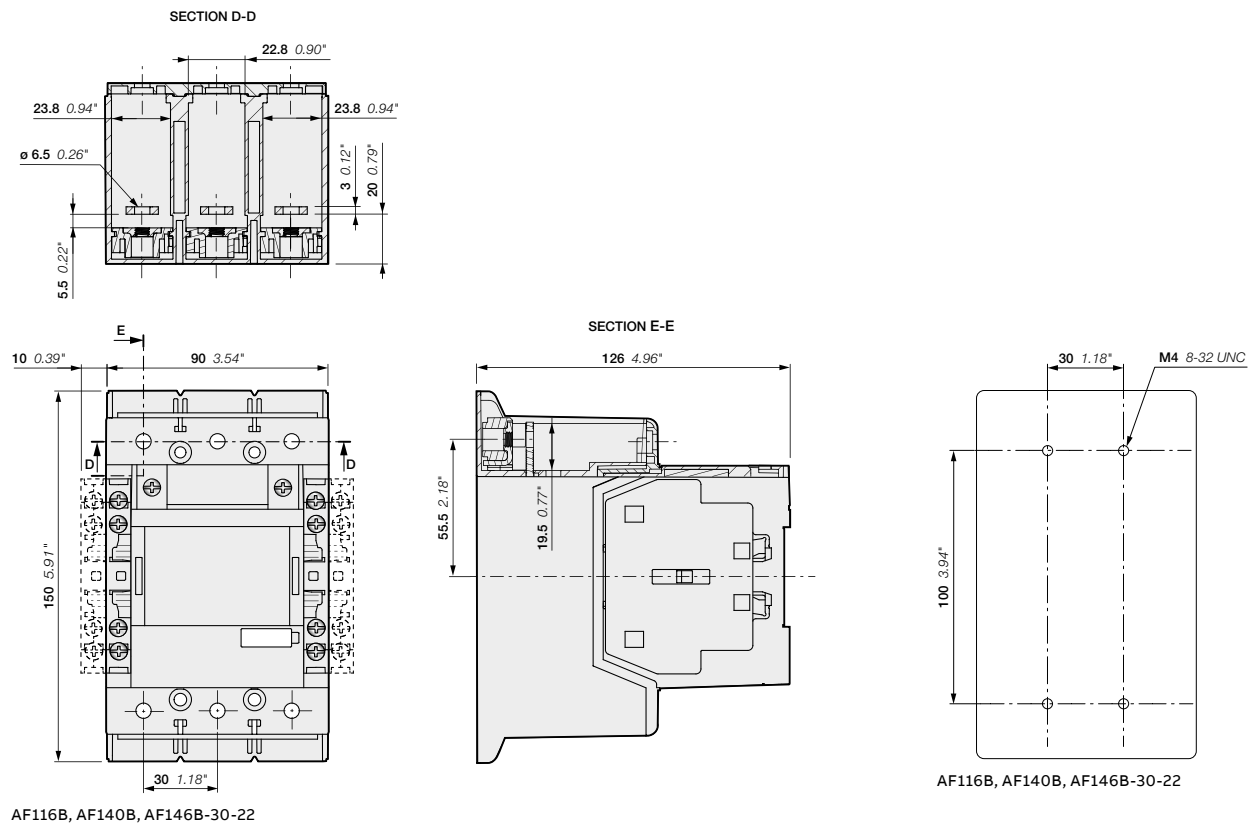
AF80B, AF96B
+ TF96B

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

Main dimensions mm, inches

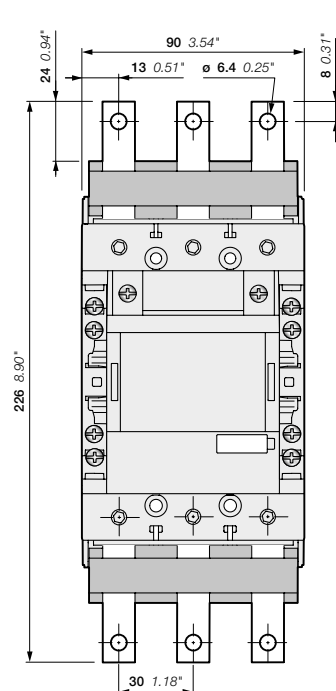
AF116B, AF140B, AF146B 3-pole contactors

Dimensions

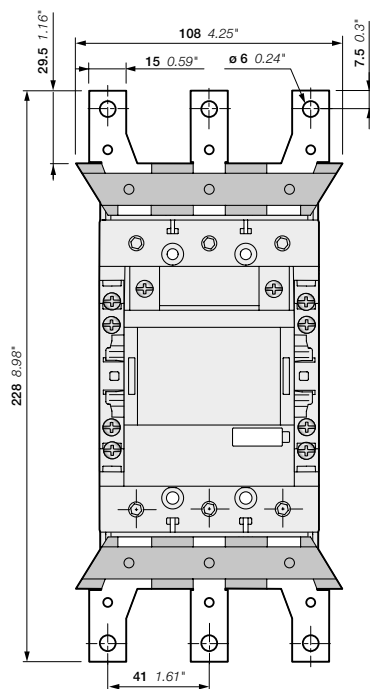


AF116B, AF140B, AF146B 3-pole contactors

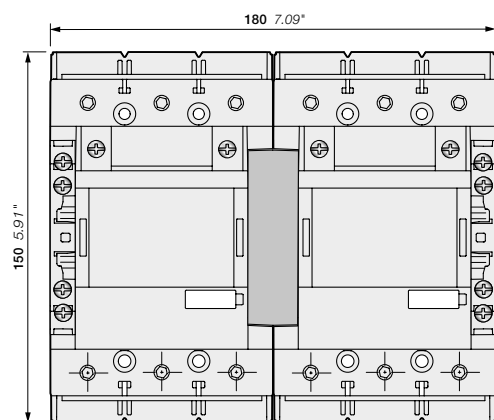
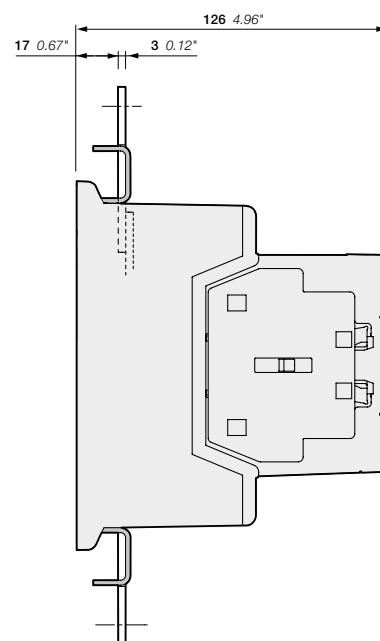
Dimensions



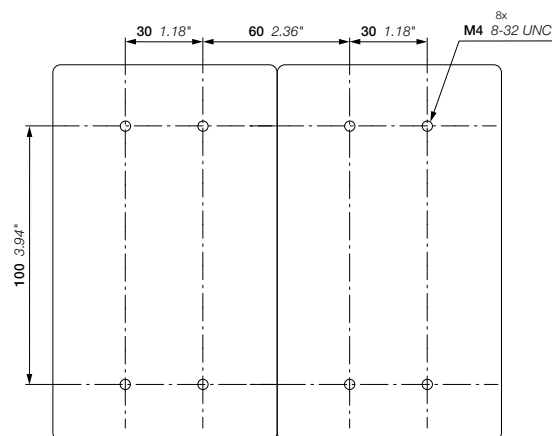
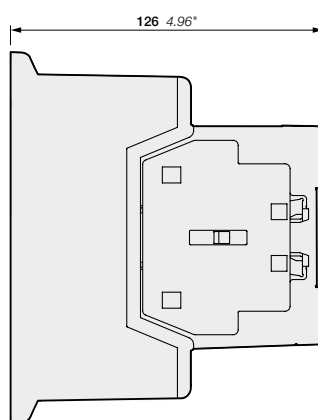
AF116B, AF140B, AF146B-30-22
+ LX140 terminal extension



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



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

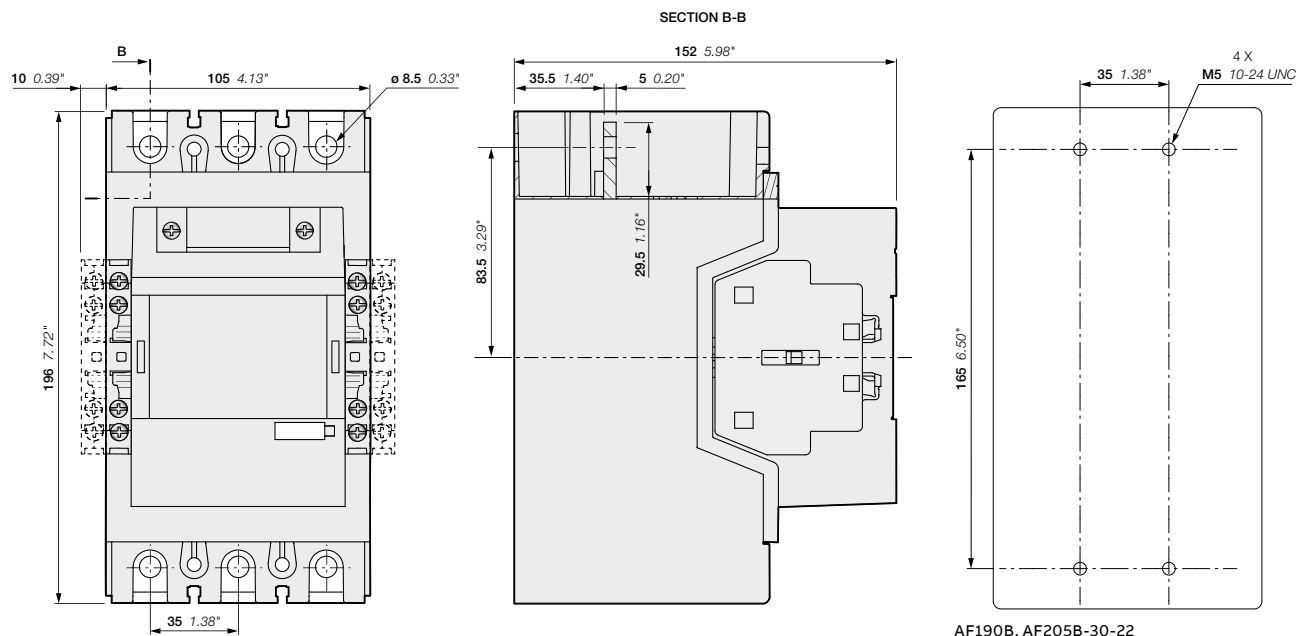


AF116B, AF140B, AF146B-30-22
+ VM19 mechanical interlocking unit

Main dimensions mm, inches

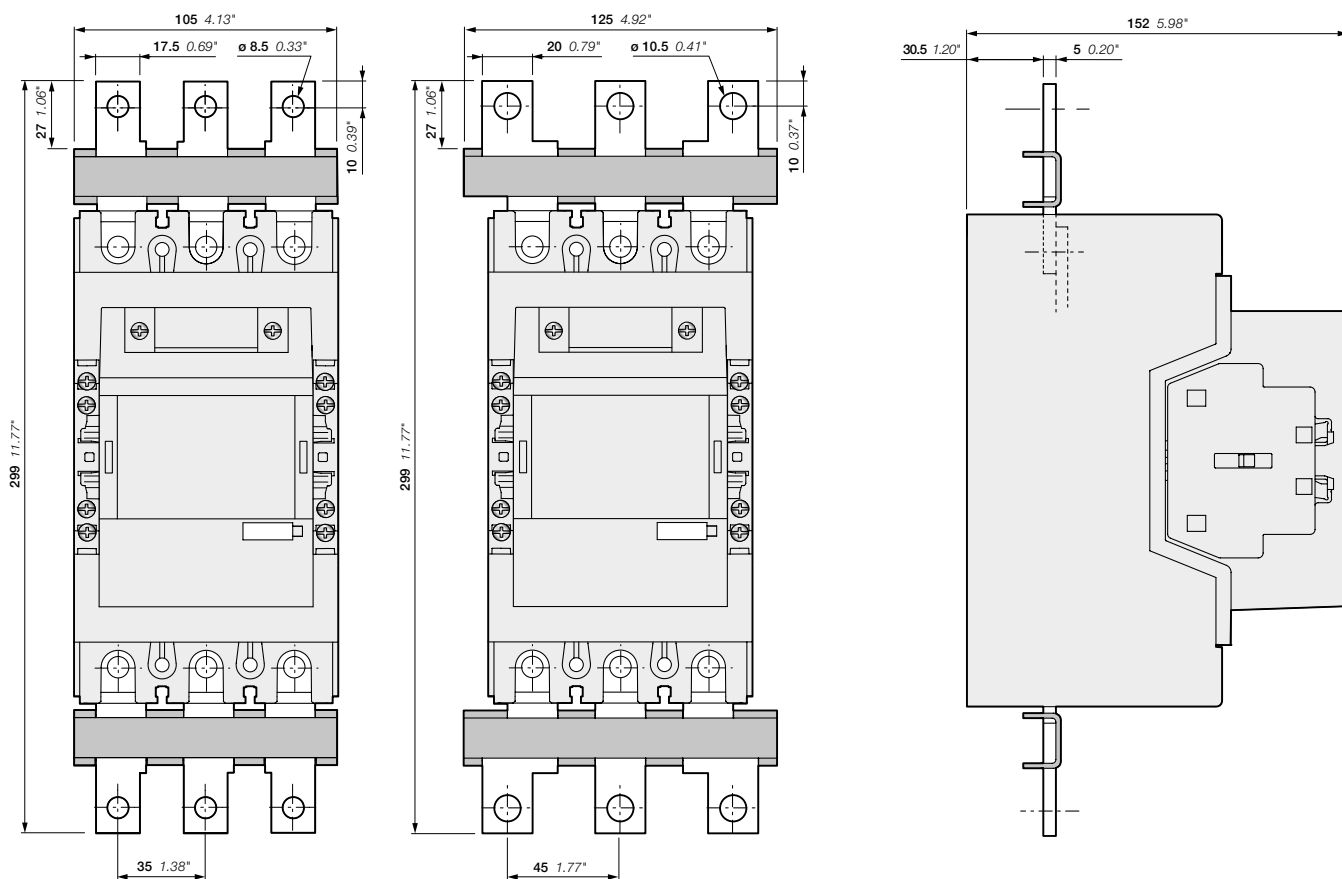
AF190B, AF205B 3-pole contactors

Dimensions



AF190B, AF205B-30-22

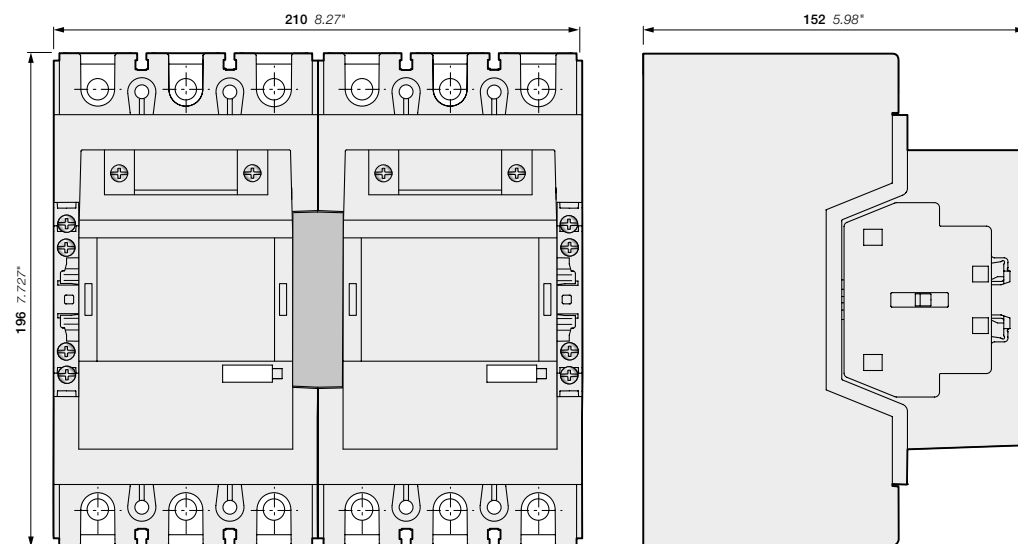
AF190B, AF205B-30-22

AF190B, AF205B-30-22
+ LX205 terminal extensionAF190B, AF205B-30-22
+ LW205 terminal enlargement

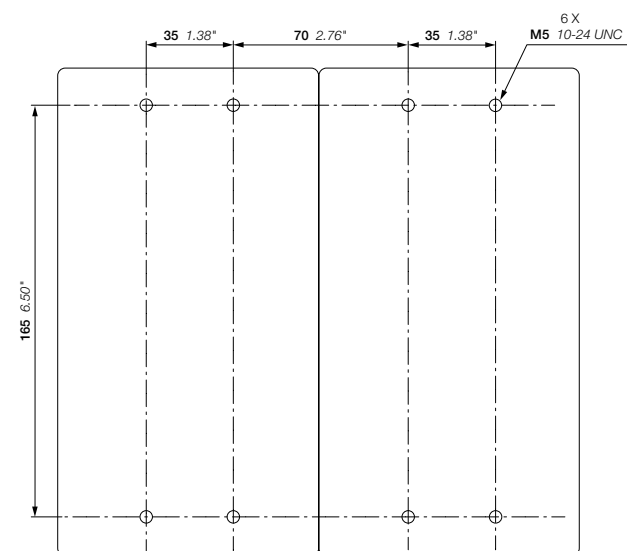
Main dimensions mm, inches

AF190B, AF205B 3-pole contactors

Dimensions



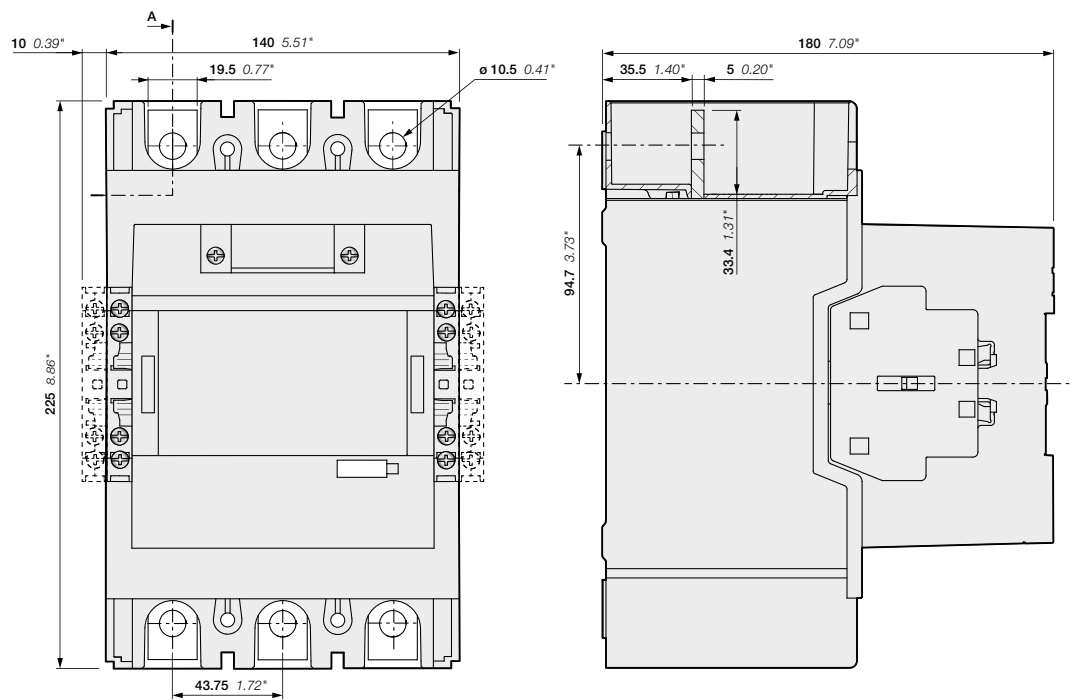
AF190B, AF205B-30-22
+ VM19 mechanical interlocking unit



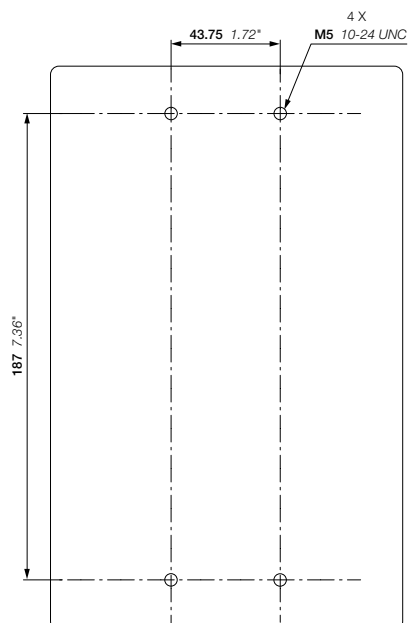
AF190B, AF205B-30-22
+ VM19 mechanical interlocking unit

AF265B, AF305B, AF370B 3-pole contactors

Dimensions



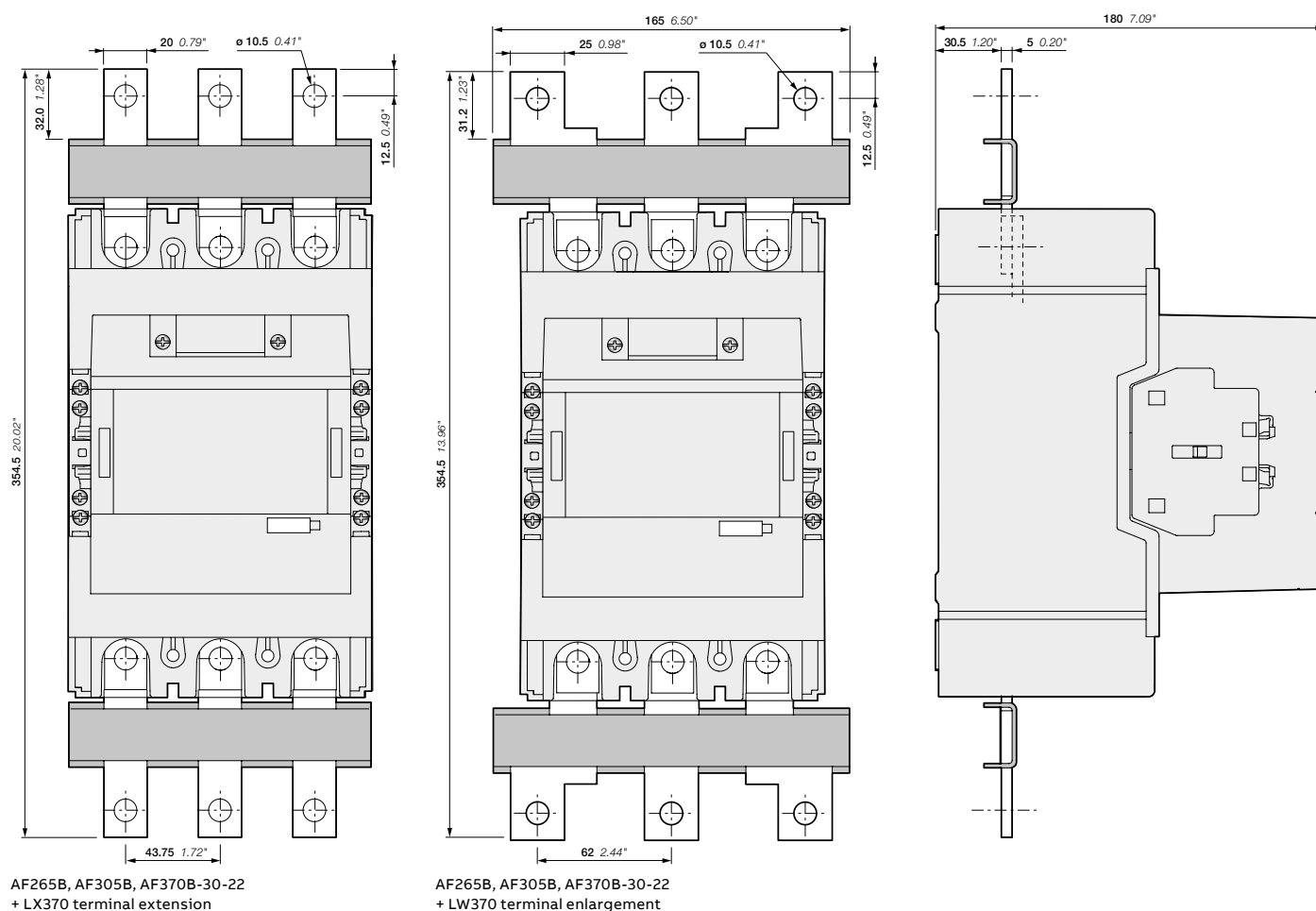
AF265B, AF305B, AF370B-30-22



AF265B, AF305B, AF370B-30-22

AF265B, AF305B, AF370B 3-pole contactors

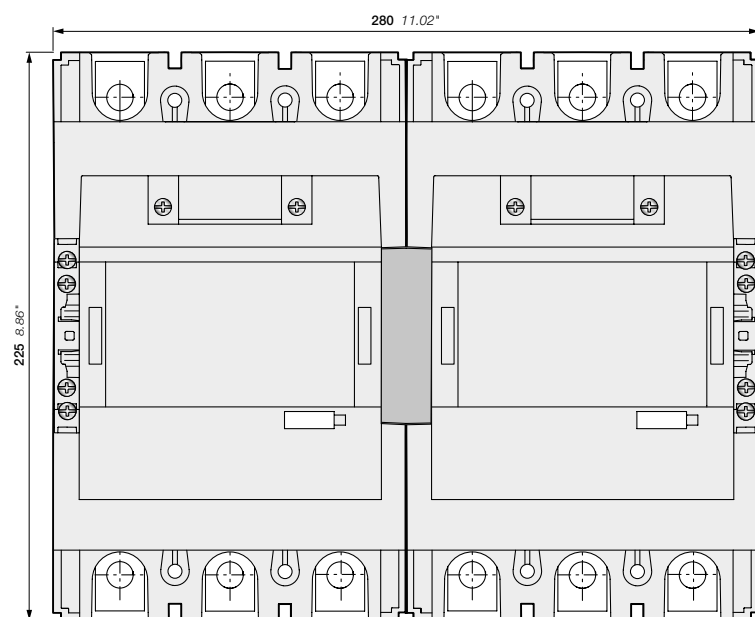
Dimensions



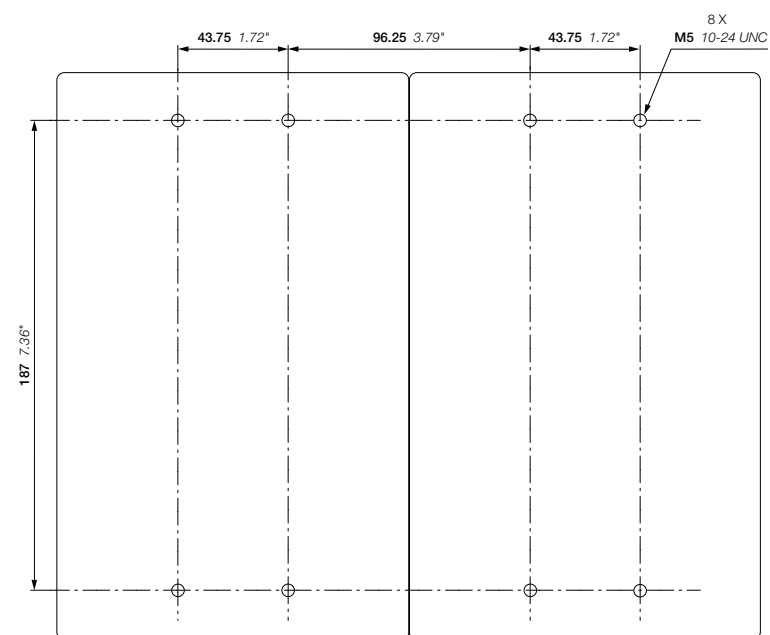
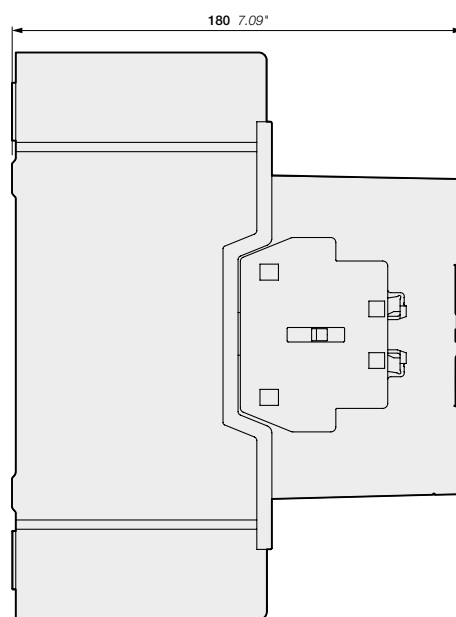
Main dimensions mm, inches

AF265B, AF305B, AF370B 3-pole contactors

Dimensions



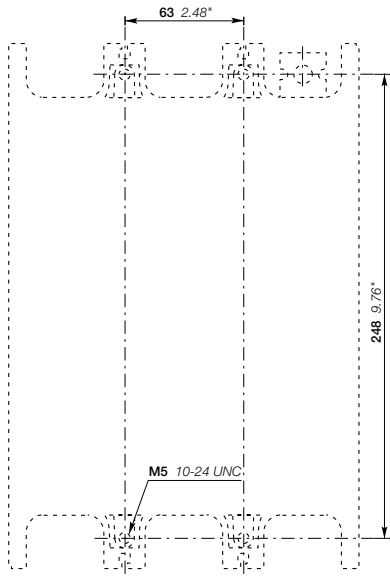
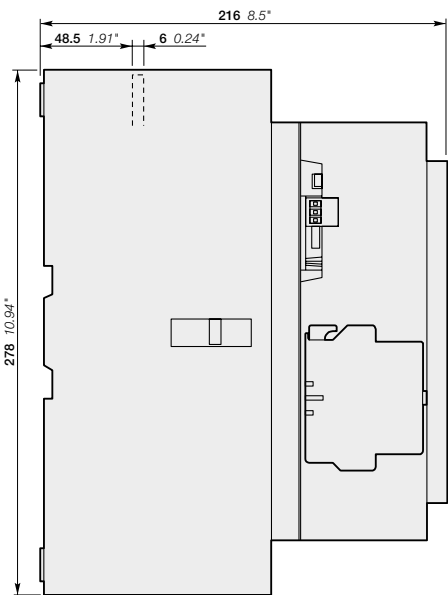
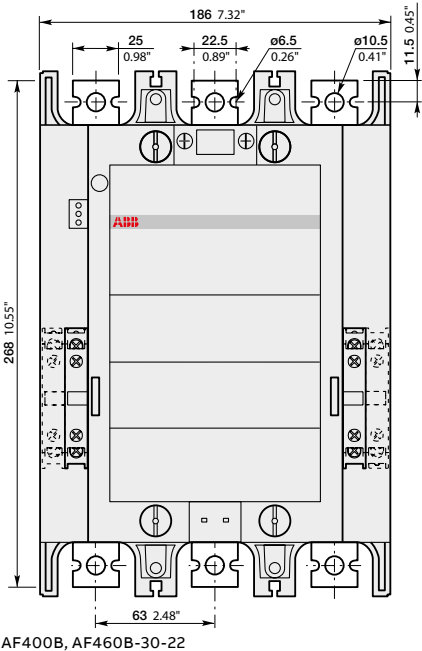
AF265B, AF305B, AF370B-30-22
+ VM19 mechanical interlocking unit



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

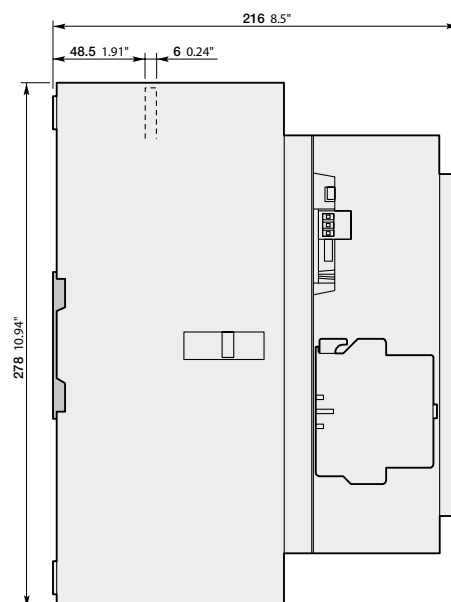
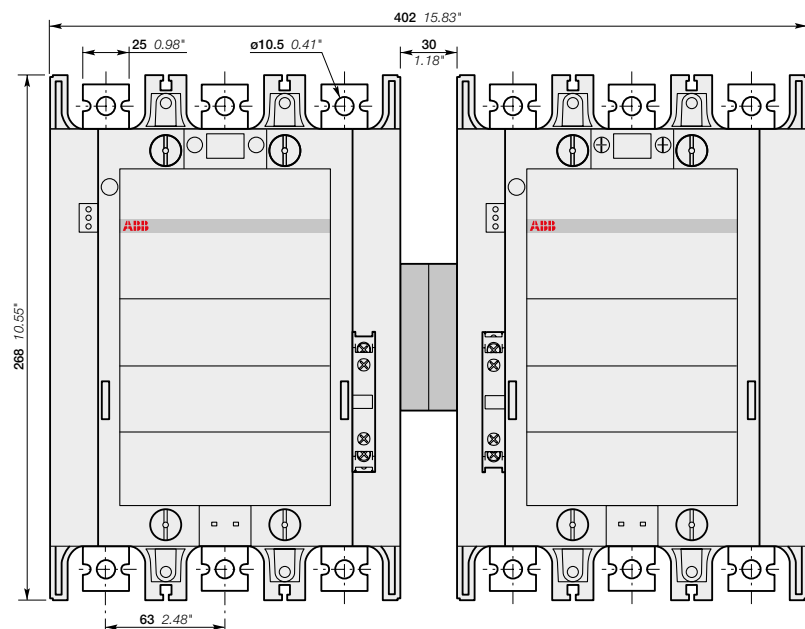
AF400B and AF460B 3-pole contactors

Dimensions

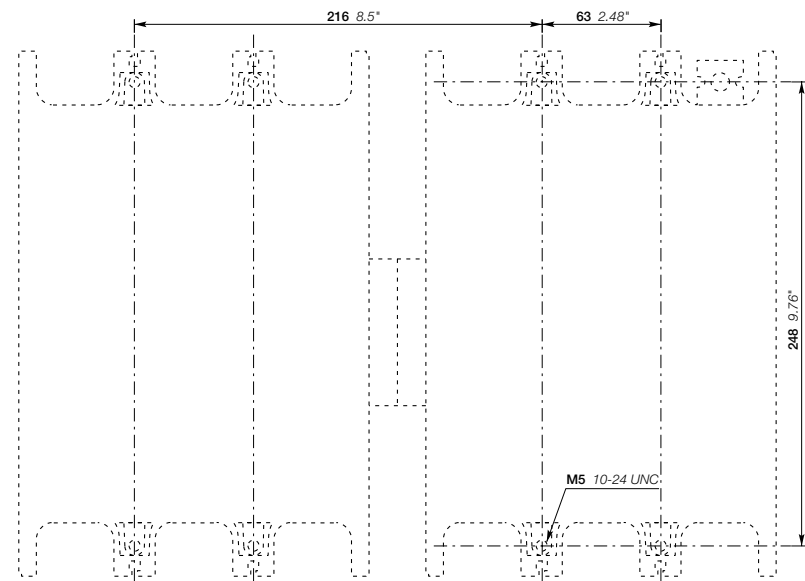


AF400B and AF460B 3-pole contactors

Dimensions



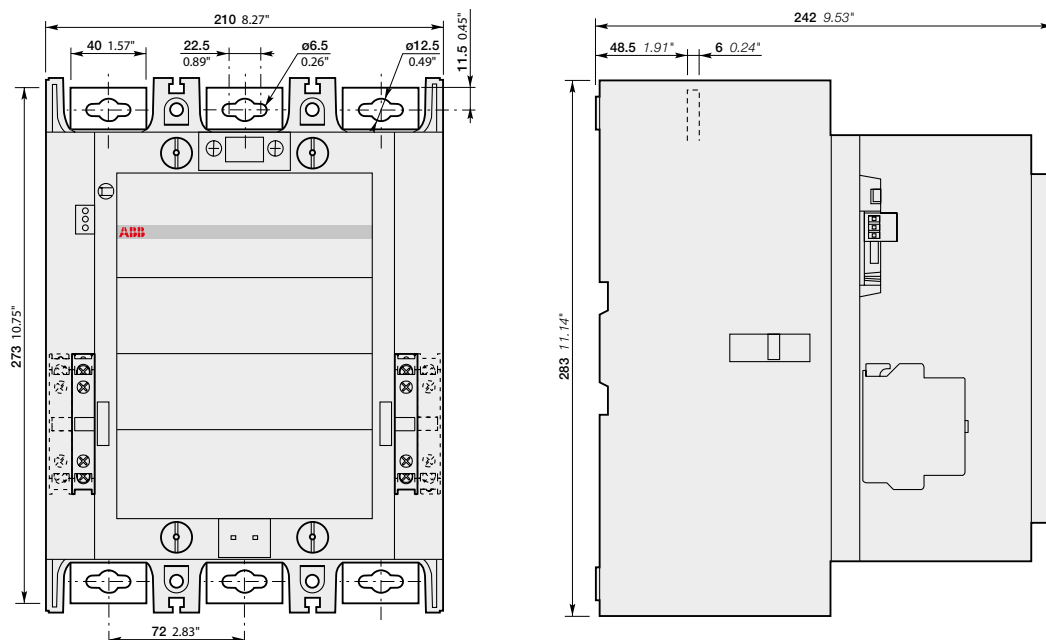
AF400B, AF460B-30-11
+ VM750H mechanical interlock unit



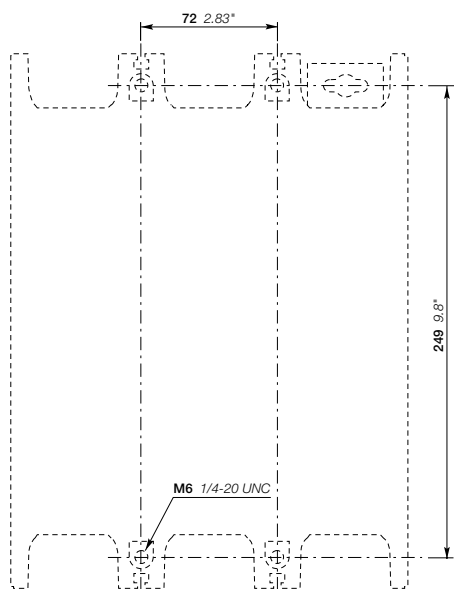
AF400B, AF460B
+ VM750H mechanical interlock unit

AF580B and AF750B 3-pole contactors

Dimensions



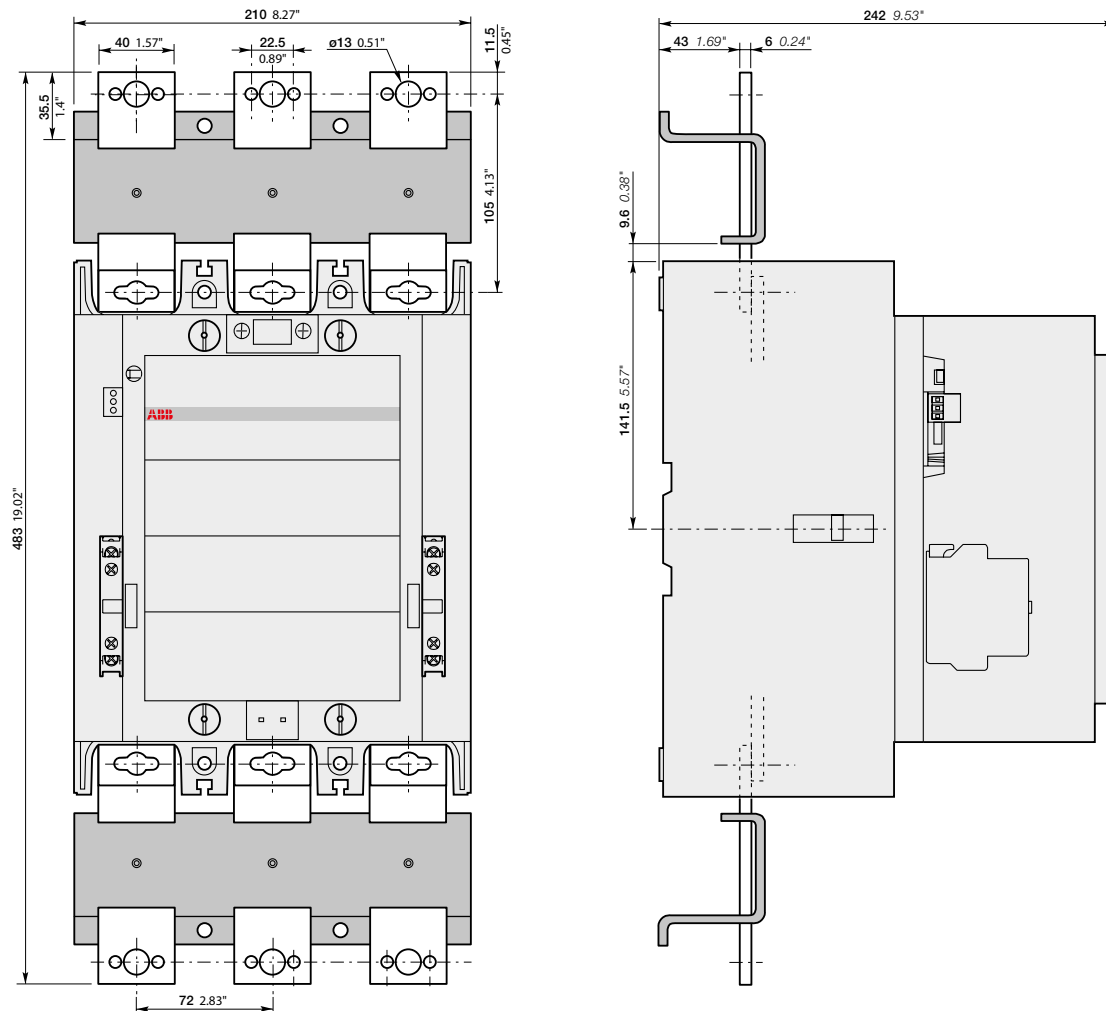
AF580B and AF750B-30-22



AF580B and AF750B

AF580B and AF750B 3-pole contactors

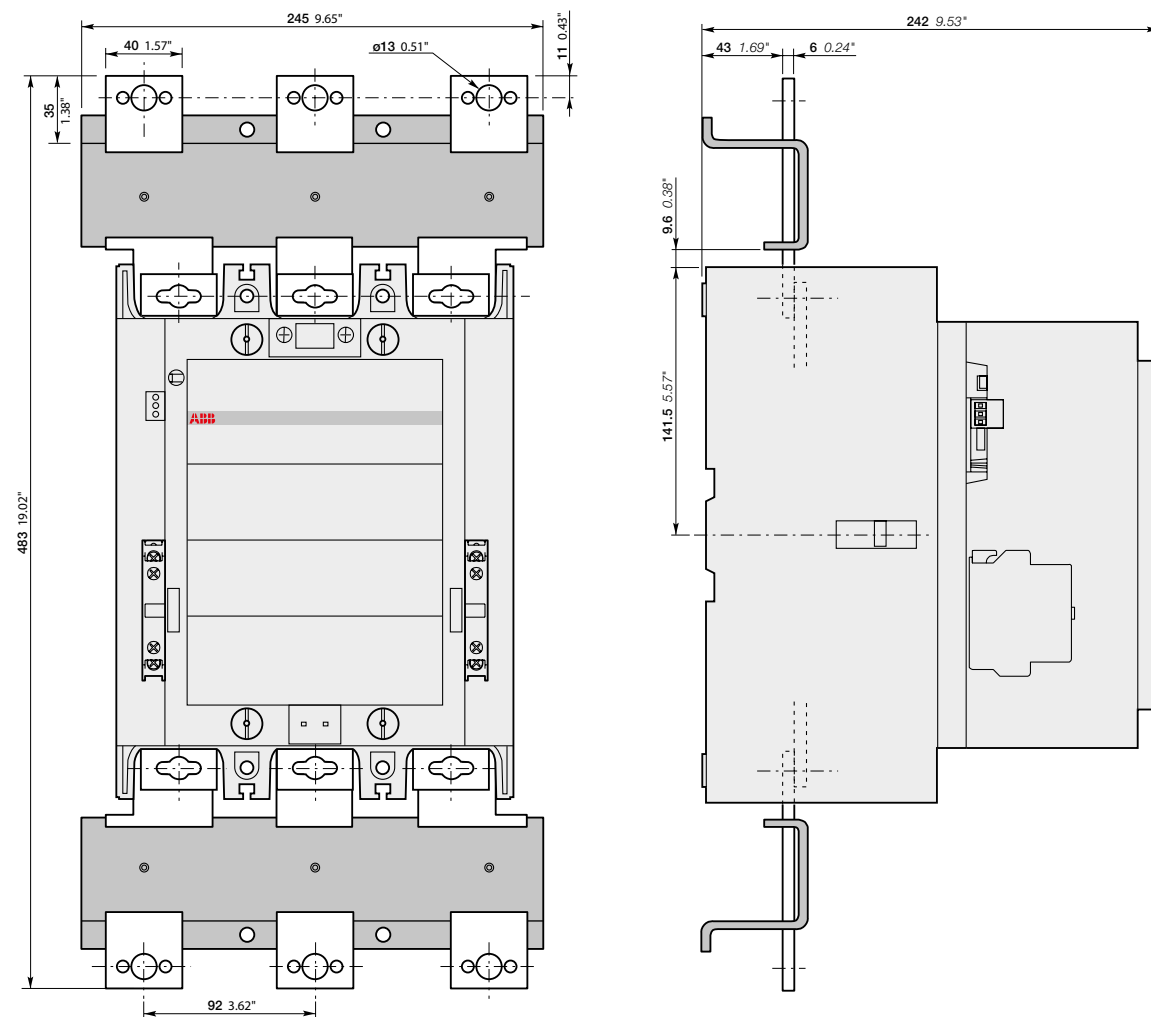
Dimensions



AF580B and AF750B-30-22
+ LX750 terminal extension

AF580B and AF750B 3-pole contactors

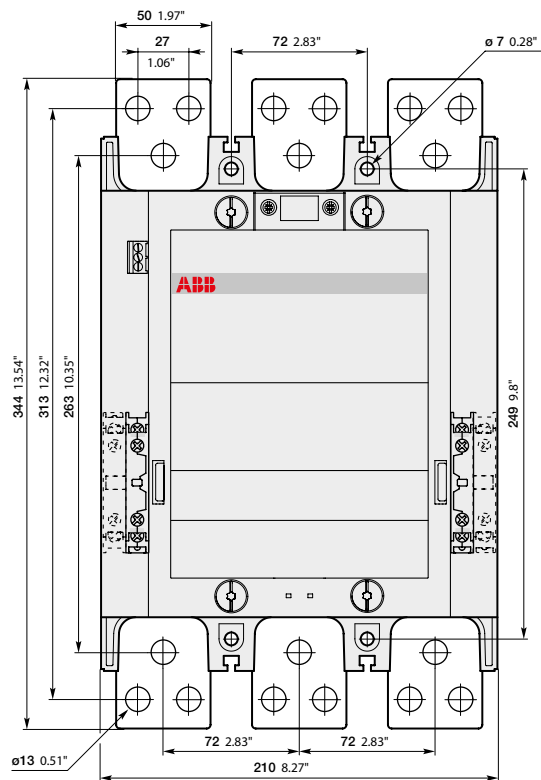
Dimensions



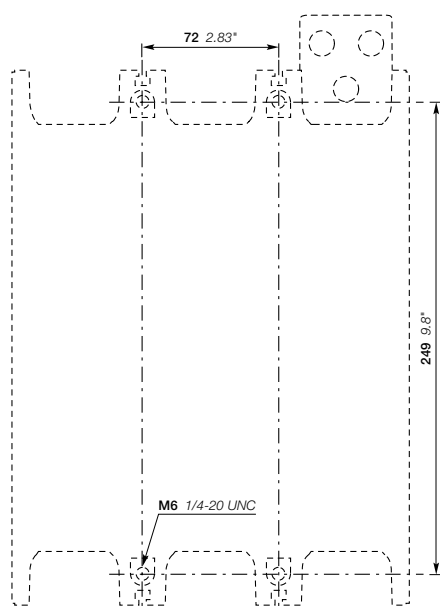
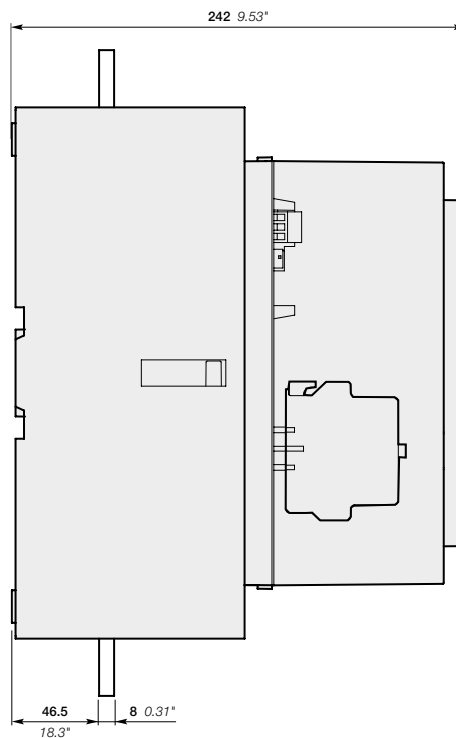
AF580B and AF750B-30-22
+ LW750 terminal enlargement

AF1250B 3-pole contactors

Dimensions



AF1250B-30-22

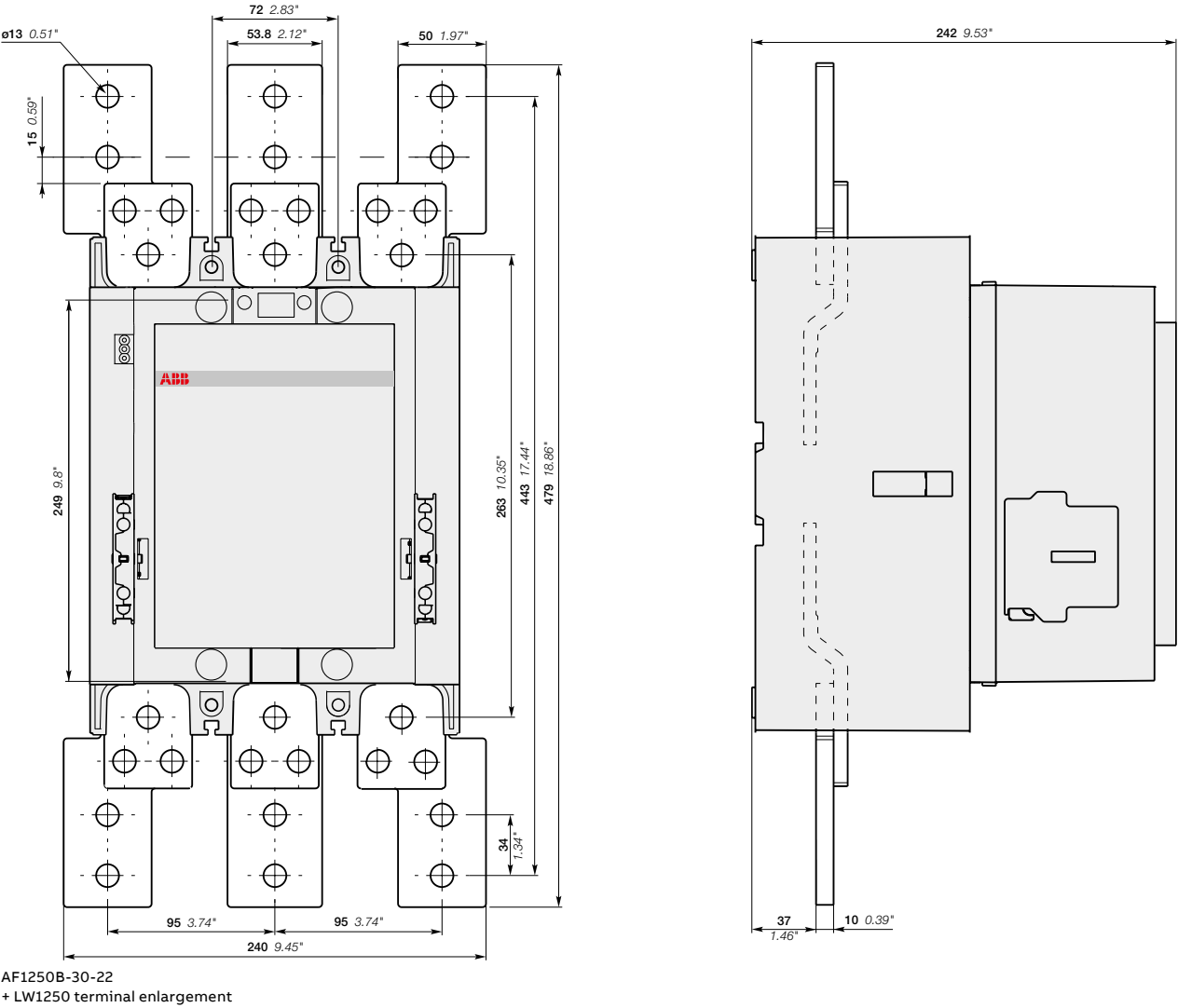


AF1250B

Main dimensions mm, inches

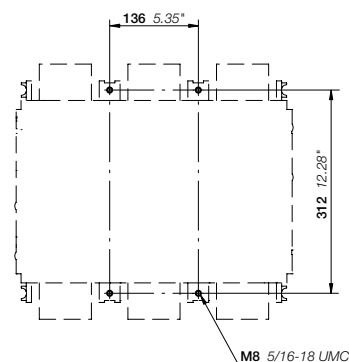
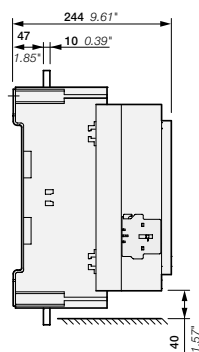
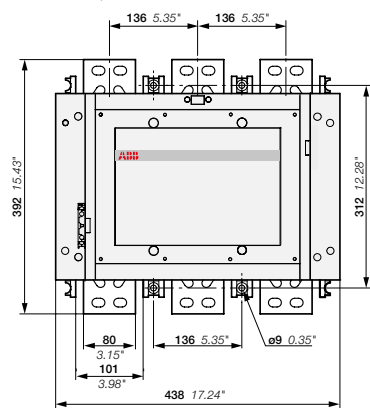
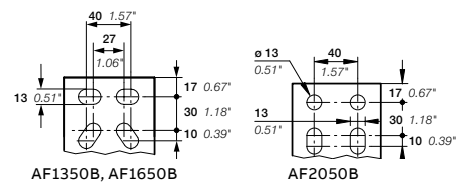
AF1250B 3-pole contactors

Dimensions

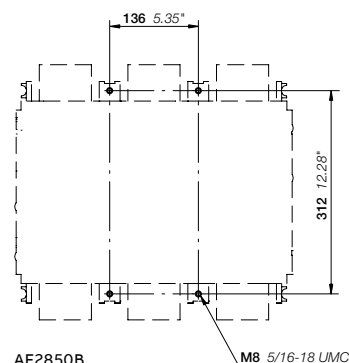
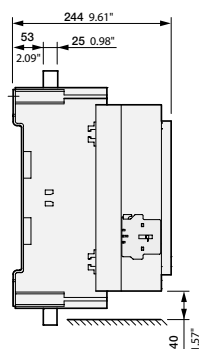
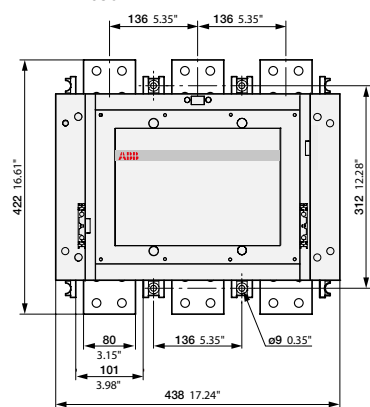
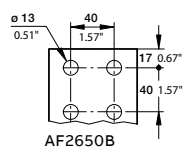


AF1350B, AF1650B, AF2050B and AF2850B 3-pole contactors

Dimensions



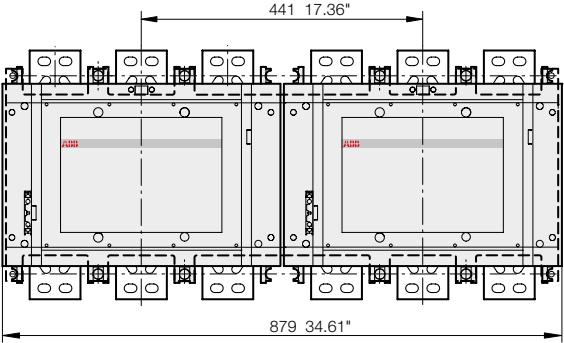
AF1350B, AF1650B, AF2050B



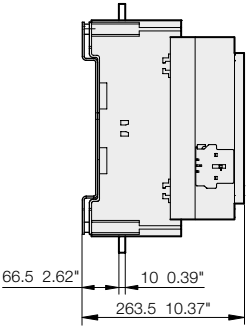
AF2850B

AF1350B, AF1650B, AF2050B and AF2850B 3-pole contactors

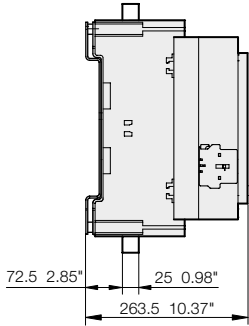
Dimensions



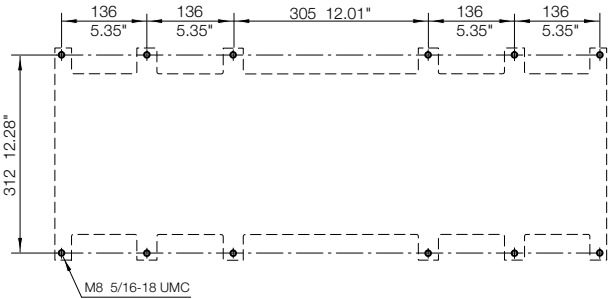
AF1350B, AF1650B, AF2050B, AF2850B
+ VM 1650H mechanical interlock unit



AF1350B, AF1650B, AF2050B



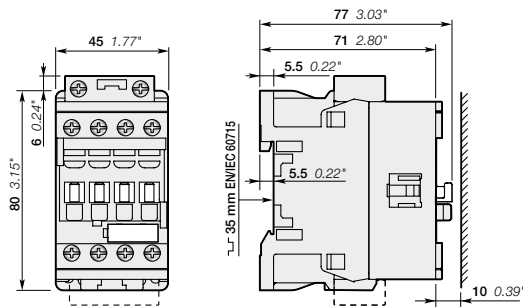
AF2850B



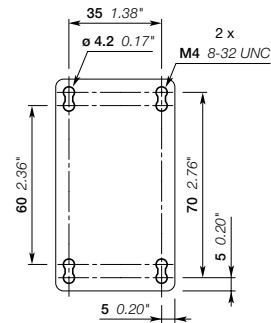
AF1350B, AF1650B, AF2050B, AF2850B
+ VM 1650H mechanical interlock unit

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

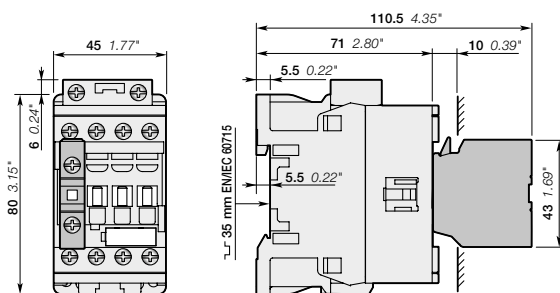
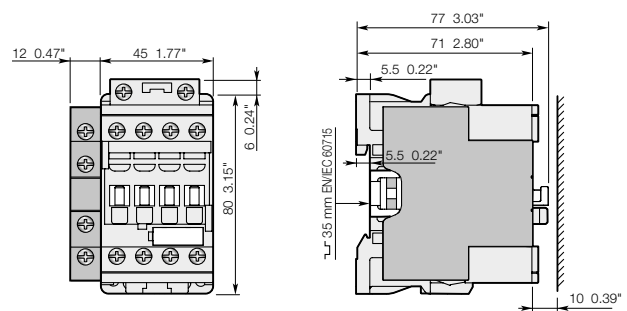
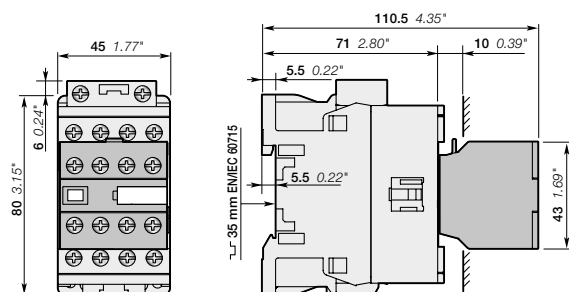
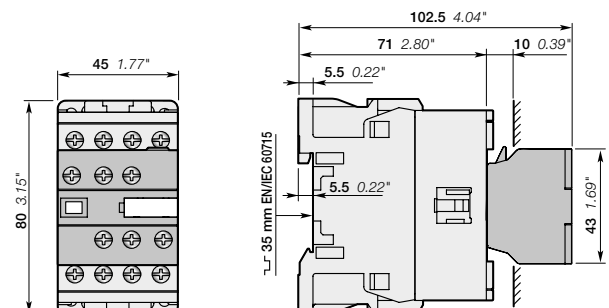
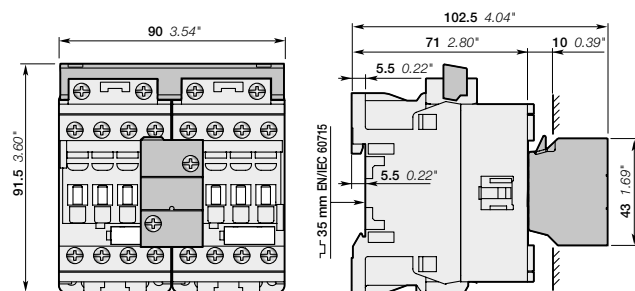
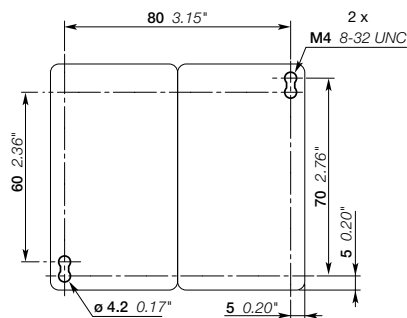
Dimensions



AF09(Z)B, AF16(Z)B



AF09(Z)B, AF16(Z)B

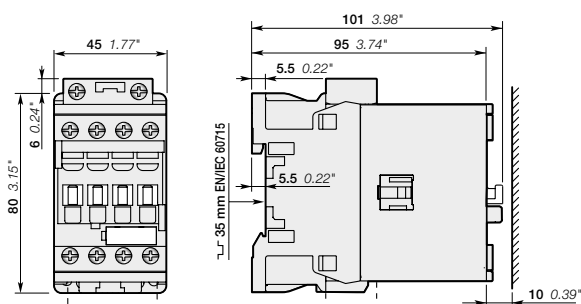
AF09(Z)B, AF16(Z)B
+ CA4 1-pole auxiliary contact blockAF09(Z)B, AF16(Z)B
+ CAL4-11 2-pole auxiliary contact blockAF09(Z)B, AF16(Z)B
+ CA4 4-pole auxiliary contact blockAF09(Z)B, AF16(Z)B
+ CAT4 2-pole auxiliary contact and coil terminal blockAF09(Z)B-40-00, AF16(Z)B-40-00
+ VEM4 mechanical and electrical interlock setAF09(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.

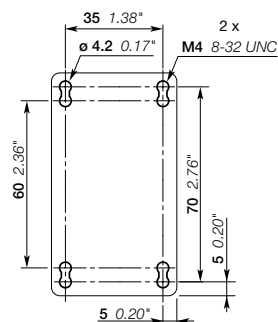
Main dimensions mm, inches

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

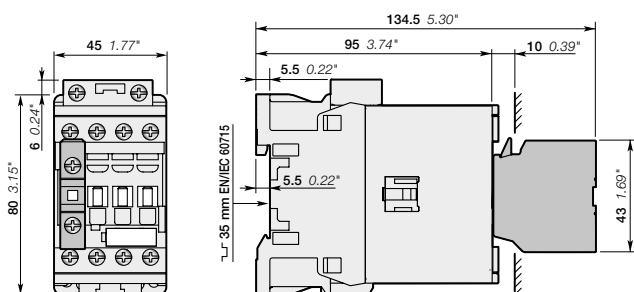
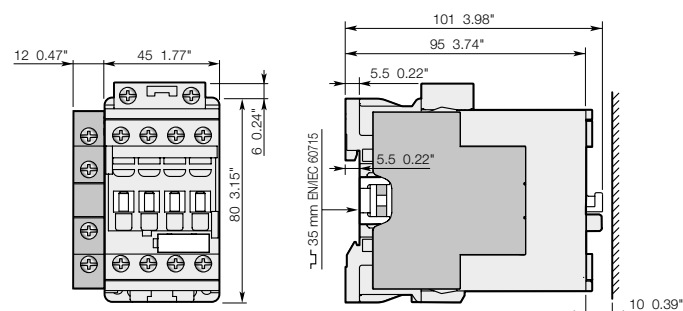
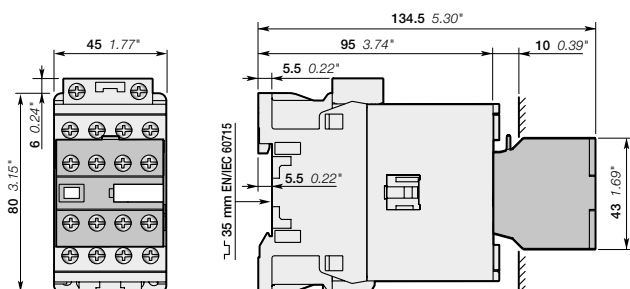
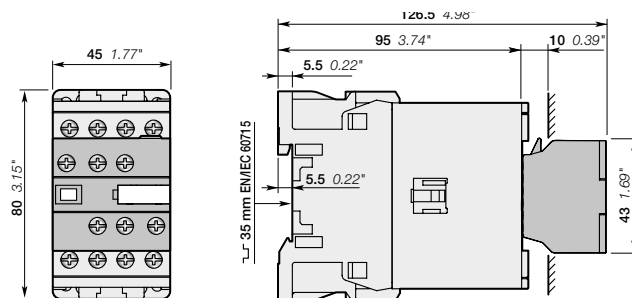
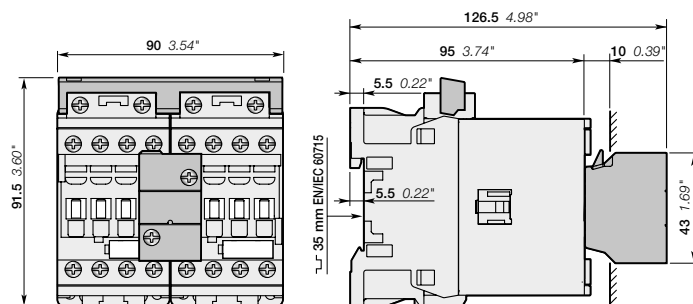
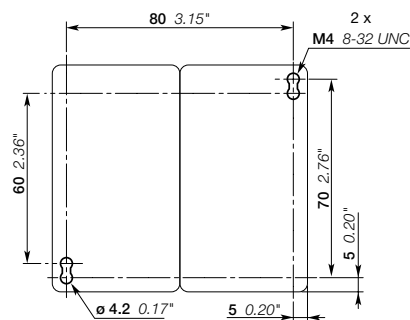
Dimensions



AF26(Z)B, AF38(Z)B



AF26(Z)B, AF38(Z)B

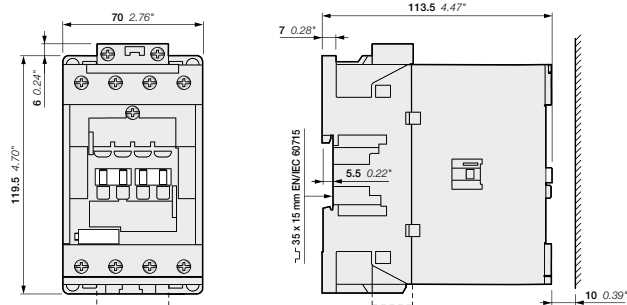
AF26(Z)B, AF38(Z)B
+ CA4 1-pole auxiliary contact blockAF26(Z)B, AF38(Z)B
+ CAL4-11 2-pole auxiliary contact blockAF26(Z)B, AF38(Z)B
+ CA4 4-pole auxiliary contact blockAF26(Z)B, AF38(Z)B
+ CAT4 2-pole auxiliary contact and coil terminal blockAF26(Z)B-40-00, AF38(Z)B-40-00
+ VEM4 mechanical and electrical interlock setAF26(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 inches min.

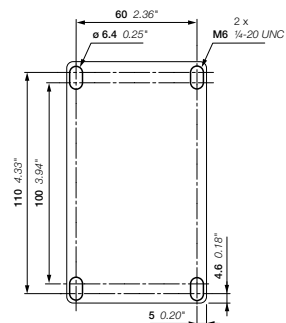
Main dimensions mm, inches

AF40B, AF52B 4-pole contactors

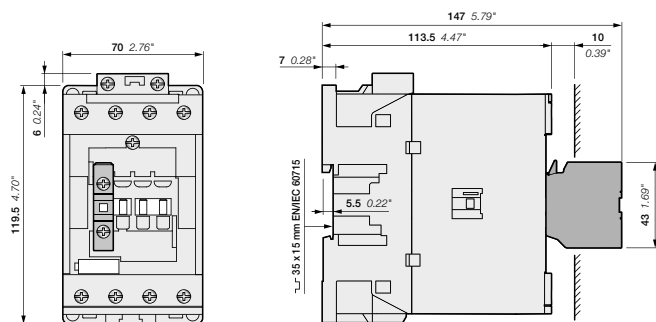
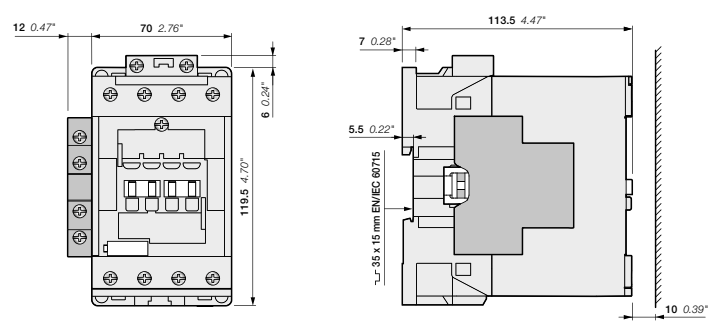
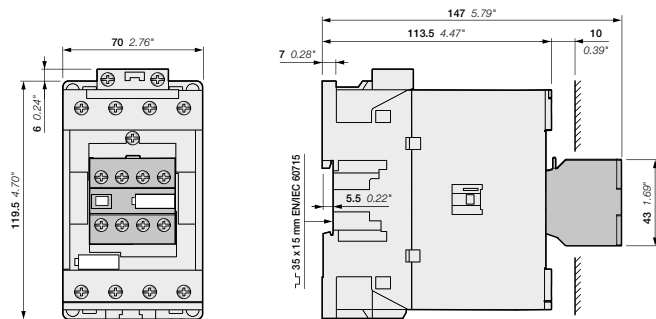
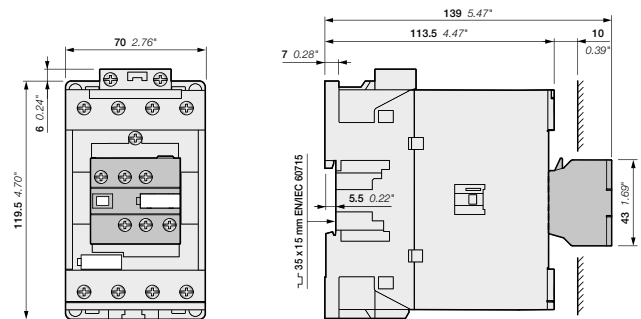
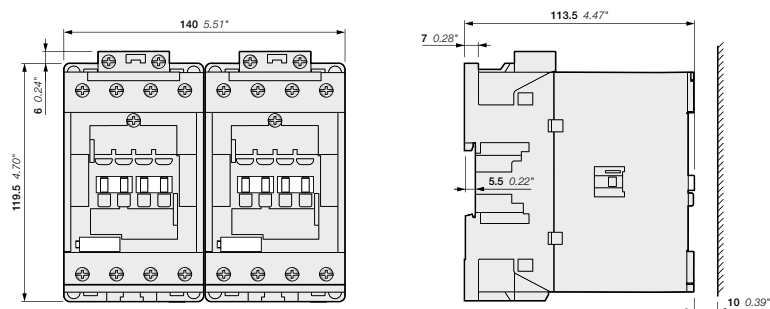
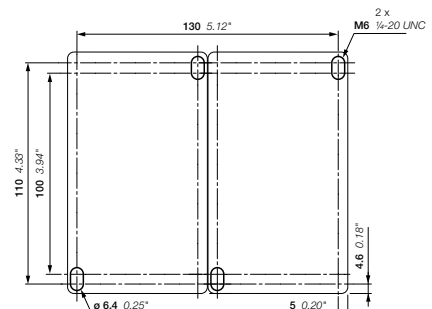
Dimensions



AF40B, AF52B



AF40B, AF52B

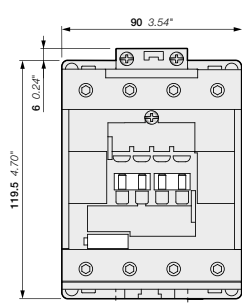
AF40B, AF52B
+ CA4 1-pole auxiliary contact blockAF40B, AF52B
+ CAL4-11 2-pole auxiliary contact blockAF40B, AF52B
+ CA4 4-pole auxiliary contact blockAF40B, AF52B
+ CAT4 2-pole auxiliary contact and coil terminal blockAF40B, AF52B
+ VM96-4 mechanical interlock unitAF40B, AF52B
+ VM96-4 mechanical interlock unit

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

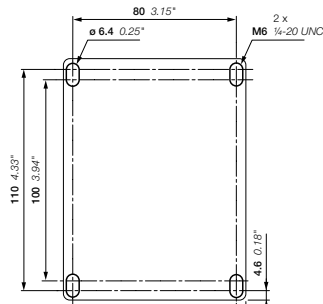
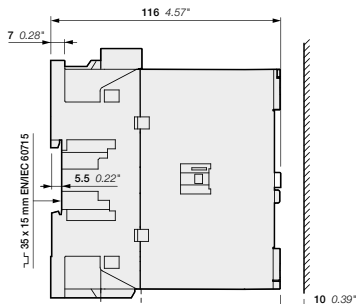
Main dimensions mm, inches

AF80B 4-pole contactors

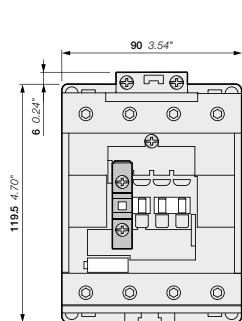
Dimensions



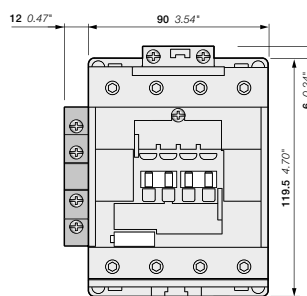
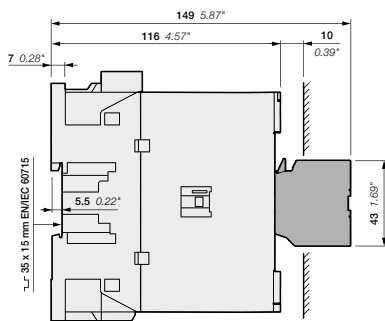
AF80B



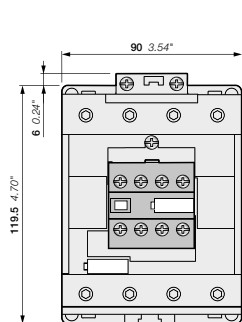
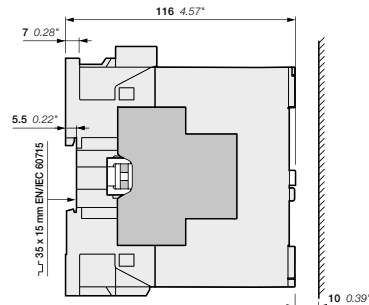
AF80B



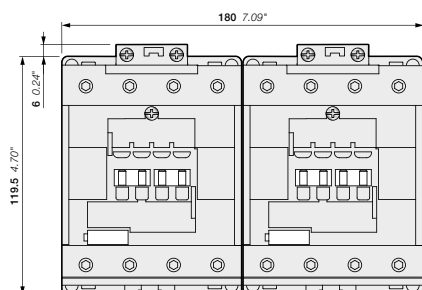
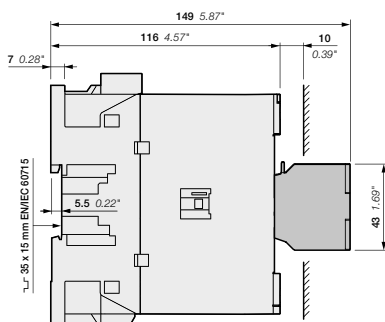
AF80B
+ CA4, CC4 1-pole auxiliary contact block



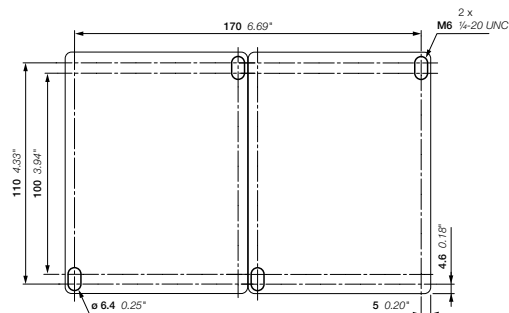
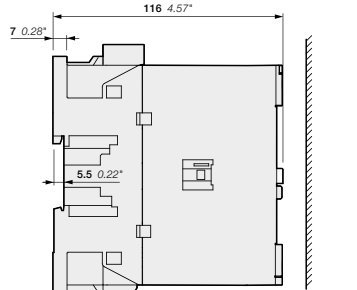
AF80B
+ CAL4-11 2-pole auxiliary contact block



AF80B
+ CA4 4-pole auxiliary contact block



AF80B
+ VM96-4 mechanical interlock unit



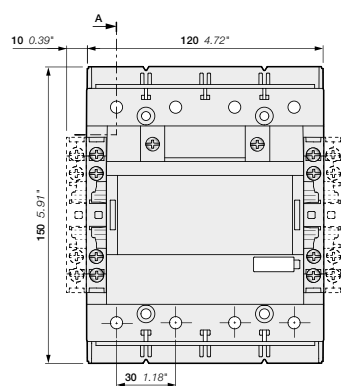
AF80B
+ VM96-4 mechanical interlock unit

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

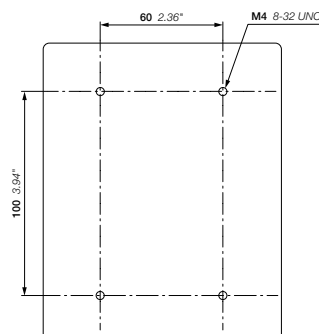
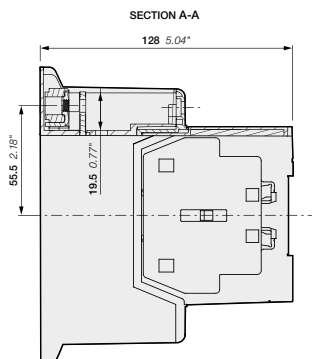
Main dimensions mm, inches

AF116B, AF140B 4-pole contactors

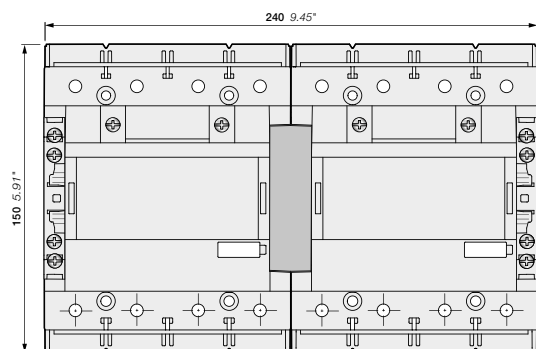
Dimensions



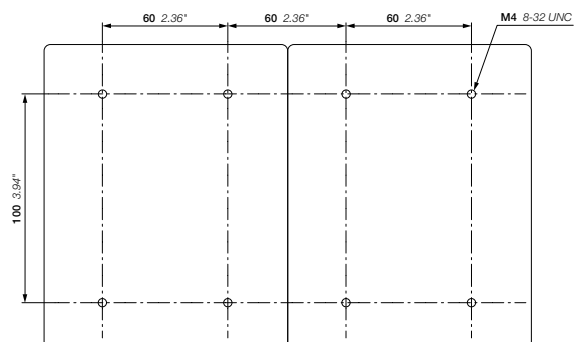
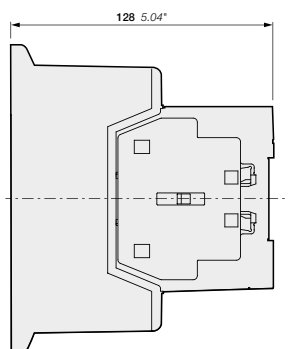
AF116B, AF140B-40-22



AF116B, AF140B-40-22



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

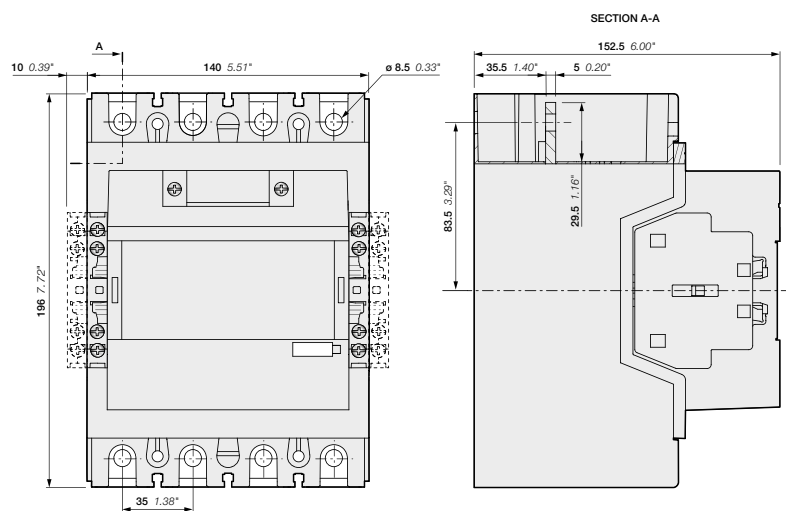


AF116B, AF140B-40-22
+ VM19 mechanical interlocking unit

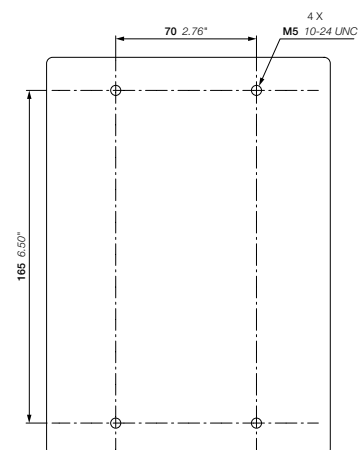
Main dimensions mm, inches

AF190B, AF205B 4-pole contactors

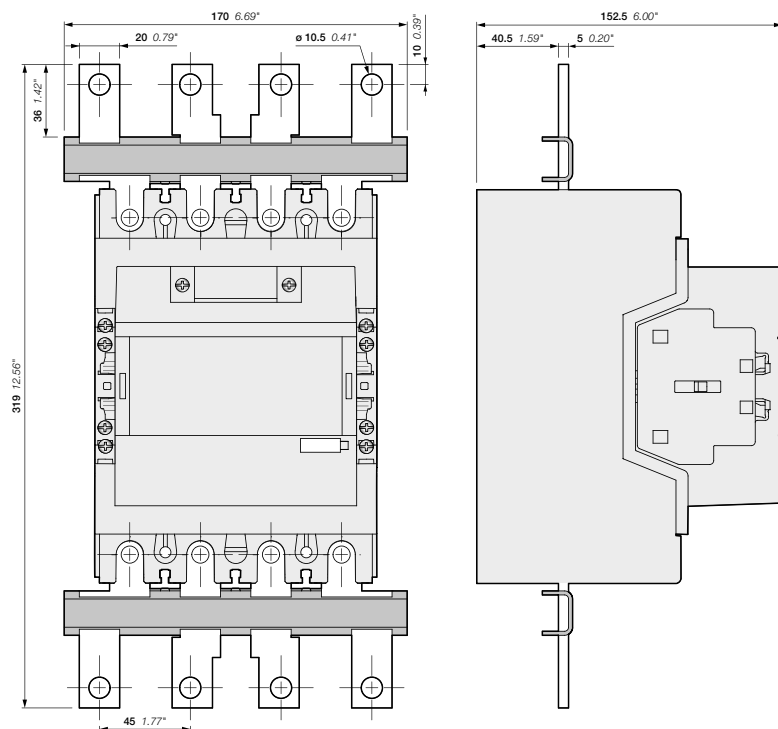
Dimensions



AF190B, AF205B-40-22

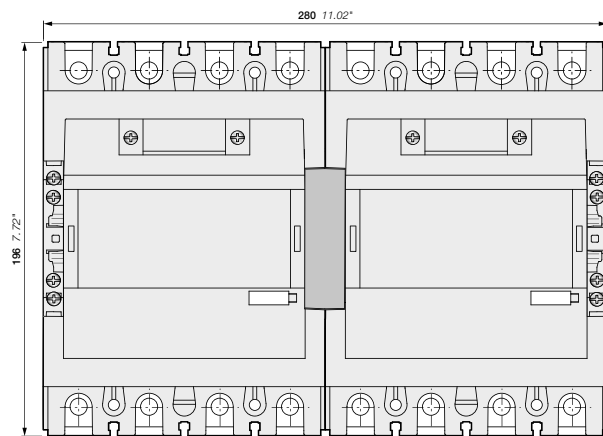


AF190B, AF205B-40-22

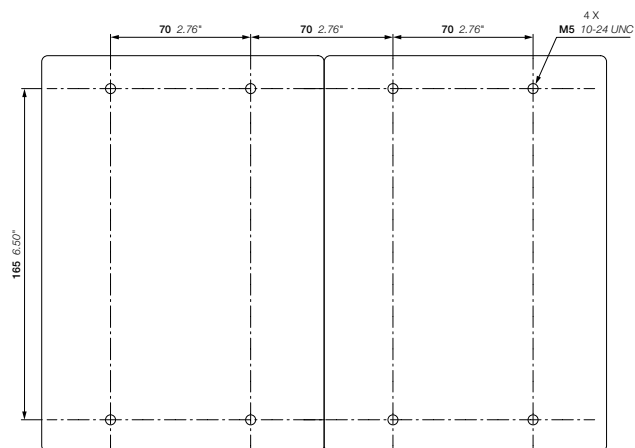
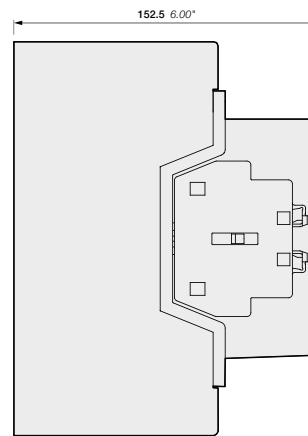
AF190B, AF205B-40-22
+ LW205-40 terminal enlargement

AF190B, AF205B 4-pole contactors

Dimensions



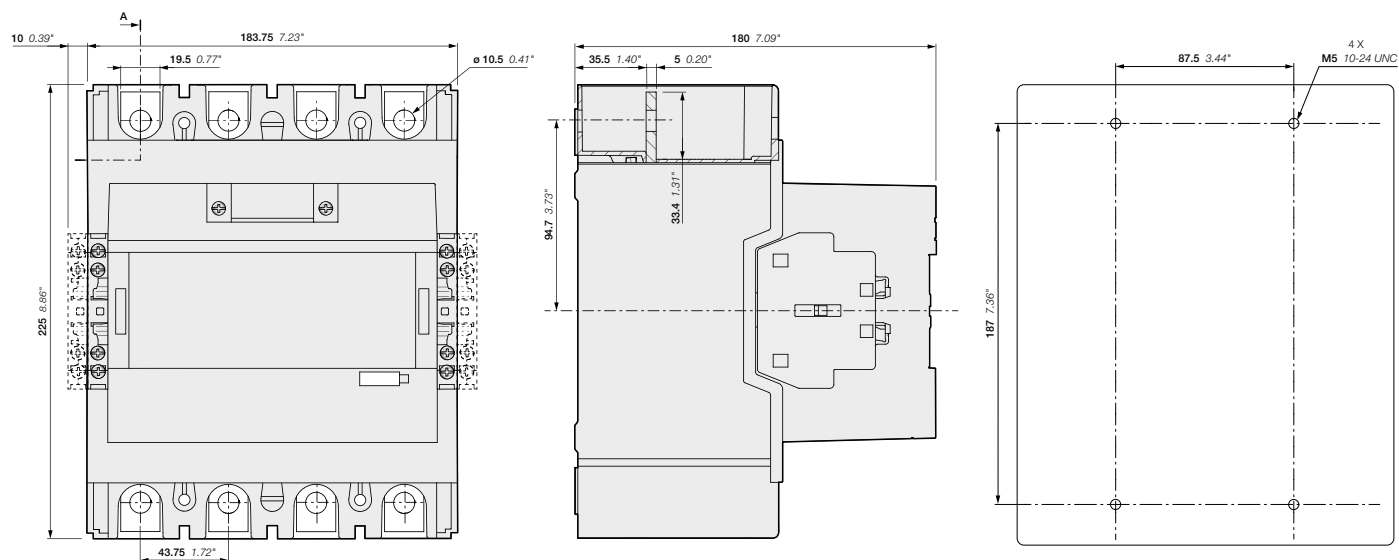
AF190B, AF205B-40-22
+ VM19 mechanical interlocking unit



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

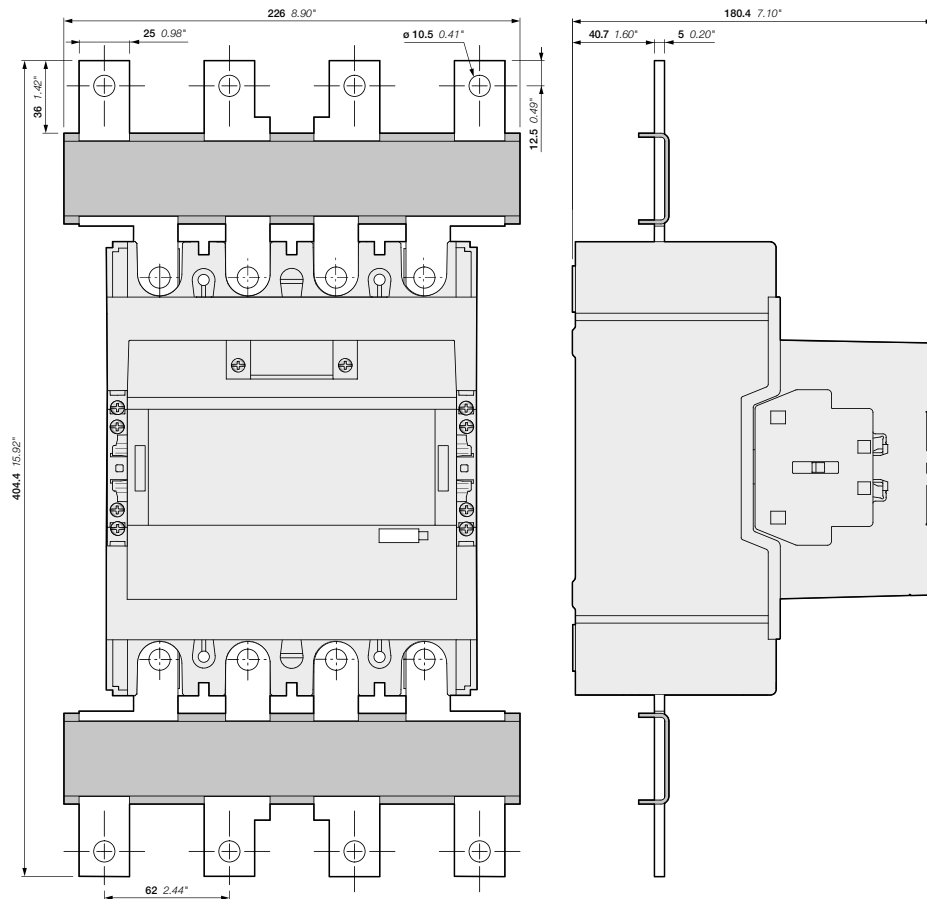
AF265B, AF305B, AF370B 4-pole contactors

Dimensions



AF265B, AF305B, AF370B-40-22

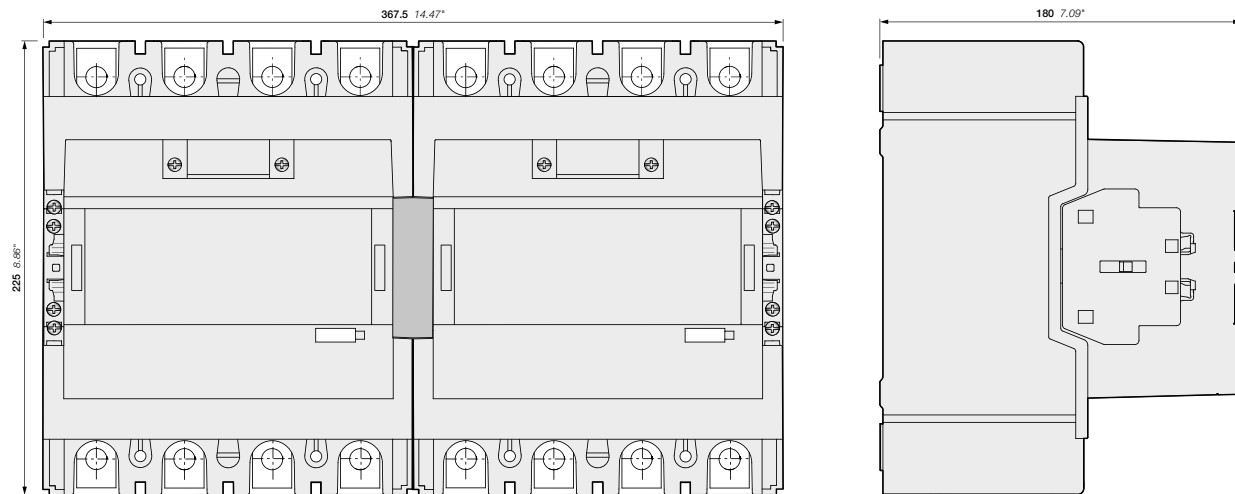
AF265B, AF305B, AF370B-40-22

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

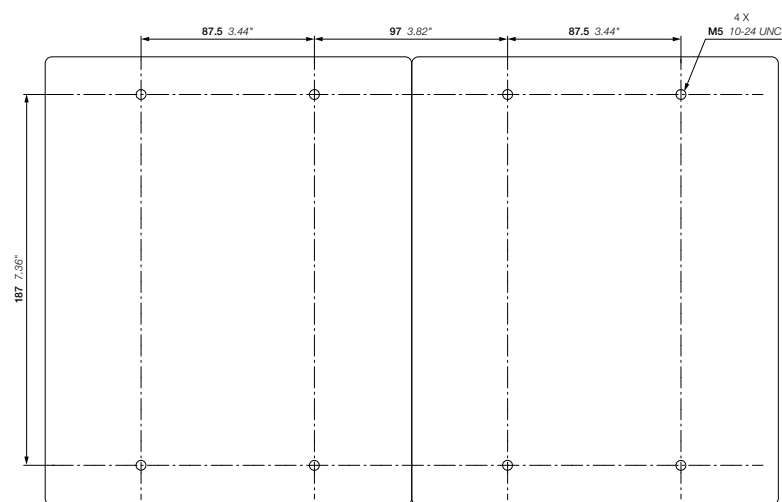
Main dimensions mm, inches

AF265B, AF305B, AF370B 4-pole contactors

Dimensions



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

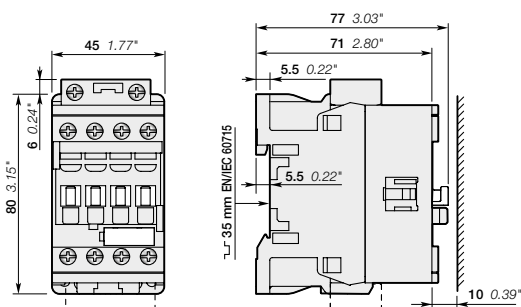


AF265B, AF305B, AF370B-40-22
+ VM19 mechanical interlocking unit

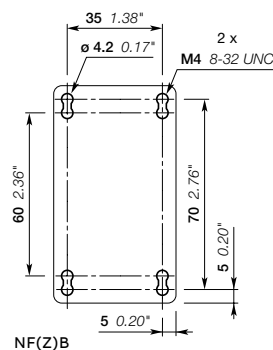
Main dimensions mm, inches

NF(Z)B contactor relays

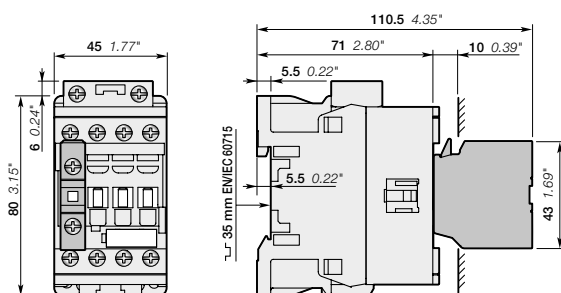
Dimensions



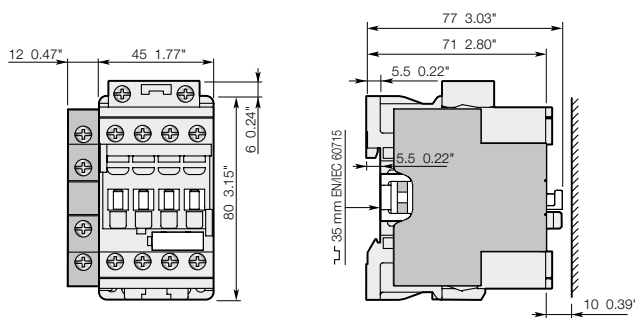
NF(Z)B22E, NF(Z)B31E, NF(Z)B40E



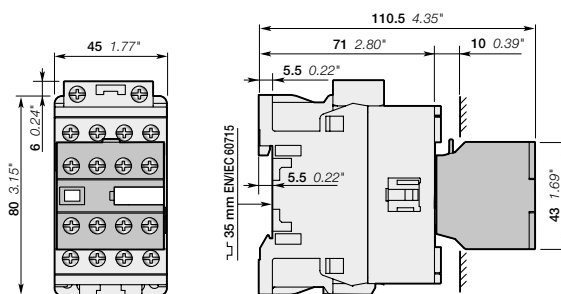
NF(Z)B



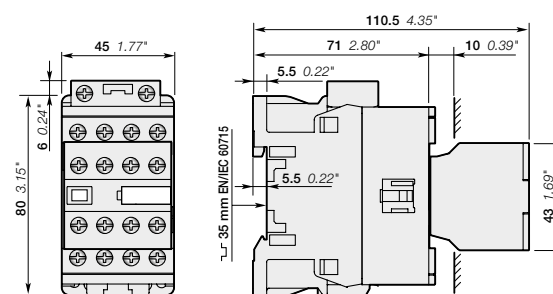
NF(Z)B22E, NF(Z)B31E, NF(Z)B40E
+ CA4 1-pole auxiliary contact block



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



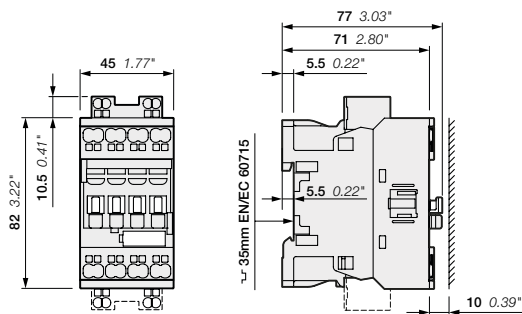
NF(Z)B44E, NF(Z)B62E, NF(Z)B80E

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

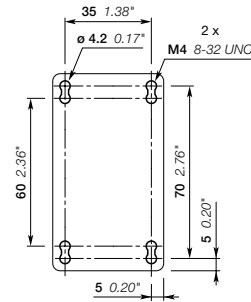
Main dimensions mm, inches

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

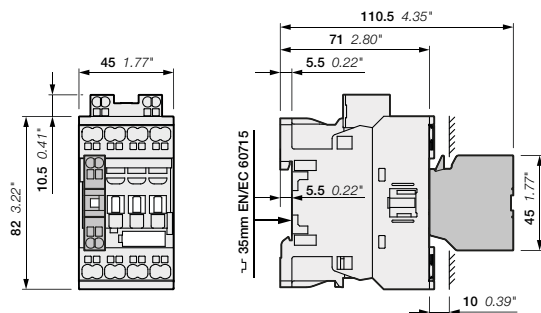
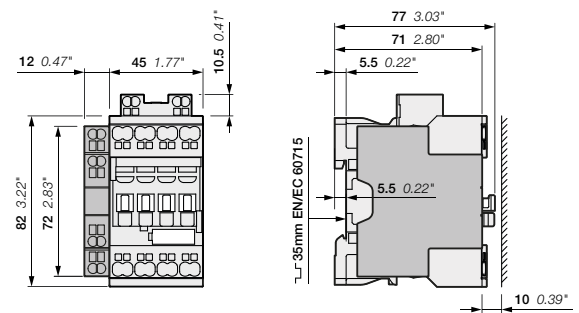
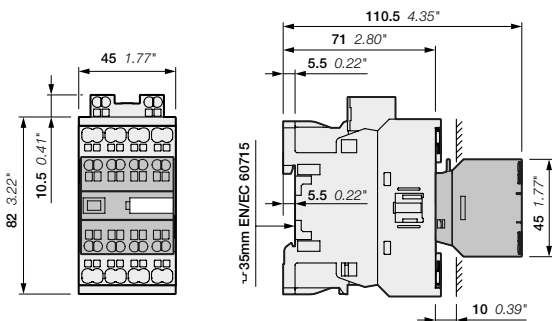
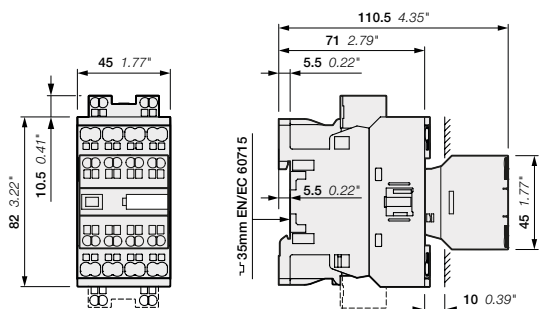
Dimensions



NFZ22EK, NFZ31EK, NFZ40EK



NFZ22EK, NFZ31EK, NFZ40EK

NFZ22EK, NFZ31EK, NFZ40EK
+ CA4..K 1-pole auxiliary contact blockNFZ22EK, NFZ31EK, NFZ40EK
+ CAL4-11K 2-pole auxiliary contact blockNFZ22EK, 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 U_c min. ... U_c 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

U_c min. ... U_c max.
acc. to IEC 60077

V DC

17...32
23...42.5
23...44.5
25...45
33...60
36...65

42...78
50...90
55...96
63...113
67...120
77...143

87.5...162.5
90...150
105...183
120...167
152...264
187...253

Rated control circuit voltage

U_c min. ... U_c max.
acc. to IEC 60947-4-1
0.85 U_c min. ... 1.1 U_c max.

V DC

20...60

48...130

100...250

Coil voltage codes

AF09..38ZB(..K)
NFZB(..K)

AF40B ... AF370B

AF400B ... AF1250B

AF1350B ... AF2850B

21

11

69

69

22

12

70

70

23

13

71

AC operated

Rated control circuit voltage

U_c min. ... U_c max.
acc. to IEC 60947-4-1
0.85 U_c min. ... 1.1 U_c max.

V AC 50/60 Hz

24...60

48...130

100...250

250...500

Coil voltage codes

AF09..38(Z)B(..K)
NF(Z)B(..K)

AF40B ... AF370B

AF400B ... AF1250B

AF1350B ... AF2850B

21

11

68

22

12

69

69

23

13

70

70

14

14

71

Voltage code table

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

DC operated

Type AF09 **Z** B - 30 - 10 - 22

Order code 1SBL136061R **22** 10

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

21	20...60 V	24 V
22	48...130 V	33 V
23	100...250 V	48 V
		72 V
		96 V
		110 V
		220 V

Coil code 22

Terminal connection
Blank: Screw terminals for standard ferrules
K: Push-in Spring terminals for standard ferrules

Auxiliary contacts
N.O. N.C.

Main contacts
N.O. N.C.

Designed for rolling stock

Low consumption

Rated control circuit voltage coil code

AC operated

Type AF09 **Z** B - 30 - 10 - 23

Order code 1SBL136061R **23** 10

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

AC 50/60 Hz

21	24...60 V
22	48...130 V
23	100...250 V
14	250...500 V

Coil code 23

Terminal connection
Blank: Screw terminals for standard ferrules
K: Push-in Spring terminals for standard ferrules

Auxiliary contacts
N.O. N.C.

Main contacts
N.O. N.C.

Designed for rolling stock

Low consumption

Rated control circuit voltage coil code

Note: For AC 50/60 Hz sinusoidal 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

Type AF116 B - 30 - 22 - 12

Order code 1SFL427063R **12** 22

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

11	20...60 V	24 V
12	48...130 V	33 V
13	100...250 V	48 V
		72 V
		96 V
		110 V
		220 V

Coil code 12

Terminal connection
Blank: for standard ferrules

Auxiliary contacts
N.O. N.C.

Main contacts
N.O. N.C.

Designed for rolling stock

Rated control circuit voltage coil code

AC operated

Type AF116 B - 30 - 22 - 13

Order code 1SFL427063R **13** 22

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

AC 50/60 Hz

11	24...60 V
12	48...130 V
13	100...250 V
14	250...500 V

Coil code 13

Terminal connection
Blank: for standard ferrules

Auxiliary contacts
N.O. N.C.

Main contacts
N.O. N.C.

Designed for rolling stock

Rated control circuit voltage coil code

Note: For AC 50/60 Hz sinusoidal 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

AF400B ... AF2850B 3-pole contactors

DC operated

Type	Order code	Rated control circuit voltage	Supply control voltage
AF400 B - 30 - 22 - 69	1SFL57631R 69 22	Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max.	Uc acc. to IEC 60077
Auxiliary contacts N.O. N.C.			
N.O. N.C. Main contacts			
Designed for rolling stock			
Terminal connection Blank: for standard ferrules			
	Coil code		
	68 20...60 V		DC 24 V
	69 48...130 V		33 V
			48 V
			72 V
			96 V
			110 V
	70 100...250 V		220 V

AC operated

Type	Order code	Rated control circuit voltage
AF400 B - 30 - 22 - 69	1SFL57763R 70 22	Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max.
Auxiliary contacts N.O. N.C.		
N.O. N.C. Main contacts		
Designed for rolling stock		
Terminal connection Blank: for standard ferrules		
	Coil code	
	68 24...60 V	
	69 48...130 V	
	70 100...250 V	
	71 250...500 V	

Note: For AC 50/60 Hz sinusoidal 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).

Coil 68, 71: not available for AF1350B...AF2850B

NF(Z)B contactor relays

DC operated

Type	Order code	Rated control circuit voltage	Supply control voltage
NF Z B - 22 - E - 22	1SBH136061R 22 22	Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max.	Uc acc. to IEC 60077
Auxiliary contacts N.O. N.C.			
Designed for rolling stock			
Low consumption			
Rated control circuit voltage coil code			
Terminal connection Blank: Screw terminals for standard ferrules K: Push-in Spring terminals for standard ferrules			
	Coil code		
	21 20...60 V		DC 24 V
	22 48...130 V		33 V
			48 V
			72 V
			96 V
			110 V
	23 100...250 V		220 V

AC operated

Type	Order code	Rated control circuit voltage
NF Z B - 22 - E - 23	1SBH136061R 23 22	Uc min. ... Uc max. acc. to IEC 60947-4-1 0.85 Uc min. ... 1.1 Uc max.
Auxiliary contacts N.O. N.C.		
Designed for rolling stock		
Low consumption		
Rated control circuit voltage coil code		
Terminal connection Blank: Screw terminals for standard ferrules K: Push-in Spring terminals for standard ferrules		
	Coil code	
	21 24...60 V	
	22 48...130 V	
	23 100...250 V	
	14 250...500 V	

Note: For AC 50/60 Hz sinusoidal 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
4/61	NF(Z)B..RT contactor relays
4/69	Accessories
4/83	Terminal marking and positioning
4/88	Dimensions
4/109	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	$\theta \leq 60^\circ\text{C}$, 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..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	$\theta \leq 60^\circ\text{C}$, 400 V	A	9	12	18	26	32	38
	AC-1 Rated operational current	$\theta \leq 40^\circ\text{C}$, 690 V	A	25	28	30	45	50	50
		$\theta \leq 60^\circ\text{C}$, 690 V	A	25	28	30	40	42	42
		$\theta \leq 70^\circ\text{C}$, 690 V	A	22	24	26	32	37	37
UL/CSA	General use rating	600 V	A	25	28	30	45	50	50
NEMA	NEMA Size			00	0	–	1	–	–

Main accessories

Auxiliary contact blocks	Front mounting
	Side mounting
Interlocking units	Mechanical
Surge suppressors	

CA4..RT, CAT4..RT

CAL4-11RT

VM4

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	AF40B..RT	AF52B..RT	AF80B..RT
IEC	AC-1 Rated operational current	$\theta \leq 40^\circ\text{C}$, 690 V	A	25	30	45	55	70	100	125
	Ue max. $\leq 690\text{ V}$, 50/60 Hz	$\theta \leq 60^\circ\text{C}$, 690 V	A	25	30	40	45	60	85	105
		$\theta \leq 70^\circ\text{C}$, 690 V	A	22	26	32	37	50	70	85
UL/CSA	General use rating	600 V	A	25	30	45	55	60	80	105

Main accessories

Auxiliary contact blocks	Front mounting
	Side mounting
Interlocking units	Mechanical
Surge suppressors	

CA4..RT, CAT4..RT

CAL4-11RT

VM4

Built-in surge protection

CA4..RT

CAL4-11RT

–

NF(Z)B..RT Contactor relays



Number of contacts									
IEC	AC-15 Rated operational current	400 V	A	3	3	3	3	3	3
UL/CSA	Pilot Duty			A600, Q600			A600, Q600		
Contactor relays type				NF(Z)B22ERT	NF(Z)B31ERT	NF(Z)B40ERT	NF(Z)B44ERT	NF(Z)B62ERT	NF(Z)B80ERT

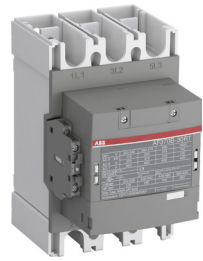
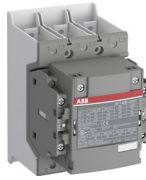
Main accessories

Auxiliary contact blocks	Front mounting
	Side mounting
Surge suppressors	

CA4..RT

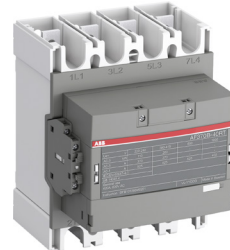
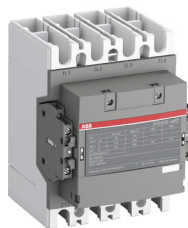
CAL4-11RT

Built-in surge protection



	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..RT	AF52B..RT	AF65B..RT	AF80B..RT	AF96B..RT	AF116B..RT	AF140B..RT	AF146B..RT	AF190B..RT	AF205B..RT	AF265B..RT	AF305B..RT	AF370B..RT
	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..RT, CA4..K..RT	-
-	CAL19B-11RT
-	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-11RT
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
4/8	AF40B..RT ... AF96B..RT	DC operated
4/9	AF40B..RT ... AF96B..RT	AC operated
4/11	AF40B..RT ... AF96B..RT	DC operated - with 1 N.O. + 1 N.C.
4/12	AF40B..RT ... AF96B..RT	AC operated - with 1 N.O. + 1 N.C.
4/14	AF116B..RT ... AF146B..RT	DC operated
4/15	AF116B..RT ... AF146B..RT	AC operated
4/16	AF190B..RT ... AF370B..RT	DC operated
4/17	AF190B..RT ... AF370B..RT	AC operated
4/19	Technical data	
4/32	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

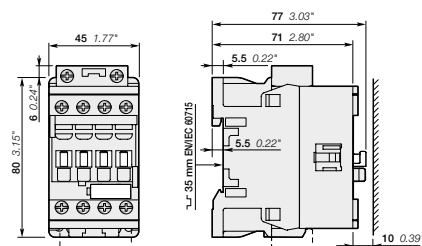
AF09ZB..RT ... AF38ZB..RT 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220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

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

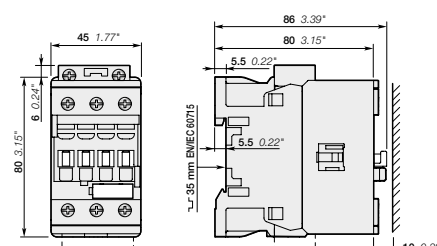
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 ... 1.25 U_c 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 current θ ≤ 40 °C	3-phase motor rating 480 V	General use rating 600 V AC							Pkg (1 pce)				
400 V 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-30-10RT-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



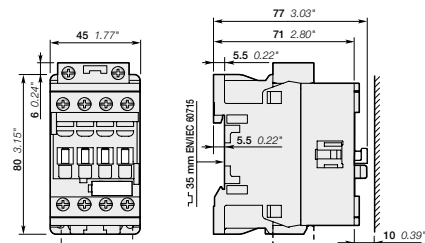
AF26(Z)B-30-00RT

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.

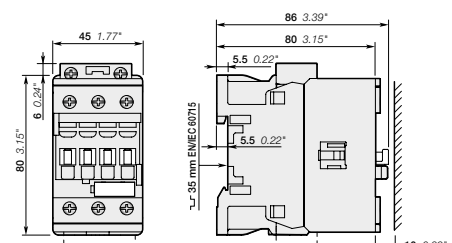
These contactors are of the block type design with 3 main poles.

- 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 $U_c \text{ min.} \dots U_c \text{ max.}$ 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 $U_c \text{ min.} \dots U_c \text{ max.}$ (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating 480 V	General use rating 600 V AC					
400 V AC-3 kW	AC-1 A	hp	A	V AC 50/60 Hz				
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
				24...60	1 0	AF12ZB-30-10RT-21	1SBL156060R2110	0.320
					0 1	AF12ZB-30-01RT-21	1SBL156060R2101	0.320
5.5	28	7.5	28	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
				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
7.5	30	10	30	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
				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
				24...60	0 0	AF30ZB-30-00RT-21	1SBL276060R2100	0.360
				48...130	0 0	AF30ZB-30-00RT-22	1SBL276060R2200	0.360
15	50	20	50	100...250	0 0	AF30ZB-30-00RT-23	1SBL276060R2300	0.360
				250...500	0 0	AF30B-30-00RT-14	1SBL277060R1400	0.360
				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
18.5	50	25	50	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

AF40B..RT ... AF96B..RT 3-pole contactors

18.5 to 45 kW

DC operated - connection with ring tongue ferrules



AF40B-30-00RT



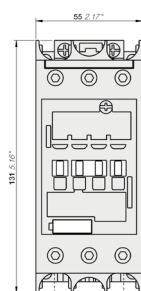
AF80B-30-00RT

AF40B..RT ... AF96B..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 (AF80B...AF96B up to 1000 V AC) and 220 V DC. These contactors are of the block type design with 3 main poles.

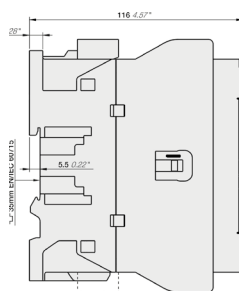
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 ... 1.25 U_c 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 U_c (IEC 60077) (1)	Rated control circuit voltage U_c min. ... U_c max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating 480 V	General use rating 600 V AC						
400 V AC-3	AC-1								
kW	A	hp	A	V DC	V DC				
18.5	70	30	60	24, 33, 48	20...60	0 0	AF40B-30-00RT-11	1SBL347060R1100	0.870
				72, 96, 110	48...130	0 0	AF40B-30-00RT-12	1SBL347060R1200	0.870
				220	100...250	0 0	AF40B-30-00RT-13	1SBL347060R1300	0.870
22	100	40	80	24, 33, 48	20...60	0 0	AF52B-30-00RT-11	1SBL367060R1100	0.870
				72, 96, 110	48...130	0 0	AF52B-30-00RT-12	1SBL367060R1200	0.870
				220	100...250	0 0	AF52B-30-00RT-13	1SBL367060R1300	0.870
30	105	50	90	24, 33, 48	20...60	0 0	AF65B-30-00RT-11	1SBL387060R1100	0.870
				72, 96, 110	48...130	0 0	AF65B-30-00RT-12	1SBL387060R1200	0.870
				220	100...250	0 0	AF65B-30-00RT-13	1SBL387060R1300	0.870
37	125	60	105	24, 33, 48	20...60	0 0	AF80B-30-00RT-11	1SBL397060R1100	1.050
				72, 96, 110	48...130	0 0	AF80B-30-00RT-12	1SBL397060R1200	1.050
				220	100...250	0 0	AF80B-30-00RT-13	1SBL397060R1300	1.050
45/55	130	60/75	115	24, 33, 48	20...60	0 0	AF96B-30-00RT-11	1SBL407060R1100	1.050
				72, 96, 110	48...130	0 0	AF96B-30-00RT-12	1SBL407060R1200	1.050
				220	100...250	0 0	AF96B-30-00RT-13	1SBL407060R1300	1.050

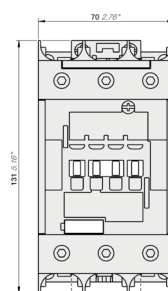
(1) Other control voltages, see voltage code table.



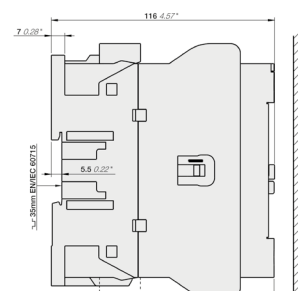
AF40B..RT, AF52B..RT, AF65B..RT



Main dimensions mm, inches



AF80B..RT, AF96B..RT



AF40B..RT ... AF96B..RT 3-pole contactors

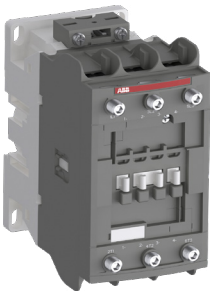
18.5 to 45 kW

AC operated - connection with ring tongue ferrules



AF40B-30-00RT

9PAA00000318868



AF80B-30-00RT

9PAA00000318867

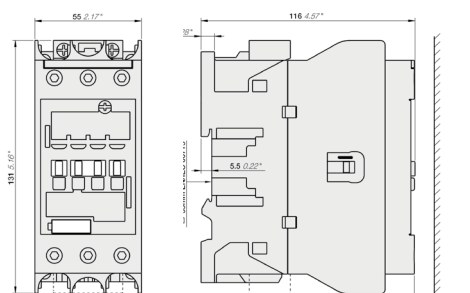
AF09(Z)B..RT ... AF38(Z)B..RT 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and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

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

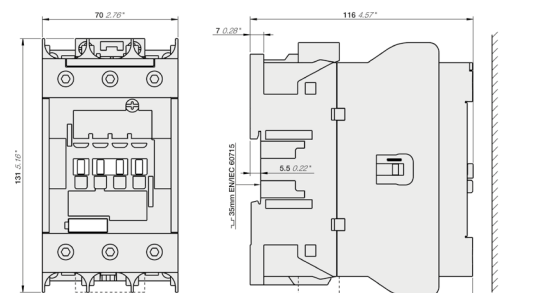
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range $U_{c \min}$... $U_{c \max}$ 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 $U_{c \min}$... $U_{c \max}$ (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating 480 V	General use rating 600 V AC					
400 V AC-3	AC-1			V DC				
kW	A	hp	A					
18.5	70	30	60	24...60	0 0	AF40B-30-00RT-11	1SBL347060R1100	0.870
				48...130	0 0	AF40B-30-00RT-12	1SBL347060R1200	0.870
				100...250	0 0	AF40B-30-00RT-13	1SBL347060R1300	0.870
				250...500	0 0	AF40B-30-00RT-14	1SBL347060R1400	0.870
22	100	40	80	24...60	0 0	AF52B-30-00RT-11	1SBL367060R1100	0.870
				48...130	0 0	AF52B-30-00RT-12	1SBL367060R1200	0.870
				100...250	0 0	AF52B-30-00RT-13	1SBL367060R1300	0.870
				250...500	0 0	AF52B-30-00RT-14	1SBL367060R1400	0.870
30	105	50	90	20...60	0 0	AF65B-30-00RT-11	1SBL387060R1100	0.870
				48...130	0 0	AF65B-30-00RT-12	1SBL387060R1200	0.870
				100...250	0 0	AF65B-30-00RT-13	1SBL387060R1300	0.870
				250...500	0 0	AF65B-30-00RT-14	1SBL387060R1400	0.870
37	125	60	105	20...60	0 0	AF80B-30-00RT-11	1SBL397060R1100	1.050
				48...130	0 0	AF80B-30-00RT-12	1SBL397060R1200	1.050
				100...250	0 0	AF80B-30-00RT-13	1SBL397060R1300	1.050
				250...500	0 0	AF80B-30-00RT-14	1SBL397060R1400	1.050
45/55	130	60/75	115	20...60	0 0	AF96B-30-00RT-11	1SBL407060R1100	1.050
				48...130	0 0	AF96B-30-00RT-12	1SBL407060R1200	1.050
				100...250	0 0	AF96B-30-00RT-13	1SBL407060R1300	1.050
				250...500	0 0	AF96B-30-00RT-14	1SBL407060R1400	1.050

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



AF40B..RT, AF52B..RT, AF65B..RT

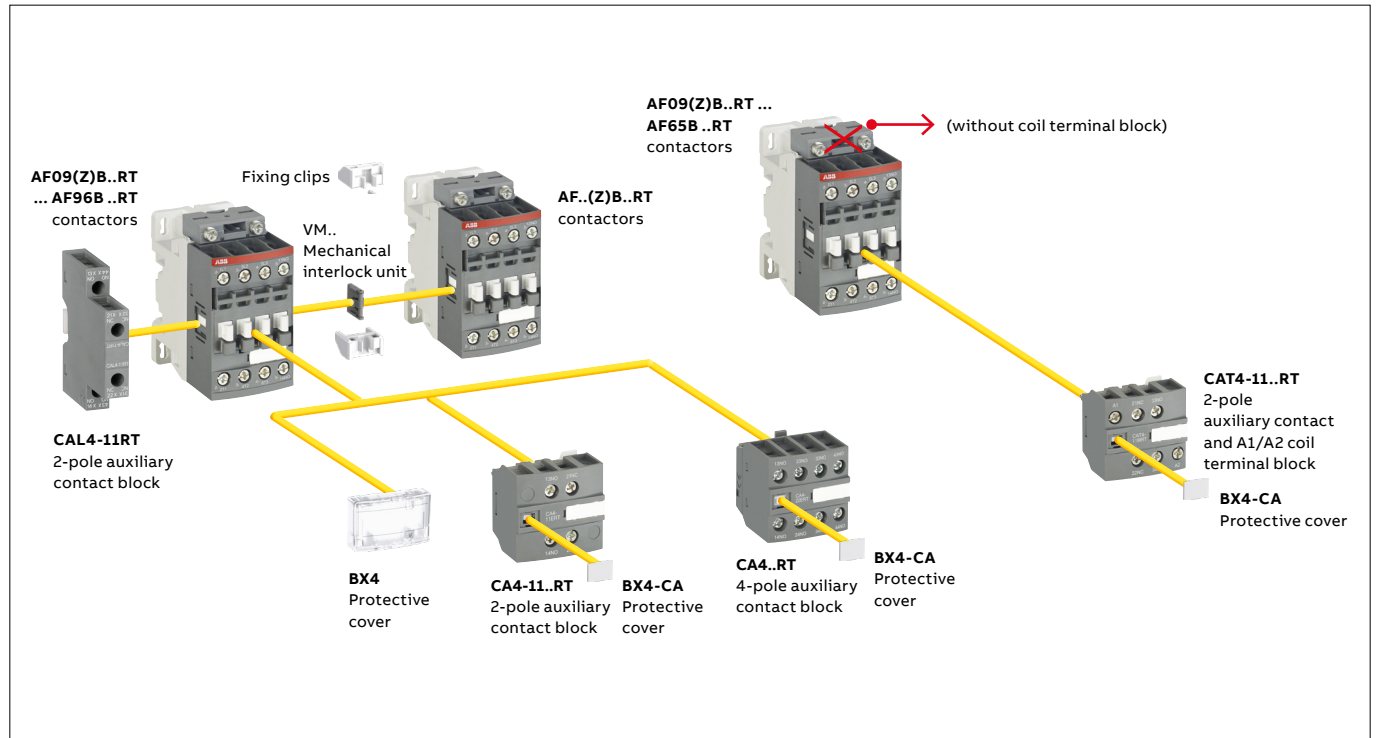


AF80B..RT, AF96B..RT

Main dimensions mm, inches

AF09(Z)B..RT ... AF96B..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	Built-in auxiliary contacts	Front-mounted accessories				Mechanical interlocking unit (between 2 contactors)	Side-mounted accessories			
			Auxiliary contact blocks			Auxiliary contact blocks					
			2-pole CA4-11..RT	2-pole CAT4-11..RT	4-pole CA4..RT	2-pole CAL4-11RT		Left side	Right side		
AF09(Z)..B..RT ... AF38(Z)B..RT (1)											
AF09(Z)B..RT ... AF16(Z)B..RT	3 0	0 1	1	or	1		–	+	1	–	
			–		–		–	+	1	+	1
			1	or	1	or	1	+	1	+	1
AF09(Z)B..RT ... AF16(Z)B..RT	3 0	1 0	1	or	1	or	1	–	+	1	–
			1	or	1		–	+	1	+	1
			1	or	1	or	1	+	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
			1	or	1	or	1	+	1	+	1
AF40..B..RT ... AF96B..RT											
AF09(Z)B..RT ... AF16(Z)B..RT	3 0	0 0	4 max.	or	1	or	1	+	1	+	1
			4 max.	–	or	1	+	1	+	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.

AF40B..RT ... AF96B..RT 3-pole contactors

18.5 to 45 kW with 1 N.O. + 1 N.C. auxiliary contacts

DC operated - connection with ring tongue ferrules



AF40B-30-11RT

9PAA00000318868



AF80B-30-11RT

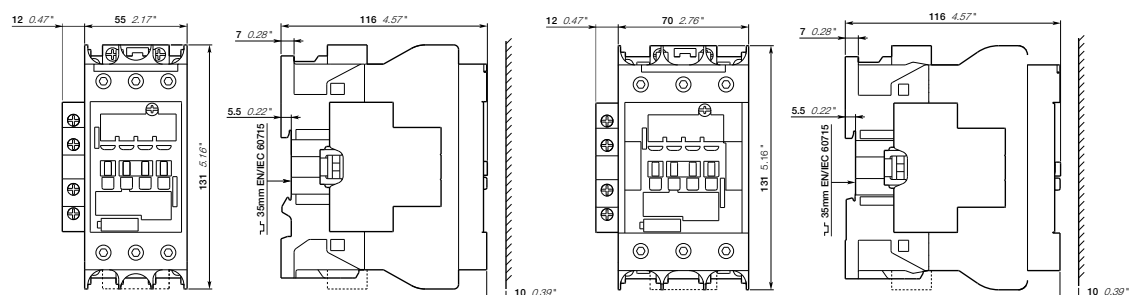
9PAA00000318867

AF40B..RT ... AF96B..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 (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 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 ... 1.25 U_c 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 U_c (IEC 60077) (1)	Rated control circuit voltage U_c min. ... U_c max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
	Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating 480 V	General use rating 600 V AC				Pkg (1 pce)
400 V AC-3	AC-1							kg
kW	A	hp	A	V DC	V DC			
18.5	70	30	60	24, 33, 48	20...60	1 1	AF40B-30-11RT-11	1.010
				72, 96, 110	48...130	1 1	AF40B-30-11RT-12	1.010
				220	100...250	1 1	AF40B-30-11RT-13	0.990
					250...500	1 1	AF40B-30-11RT-14	0.990
22	100	40	80	24, 33, 48	20...60	1 1	AF52B-30-11RT-11	1.010
				72, 96, 110	48...130	1 1	AF52B-30-11RT-12	1.010
				220	100...250	1 1	AF52B-30-11RT-13	0.990
					250...500	1 1	AF52B-30-11RT-14	0.990
30	105	50	90	24, 33, 48	20...60	1 1	AF65B-30-11RT-11	1.010
				72, 96, 110	48...130	1 1	AF65B-30-11RT-12	1.010
				220	100...250	1 1	AF65B-30-11RT-13	0.990
					250...500	1 1	AF65B-30-11RT-14	0.990
37	125	60	105	24, 33, 48	20...60	1 1	AF80B-30-11RT-11	1.260
				72, 96, 110	48...130	1 1	AF80B-30-11RT-12	1.260
				220	100...250	1 1	AF80B-30-11RT-13	1.210
					250...500	1 1	AF80B-30-11RT-14	1.210
45/55	130	60/75	115	24, 33, 48	20...60	1 1	AF96B-30-11RT-11	1.260
				72, 96, 110	48...130	1 1	AF96B-30-11RT-12	1.260
				220	100...250	1 1	AF96B-30-11RT-13	1.210
					250...500	1 1	AF96B-30-11RT-14	1.210

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



Main dimensions mm, inches

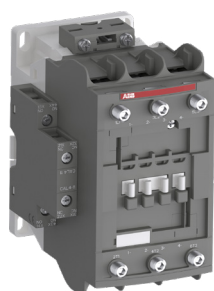
AF40B..RT ... AF96B..RT 3-pole contactors

18.5 to 45 kW with 1 N.O. + 1 N.C. auxiliary contacts

AC operated - connection with ring tongue ferrules



AF40B-30-00RT

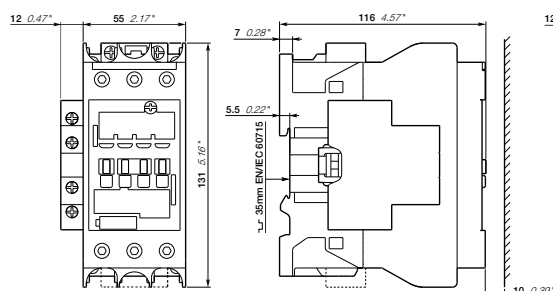


AF80B-30-00RT

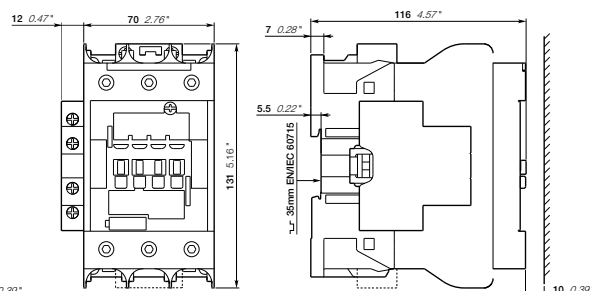
AF40B..RT ... AF96B..RT 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or under-grounds. They are mainly used for controlling 3-phase motors and power circuits up to 690 V AC (AF80B...AF96B 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 sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range $U_c \text{ min.} \dots U_c \text{ max.}$ 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 $+70^\circ\text{C}$
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC	UL / CSA		Rated control circuit		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power	current	3-phase motor rating	General use rating	voltage				
$\theta \leq 40^\circ\text{C}$	$\theta \leq 40^\circ\text{C}$	480 V	600 V AC	$U_c \text{ min.} \dots U_c \text{ max.}$				
400 V	AC-1	hp	A	(IEC 60947-4-1)				Pkg (1 pce)
kW	A			V AC 50/60 Hz				kg
18.5	70	30	60	24...60	1 1	AF40B-30-11RT-11	1SBL347060R1111	1.010
				48...130	1 1	AF40B-30-11RT-12	1SBL347060R1211	1.010
				100...250	1 1	AF40B-30-11RT-13	1SBL347060R1311	0.990
				250...500	1 1	AF40B-30-11RT-14	1SBL347060R1411	0.990
22	100	40	80	24...60	1 1	AF52B-30-11RT-11	1SBL367060R1111	1.010
				48...130	1 1	AF52B-30-11RT-12	1SBL367060R1211	1.010
				100...250	1 1	AF52B-30-11RT-13	1SBL367060R1311	0.990
				250...500	1 1	AF52B-30-11RT-14	1SBL367060R1411	0.990
30	105	50	90	24...60	1 1	AF65B-30-11RT-11	1SBL387060R1111	1.010
				48...130	1 1	AF65B-30-11RT-12	1SBL387060R1211	1.010
				100...250	1 1	AF65B-30-11RT-13	1SBL387060R1311	0.990
				250...500	1 1	AF65B-30-11RT-14	1SBL387060R1411	0.990
37	125	60	105	24...60	1 1	AF80B-30-11RT-11	1SBL397060R1111	1.260
				48...130	1 1	AF80B-30-11RT-12	1SBL397060R1211	1.260
				100...250	1 1	AF80B-30-11RT-13	1SBL397060R1311	1.210
				250...500	1 1	AF80B-30-11RT-14	1SBL397060R1411	1.210
45/55	130	60/75	115	24...60	1 1	AF96B-30-11RT-11	1SBL407060R1111	1.260
				48...130	1 1	AF96B-30-11RT-12	1SBL407060R1211	1.260
				100...250	1 1	AF96B-30-11RT-13	1SBL407060R1311	1.210
				250...500	1 1	AF96B-30-11RT-14	1SBL407060R1411	1.210



AF40B..RT, AF52B..RT, AF65B..RT

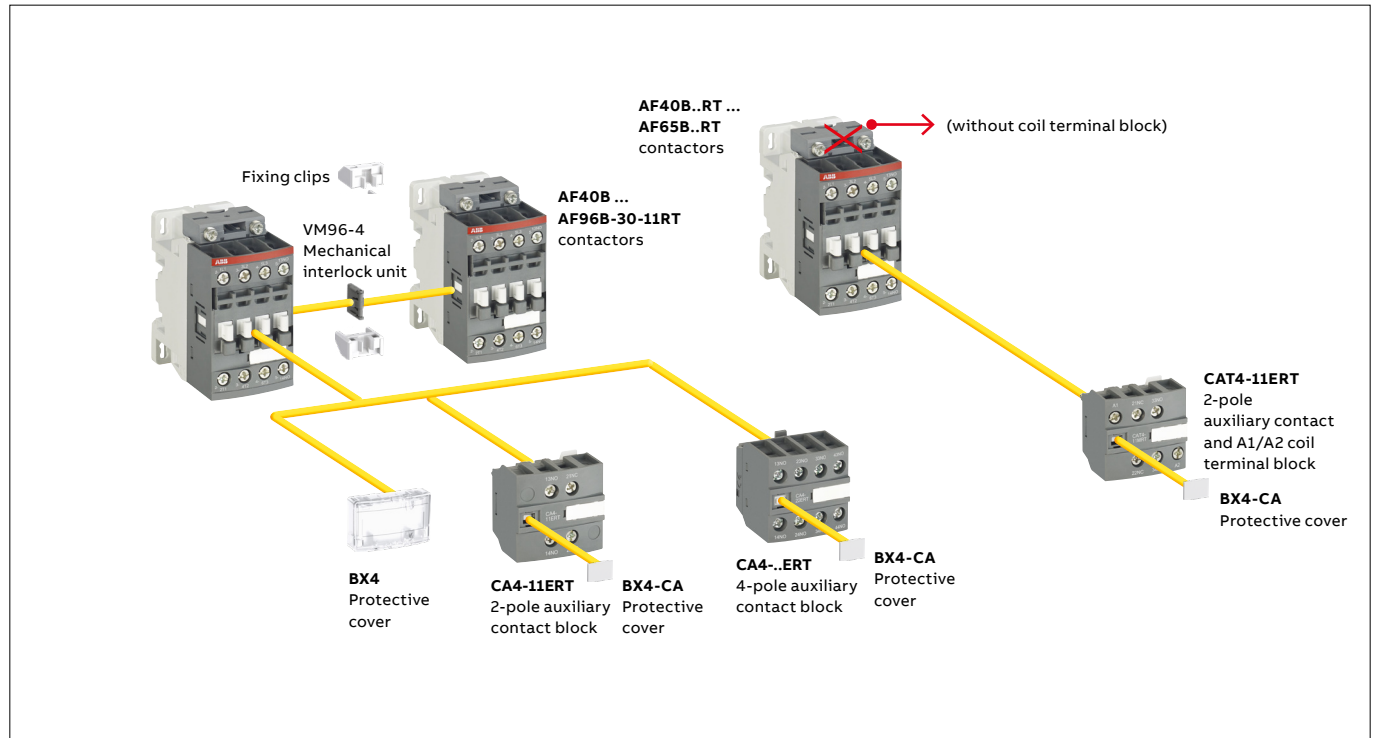


AF80B..RT, AF96B..RT

Main dimensions mm, inches

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

Contactors and Main accessories



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

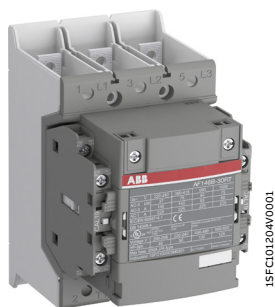
Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

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

AF116B..RT ... AF146B..RT 3-pole contactors

55 to 75 kW

DC operated - connection with ring tongue ferrules



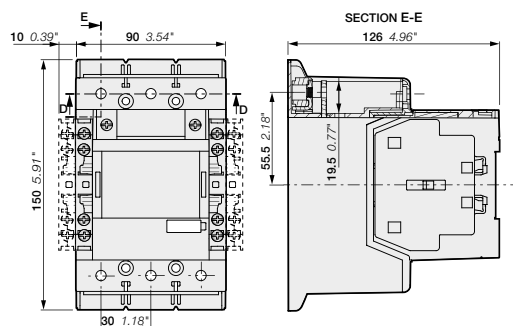
AF146B-30-22RT

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 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 ... 1.25 U_c 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 current θ ≤ 40 °C	3-phase motor rating 480 V	General use rating 600 V AC							Pkg (1 pce)
400 V AC-3	AC-1								
kW	A	hp	A	V DC	V DC			kg	
55	160	75	160	28, 33, 48	20...60	2 2	AF116B-30-22RT-11	1SFL427062R1122	1.500
				64, 72, 87, 96	48...130	2 2	AF116B-30-22RT-12	1SFL427062R1222	1.500
				110, 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.



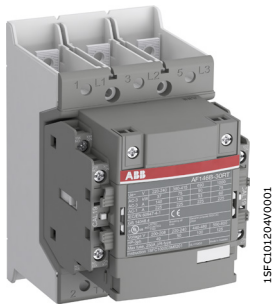
AF116B, AF140B, AF146B-30-22RT

Main dimensions mm, inches

AF116B..RT ... AF146B..RT 3-pole contactors

55 to 75 kW

AC operated - connection with ring tongue ferrules



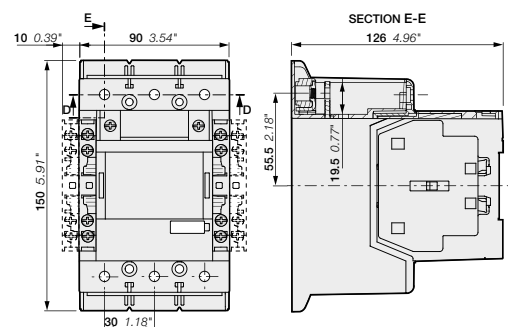
AF146B-30-22RT

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 $U_{c \min.} \dots U_{c \max.}$ 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 $U_{c \min.} \dots U_{c \max.}$ (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating 480 V	General use rating 600 V AC					
400 V AC-3	AC-1			V AC 50/60 Hz				
kW	A	hp	A					
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



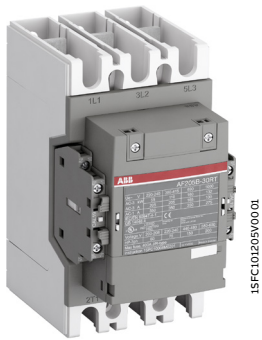
AF116B, AF140B, AF146B-30-22RT

Main dimensions mm, inches

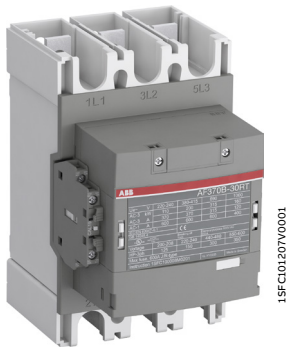
AF190B..RT ... AF370B..RT 3-pole contactors

90 to 200 kW

DC operated - connection with ring tongue ferrules



AF205B-30-22RT



AF370B-30-22RT

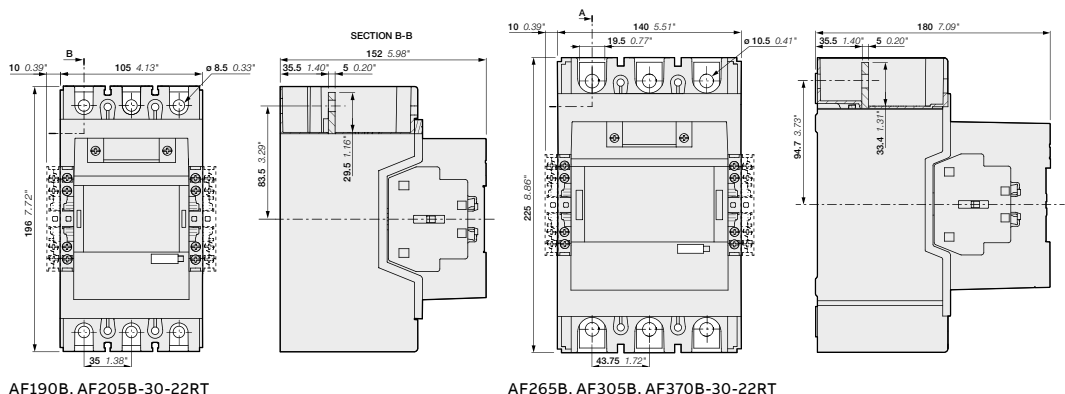
AF190B..RT ... AF370B..RT 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC and 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 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 ... 1.25 U_c 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	current θ ≤ 40 °C	3-phase motor rating 480 V						General use rating 600 V AC	Pkg (1 pce)
400 V AC-3	AC-1							kg	
kW	A	hp	A	V DC	V DC				
90	275	125	250	28, 33, 48	20...60	2 2	AF190B-30-22RT-11	1SFL487062R1122	3.000
				64, 72, 87, 96	48...130	2 2	AF190B-30-22RT-12	1SFL487062R1222	3.000
				110, 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

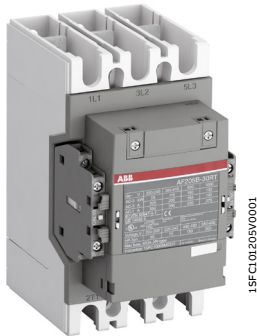
AF265B, AF305B, AF370B-30-22RT

Main dimensions mm, inches

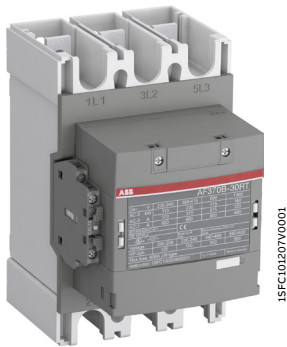
AF190B..RT ... AF370B..RT 3-pole contactors

90 to 200 kW

AC operated - connection with ring tongue ferrules



AF205B-30-22RT



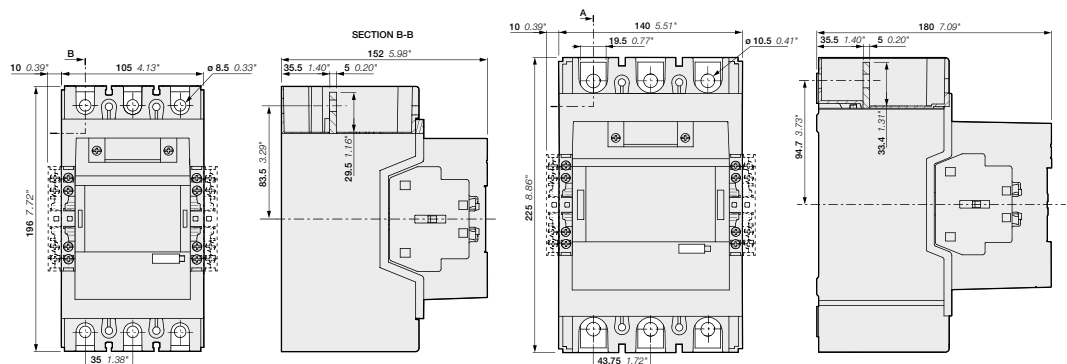
AF370B-30-22RT

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 $U_{c \min}$... $U_{c \max}$ 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 $U_{c \min}$... $U_{c \max}$ (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating 480 V	General use rating 600 V AC					
400 V AC-3 kW	AC-1 A	hp	A	V AC 50/60 Hz				
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



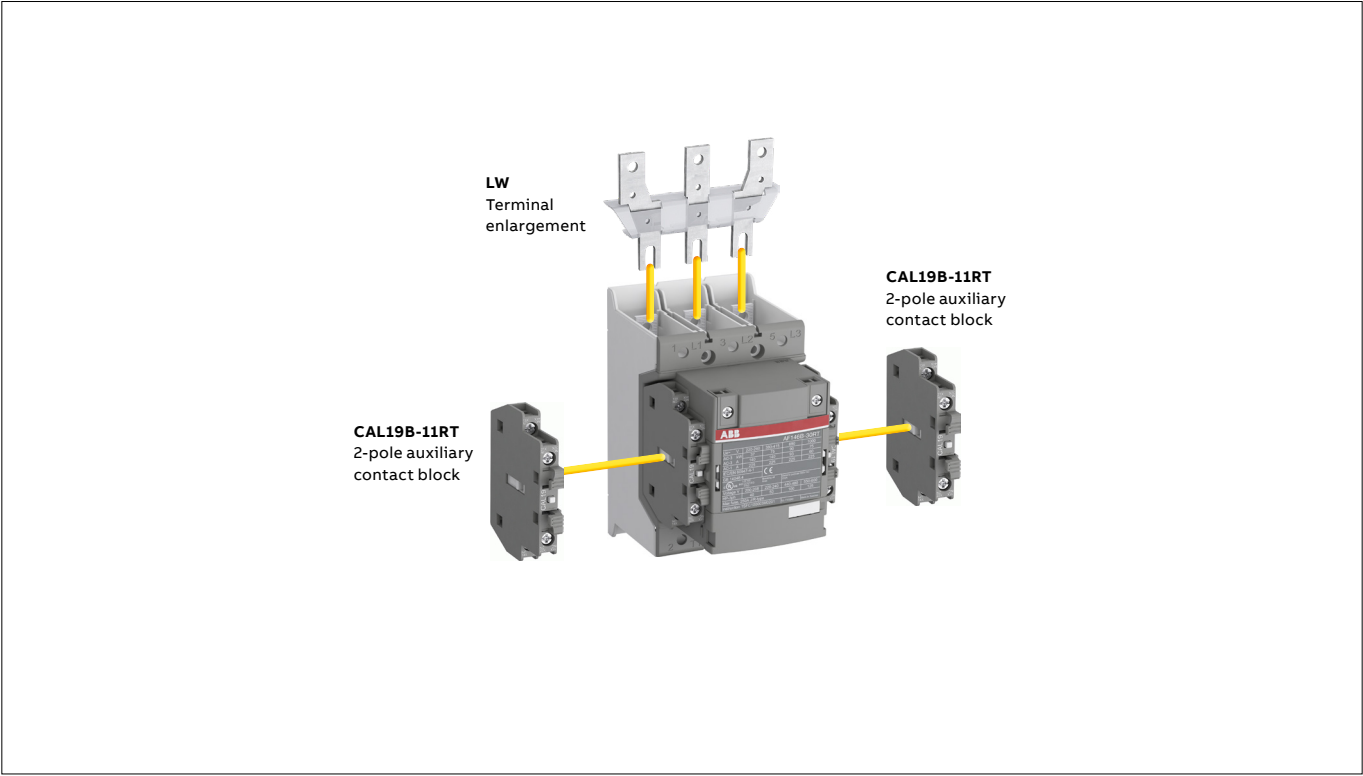
AF190B, AF205B-30-22RT

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		
			CAL19-11-RT	CAL19-11B-RT	Mechanical interlock units (between two contactors)
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

Contactors 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 U _e max.	690 V					
Rated frequency (without derating)	50 / 60 Hz					
Conventional free-air thermal current I _{th}						
acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$	35 A	35 A	35 A	50 A	50 A	50 A
With conductor cross-sectional area	6 mm ²	6 mm ²	6 mm ²	10 mm ²	10 mm ²	10 mm ²
AC-1 Utilization category						
For air temperature close to contactor						
I _e / Rated operational current AC-1	$\theta \leq 40^\circ\text{C}$	25 A	28 A	30 A	45 A	50 A
U _e max. $\leq 690\text{ V}$, 50/60 Hz	$\theta \leq 60^\circ\text{C}$	25 A	28 A	30 A	40 A	42 A
	$\theta \leq 70^\circ\text{C}$	22 A	24 A	26 A	32 A	37 A
With conductor cross-sectional area		4 mm ²	6 mm ²	6 mm ²	10 mm ²	10 mm ²
AC-3, AC-3e Utilization category						
For air temperature close to contactor $\theta \leq 60^\circ\text{C}$						
I _e / Max. rated operational current AC-3, AC-3e (2)						
	220-230-240 V	9 A	12 A	18 A	26 A	33 A
	380-400 V	9 A	12 A	18 A	26 A	32 A
	415 V	9 A	12 A	18 A	26 A	32 A
	440 V	9 A	12 A	18 A	26 A	32 A
	500 V	9.5 A	12.5 A	15 A	23 A	28 A
	690 V	7 A	9 A	10.5 A	17 A	21 A
	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW
	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW
	415 V	4 kW	5.5 kW	9 kW	11 kW	15 kW
	440 V	4 kW	5.5 kW	9 kW	15 kW	18.5 kW
	500 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW
	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW
	415 V	4 kW	5.5 kW	9 kW	11 kW	15 kW
	440 V	4 kW	5.5 kW	9 kW	15 kW	18.5 kW
	500 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW
	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW
	415 V	4 kW	5.5 kW	9 kW	11 kW	15 kW
	440 V	4 kW	5.5 kW	9 kW	15 kW	18.5 kW
	500 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW
	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW
	415 V	4 kW	5.5 kW	9 kW	11 kW	15 kW
	440 V	4 kW	5.5 kW	9 kW	15 kW	18.5 kW
	500 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW
	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW
	415 V	4 kW	5.5 kW	9 kW	11 kW	15 kW
	440 V	4 kW	5.5 kW	9 kW	15 kW	18.5 kW
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	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW
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	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
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	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW
	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW
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	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
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	500 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
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	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW
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	440 V	4 kW	5.5 kW	9 kW	15 kW	18.5 kW
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	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
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	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW
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	440 V	4 kW	5.5 kW	9 kW	15 kW	18.5 kW
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	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
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	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW
	415 V	4 kW	5.5 kW	9 kW	11 kW	15 kW
	440 V	4 kW	5.5 kW	9 kW	15 kW	18.5 kW
	500 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW
	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW
	415 V	4 kW	5.5 kW	9 kW	11 kW	15 kW
	440 V	4 kW	5.5 kW	9 kW	15 kW	18.5 kW
	500 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW
	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW
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	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
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	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW
	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW
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	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW
	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW
	415 V	4 kW	5.5 kW	9 kW	11 kW	15 kW
	440 V	4 kW	5.5 kW	9 kW	15 kW	18.5 kW
	500 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW
	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW
	415 V	4 kW	5.5 kW	9 kW	11 kW	15 kW
	440 V	4 kW	5.5 kW	9 kW	15 kW	18.5 kW
	500 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW
	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW
	415 V	4 kW	5.5 kW	9 kW	11 kW	15 kW
	440 V	4 kW	5.5 kW	9 kW	15 kW	18.5 kW
	500 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW
	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW

AF40B..RT ... AF96B..RT 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types		AF40B..RT	AF52B..RT	AF65B..RT	AF80B..RT	AF96B..RT
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						
le / 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						
le / 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
	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
	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 le AC-3, 12 x le AC-3e acc. to IEC 60947-4-1				
Rated breaking capacity AC-3, AC-3e		8 x le AC-3, 8.5 x le 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		le / AC-1 3 W	6.3 W	7 W	7.6 W	8.2 W
	le / 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..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 U_e 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 I_{th} acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$	160 A	200 A	225 A	275 A	350 A	400 A	500 A	600 A
With conductor cross-sectional area	70 mm ²	95 mm ²	95 mm ²	150 mm ²	240 mm ² (4)	240 mm ²	300 mm ² (5)	2 x 185 mm ² (5)
AC-1 Utilization category								
For air temperature close to contactor								
I_e / Rated operational current AC-1								
U_e max. ≤ 690 V, 50/60 Hz	$\theta \leq 40^\circ\text{C}$ 160 A	200 A	225 A	275 A	350 A	400 A	500 A	600 A
	$\theta \leq 60^\circ\text{C}$ 145 A	175 A	200 A	250 A	300 A	350 A	400 A	500 A
	$\theta \leq 70^\circ\text{C}$ 130 A	160 A	175 A	200 A	240 A	290 A	325 A	400 A
I_e / Rated operational current AC-1								
U_e max. ≤ 1000 V, 50/60 Hz	$\theta \leq 40^\circ\text{C}$ –	–	225 A	250 A	275 A	350 A	375 A	400 A
	$\theta \leq 60^\circ\text{C}$ –	–	200 A	225 A	250 A	300 A	325 A	350 A
	$\theta \leq 70^\circ\text{C}$ –	–	175 A	185 A	200 A	240 A	260 A	290 A
With conductor cross-sectional area	70 mm ²	95 mm ²	95 mm ²	150 mm ²	240 mm ² (4)	240 mm ²	300 mm ² (5)	2 x 185 mm ² (5)
AC-3 Utilization category								
For air temperature close to contactor $\theta \leq 60^\circ\text{C}$								
I_e / 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
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
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 I_e AC-3 acc. to IEC 60947-4-1							
Rated breaking capacity AC-3	8 x I_e AC-3 acc. to IEC 60947-4-1							
Short-circuit protection device for contactors without thermal overload relay - Motor protection excluded (3)								
$U_e \leq 500$ 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 I_{cw} at 40°C ambient temperature, in free air from a cold state	1 s 1300 A	1460 A	1460 A	1900 A	2050 A	2650 A	3050 A	3700 A
	10 s 928 A	1168 A	1168 A	1520 A	1640 A	2120 A	2440 A	2960 A
	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								
$\cos \varphi = 0.45$	at 440 V 2000 A	3000 A	3000 A	3300 A	3500 A	3800 A	4600 A	5000 A
($\cos \varphi = 0.35$ for $I_e > 100$ A)	at 690 V 1000 A	1500 A	1500 A	2200 A	2500 A	3300 A	3800 A	4000 A
Power dissipation per pole	I_e / AC-1 12 W	18 W	23 W	15 W	25 W	32 W	50 W	72 W
	I_e / 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 275 A use terminal enlargements or terminal extensions.

(5) For currents above 450 A 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".

AF40B..RT ... AF96B..RT 3-pole contactors

Technical data

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

Contactors types		AF40B..RT	AF52B..RT	AF65B..RT	AF80B..RT	AF96B..RT
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..RT ... AF370B..RT 3-pole contactors

Technical data

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

Contractor 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	275 A	300 A	350 A	400 A	520 A
With conductor cross-sectional area		AWG 2/0	AWG 3/0	AWG 3/0	MCM 300	MCM 350 (2)	MCM 400	2//AWG 3/0	2//MCM 300
1000 V AC		–	–	200 A	250 A	275 A	350 A	350 A	400 A
With conductor cross-sectional area		–	–	AWG 3/0	MCM 250	MCM 300	MCM 350	MCM 400	2//AWG 3/0
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		250 A	250 A	250 A	400 A	400 A	600 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

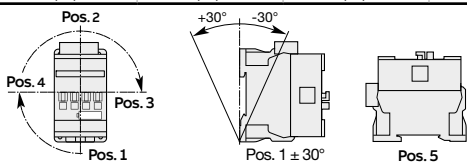
General technical data

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 U_i acc. to IEC 60947-4-1	690 V					
acc. to UL / CSA	600 V					
Rated impulse withstand voltage U_{imp}	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..RT	AF12(Z)B..RT	AF16(Z)B..RT	AF26(Z)B..RT	AF30(Z)B..RT	AF38(Z)B..RT
Coil operating limits		DC supply	(AF..ZB) at $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... 1.1 x Uc max (AF..B) at $\theta \leq 60\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... 1.1 x Uc max; at $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... Uc max				
acc. to IEC 60947-4-1		AC supply	at $\theta \leq 60\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... 1.1 x Uc max; at $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... Uc max				
Rated control circuit voltage Uc			(AF...ZB)20...250 V DC; (AF..ZB) 24 ... 250 V AC; (AF..B) 250 ... 500 V AC				
Coil consumption							
DC control voltage							
20..60 V DC	Average pull-in value	13 VA / W					
	Average holding value	1.8 W					
48...130 V DC	Average pull-in value	14 VA / W					
	Average holding value	1.9 W					
100...250 V DC	Average pull-in value	14 VA / W					
	Average holding value	2 VA					
AC control voltage 50/60 Hz							
24...60 V AC	Average pull-in value	25 VA					
	Average holding value	2.4 VA / 1.7 W					
48...130 V AC	Average pull-in value	21 VA					
	Average holding value	3 VA / 1.7 W					
100...250 V AC	Average pull-in value	18 VA					
	Average holding value	3.5 VA / 2 W					
250...500 V AC	Average pull-in value	28 VA					
	Average holding value	5.9 VA / 2.7 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		$\leq 60\%$ 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 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					

AF40B..RT ... AF96B..RT 3-pole contactors

Technical data

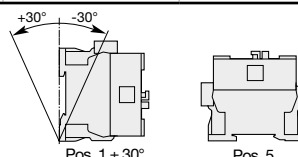
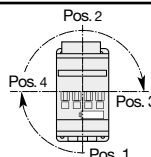
General technical data

Contact types	AF40B..RT	AF52B..RT	AF65B..RT	AF80B..RT	AF96B..RT
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 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	5 million operating cycles				
Maximum switching frequency	3600 cycles/h				
Shock and vibration withstand acc. to IEC 61373	Category 1, class B				

Magnet system characteristics

Contact types		AF40B..RT	AF52B..RT	AF65B..RT	AF80B..RT	AF96B..RT
Coil operating limits		AC supply At $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.85 x Uc min...1.1 x Uc max.				
acc. to IEC 60947-4-1		DC supply At $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.85 x Uc min...1.1 x Uc max.				
Rated control circuit voltage Uc		24...500 V AC, 20 ... 250 V DC				
Coil consumption						
DC control voltage						
20...60 V DC	Average pull-in value	31 VA / W				51 VA / W
	Average holding value	1.4 W				1.5 W
48...130 V DC	Average pull-in value	52 VA / W				74 VA / W
	Average holding value	1.8 W				1.6 W
100...250 V DC	Average pull-in value	30 VA / W				44 VA / W
	Average holding value	1.7 W				1.8 W
AC control voltage 50/60 Hz						
24...60 V AC	Average pull-in value	92 VA				125 VA
	Average holding value	3.3 VA / 1.3 W				3.4 VA / 1.4 W
48...130 V AC	Average pull-in value	67 VA				100 VA
	Average holding value	2.8 VA / 1.7 W				2.7 VA / 1.6 W
100...250 V AC	Average pull-in value	49 VA				75 VA
	Average holding value	3.9 VA / 1.6 W				4.0 VA / 2.1 W
250...500 V AC	Average pull-in value	60 VA				85 VA
	Average holding value	6.4 VA / 2.4 W				6.2 VA / 2.4 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		$\leq 60\text{ }\%$ 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

Contact types	AF40B...RT	AF52B...RT	AF65B...RT	AF80B...RT	AF96B...RT
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..RT ... AF370B..RT 3-pole contactors

Technical data

General technical data

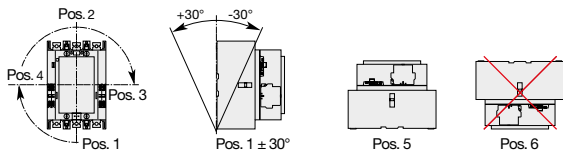
Contactors types	AF116B..RT	AF140B..RT	AF146B..RT	AF190B..RT	AF205B..RT	AF265B..RT	AF305B..RT	AF370B..RT
Rated insulation voltage U_i	1000 V							
acc. to IEC 60947-4-1								
acc. to UL / CSA	600 V		1000 V					
Rated impulse withstand voltage U_{imp} .	8 kV							
Electromagnetic compatibility	Devices complying with IEC/EN 60947-1 - Environment A							
Pollution degree	3							
Ambient air temperature close to contactor								
Operation								
Fitted with thermal overload relay								
Without thermal overload relay								
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	5 million operating cycles							
Number of operating cycles								
Maximum switching frequency								
Shock and vibration withstand acc to IEC 61373	Category 1, class B							

Magnet system characteristics

Contractor types		AF116B..RT	AF140B..RT	AF146B..RT	AF190B..RT	AF205B..RT	AF265B..RT	AF305B..RT	AF370B..RT
Coil operating limits		AC supply							
acc. to IEC 60947-4-1		DC supply							
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	420 VA/W			370 VA/W		980 VA/W		
	Average holding value	2.7 W			2.5 W		2.9 W		
48...130 V DC	Average pull-in value	435 VA/W			465 VA/W		1225 VA/W		
	Average holding value	2.4 W			2.5 W		2.0 W		
100...250 V DC	Average pull-in value	275 VA/W			360 W		720 W		
	Average holding value	2.8 W			3.5 W		4.2 W		
250...500 V DC	Average pull-in value	820 VA/W			680 VA/W (1)		1515 VA/W (3)		
	Average holding value	4.3 W			4.1 W		4.1 W		
AC control voltage 50/60 Hz									
24...60 V AC	Average pull-in value	305 VA			245 VA		695 VA		
	Average holding value	4.9 VA / 2.75 W			10 VA / 2.4 W		10 VA / 2.7 W		
48...130 V AC	Average pull-in value	320 VA			340 VA		975 VA		
	Average holding value	15.1 VA / 2.4 W			14.5 VA / 2.5 W		23.2 VA / 2.1 W		
100...250 V AC	Average pull-in value	220 VA			285 VA		590 VA		
	Average holding value	30.7 VA / 2.7 W			26.8 VA / 2.4 W		32 VA / 4.1 W		
250...500 V AC	Average pull-in value	275 VA			260 VA		685 VA (2)		
	Average holding value	33.2 VA / 4.4 W			18.6 VA / 4.1 W		27.5 VA / 4.1 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		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		

- 1) Current peak up to 2.5 A can occur during pull-in
2) Current peak up to 7.4 A can occur during pull-in
3) Current peak up to 6 A can occur during pull-in

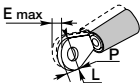
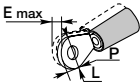
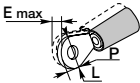
Mounting characteristics and conditions for use

Contactors 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

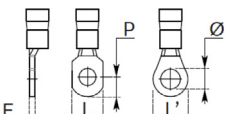
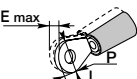
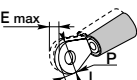
Contactor types		AF09(Z)B..RT	AF12(Z)B..RT	AF16(Z)B..RT	AF26(Z)B..RT	AF30(Z)B..RT	AF38(Z)B..RT
Main terminals							
		Conductors with insulated ring tongue ferrule					
Connection capacity (min. ... max.)							
Main conductors (poles)							
	Flexible with insulated ferrule	1 or 2 x	0.75...6 mm ²			1.5...10 mm ²	
		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 mm ²				
		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 mm ²			-	
		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.

AF40B..RT ... AF96B..RT 3-pole contactors

Technical data

Connecting characteristics

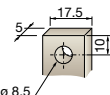
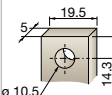
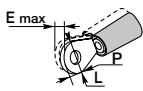
Contactors types	AF40B..RT	AF52B..RT	AF65B..RT	AF80B..RT	AF96B..RT
Main terminals	 Conductors with insulated ring tongue ferrule				
Connection capacity (min. max.) (1)					
Main conductors (poles)					
Flexible with insulated ferrule	1 or 2 x	1...25 mm ²		1...35 mm ²	
	Ø mm ≤	9 mm		9 mm	
	L mm ≤	13 mm		16 mm	
	L' mm ≤	16 mm		20 mm	
	P mm ≤	11.2 mm		10.2 mm	
	2 x E mm ≤	6.6 mm		7.6 mm	
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 17...3		AWG 17...2	
Tightening torque		4 N.m / 35 lb.in		6 N.m / 53 lb.in	
Coil conductors					
Flexible with insulated ferrule	1 or 2 x	0.75...2.5 mm ²		0.75...2.5 mm ²	
	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		1.2 Nm/ 11 lb.in		1.2 Nm/ 11 lb.in	
Auxiliary conductors					
Flexible with insulated ferrule	1 or 2 x	0.75...2.5 mm ²			
	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				
Screw terminals	Delivered in open position, screws of unused terminals must be tightened				
Main terminals	M5		M5		
Screwdriver type	Hexagon 4 mm				
Coil terminals	M3.5		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) List of recommended lugs compatible with conductors requirements on demand

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 mm ²			6...150 mm ²		16...300 mm ²		
	Clamp type		LD... not included			1SDA066917R1		1SDA055016R1		
	Tightening torque		8 Nm			14 Nm		25 Nm		
	Cu cable - Stranded	2 x	10...95 mm ²			50...120 mm ²		70...185 mm ²		
	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 mm ²		185...240 mm ²		
	Clamp type		-			1SDA054988R1		1SDA055020R1		
	Tightening torque		-			31 Nm		43 Nm		
	Cu cable - Flexible	1 x	10...70 mm ²			6...120 mm ²		16...240 mm ²		
	Clamp type		LD... not included			1SDA066917R1		1SDA055016R1		
	Tightening torque		8 Nm			14 Nm		25 Nm		
	Cu cable - Flexible	2 x	10...70 mm ²			50...95 mm ²		70...185 mm ²		
	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 mm ²						
			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 ... AF96B..RT 3-pole contactors

Technical data

• AF40B...RT AF52B...RT AF65B...RT AF80B..RT AF96B...RT

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 frequency		AC-15	1200 cycles/h	
		DC-13	900 cycles/h	
Mechanically linked contacts		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.		
acc. to annex L of IEC 60947-5-1				
Mirror contacts		Built-in N.C. auxiliary contacts or additional N.C. auxiliary contacts (CA4, CAL4, CAT4 aux. contact blocks) are mirror contacts.		
acc. to annex F of IEC 60947-4-1				

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 I_c is the current to be broken by the contactor and I_e the rated operational current normally drawn by the load, then:

- Categories AC-1 and AC-3 $I_c = I_e$
- Category AC-2 $I_c = 2.5 \times I_e$
- Category AC-4 $I_c = 6 \times I_e$

Generally speaking $I_c = m \times I_e$ 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 I_c . 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	U_e
Current normally drawn	I_e (U_e / I_e / kW relation for motors, see "Motor rated operational powers and currents")
Utilization category	AC-1, AC-2, AC-3 or AC-4
Breaking current	$I_c = I_e$ for AC-1 and for AC-3 ; $I_c = 2.5 \times I_e$ for AC-2 ; $I_c = 6 \times I_e$ 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 (I_c ; N).

Electrical durability forecast and contactor selection for mixed duty motor control: AC-3 ($I_c = I_e$) type switching off while "motor running" and, occasionally, AC-4 ($I_c = 6 \times I_e$) type switching off while "motor accelerating"

Characteristics	Load to be controlled
Operational voltage	U_e
Current normally drawn while "motor running"	I_e (U_e / I_e / 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	$I_c = I_e$
Breaking current for AC-4 while "motor accelerating"	$I_c = 6 \times I_e$
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 (U_e / I_e) 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 $I_c = I_e$ (AC-3)
 - The number of operating cycles B for $I_c = 6 \times I_e$ (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 combined 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.

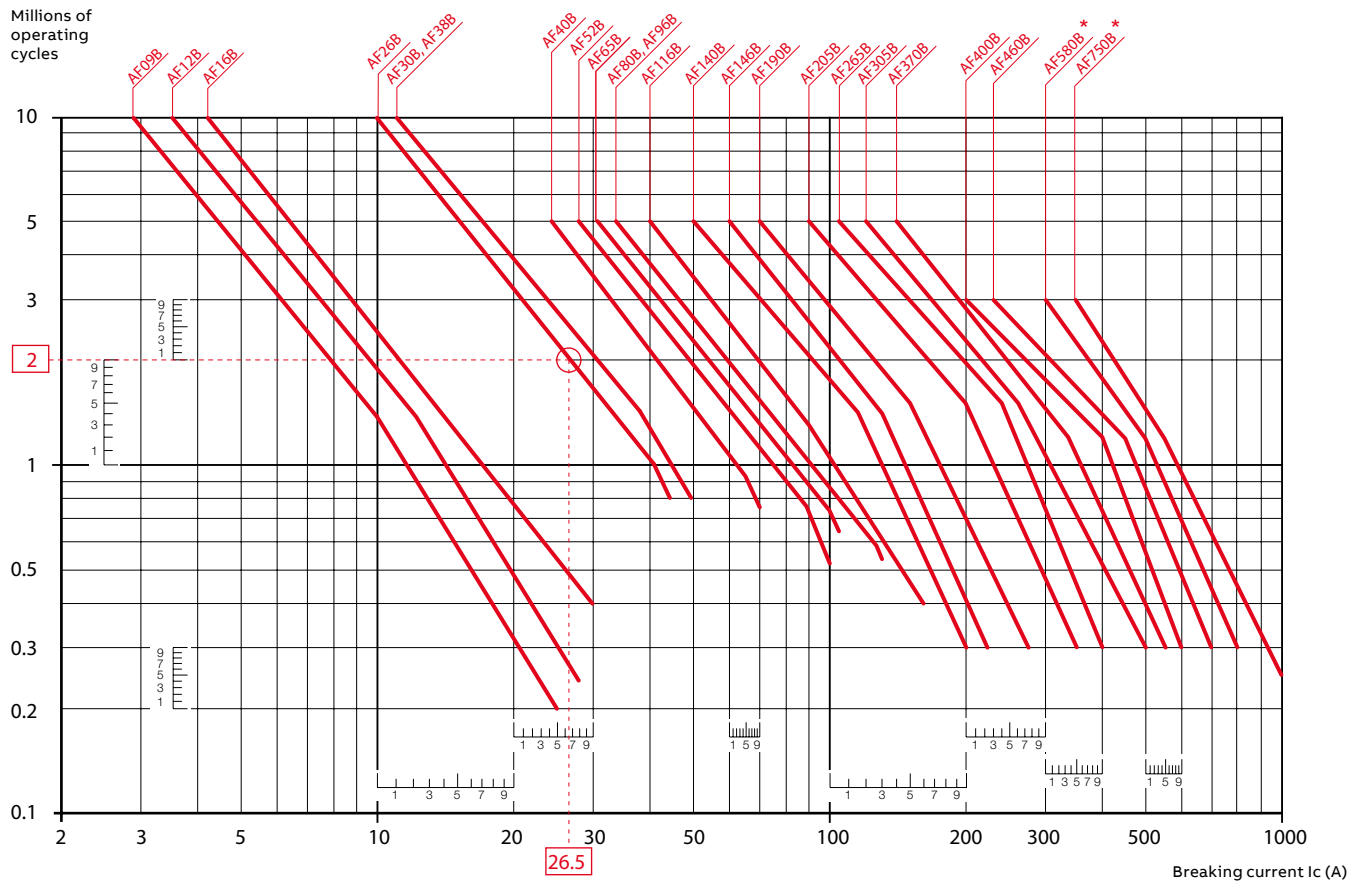
AF09(Z)B..RT ... AF370B..RT 3-pole contactors

Electrical durability

Electrical durability for AC-1 utilization category - $U_e \leq 690 \text{ V}$

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

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



Example:

$I_c / \text{AC-1} = 26.5 \text{ A}$ – Electrical durability required = 2 millions operating cycles.

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

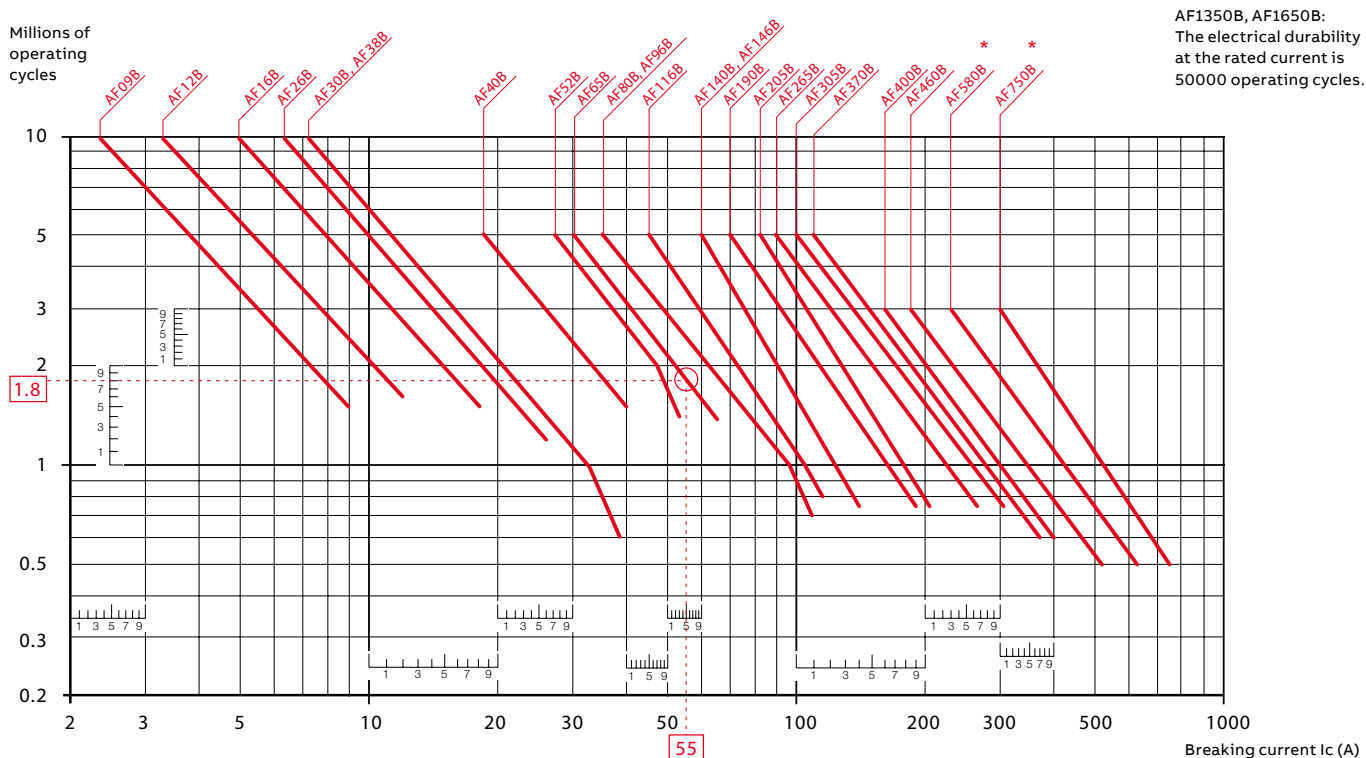
AF09(Z)B..RT ... AF370B..RT 3-pole contactors

Electrical durability

Electrical durability for AC-3 utilization category - $U_e \leq 440$ V.

Switching cage motors: starting and switching off running motors. The breaking current I_c for AC-3 is equal to the rated operational current I_e (I_e = motor full load current).

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



Note: * For AF580 and AF750 contacts needs to be replaced after 750k operations.

Example:

Motor power 30 kW for AC-3 - $U_e = 400$ V and $I_e = 55$ A utilization – Electrical durability required = 1.8 million operating cycles. For AC-3: $I_c = I_e$. Select the AF65 contactor at intersection "O" (55 A / 1.8 million operating cycles) on the curves (AC-3 - $U_e \leq 440$ V).

AF..B..RT 4-pole contactors connection with ring tongue ferrules

4/38	AF09ZB..RT ... AF38ZB..RT	DC operated
4/39	AF09(Z)B..RT ... AF38(Z)B..RT	AC operated
4/40	AF40..RT ... AF80B..RT	DC operated
4/41	AF40..RT ... AF80B..RT	AC operated
4/42	AF116B..RT ... AF140B..RT	DC operated
4/44	AF116B..RT ... AF140B..RT	AC operated
4/45	AF190B..RT ... AF370B..RT	DC operated
4/46	AF190B..RT ... AF370B..RT	AC operated
4/48	Technical data	
4/57	Electrical durability	
4/59	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



AF26ZB-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 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 ... 1.25 U_c 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 U_c (IEC 60077) (1)	Rated control circuit voltage U_c min. ... U_c max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current $I_n \leq 40^\circ\text{C}$ AC-1	General use rating	600 V AC					Pkg (1 pce)
A	A	V DC	V DC				kg

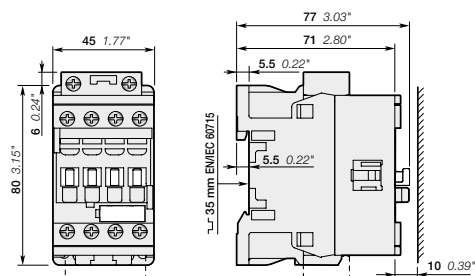
4 N.O. main poles

25	25	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	0 0 0 0 0 0	AF09ZB-40-00RT-21 AF09ZB-40-00RT-22 AF09ZB-40-00RT-23	1SBL136260R2100 1SBL136260R2200 1SBL136260R2300	0.320 0.320 0.320
30	30	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	0 0 0 0 0 0	AF16ZB-40-00RT-21 AF16ZB-40-00RT-22 AF16ZB-40-00RT-23	1SBL176260R2100 1SBL176260R2200 1SBL176260R2300	0.320 0.320 0.320
45	45	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	0 0 0 0 0 0	AF26ZB-40-00RT-21 AF26ZB-40-00RT-22 AF26ZB-40-00RT-23	1SBL236260R2100 1SBL236260R2200 1SBL236260R2300	0.390 0.390 0.390
55	55	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	0 0 0 0 0 0	AF38ZB-40-00RT-21 AF38ZB-40-00RT-22 AF38ZB-40-00RT-23	1SBL296260R2100 1SBL296260R2200 1SBL296260R2300	0.390 0.390 0.390

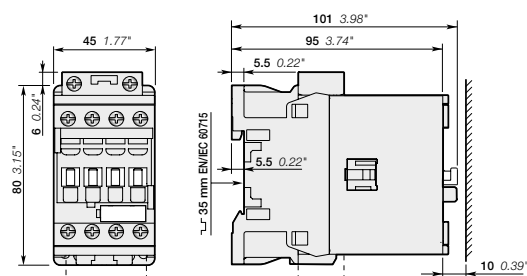
2 N.O. + 2 N.C. main poles

25	25	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	0 0 0 0 0 0	AF09ZB-22-00RT-21 AF09ZB-22-00RT-22 AF09ZB-22-00RT-23	1SBL136560R2100 1SBL136560R2200 1SBL136560R2300	0.320 0.320 0.320
30	30	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	0 0 0 0 0 0	AF16ZB-22-00RT-21 AF16ZB-22-00RT-22 AF16ZB-22-00RT-23	1SBL176560R2100 1SBL176560R2200 1SBL176560R2300	0.320 0.320 0.320
45	45	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	0 0 0 0 0 0	AF26ZB-22-00RT-21 AF26ZB-22-00RT-22 AF26ZB-22-00RT-23	1SBL236560R2100 1SBL236560R2200 1SBL236560R2300	0.390 0.390 0.390
55	55	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	0 0 0 0 0 0	AF38ZB-22-00RT-21 AF38ZB-22-00RT-22 AF38ZB-22-00RT-23	1SBL296560R2100 1SBL296560R2200 1SBL296560R2300	0.390 0.390 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 $U_{c \min.} \dots U_{c \max.}$ 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 $+70^{\circ}\text{C}$
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

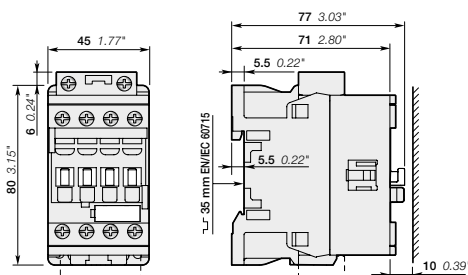
IEC	UL / CSA	Rated control circuit voltage	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current $\theta \leq 40^{\circ}\text{C}$ AC-1	General use rating 600 V AC	$U_{c \min.} \dots U_{c \max.}$ (IEC 60947-4-1)				Pkg (1 pce) kg
A	A	V AC 50/60 Hz				

4 N.O. main poles

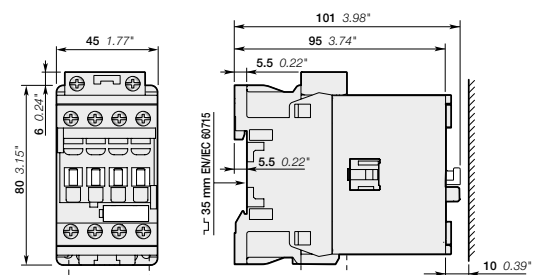
25	25	24...60	0 0	AF09ZB-40-00RT-21	1SBL136260R2100	0.320
		48...130	0 0	AF09ZB-40-00RT-22	1SBL136260R2200	0.320
		100...250	0 0	AF09ZB-40-00RT-23	1SBL136260R2300	0.320
		250...500	0 0	AF09B-40-00RT-14	1SBL137260R1400	0.320
30	30	24...60	0 0	AF16ZB-40-00RT-21	1SBL176260R2100	0.320
		48...130	0 0	AF16ZB-40-00RT-22	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

AF40B..RT ... AF80B..RT 4-pole contactors

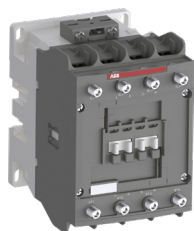
70 to 125 A AC-1

DC operated - connection with standard ferrules



AF40B-40-00RT

1SBL01045V0014



AF80B-40-00RT

99AA00000318869

AF40B..RT ... AF80B..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 under-grounds. 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 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 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 ... 1.25 U_c 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 U_c (IEC 60077) (1)	Rated control circuit voltage U_c min. ... U_c max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current $\theta \leq 40$ °C AC-1	General use rating	600 V AC					Pkg (1 pce)
A	A	V DC	V DC				kg

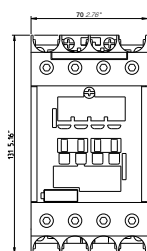
4 N.O. main poles

70	60	24, 33, 48	20...60	0 0	AF40B-40-00RT-11	1SBL347260R1100	1.020
		72, 96, 110	48...130	0 0	AF40B-40-00RT-12	1SBL347260R1200	1.020
		220	100...250	0 0	AF40B-40-00RT-13	1SBL347260R1300	1.020
100	80	24, 33, 48	20...60	0 0	AF52B-40-00RT-11	1SBL367260R1100	1.020
		72, 96, 110	48...130	0 0	AF52B-40-00RT-12	1SBL367260R1200	1.020
		220	100...250	0 0	AF52B-40-00RT-13	1SBL367260R1300	1.020
125	105	24, 33, 48	20...60	0 0	AF80B-40-00RT-11	1SBL397260R1100	1.240
		72, 96, 110	48...130	0 0	AF80B-40-00RT-12	1SBL397260R1200	1.240
		220	100...250	0 0	AF80B-40-00RT-13	1SBL397260R1300	1.240

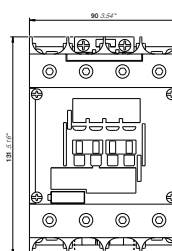
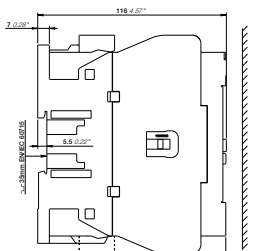
2 N.O. + 2 N.C. main poles

70	60	24, 33, 48	20...60	0 0	AF40B-22-00RT-11	1SBL347560R1100	1.020
		72, 96, 110	48...130	0 0	AF40B-22-00RT-12	1SBL347560R1200	1.020
		220	100...250	0 0	AF40B-22-00RT-13	1SBL347560R1300	1.020
100	80	24, 33, 48	20...60	0 0	AF52B-22-00RT-11	1SBL367560R1100	1.020
		72, 96, 110	48...130	0 0	AF52B-22-00RT-12	1SBL367560R1200	1.020
		220	100...250	0 0	AF52B-22-00RT-13	1SBL367560R1300	1.020
125	105	24, 33, 48	20...60	0 0	AF80B-22-00RT-11	1SBL397560R1100	1.240
		72, 96, 110	48...130	0 0	AF80B-22-00RT-12	1SBL397560R1200	1.240
		220	100...250	0 0	AF80B-22-00RT-13	1SBL397560R1300	1.240

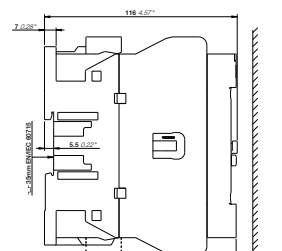
(1) Other control voltages, see voltage code table.



AF40B..RT, AF52B..RT



AF80B..RT



Main dimensions mm, inches

AF40B..RT ... AF80B..RT 4-pole contactors

70 to 125 A AC-1

AC operated - connection with standard ferrules



AF80B-40-00RT

9PAA00000337424



AF80B-40-00RT

9PAA00000318869

AF40B..RT ... AF80B..RT 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-inductive 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 sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range $U_{c \min} \dots U_{c \max}$ 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 $+70^{\circ}\text{C}$
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

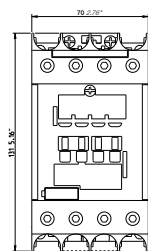
IEC	UL / CSA	Rated control circuit voltage $U_{c \min} \dots U_{c \max}$ (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
Rated operational current $\theta \leq 40^{\circ}\text{C}$ AC-1	General use rating 600 V AC					kg
A	A	V AC 50/60 Hz				

4 N.O. main poles

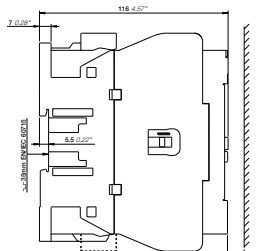
70	60	24...60	0 0	AF40B-40-00RT-11	1SBL347260R1100	1.020
		48...130	0 0	AF40B-40-00RT-12	1SBL347260R1200	1.020
		100...250	0 0	AF40B-40-00RT-13	1SBL347260R1300	1.020
		250...500	0 0	AF40B-40-00RT-14	1SBL347260R1400	1.020
100	80	20...60	0 0	AF52B-40-00RT-11	1SBL367260R1100	1.020
		48...130	0 0	AF52B-40-00RT-12	1SBL367260R1200	1.020
		100...250	0 0	AF52B-40-00RT-13	1SBL367260R1300	1.020
		250...500	0 0	AF52B-40-00RT-14	1SBL367260R1400	1.020
125	105	20...60	0 0	AF80B-40-00RT-11	1SBL397260R1100	1.240
		48...130	0 0	AF80B-40-00RT-12	1SBL397260R1200	1.240
		100...250	0 0	AF80B-40-00RT-13	1SBL397260R1300	1.240
		250...500	0 0	AF80B-40-00RT-14	1SBL397260R1400	1.240

2 N.O. + 2 N.C. main poles

70	60	20...60	0 0	AF40B-22-00RT-11	1SBL347560R1100	1.020
		48...130	0 0	AF40B-22-00RT-12	1SBL347560R1200	1.020
		100...250	0 0	AF40B-22-00RT-13	1SBL347560R1300	1.020
		250...500	0 0	AF40B-22-00RT-14	1SBL347560R1400	1.020
100	80	20...60	0 0	AF52B-22-00RT-11	1SBL367560R1100	1.020
		48...130	0 0	AF52B-22-00RT-12	1SBL367560R1200	1.020
		100...250	0 0	AF52B-22-00RT-13	1SBL367560R1300	1.020
		250...500	0 0	AF52B-22-00RT-14	1SBL367560R1400	1.020
125	105	20...60	0 0	AF80B-22-00RT-11	1SBL397560R1100	1.240
		48...130	0 0	AF80B-22-00RT-12	1SBL397560R1200	1.240
		100...250	0 0	AF80B-22-00RT-13	1SBL397560R1300	1.240
		250...500	0 0	AF80B-22-00RT-14	1SBL397560R1400	1.240



AF40B..RT, AF52B..RT

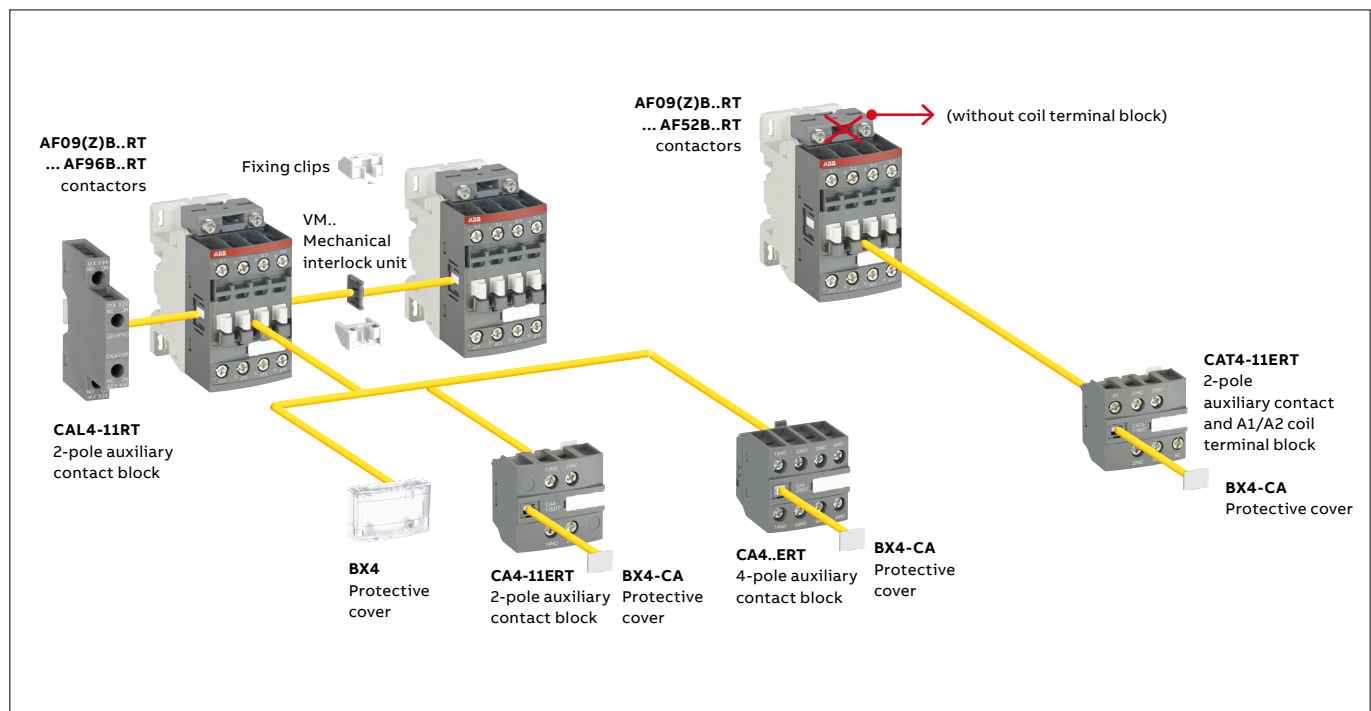


AF80B..RT

Main dimensions mm, inches

AF09(Z)B..RT ... AF80B..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					Side-mounted accessories	
			Auxiliary contact blocks			Mechanical interlocking unit (between 2 contactors)	VM..	Auxiliary contact blocks	
			2-pole CA4-11ERT	2-pole CAT4-11ERT	4-pole CA4..RT			Left side 2-pole CAL4-11RT	Right side
AF09(Z)B..RT ... AF38(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
AF40B..RT ... AF80B..RT									
AF40B..RT, AF52B..RT	4 0	0 0	+ 1	or 1	or 1	+	1	+ 1	+ 1
AF80B..RT	4 0	0 0	+ 1	-	or 1	+	1	+ 1	+ 1
AF40B..RT, AF52B..RT	2 2	0 0 (3)	+ 1	or 1	or 1	-	-	+ 1	-
			+ 1	-	or 1	-	-	+ 1	+ 1
AF80B..RT	2 2	0 0 (3)	+ 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.

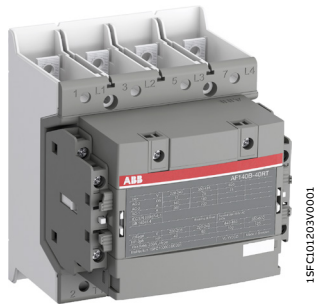
(2) Including add-on contacts: 3 N.C. auxiliary contacts max. on positions 1, 2, 3, 4 and 2 N.C. auxiliary contacts max on positions 1+/-30°, 5.

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

AF116B..RT ... AF140B..RT 4-pole contactors

160 to 200 A AC-1

DC operated - connection with ring tongue ferrules



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.

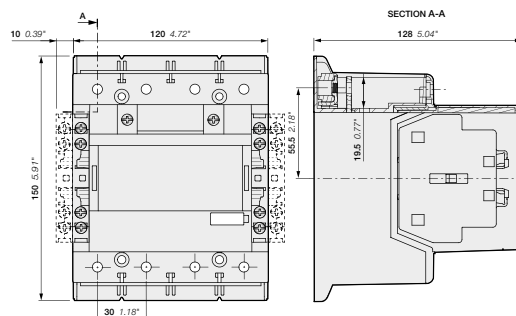
- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting a wide DC control 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 $\theta \leq 40^\circ\text{C}$ 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

160	160	28, 33, 48	20...60	2 2	AF116B-40-22RT-11	1SFL427262R1122	2.190
		64, 72, 87, 96	48...130	2 2	AF116B-40-22RT-12	1SFL427262R1222	2.190
		110, 220	100...250	2 2	AF116B-40-22RT-13	1SFL427262R1322	2.190
200	175	28, 33, 48	20...60	2 2	AF140B-40-22RT-11	1SFL447262R1122	2.190
		64, 72, 87, 96	48...130	2 2	AF140B-40-22RT-12	1SFL447262R1222	2.190
		110, 220	100...250	2 2	AF140B-40-22RT-13	1SFL447262R1322	2.190

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



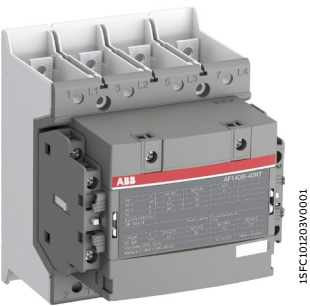
AF116B, AF140B-40-22RT

Main dimensions mm, inches

AF116B..RT ... AF140B..RT 4-pole contactors

160 to 200 A AC-1

AC operated - connection with ring tongue ferrules



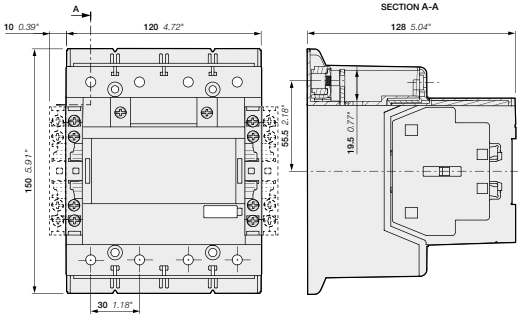
AF140B-40-22RT

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 $U_c \text{ min.} \dots U_c \text{ max.}$ 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 $U_c \text{ min.} \dots U_c \text{ max.}$ (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current $\theta \leq 40^\circ\text{C}$ 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



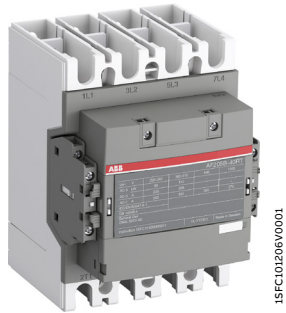
AF116B, AF140B-40-22RT

Main dimensions mm, inches

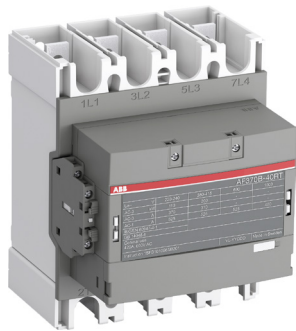
AF190B..RT ... AF370B..RT 4-pole contactors

275 to 525 A AC-1

DC operated - connection with ring tongue ferrules



AF205B-40-22RT



AF370B-40-22RT

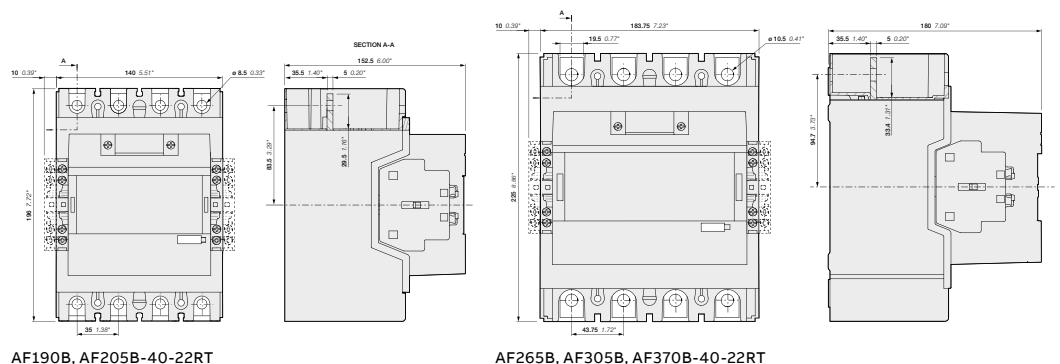
AF190B..RT ... AF370B..RT 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds.

They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling power circuits up to 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	Rated control circuit voltage Uc min. ... Uc max.	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current $\theta \leq 40^\circ\text{C}$ AC-1	General use rating	General use rating	General use rating	General use rating	General use rating	General use rating	Pkg (1 pce)
A	A	V DC	V DC				kg
4 N.O. main poles							
275	230	28, 33, 48	20...60	2 2	AF190B-40-22RT-11	1SFL487262R1122	3.940
		64, 72, 87, 96	48...130	2 2	AF190B-40-22RT-12	1SFL487262R1222	3.940
		110, 220	100...250	2 2	AF190B-40-22RT-13	1SFL487262R1322	3.940
350	250	28, 33, 48	20...60	2 2	AF205B-40-22RT-11	1SFL527262R1122	3.940
		64, 72, 87, 96	48...130	2 2	AF205B-40-22RT-12	1SFL527262R1222	3.940
		110, 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
		64, 72, 87, 96	48...130	2 2	AF265B-40-22RT-12	1SFL547262R1222	6.400
		110, 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
		64, 72, 87, 96	48...130	2 2	AF305B-40-22RT-12	1SFL587262R1222	6.400
		110, 220	100...250	2 2	AF305B-40-22RT-13	1SFL587262R1322	6.400
525	420	28, 33, 48	20...60	2 2	AF370B-40-22RT-11	1SFL607262R1122	6.400
		64, 72, 87, 96	48...130	2 2	AF370B-40-22RT-12	1SFL607262R1222	6.400
		110, 220	100...250	2 2	AF370B-40-22RT-13	1SFL607262R1322	6.400

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

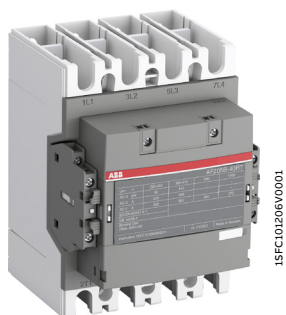


Main dimensions mm, inches

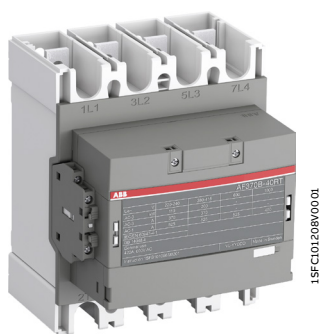
AF190B..RT ... AF370B..RT 4-pole contactors

275 to 525 A AC-1

AC operated - connection with ring tongue ferrules



AF205B-40-22RT



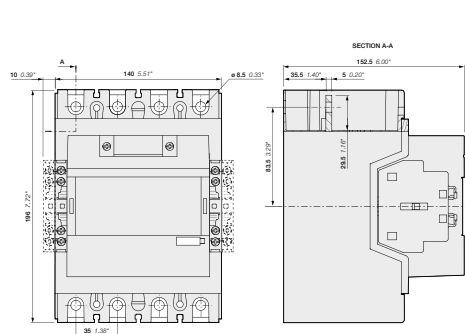
AF370B-40-22RT

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.

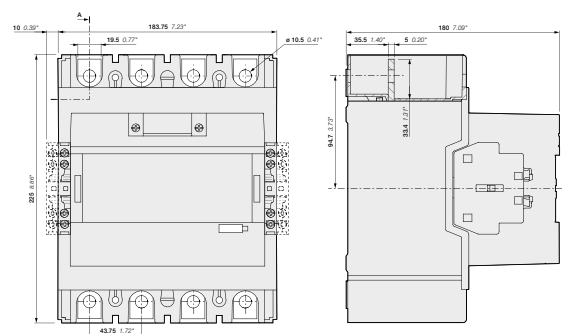
They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling power circuits up to 690 V AC and up to 220 V DC. These contactors are of the block type design with 4 main poles.

- 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 $U_c \text{ min.} \dots U_c \text{ max.}$ 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 $+70^\circ\text{C}$
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC	UL / CSA	Rated control circuit voltage $U_c \text{ min.} \dots U_c \text{ max.}$ (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current $\theta \leq 40^\circ\text{C}$ AC-1 A	General use rating 600 V AC A	V AC 50/60 Hz				Pkg (1 pce) 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

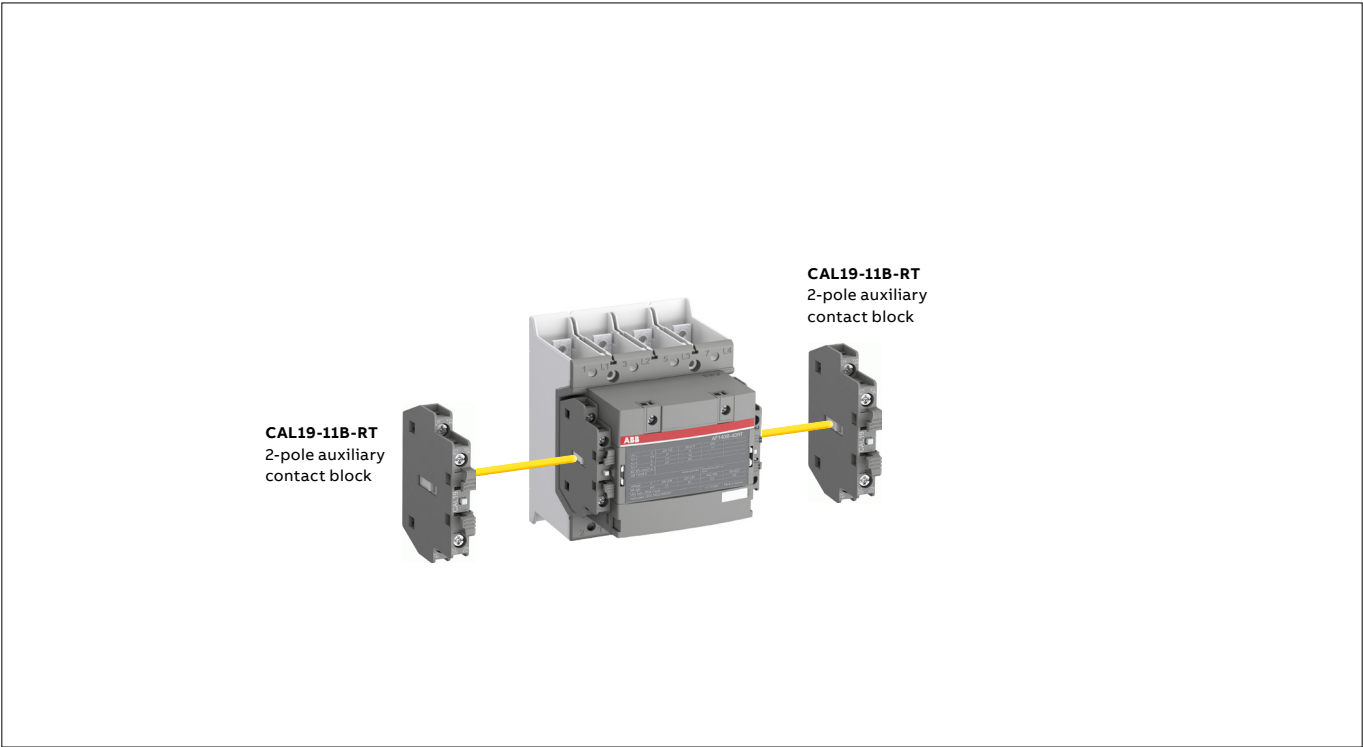


AF265B, AF305B, AF370B-40-22RT

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		Mechanical interlock units (between two contactors)
			CAL19-11-RT	CAL19-11B-RT	
AF116B..RT ... AF370B..RT	4 0	2 2	2 x CAL19-11-RT included	+ 2 x CAL19-11B-RT	-

AF09(Z)B..RT ... AF80B..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	AF40B..RT	AF52B..RT	AF80B..RT	
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 Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 40 °C	25 A	30 A	45 A	55 A	70 A	100 A	125 A	
	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	
2 poles in serie		160 V DC	25 A (5)	30 A (5)	45 A	55 A	60 A	80 A	
3 poles in serie		240 V DC	25 A	30 A	45 A	55 A	60 A	80 A	
4 poles in serie		320 V DC	25 A	30 A	45 A	55 A	60 A	80 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 at 40 °C ambient temperature, in free air from a cold state									
	1 s	300 A	300 A	450 A	450 A	1000 A	1000 A	1200 A	
	10 s	150 A	150 A	300 A	300 A	600 A	600 A	780 A	
	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"

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

Technical data

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	AF40B..RT	AF52B..RT	AF80B..RT
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..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 Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 40 °C	160 A	200 A	275 A	350 A	400 A	500 A	525 A
	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 At 40 °C ambient temperature, in free air from a cold state	1 s	1300 A	1460 A	1900 A	2050 A	2650 A	3050 A	3700 A
	10 s	928 A	1168 A	1520 A	1640 A	2120 A	2440 A	2960 A
	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	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 and CSA C22.2 No. 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						

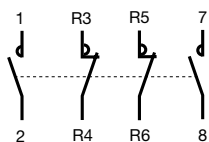
AF09(Z)B..RT ... AF80B..RT 4-pole contactors

Technical data

General technical data

Contactors types	AF09(Z)B..RT	AF16(Z)B..RT	AF26(Z)B..RT	AF38(Z)B..RT	AF40B..RT	AF52B..RT	AF80B..RT
Rated insulation voltage Ui	690 V						1000 V
acc. to IEC 60947-4-1							
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						
Pollution degree	3						
Ambient air temperature	-40...+70 °C						
Operation in free air							
Storage	-60...+80 °C						
Climatic withstand	Category B according to IEC 60947-1 Annex Q						
Maximum operating altitude (without derating)	3000 m						
Mechanical durability	10 million operating cycles						5 million operating cycles
Number of operating cycles							
Maximum switching frequency	3600 cycles/h						
Shock and vibration withstand	Category 1, class B						
acc. to IEC 61373							

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



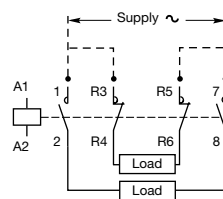
These contactors are suitable for controlling 2 separate circuits, i.e. 2 loads with 2 separate supplies, or 1 circuit comprising 2 separate loads with a single supply (see diagrams below). When the contactor operates there is no mechanical overlapping between the N.O. poles and the N.C. poles: BREAK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



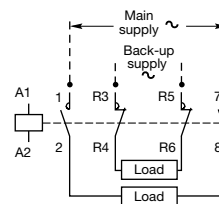
These contactors are not suitable for a reversing starter or for controlling a single load from 2 separate supplies.

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

Contactors 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 ... AF80B..RT 4-pole contactors

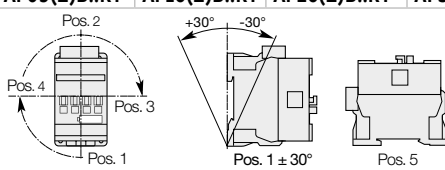
Technical data

Magnet system characteristics

Contactor types		AF09(Z)B..RT	AF16(Z)B..RT	AF26(Z)B..RT	AF38(Z)B..RT	AF40B..RT	AF52B..RT	AF80B..RT
Coil operating limits	DC supply	(AF..ZB) at $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... 1.1 x Uc max (AF..B) at $\theta \leq 60\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... 1.1 x Uc max; at $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... Uc max						
acc. to IEC 60947-4-1	AC supply	at $\theta \leq 60\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... 1.1 x Uc max; at $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... Uc max						
Rated control circuit voltage Uc		(AF...ZB) 24...250 V AC, AF..B 250...500 V AC, (AF...ZB) 20...250 V DC						
Coil consumption								
DC control voltage								
20 ... 60 V DC	Average pull-in value	13 VA / W				51 VA / W		
	Average holding value	1.8 W				1.5 W		
48 ... 130 V DC	Average pull-in value	14 VA / W				74 VA / W		
	Average holding value	1.9 W				1.6 W		
100 ... 250 V DC	Average pull-in value	14 VA / W				44 VA / W		
	Average holding value	2 W				1.8 W		
AC control voltage 50/60 Hz								
24 ... 60 V AC	Average pull-in value*	25 VA				125 VA		
	Average holding value	2.4 VA / 1.8 W				3.4 VA / 1.4 W		
48 ... 130 V AC	Average pull-in value	21 VA				100 VA		
	Average holding value	3 VA / 1.7 W				2.7 VA / 1.6 W		
100 ... 250 V AC	Average pull-in value*	18 VA				75 VA		
	Average holding value	3.5 VA / 2 W				4.0 VA / 2.1 W		
250 ... 500 V AC	Average pull-in value	37 VA				85 VA		
	Average holding value	5.9 VA / 2.7 W				6.2 VA / 2.4 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 $\leq 60\%$ of Uc min.						
Drop-out voltage								
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						

* current peak up to 1A can occur during pull-in

Mounting characteristics and conditions for use

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

AF116B..RT ... AF370B..RT 4-pole contactors

Technical data

Magnet system characteristics

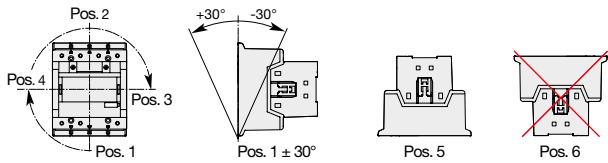
Contactor types		AF116B..RT	AF140B..RT	AF190B..RT	AF205B..RT	AF265B..RT	AF305B..RT	AF370B..RT
Coil operating limits acc. to IEC 60947-4-1	AC supply	At $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.85 x Uc min ... 1.1 x Uc max						
	DC supply	At $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.80 x Uc min ... 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	420 VA/W		370 VA/W		980 VA/W		
	Average holding value	2.7 W		2.5 W		2.9 W		
48...130 V DC	Average pull-in value	435 VA/W		465 VA/W		1225 VA/W		
	Average holding value	2.4 W		2.5 W		2.0 W		
100...250 V DC	Average pull-in value	275 VA/W		360 VA/W		720 VA/W		
	Average holding value	2.8 W		3.5 W		4.2 W		
250...500 V DC	Average pull-in value	820 VA/W		680 VA/W (1)		1515 VA/W (3)		
	Average holding value	4.3 W		4.1 W		4.1 W		
AC control voltage 50/60 Hz								
24...60 V AC	Average pull-in value	305 VA		245 VA		695 VA		
	Average holding value	4.9 VA / 2.75 W		10 VA / 2.4 W		10 VA / 2.7 W		
48...130 V AC	Average pull-in value	320 VA		340 VA		975 VA		
	Average holding value	15.1 VA / 2.4 W		14.5 VA / 2.5 W		23.2 VA / 2.1 W		
100...250 V AC	Average pull-in value	220 VA		285 VA		590 VA		
	Average holding value	30.7 VA / 2.7 W		26.8 VA / 2.4 W		32 VA / 4.1 W		
250...500 V AC	Average pull-in value	275 VA		260 VA		685 V (2)		
	Average holding value	33.2 VA / 4.4 W		18.6 VA / 4.1 W		27.5 VA / 4.1 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		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		

1) Current peak up to 2.5 A can occur during pull-in

2) Current peak up to 7.4 A can occur during pull-in

3) Current peak up to 6 A can occur during pull-in

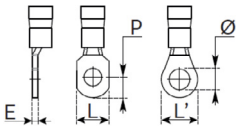
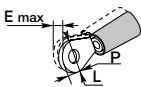
Mounting characteristics and conditions for use

Contactor types		AF116B..RT	AF140B..RT	AF190B..RT	AF205B..RT	AF265B..RT	AF305B..RT	AF370B..RT
Mounting positions								
Mounting distances		Max. add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 4-pole contactor AF116B..RT ... AF370B..RT						
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 ... AF80B..RT 4-pole contactors

Technical data

Connecting characteristics

Contact types	DC operated	AF09(Z)B..RT	AF16(Z)B..RT	AF26(Z)B..RT	AF38(Z)B..RT	AF40B..RT	AF52B..RT	AF80B..RT
Main terminals		 Conductors with insulated ring tongue ferrule						
Connection capacity (min. max.) (1)								
Main conductors (poles)								
Flexible with insulated ferrule	1 or 2 x	0.75...6 mm ²	1.5...16 mm ²		1 ... 25 mm ²		1 ... 35 mm ²	
	Ø mm ≤	3.5 mm			9 mm			
	L mm ≤	9.6 mm	9.3 mm		13 mm		16 mm	
	L' mm ≤				15.4 mm		19 mm	
	P mm ≤	5 mm	5.7 mm		11.4 mm		10.2 mm	
	2x E mm ≤	3.6 mm			6.6 mm		7.6 mm	
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 16...10	AWG 16...6		AWG 17...3		AWG 17...2	
Tightening torque		1.2 Nm / 11 lb.in	1.2 Nm/11 lb.in		4 Nm / 35 lb.in		6 Nm / 53 lb.in	
Coil conductors								
Flexible with insulated ferrule	1 or 2 x	0.75...2.5 mm ²						
	Ø mm >	3.5 mm						
	L mm <	8 mm						
	P mm <	4.7 mm	3.9 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	1 Nm / 9 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 (2)					Delivered in open position, screws of unused terminals must be tightened	
Main terminals		M3.5						M5
Screwdriver type		Flat Ø 5.5 / Pozidriv 2						Hexagon 4 mm
Coil terminals		M3.5						
Screwdriver type		Flat Ø 5.5 / Pozidriv 2						

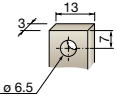
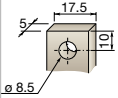
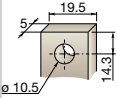
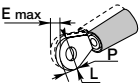
(1) List of recommended lugs compatible with conductors requirements on demand

(2) Screws of unused terminals must be tightened with a max. tightening torque of 0.5 Nm / 4.58 lb.in.

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 mm ²		6...150 mm ²		16...300 mm ²		
Clamp type		LD... included		1SDA066917R1		1SDA055016R1		
Tightening torque		8 Nm		14 Nm		25 Nm		
 Cu cable - Stranded	2 x	10...95 mm ²		50...120 mm ²		70...185 mm ²		
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 mm ²		185...240 mm ²		
Clamp type		–		1SDA054988R1		1SDA055020R1		
Tightening torque		–		31 Nm		43 Nm		
 Cu cable - Flexible	1 x	10...70 mm ²		6...120 mm ²		16...240 mm ²		
Clamp type		LD... included		1SDA066917R1		1SDA055016R1		
Tightening torque		8 Nm		14 Nm		25 Nm		
 Cu cable - Flexible	2 x	10...70 mm ²		50...95 mm ²		70...185 mm ²		
Clamp type		LD... included		1SFN074709R1000, LZ185-2C/120		1SCA022194R0890, OZXB4		
Tightening torque		8 Nm		16 Nm		22 Nm		
 Plugs	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 mm ²						
 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 I_c is the current to be broken by the contactor and I_e the rated operational current normally drawn by the load, then $I_c = I_e$ 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 I_c .

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 U_e
- Current normally drawn I_e
- Utilization category AC-1
- Breaking current $I_c = I_e$ 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 ($I_c ; N$).

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 combined 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.

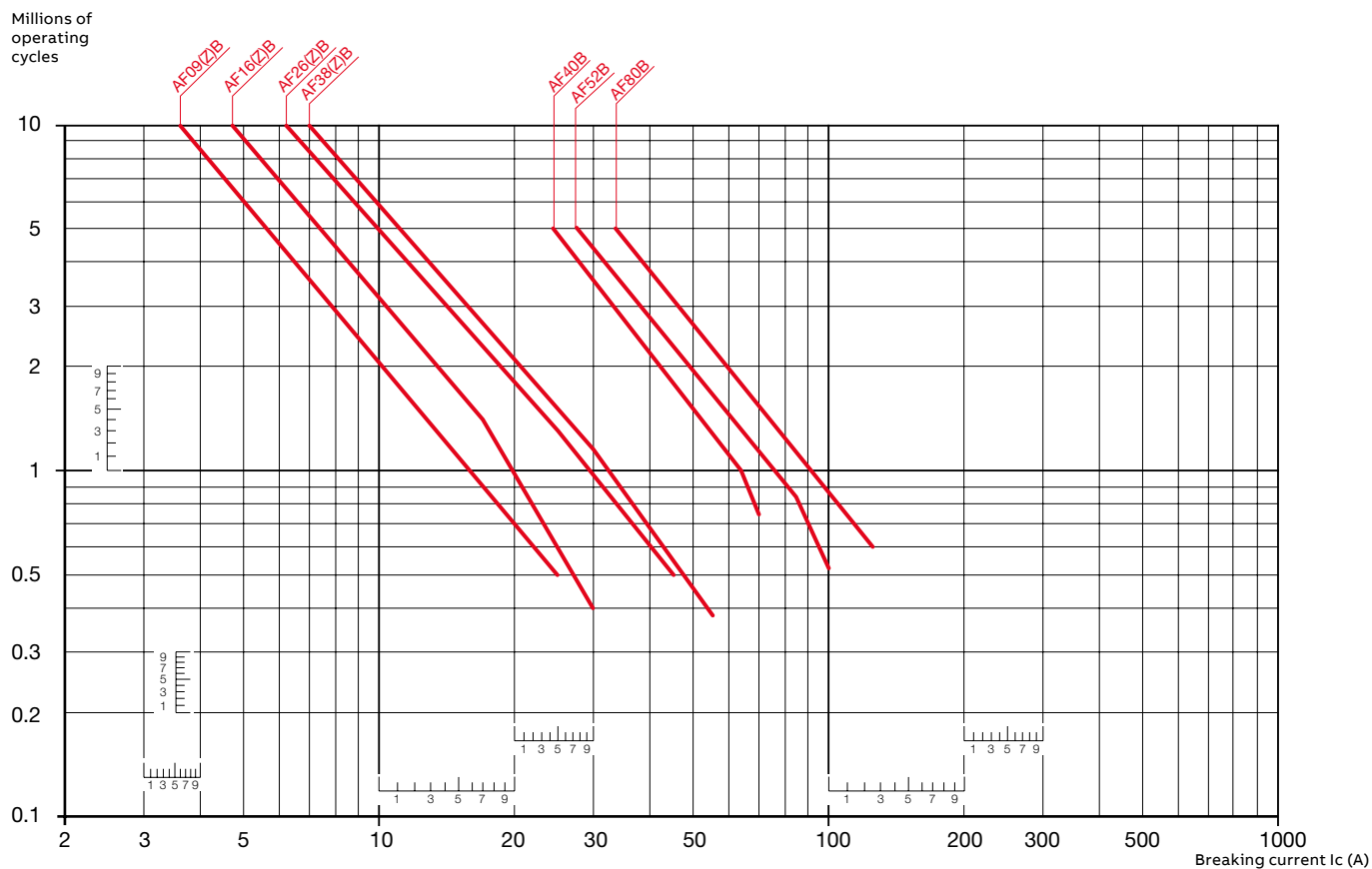
AF09(Z)B..RT ... AF370B..RT 4-pole contactors

Electrical durability

Electrical durability for AC-1 utilization category - $U_e \leq 690\text{ V}$

Switching non-inductive or slightly inductive loads. The breaking current I_c 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) = $\text{mH}/\Omega = \text{ms}$) 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 ($L/R \leq 1 \text{ ms}$)
- DC-3 shunt motors: starting, plugging, inching, dynamic breaking of DC motors ($L/R \leq 2 \text{ ms}$)
- DC-5 series motors: starting, plugging, inching, dynamic breaking of DC motors ($L/R \leq 7.5 \text{ ms}$).

The higher the time constant value is, the more difficult it is to break the arc.

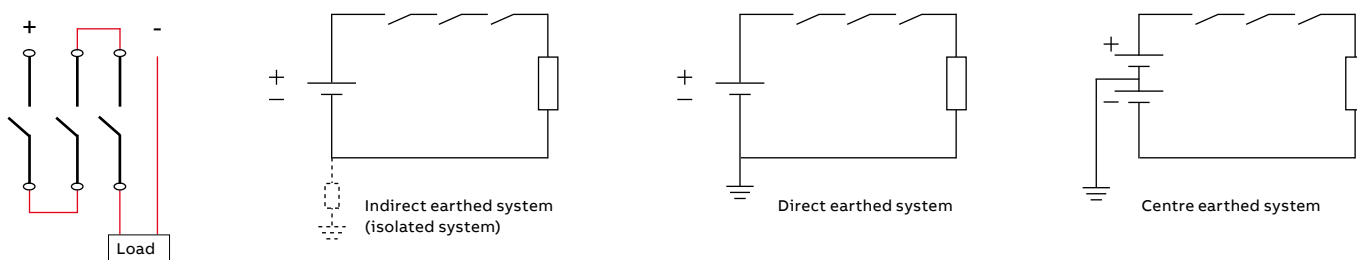
The addition of a resistor in parallel with an inductive winding helps in the elimination of the arcs, by reducing the time constant.

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.

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.

AF09(Z)B..RT ... AF96B..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 ($L/R \approx 1$ ms), inductive loads such as shunt motors ($L/R \approx 2$ ms) or series motors ($L/R \approx 7.5$ 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).

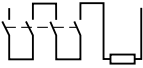
Technical data

- The tables indicate for the standard contactors the I_e 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 U_e 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.

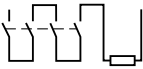
Selection table

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

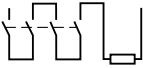
Utilization category DC-1, $L/R \leq 1$ ms

	≤ 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, $L/R \leq 2$ 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, $L/R \leq 7.5$ 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	-	-	-	-	-	-	-	-	-	-

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

4/62	NF(Z)B..RT 4-pole and 8-pole	DC operated
4/63	NF(Z)B..RT 4-pole and 8-pole	AC operated
4/65	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



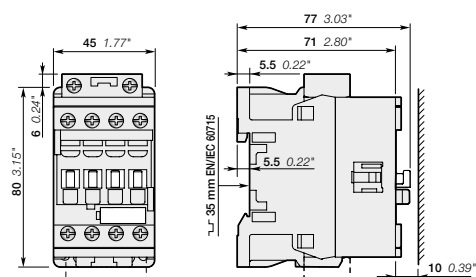
NFZB44ERT

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.

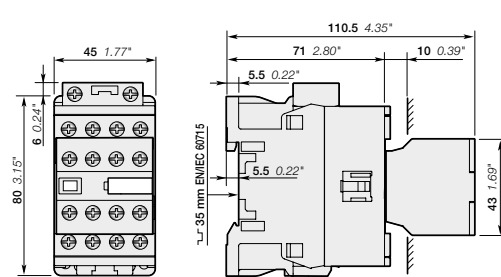
- designed in accordance to the applicable parts of IEC 60077 EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standards EN 45545 (HL2, HL3 hazard levels)
- electronic coil interface accepting a wide DC control voltage range (0.85 U_c min. ... 1.1 U_c max. according to IEC 60947-4-1) including several U_c control voltages (0.7 ... 1.25 U_c 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 U_c (IEC 60077) (1) V DC	Rated control circuit voltage U_c min. ... U_c max. (IEC 60947-4-1) V DC	Type	Order code	Weight Pkg (1 pce) 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

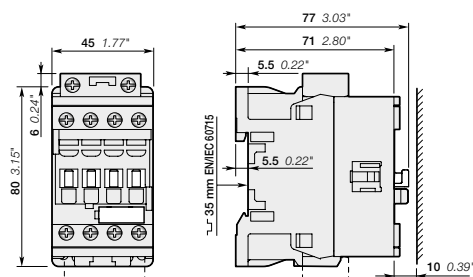


NF(Z)B44ERT

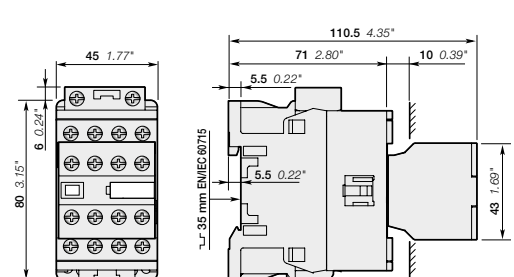
NF(Z)B..RT contactor relays comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are used for switching auxiliary and control circuits. These contactor relays are of the block type design 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 $U_c \text{ min.} \dots U_c \text{ max.}$ 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 $+70^\circ \text{C}$
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Number of contacts	Rated control circuit voltage $U_c \text{ min.} \dots U_c \text{ max.}$ (IEC 60947-4-1)	Type	Order code	Weight
	V AC 50/60 Hz			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

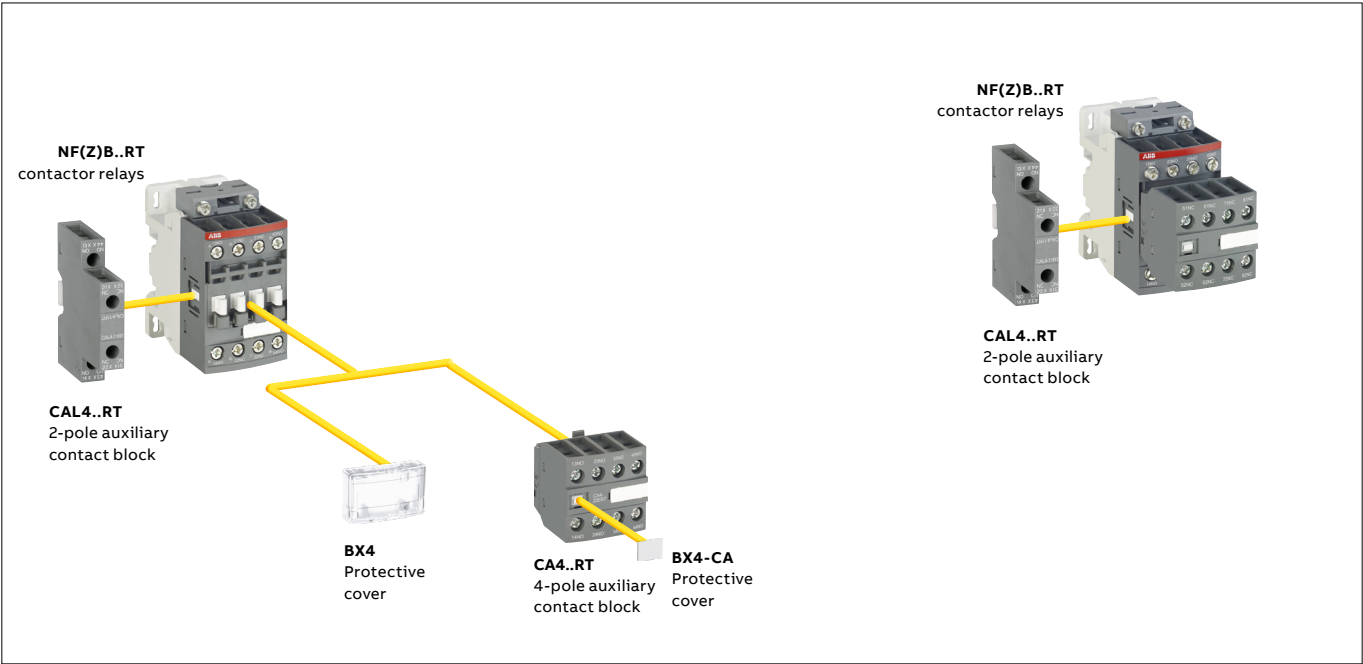


NF(Z)B44ERT, NF(Z)B62ERT, NF(Z)B80ERT

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		Side-mounted accessories	
		Auxiliary contact blocks		Auxiliary contact blocks	
		4-pole CA4..RT		Left side	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 U_e max.	690 V	
Rated frequency (without derating)	50 / 60 Hz	
Conventional free-air thermal current - I_{th} $\theta \leq 40$ °C	16 A	
I_e / 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 I_e AC-15 acc. to IEC 60947-5-1	
Breaking capacity AC-15	10 x I_e AC-15 acc. to IEC 60947-5-1	
I_e / 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 I_{cw} at 40 °C ambient temperature, in free air from a cold state	for 1.0 s	100 A
	for 0.1 s	140 A
Minimum switching capacity with failure rate acc. to IEC 60947-5-4	12 V / 3 mA 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

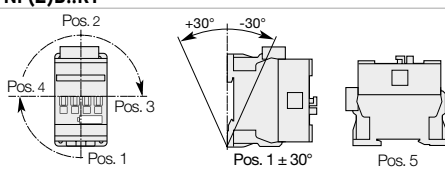
General technical data

Contactor relay types	NF(Z)B..RT
Rated insulation voltage U_i acc. to IEC 60947-5-1	690 V
acc. to UL / CSA	600 V
Rated impulse withstand voltage U_{imp} .	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	DC supply (NFZB) at $\theta \leq 70^\circ\text{C}$ $0.85 \times U_{c \min} \dots 1.1 \times U_{c \max}$ (NFB) at $\theta \leq 60^\circ\text{C}$ $0.85 \times U_{c \min} \dots 1.1 \times U_{c \max}$; at $\theta \leq 70^\circ\text{C}$ $0.85 \times U_{c \min} \dots U_{c \max}$
acc. to IEC 60947-4-1	AC supply at $\theta \leq 60^\circ\text{C}$ $0.85 \times U_{c \min} \dots 1.1 \times U_{c \max}$ at $\theta \leq 70^\circ\text{C}$ $0.85 \times U_{c \min} \dots U_{c \max}$
Rated control circuit voltage U_c	(NF...ZB) 24...250 V AC; (NF..ZB) 20...250 V DC; (NF...B) 250...500 V DC
Coil consumption	
DC control voltage	
20...60 V DC	Average pull-in value 13 VA / W Average holding value 1.8 W
48...130 V DC	Average pull-in value 14 VA / W Average holding value 1.9 W
100...250 V DC	Average pull-in value 14 VA / W Average holding value 1.9 VA
AC control voltage 50/60 Hz	
24...60 V AC	Average pull-in value 25 VA Average holding value 2.4 VA / 1.7 W
48...130 V AC	Average pull-in value 21 VA Average holding value 3 VA / 1.7 W
100...250 V AC	Average pull-in value 18 VA Average holding value 3.5 VA / 2 W
250...500 V AC	Average pull-in value 37 VA Average holding value 5.9 VA / 2.7 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	$\leq 60\%$ of $U_{c \min}$.
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

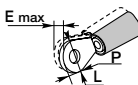
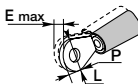
Mounting characteristics

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 mm ²	
	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 mm ²	
	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

- 4/70 Auxiliary contact blocks
- 4/78 Other accessories
- 4/80 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 ... AF65(Z)B-30-00RT	1 1 - -	CA4-11ERT	1SBN010155R1011	1	0.040
AF09(Z)B ... AF52(Z)B-40-00RT					
AF09(Z)B ... AF52(Z)B-22-00RT					
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 ... AF96(Z)B-30-00RT	2 2 - -	CA4-22ERT	1SBN010142R1022	1	0.050
AF09(Z)B ... AF80(Z)B-40-00RT	3 1 - -	CA4-31ERT	1SBN010142R1031	1	0.050
AF09(Z)B ... AF80(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

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
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	1 1 - -	CAT4-11ERT	1SBN010154R1011	1	0.045
AF09(Z)B ... AF38(Z)B-40-00RT					
AF09(Z)B ... AF38(Z)B-22-00RT					

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

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

Connection with ring tongue ferrules

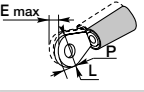
Contact utilization characteristics according to IEC

Types	2-pole CA4, 4-pole CA4, 2-pole CAT4, 2-pole CAL4	
Standards	IEC/EN 60947-5-1	
Rated insulation voltage U_i acc. to IEC 60947-5-1	690 V	
Rated impulse withstand voltage U_{imp}	6 kV	
Rated operational voltage U_e max.	24 ... 690 V	
Conventional thermal current I_{th} - $\theta \leq 40^\circ\text{C}$	16 A	
Rated frequency (without derating)	50 / 60 Hz	
I_e / 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 I_e AC-15 acc. to IEC 60947-5-1	
Breaking capacity	10 x I_e AC-15 acc. to IEC 60947-5-1	
I_e / 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 I_{cw} $\theta \leq 40^\circ\text{C}$	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}	
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 mm ²
	$\varnothing$ 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 $\varnothing$ 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.

CAL19 auxiliary contact blocks for AF116B..RT ... AF370B..RT

Connection with ring tongue ferrules

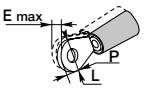
Contact utilization characteristics according to IEC

Types		CAL19-11B-RT, CAL19-11-RT
Standards		IEC/EN 60947-5-1
Rated insulation voltage U_i acc. to IEC 60947-5-1		690 V
Rated impulse withstand voltage U_{imp}		6 kV
Rated operational voltage U_e max.		24...690 V AC
Conventional thermal current I_{th} - $\theta \leq 40^\circ\text{C}$		16 A
Rated frequency (without derating)		50/60 Hz
I _e / 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 I _e AC-15
Breaking capacity acc. to IEC 60947-5-1		10 x I _e AC-15
I _e / 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 I _{cw} $\theta = 40^\circ\text{C}$	for 1.0 s	100 A
	for 0.1 s	140 A
Minimum switching capacity with failure rate acc. to IEC 60947-5-4		24 V / 50 mA $\leq 10^{-6}$
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 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.)		
Main conductors (poles)		
Flexible with insulated ferrule		
	1 or 2 x	0.75...2.5 mm ²
	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		IP20
acc. to IEC/EN 60947-1 and IEC/EN 60529		
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

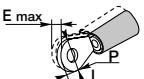
Contact utilization characteristics according to IEC

Types	CEL19-10-RT, CEL19-01-RT	
Standards	IEC/EN 60947-5-1	
Rated insulation voltage U_i acc. to IEC 60947-5-1	250 V	
Rated operational voltage U_e max.	125 V	
Conventional thermal current I_{th} - $\theta \leq 40^\circ\text{C}$	0.1 A	
I_e / 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 I_e AC-14	
Breaking capacity acc. to IEC 60947-5-1	6 x I_e AC-14	
I_e / 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 mm ²
	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 ... AF96B and NF(Z)B contactor relays

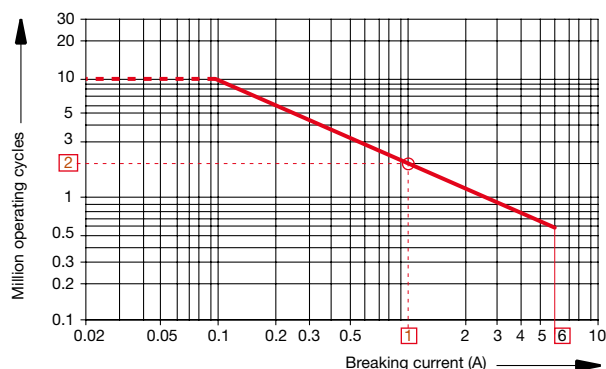
Electrical durability

Electrical durability for AC-15 utilization category

AC-15 utilization category according to IEC/EN 60947-5-1:

- making current: $10 \times I_e$ with $\cos \phi = 0.7$ and U_e
- breaking current: I_e with $\cos \phi = 0.4$ and U_e .

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.

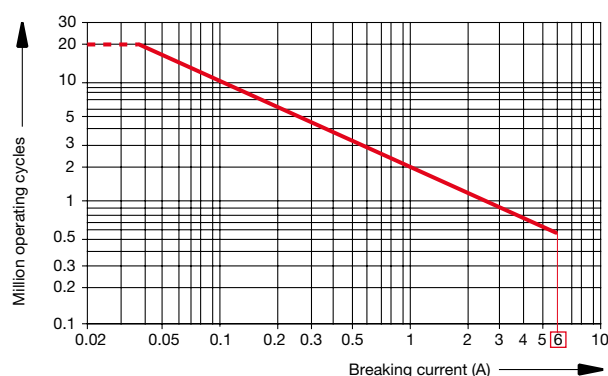


- AF09(Z)B ... AF96B contactor built-in auxiliary contacts
- CA4, CAT4 and CAL4 add-on auxiliary contacts.

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.

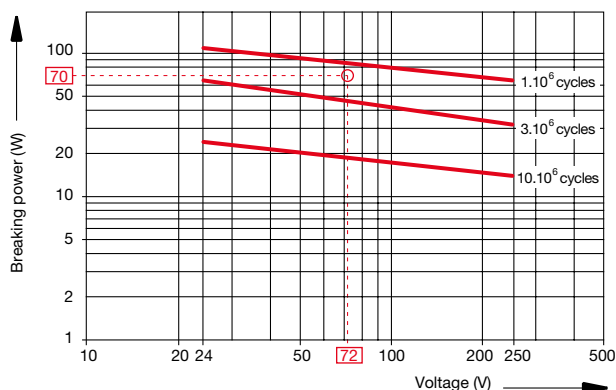


NF(Z)B contactor relays.

(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 I_e and U_e .



- AF09(Z)B ... AF96B contactor built-in auxiliary contacts
- CA4, CAT4 and CAL4 add-on auxiliary contacts
- NF(Z)B contactor relays.

Example:

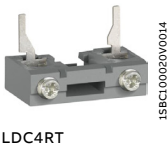
Control of DC electro-magnet:

U_e 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

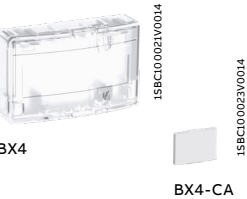
For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg

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
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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

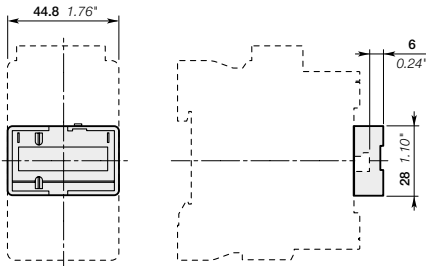


BA4

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
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BX4

Main dimensions mm, inches

Other accessories



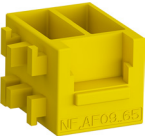
BP38-4

15BC100022V0014

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
A50 ... A75, AE50 ... AE75, AF50 ... AF75	AF40B ... AF65B	BP65-4	1SBN113403T1000	10	0.004
A95, A110, AE95, AE110, AF95, AF110	AF80B, AF85B	BP96-4	1SBN113903T1000	10	0.005



BDT4
For AF09(Z)B ... AF65B,
NF(Z)B

15BC100041V0014

Test block

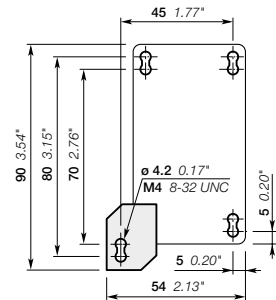
BDT4 test block is suitable for switching on contactor off-load.
Marking on the block indicates the contactor type to fit with.

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AF09(Z)(B) ... AF96(B), NF(Z)(B)	BDT4	1SBN110122T1000	10	0.007



BDT4
For AF80B, AF96B

15BC100042V0014



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) kg
	V 50/60Hz	V DC				
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) kg
	V 50/60Hz	V DC				
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

- 4/84 AF(Z)..B..RT 3-pole contactors
- 4/85 AF(Z)..B..RT 4-pole contactors
- 4/86 NF(Z)..B..RT contactor relays
- 4/87 Add-on auxiliary contacts

Dimensions

- 4/88 AF(Z)..B..RT 3-pole contactors
- 4/98 AF(Z)..B..RT 4-pole contactors
- 4/106 NF(Z)..B..RT contactor relays

- 4/109 **Voltage code table**



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

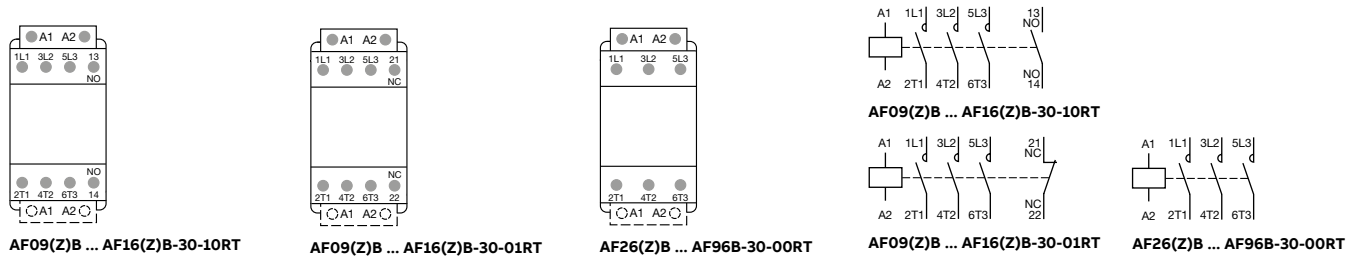
www.abb.com/productdetails/AF09-30-10-13
or www.abb.com/productdetails/1SBL137001R1310

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

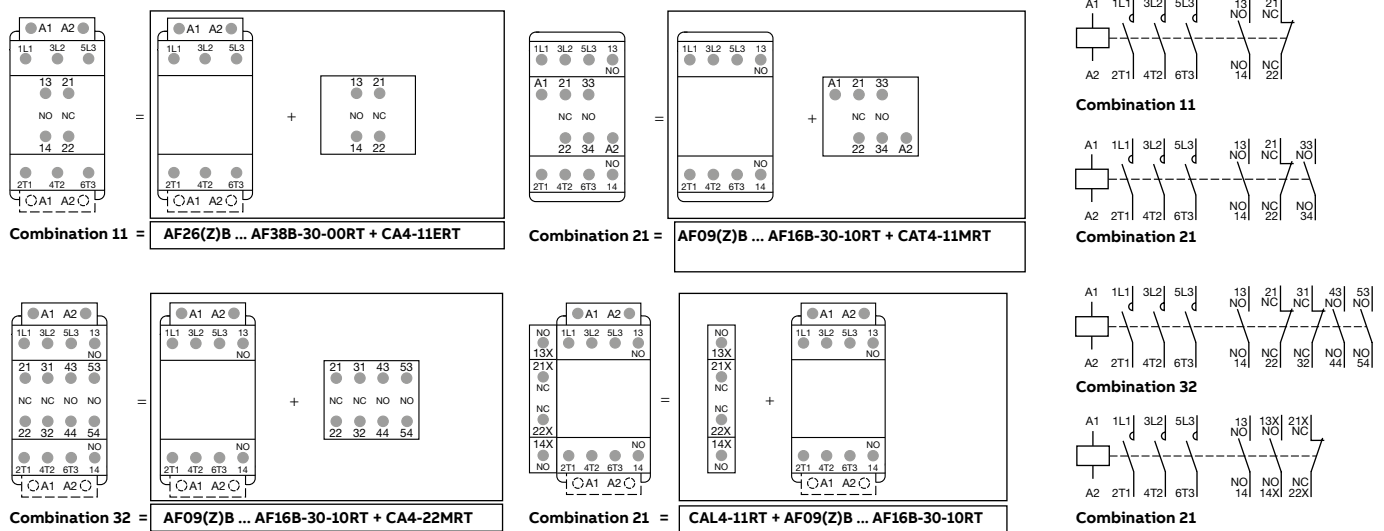
Terminal marking and positioning

AF09(Z)B..RT ... AF96B-30-00RT contactors

Standard devices without addition of auxiliary contacts

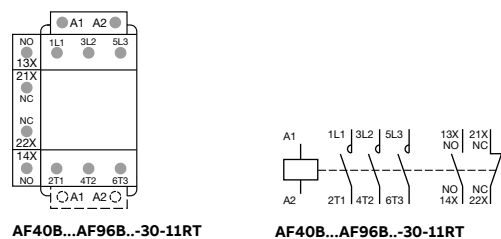


Other possible contact combinations with auxiliary contacts added by the user



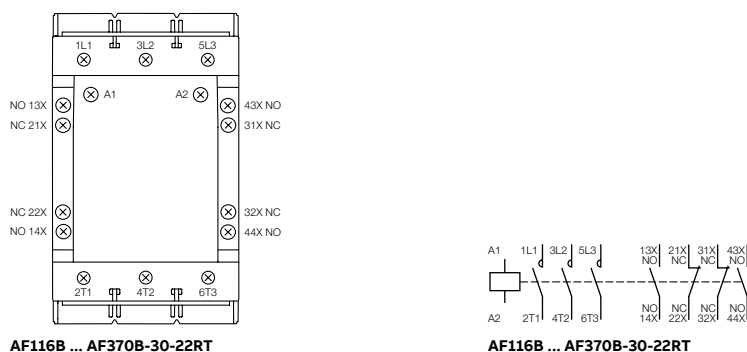
AF40B..RT ... AF96B..RT contactors

Standard devices without addition of auxiliary contacts



AF116B..RT ... AF370B..RT contactors

Standard devices with factory mounted auxiliary contacts

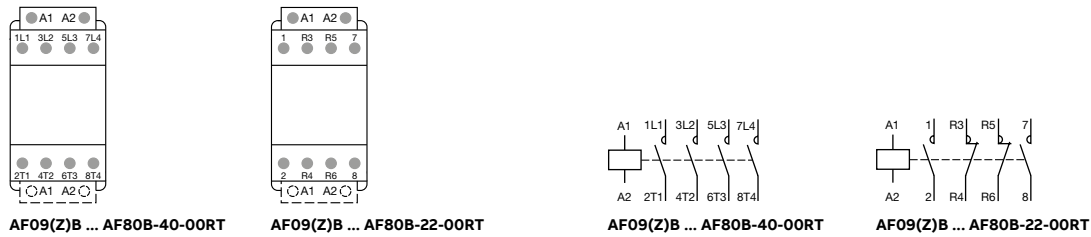


AF09(Z)B..RT ... AF370B..RT 4-pole contactors

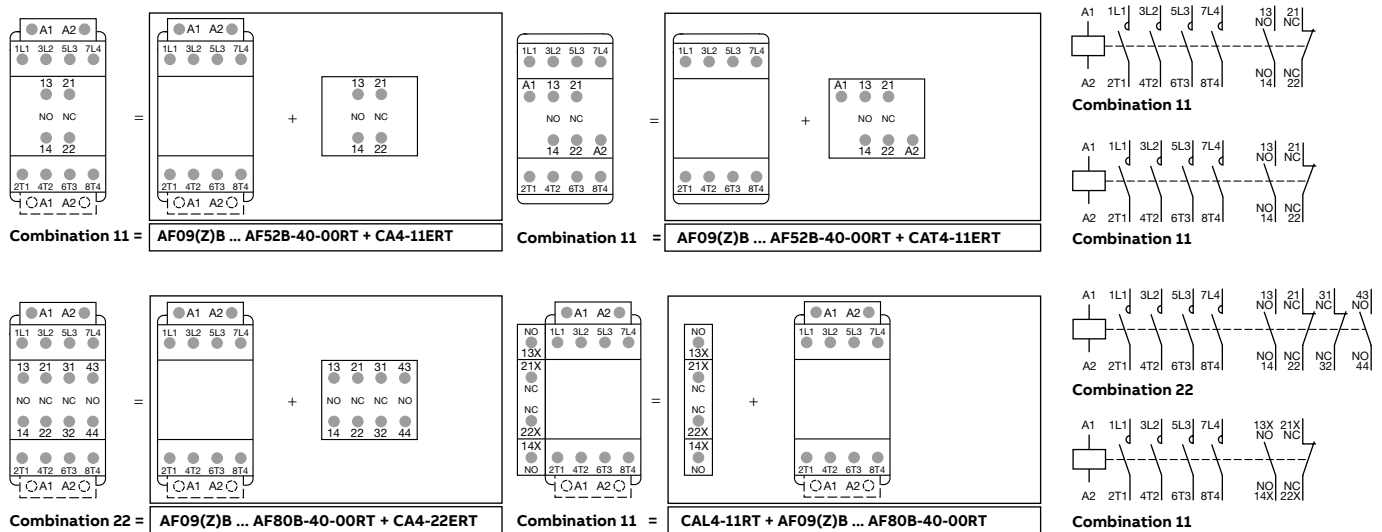
Terminal marking and positioning

AF09(Z)B..RT ... AF80B..RT contactors

Standard devices without addition of auxiliary contacts

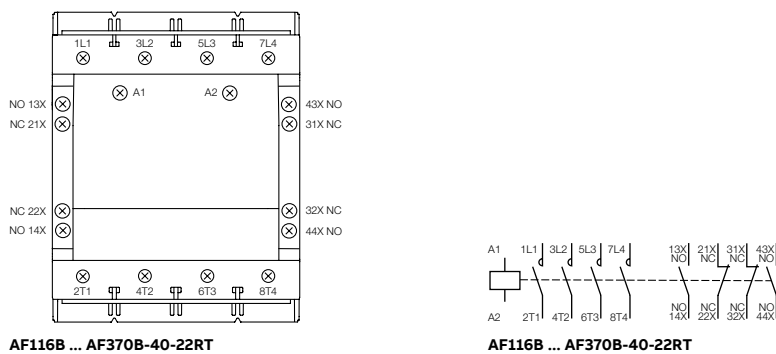


Other possible contact combinations with auxiliary contacts added by the user



AF116B..RT ... AF370B..RT contactors

Standard devices with factory mounted auxiliary contacts

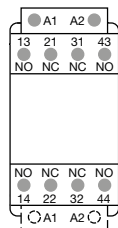


NF(Z)B..RT contactor relays

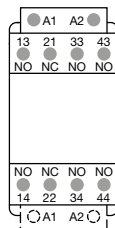
Terminal marking and positioning

NF(Z)B..RT contactors

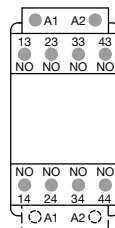
Standard devices without addition of auxiliary contacts



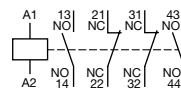
NF(Z)B22ERT



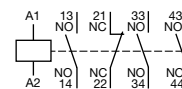
NF(Z)B31ERT



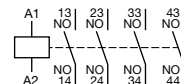
NF(Z)B40ERT



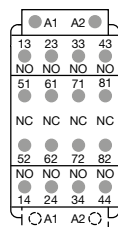
NF(Z)B22ERT



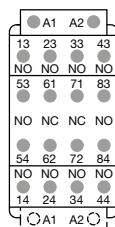
NF(Z)B31ERT



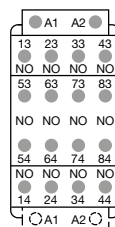
NF(Z)B40ERT



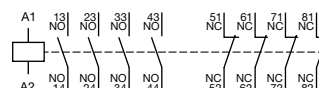
NF(Z)B44ERT



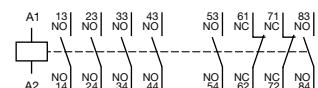
NF(Z)B62ERT



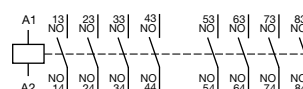
NF(Z)B80ERT



NF(Z)B44ERT

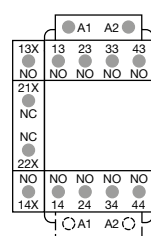


NF(Z)B62ERT

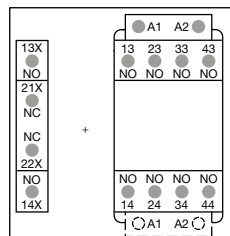


NF(Z)B80ERT

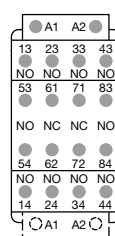
Other possible contact combinations with auxiliary contacts added by the user



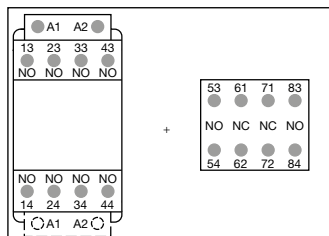
Combination 51 =



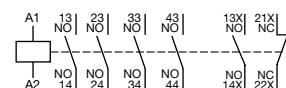
CAL4-11RT + NF(Z)B40ERT



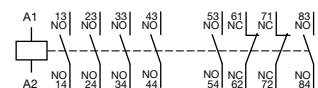
Combination 62 =



NF(Z)B40ERT + CA4-22NRT



Combination 51 ERT



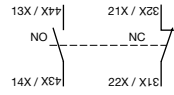
Combination 62 ERT

Add-on auxiliary contacts

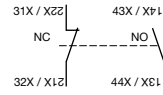
Terminal marking and positioning

Connection with ring tongue ferrules

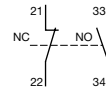
2-pole auxiliary contacts



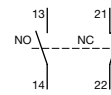
CAL4-11RT
(Left-side mounted)



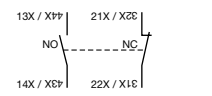
CAL4-11RT
(Right-side mounted)



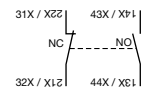
CAT4-11MRT
CA4-11MRT



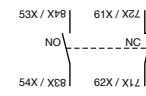
CAT4-11ERT
CA4-11ERT



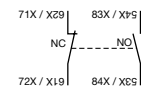
CAL18-11-RT, CAL19-11-RT
(Left-side mounted)



CAL18-11-RT, CAL19-11-RT
(Right-side mounted)

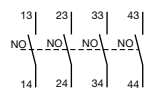


CAL19-11B-RT
(Left-side mounted)

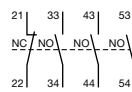


CAL19-11B-RT
(Right-side mounted)

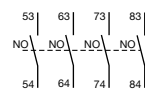
4-pole auxiliary contacts



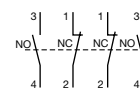
CA4-40ERT



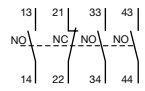
CA4-31MRT



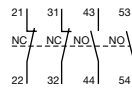
CA4-40NRT



CA4-22URT



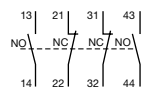
CA4-31ERT



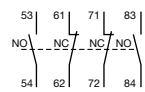
CA4-22MRT



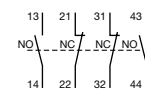
CA4-31NRT



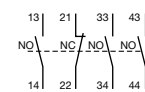
CA4-22ERT



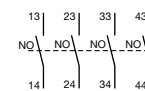
CA4-22NRT



CA5-22 ERT



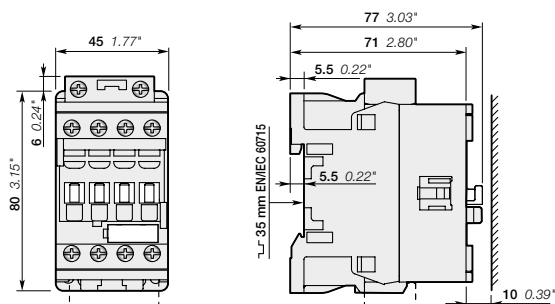
CA5-31ERT



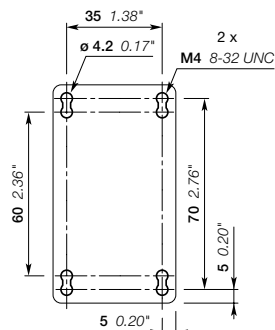
CA5-40ERT

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

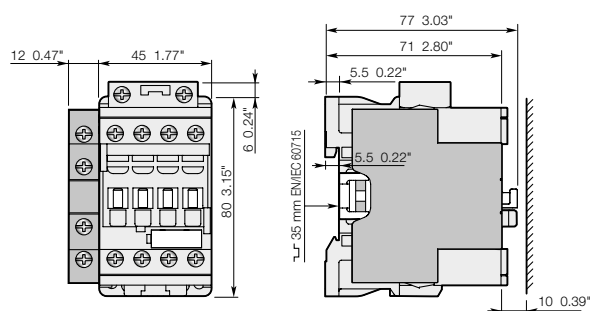
Dimensions



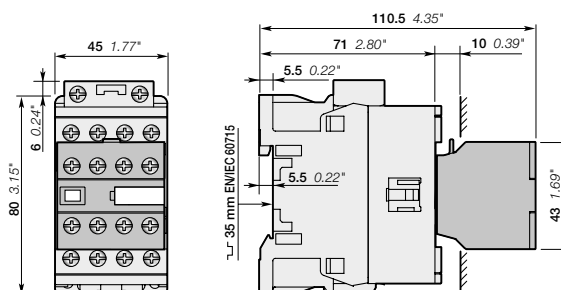
AF09(Z)B..RT, AF12(Z)B..RT, AF16(Z)B..RT



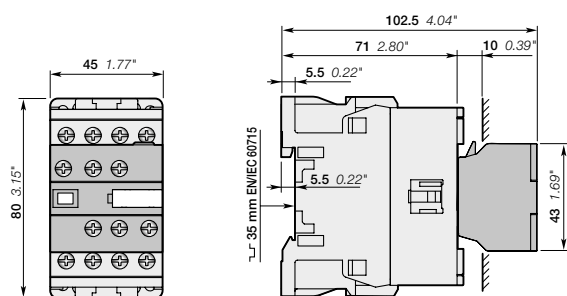
AF09(Z)B..RT, AF12(Z)B..RT, AF16(Z)B..RT



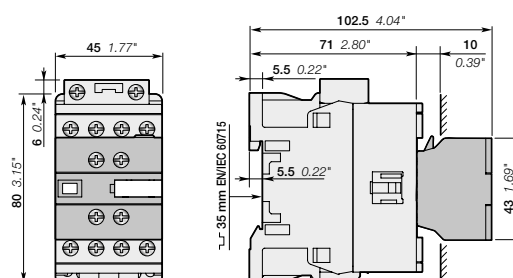
AF09(Z)B..RT, AF12(Z)B..RT, AF16(Z)B..RT
+ CAL4-11RT 2-pole auxiliary contact block



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



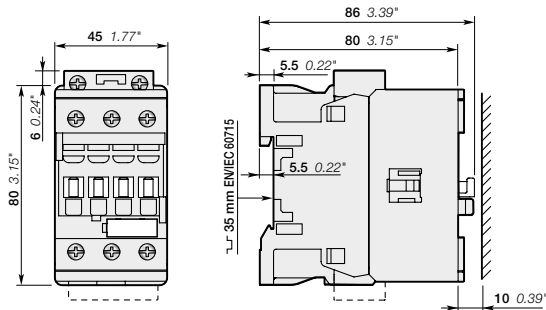
AF09(Z)B..RT, AF12(Z)B..RT, AF16(Z)B..RT
+ CA4-11..RT 2-pole auxiliary contact block

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

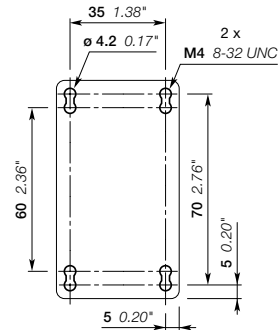
Main dimensions mm, inches

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

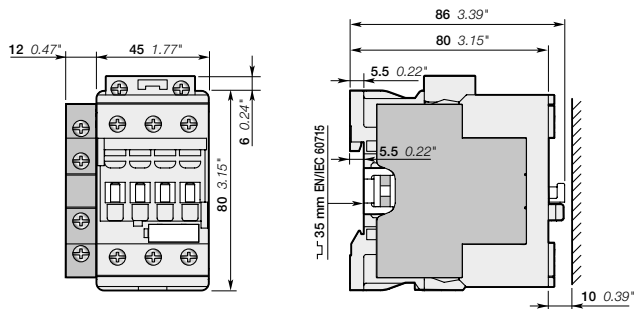
Dimensions



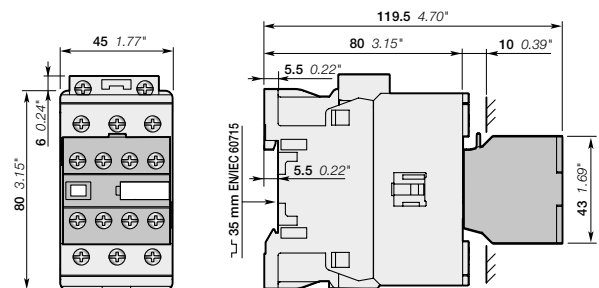
AF26(Z)B..RT, AF30(Z)B..RT, AF38(Z)B..RT



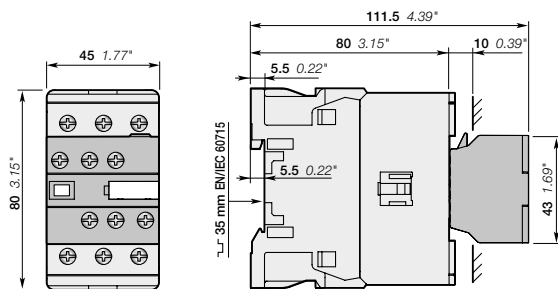
AF26(Z)B..RT, AF30(Z)B..RT, AF38(Z)B..RT



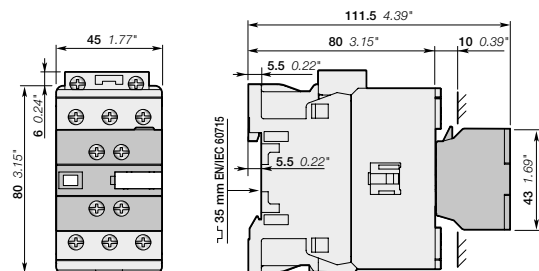
AF26(Z)B..RT, AF30(Z)B..RT, AF38(Z)B..RT
+ CAL4-11RT 2-pole auxiliary contact block



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



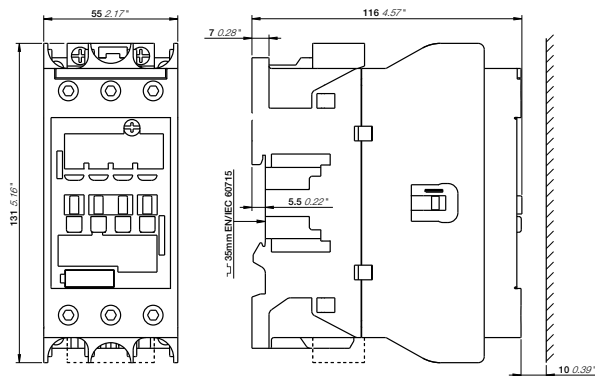
AF26(Z)B..RT, AF30(Z)B..RT, AF38(Z)B..RT
+ CA4-11..RT 2-pole auxiliary contact block

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

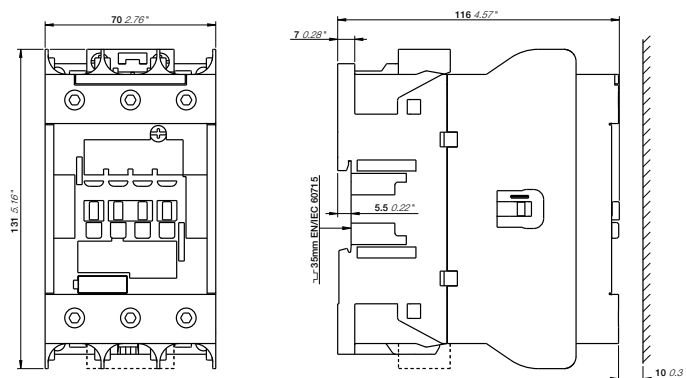
Main dimensions mm, inches

AF40B ... AF96B..RT 3-pole contactors

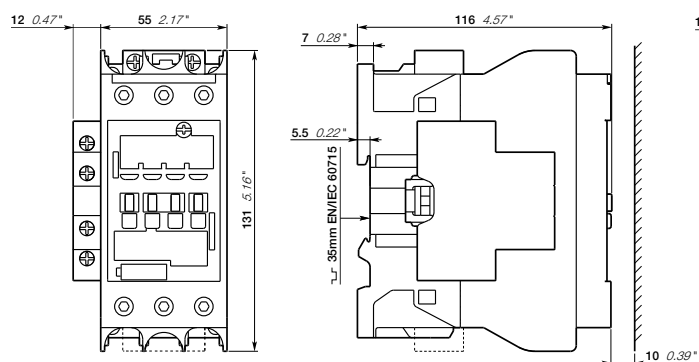
Dimensions



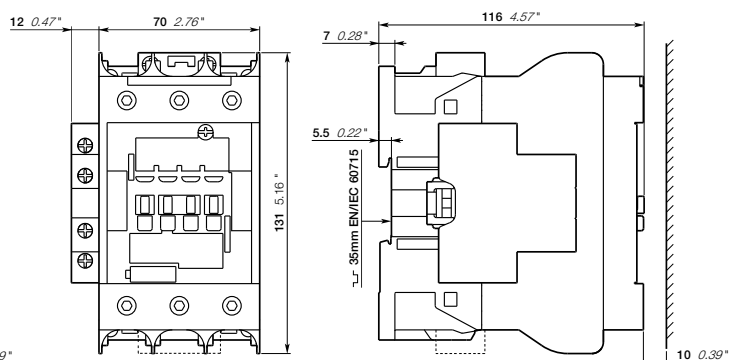
AF40B..RT, AF52B..RT, AF65B..RT



AF80B..RT, AF96B..RT



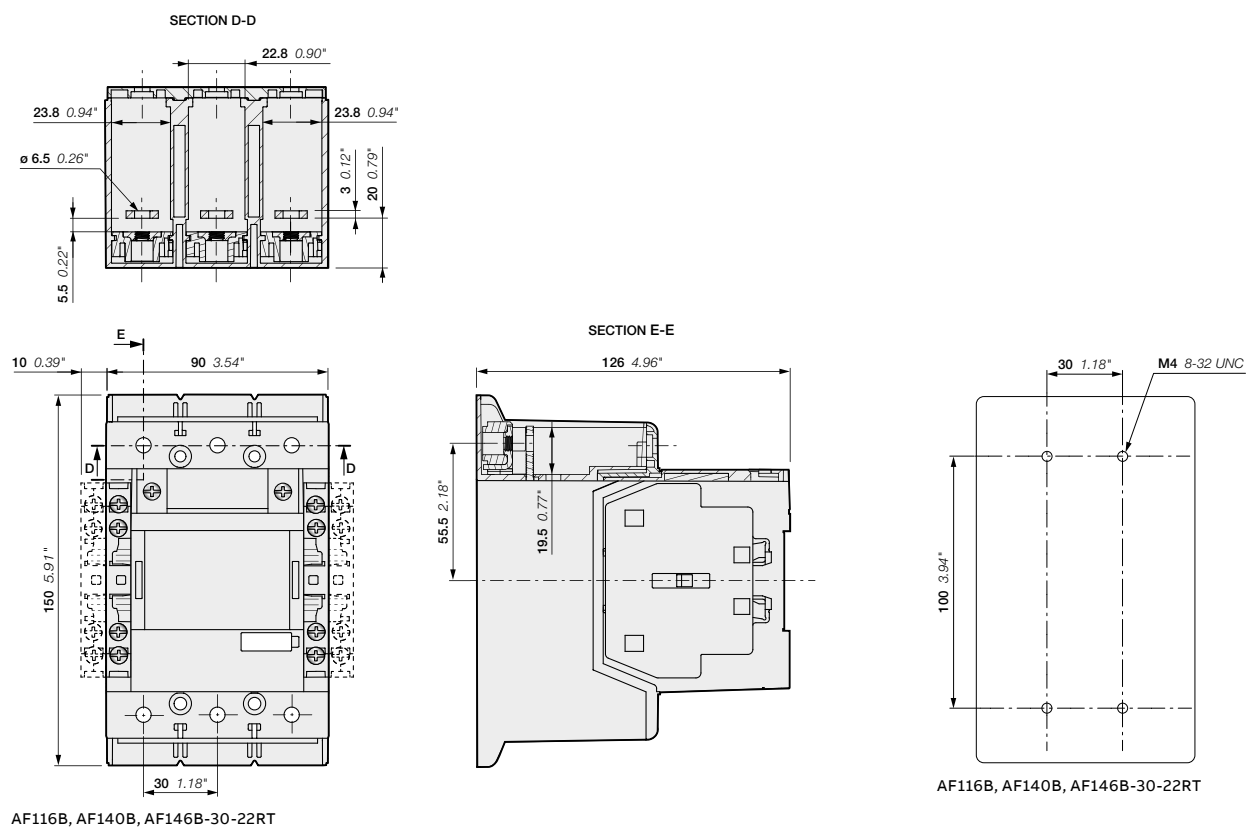
AF40B..RT, AF52B..RT, AF65B..RT



AF80B..RT, AF96B..RT

AF116B..RT, AF140B..RT, AF146B..RT 3-pole contactors

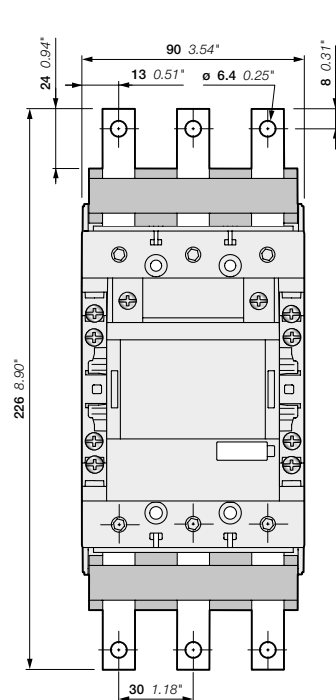
Dimensions



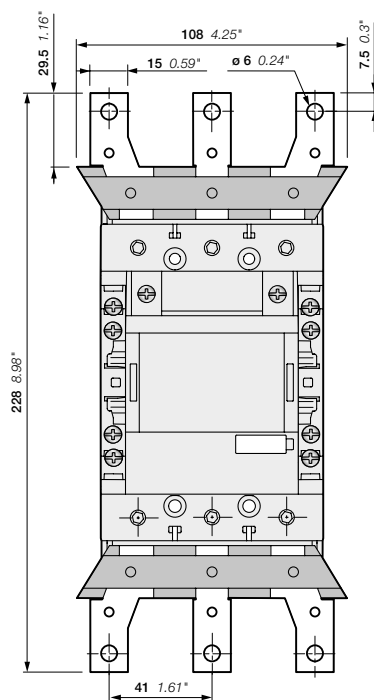
Main dimensions mm, inches

AF116B..RT, AF140B..RT, AF146B..RT 3-pole contactors

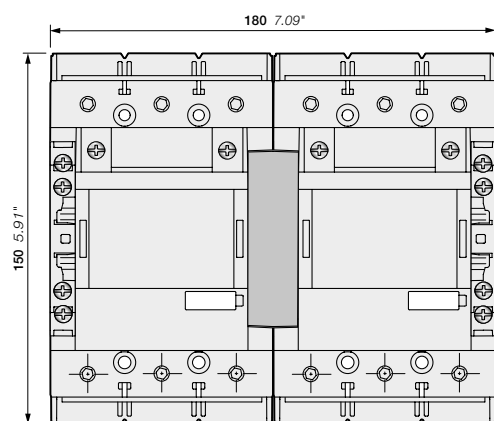
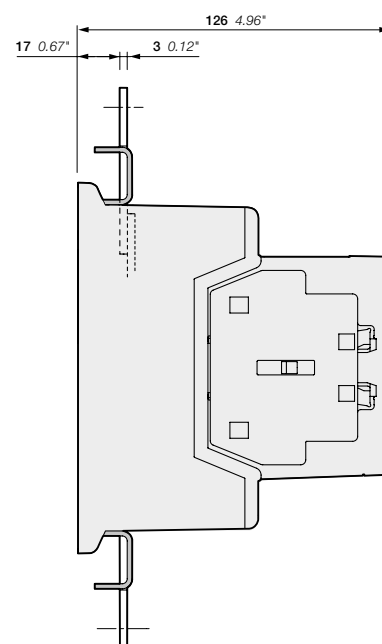
Dimensions



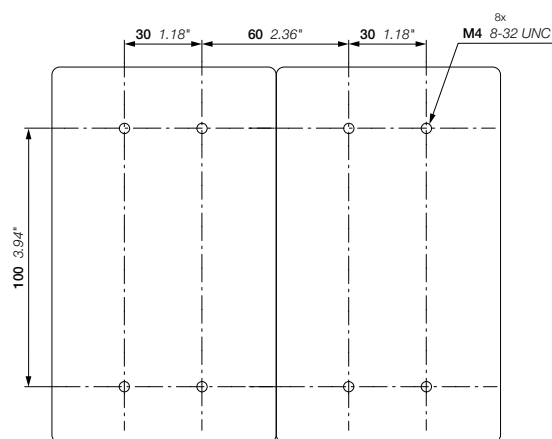
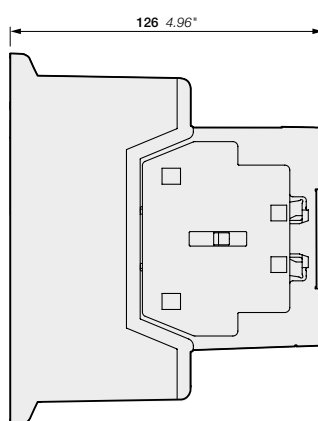
AF116B, AF140B, AF146B-30-22RT
+ LX140 terminal extension



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



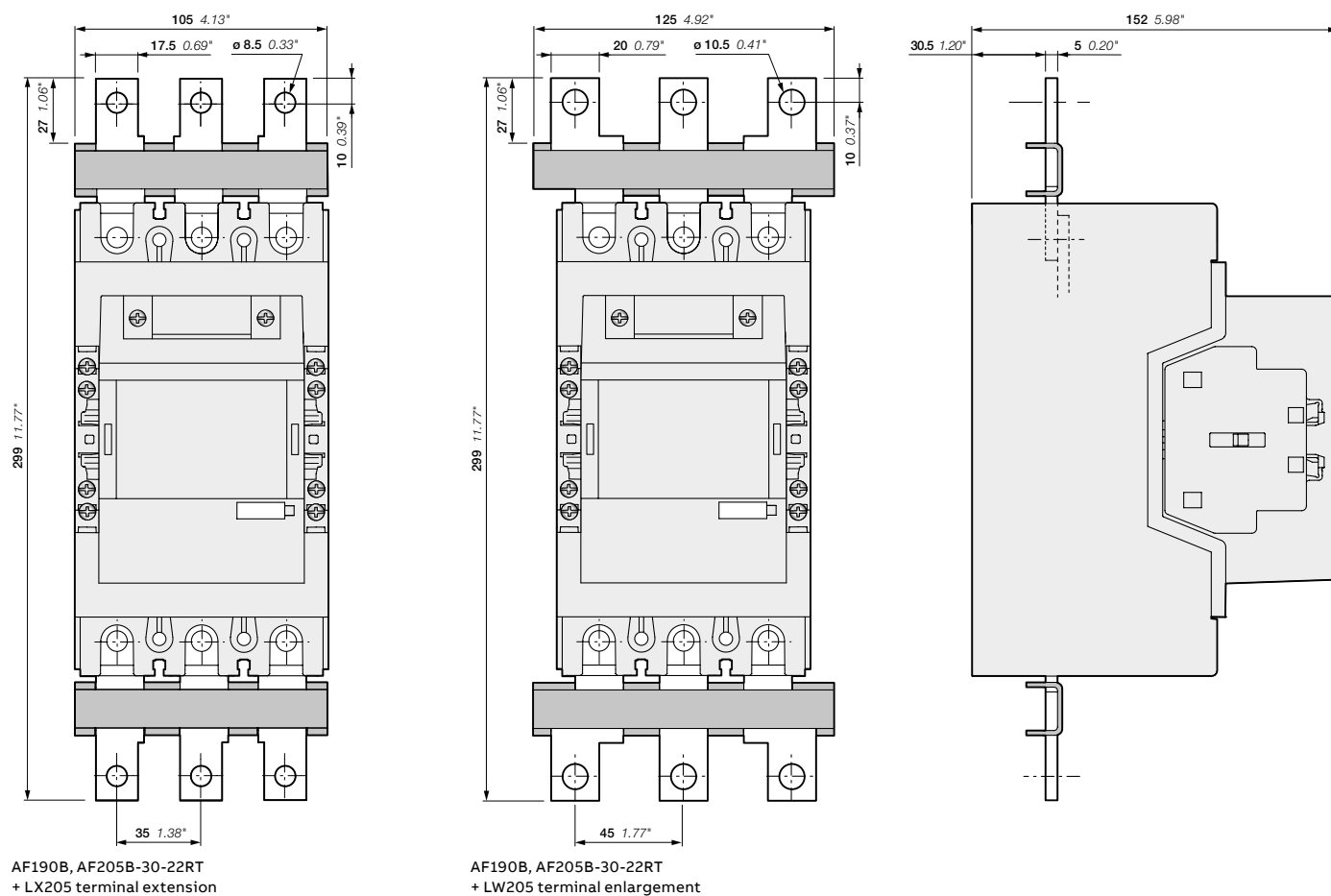
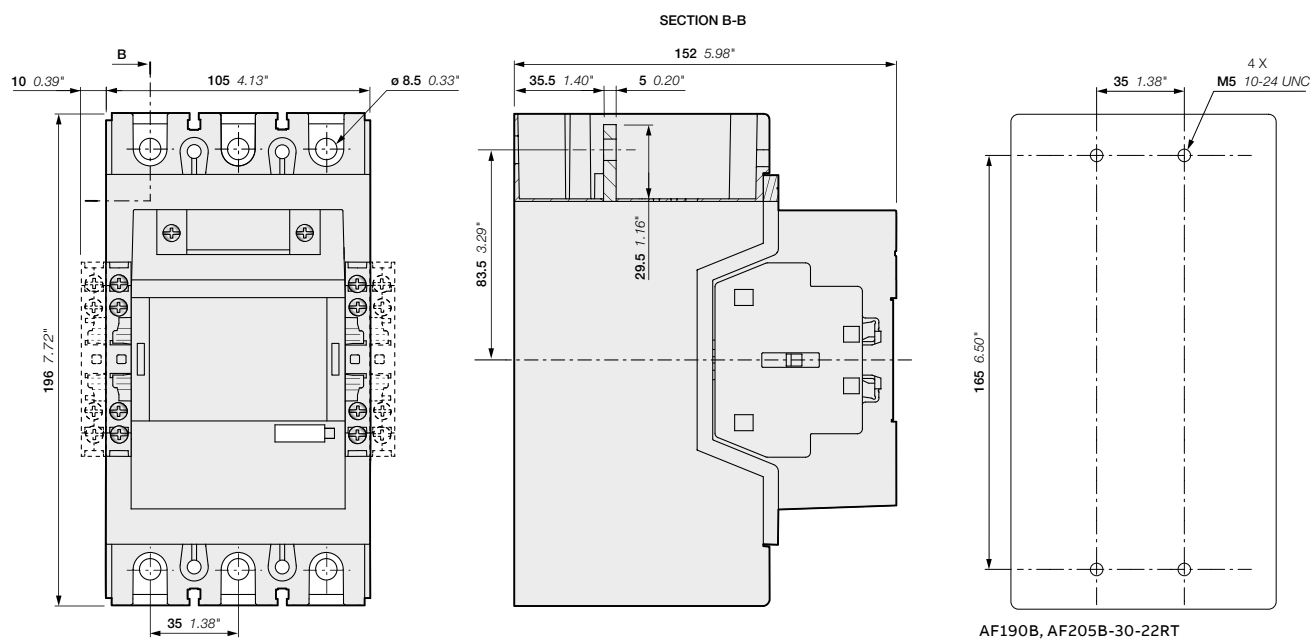
AF116B, AF140B, AF146B-30-22RT
+ VM19 mechanical interlocking unit



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

AF190B..RT, AF205B..RT 3-pole contactors

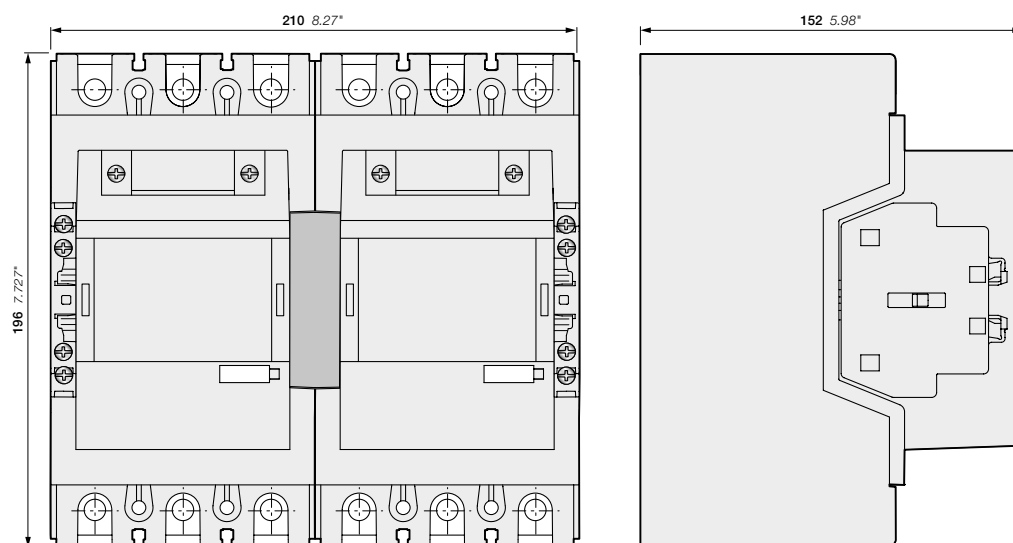
Dimensions



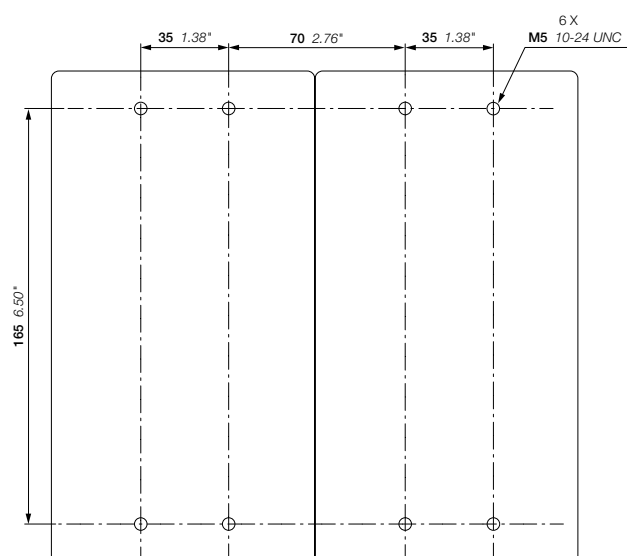
Main dimensions mm, inches

AF190B..RT, AF205B..RT 3-pole contactors

Dimensions



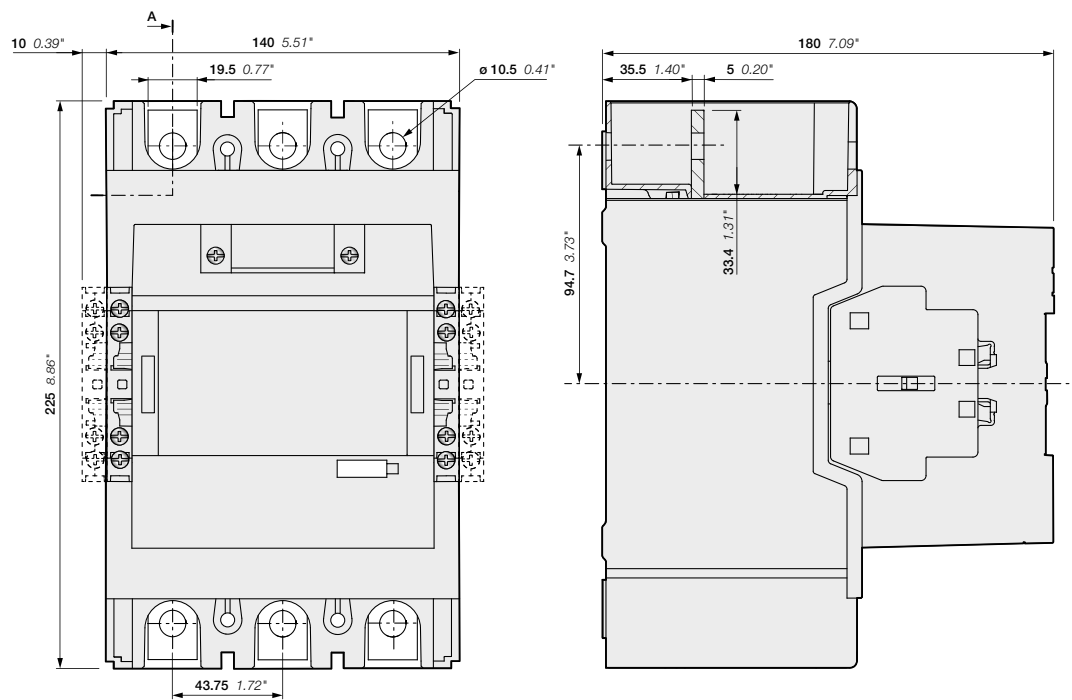
AF190B, AF205B-30-22RT
+ VM19 mechanical interlocking unit



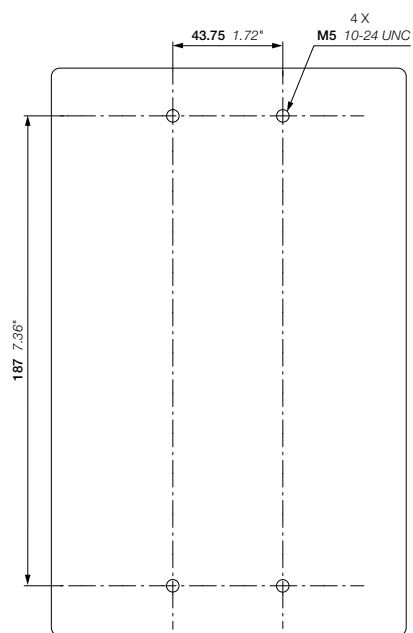
AF190B, AF205B-30-22RT
+ VM19 mechanical interlocking unit

AF265B..RT, AF305B..RT, AF370B..RT 3-pole contactors

Dimensions



AF265B, AF305B, AF370B-30-22RT

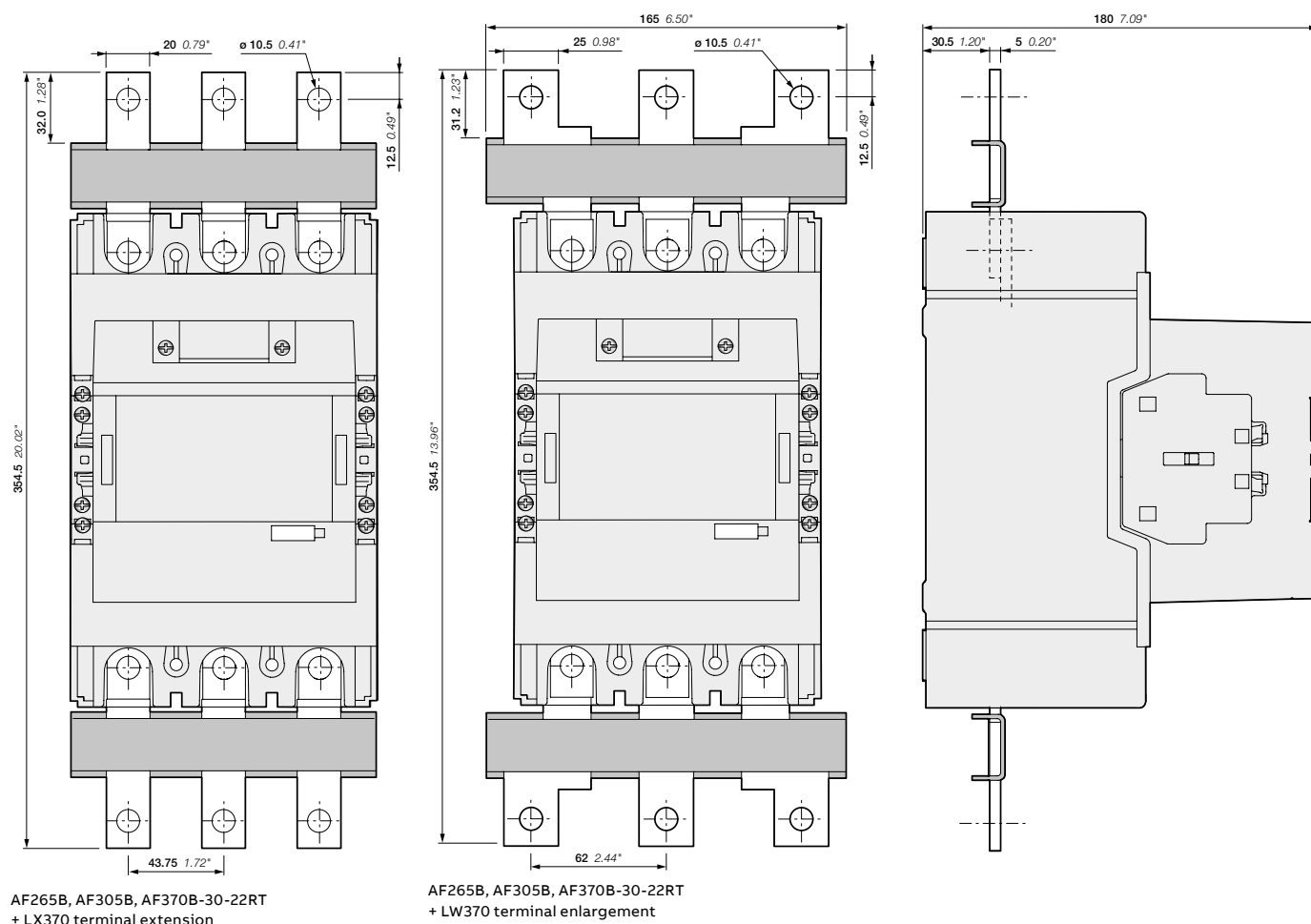


AF265B, AF305B, AF370B-30-22RT

Main dimensions mm, inches

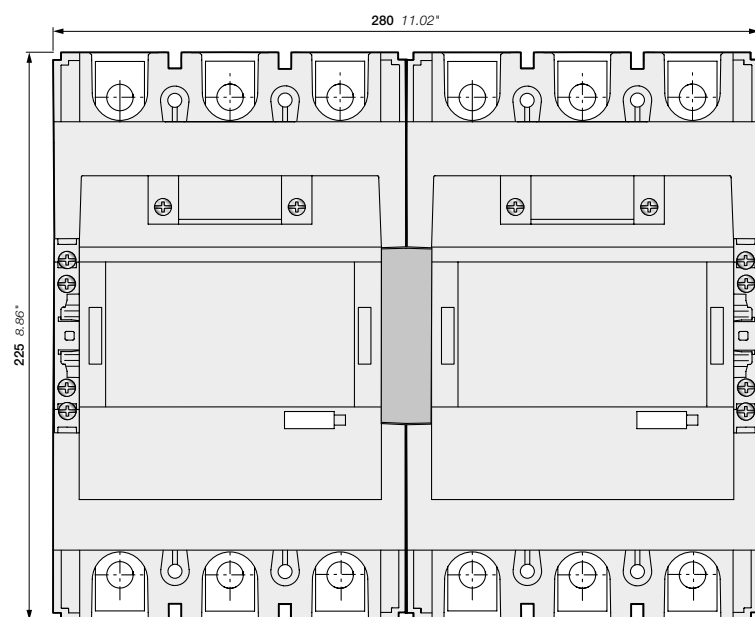
AF265B..RT, AF305B..RT, AF370B..RT 3-pole contactors

Dimensions

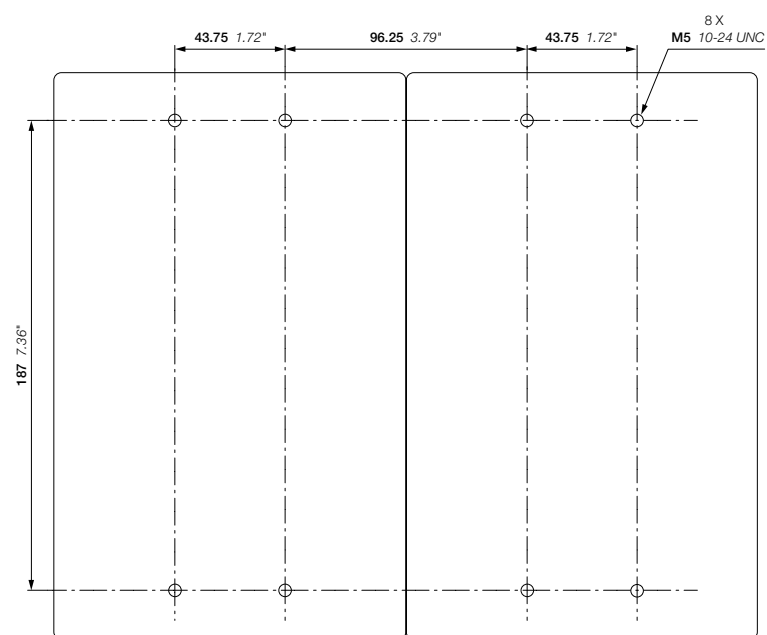
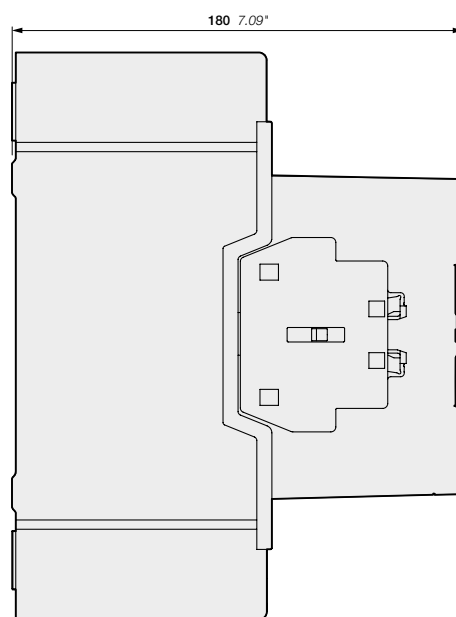


AF265B..RT, AF305B..RT, AF370B..RT 3-pole contactors

Dimensions



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

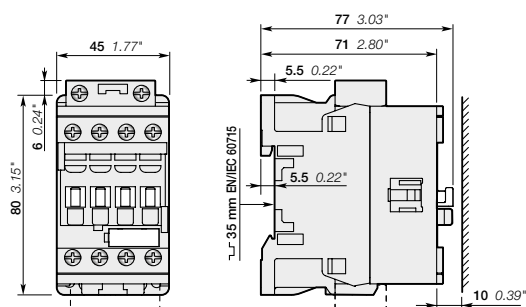


AF265B, AF305B, AF370B-30-22RT
+ VM19 mechanical interlocking unit

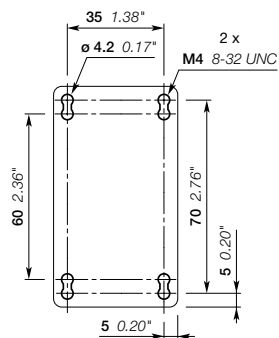
Main dimensions mm, inches

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

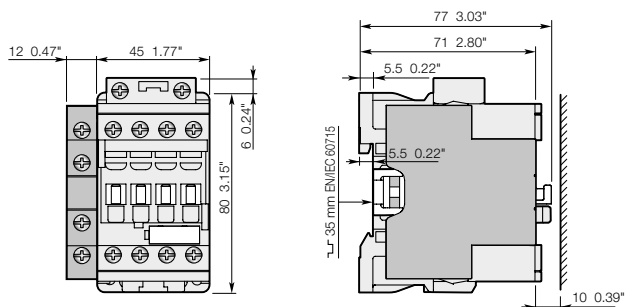
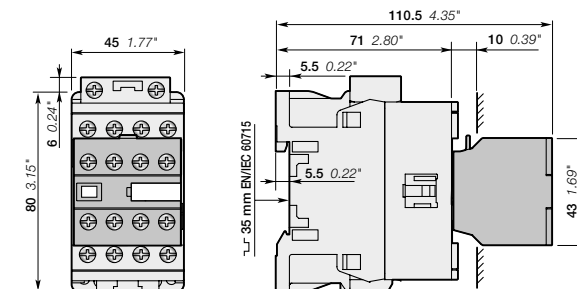
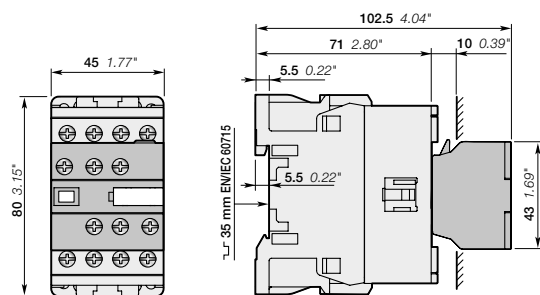
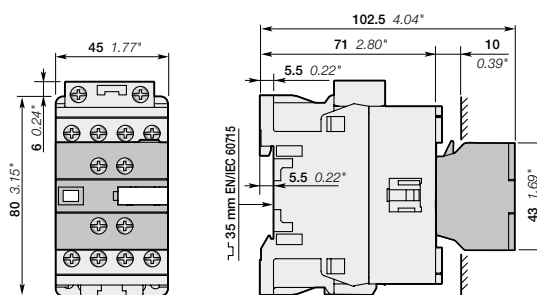
Dimensions



AF09(Z)B..RT, AF16(Z)B..RT



AF09(Z)B..RT, AF16(Z)B..RT

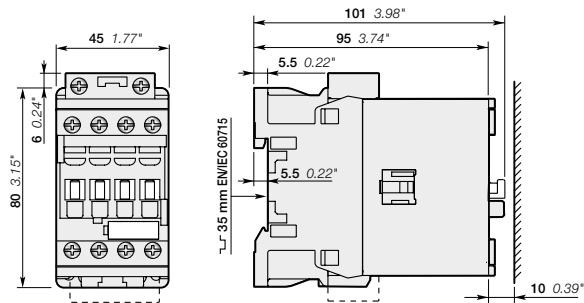
AF09(Z)B..RT, AF16(Z)B..RT
+ CAL4-11RT 2-pole auxiliary contact blockAF09(Z)B..RT, AF16(Z)B..RT
+ CA4..RT 4-pole auxiliary contact blockAF09(Z)B..RT, AF16(Z)B..RT
+ CAT4..RT 2-pole auxiliary contact and coil terminal blockAF09(Z)B..RT, AF16(Z)B..RT
+ CA4-11..RT 2-pole auxiliary contact block

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

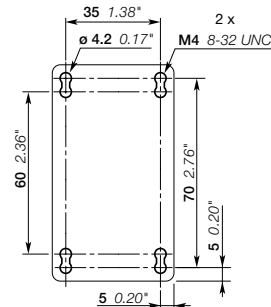
Main dimensions mm, inches

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

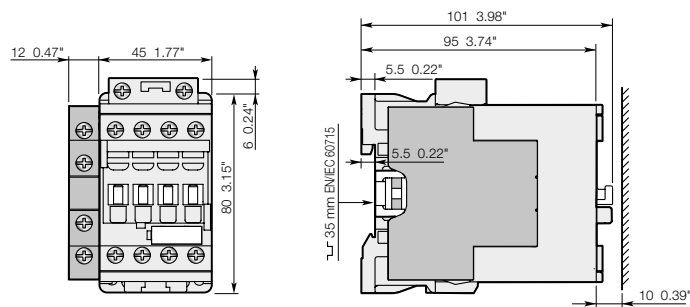
Dimensions



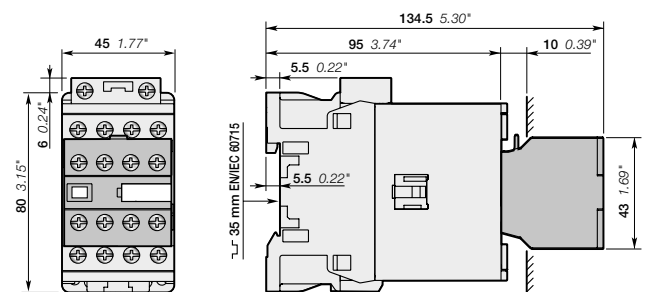
AF26(Z)B..RT, AF38(Z)B..RT



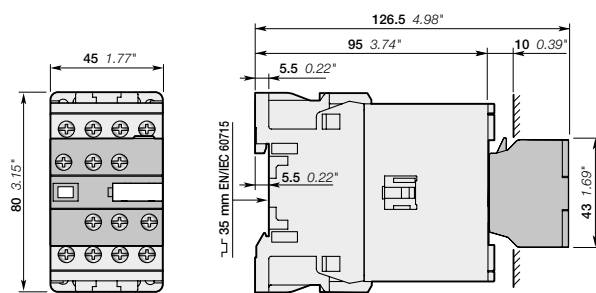
AF26(Z)B..RT, AF38(Z)B..RT



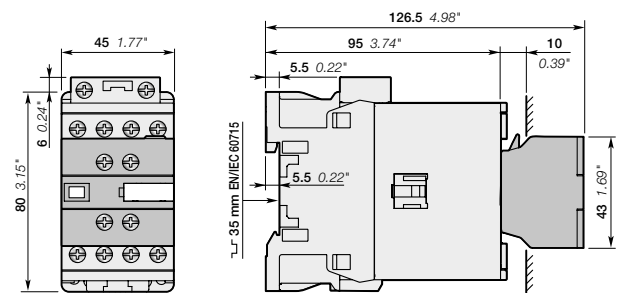
AF26(Z)B..RT, AF38(Z)B..RT
+ CAL4-11RT 2-pole auxiliary contact block



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



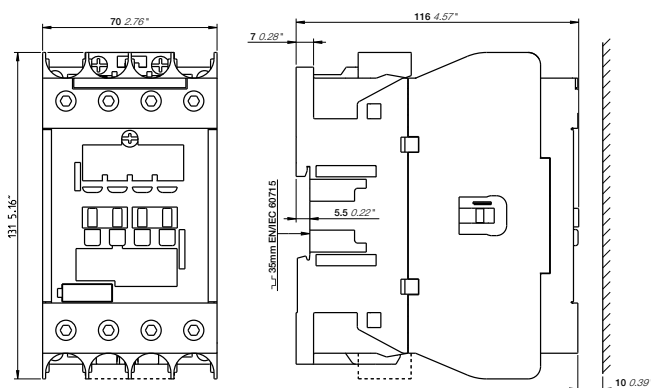
AF26(Z)B..RT, AF38(Z)B..RT
+ CA4-11..RT 2-pole auxiliary contact block

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

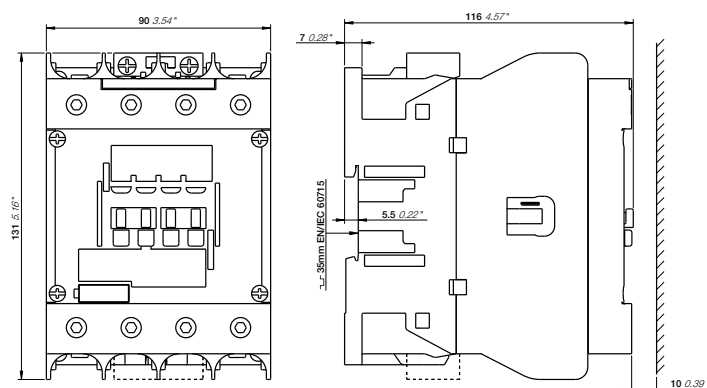
Main dimensions mm, inches

AF40B..AF96B..RT 4-pole contactors

Dimensions



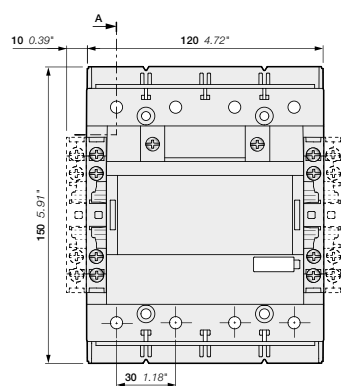
AF40B..RT, AF52B..RT, AF65B..RT



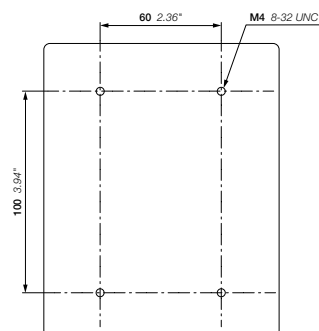
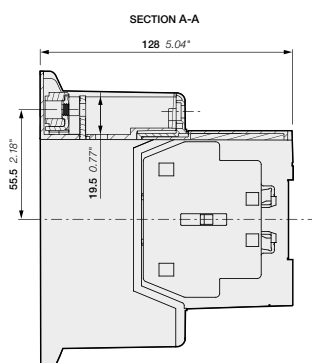
AF80B..RT, AF96B..RT

AF116B..RT, AF140B..RT 4-pole contactors

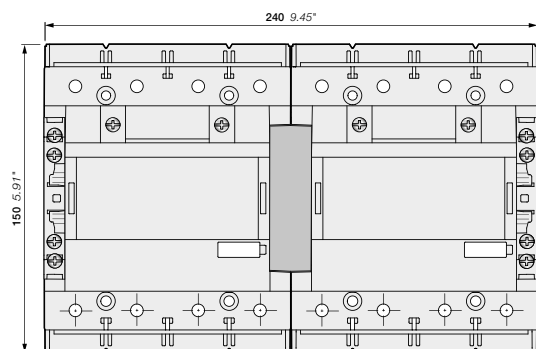
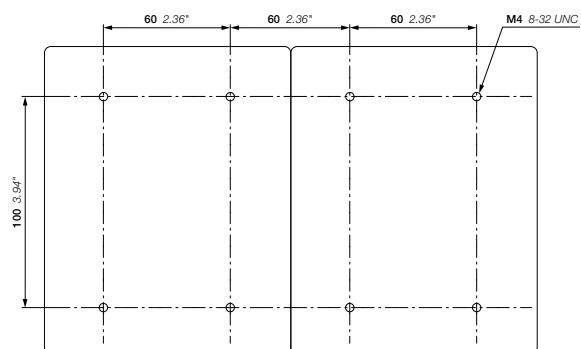
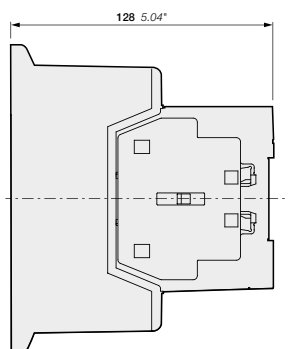
Dimensions



AF116B, AF140B-40-22RT



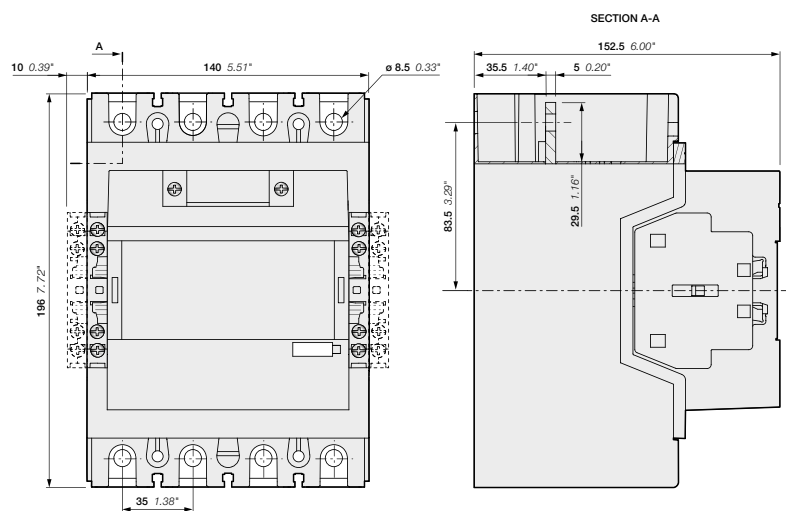
AF116B, AF140B-40-22RT

AF116B, AF140B-40-22RT
+ VM19 mechanical interlocking unitAF116B, AF140B-40-22RT
+ VM19 mechanical interlocking unit

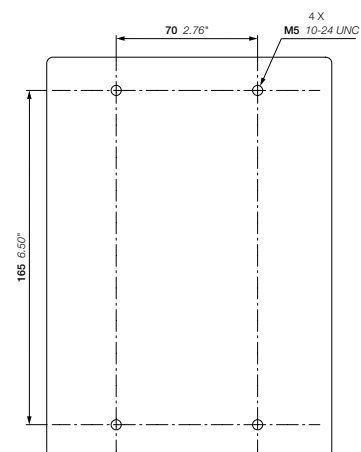
Main dimensions mm, inches

AF190B..RT, AF205B..RT 4-pole contactors

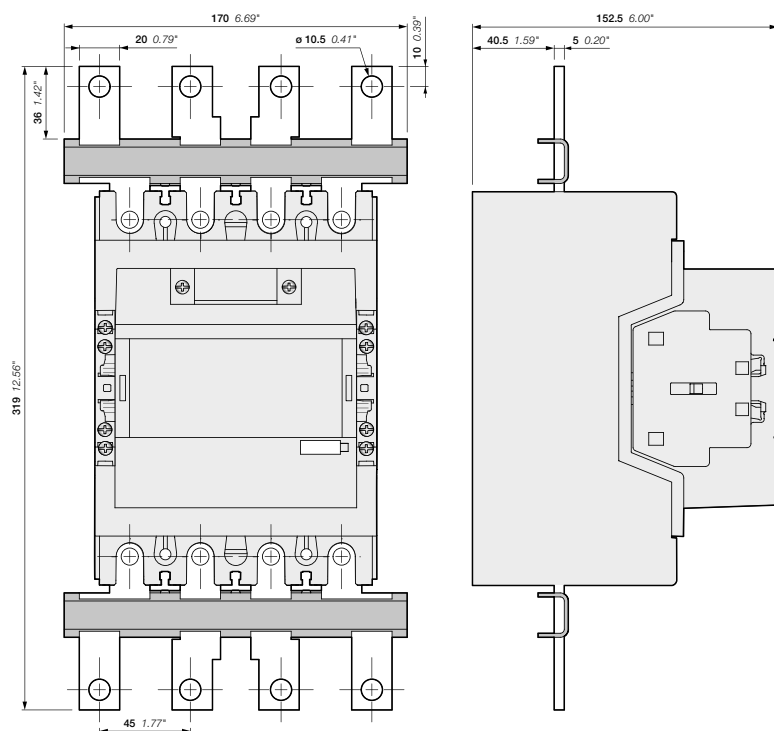
Dimensions



AF190B, AF205B-40-22RT

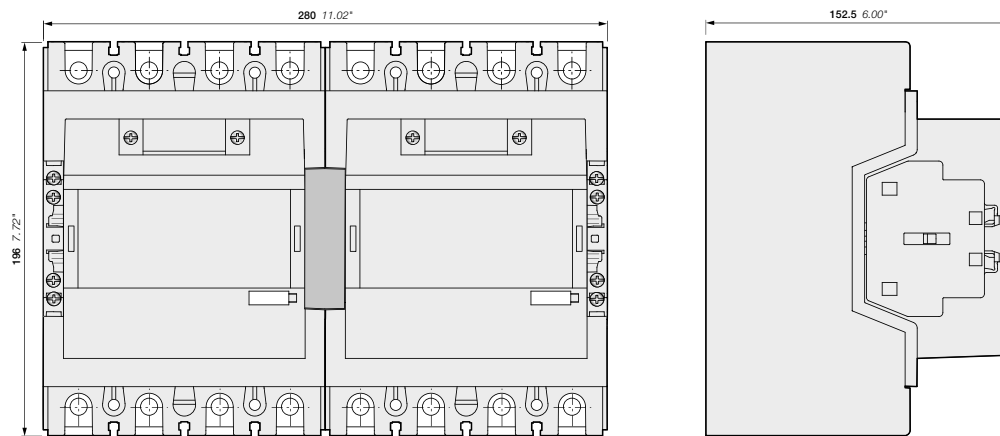


AF190B, AF205B-40-22RT

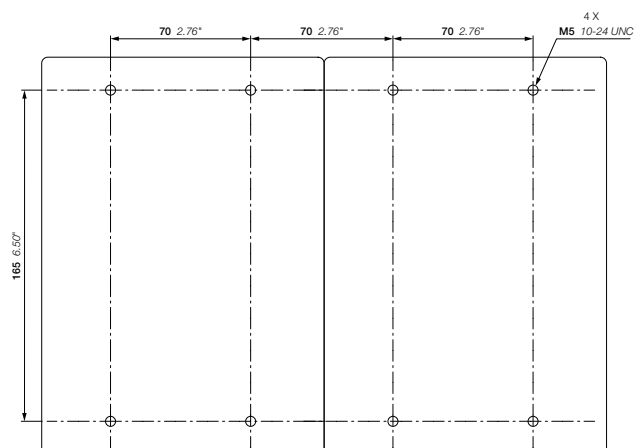
AF190B, AF205B-40-22RT
+ LW205-40 terminal enlargement

AF190B..RT, AF205B..RT 4-pole contactors

Dimensions



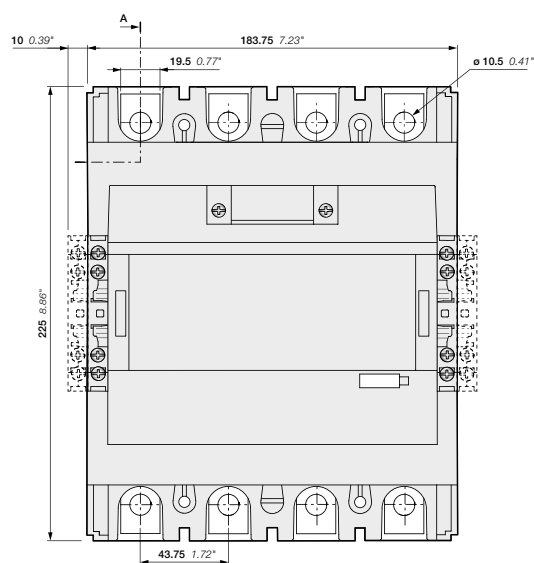
AF190B, AF205B-40-22RT
+ VM19 mechanical interlocking unit



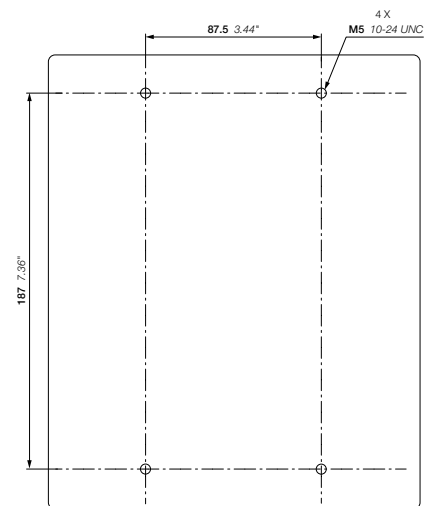
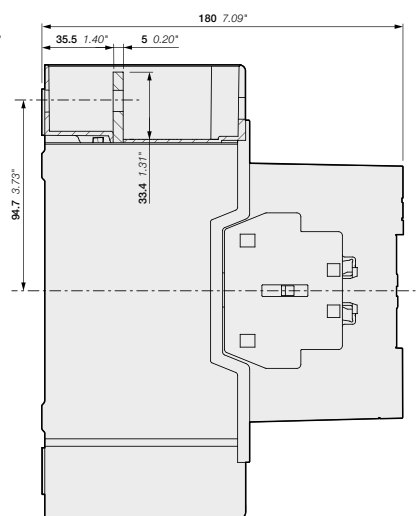
AF190B, AF205B-40-22RT
+ VM19 mechanical interlocking unit

AF265B..RT, AF305B..RT, AF370B..RT 4-pole contactors

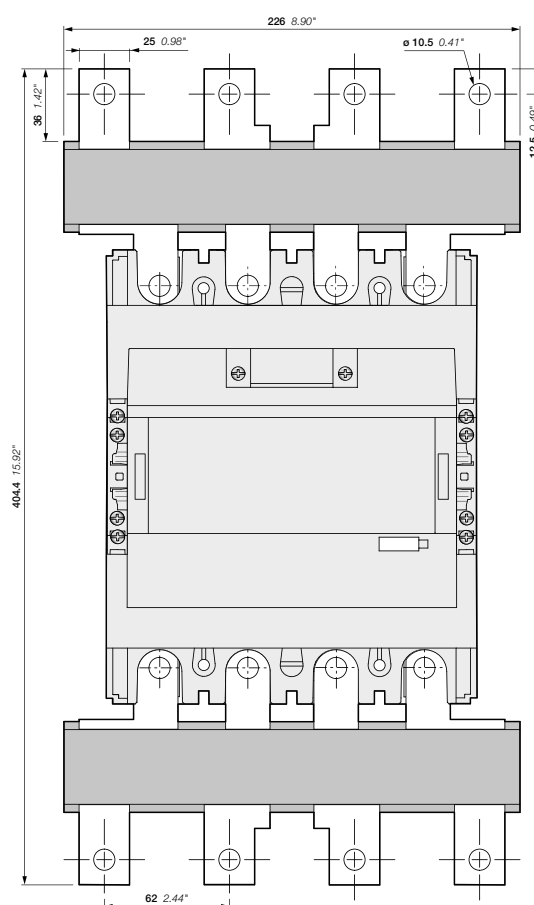
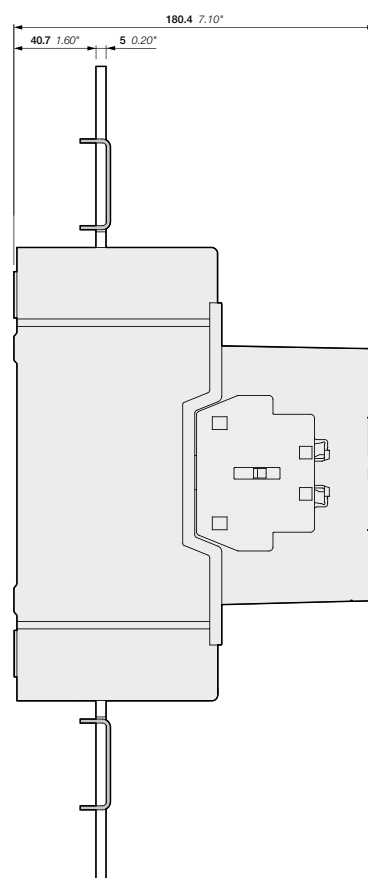
Dimensions



AF265B, AF305B, AF370B-40-22RT



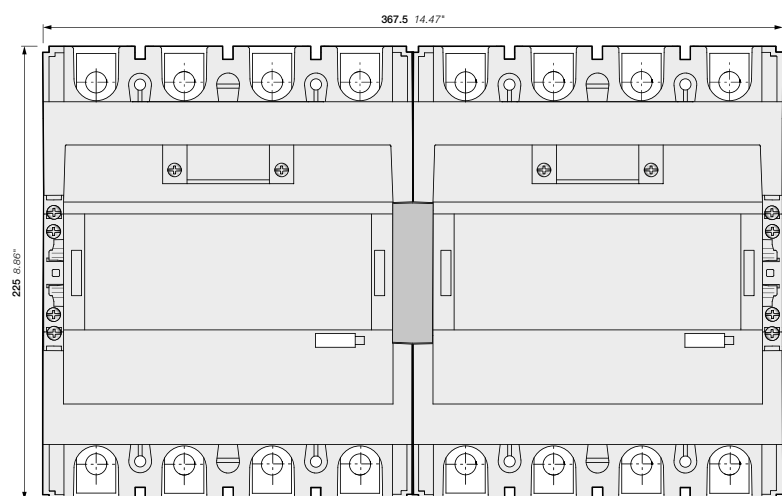
AF265B, AF305B, AF370B-40-22RT

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

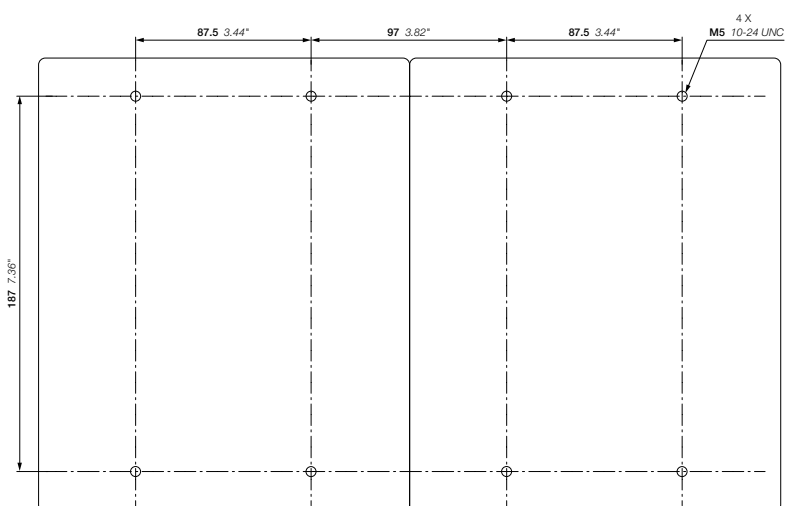
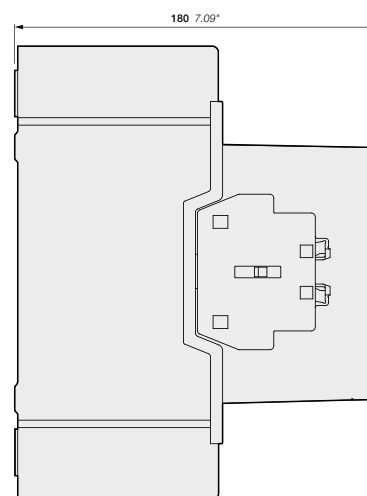
Main dimensions mm, inches

AF265B..RT, AF305B..RT, AF370B..RT 4-pole contactors

Dimensions



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

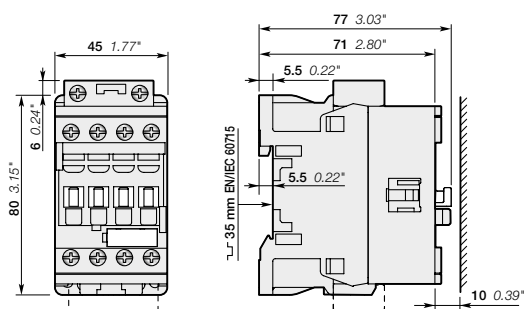


AF265B, AF305B, AF370B-40-22RT
+ VM19 mechanical interlocking unit

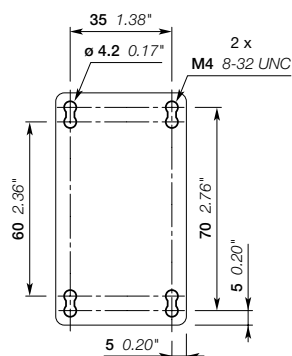
Main dimensions mm, inches

NF(Z)B..RT contactor relays

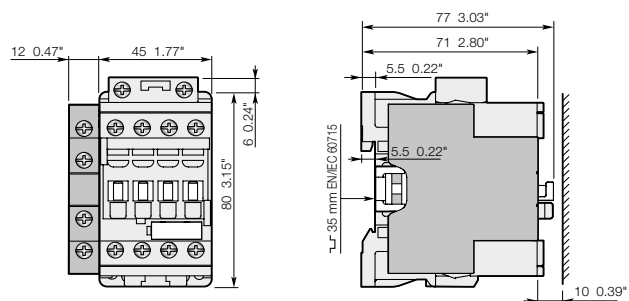
Dimensions



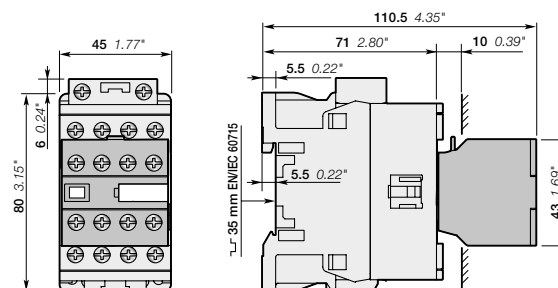
NF(Z)B22ERT, NF(Z)B31ERT, NF(Z)B40ERT



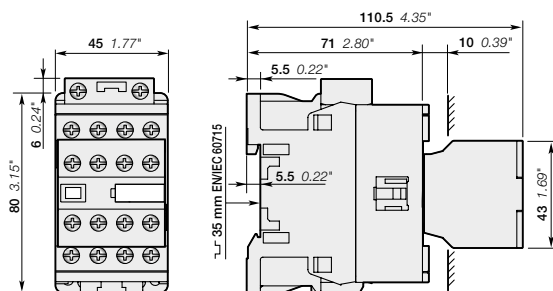
NF(Z)B..RT



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 $U_{c \min.} \dots U_{c \max.}$ 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

$U_{c \min.} \dots U_{c \max.}$
acc. to IEC 60077

V DC

17...32
23...42.5
23...44.5
25...45
33...60
36...65

42...78
50...90
55...96
63...113
67...120
77...143

87.5...162.5
90...150
105...183
120...167
152...264
187...253

Rated control circuit voltage

$U_{c \min.} \dots U_{c \max.}$
acc. to IEC 60947-4-1
0.85 $U_{c \min.} \dots 1.1 U_{c \max.}$

V DC

20...60

48...130

100...250

Coil voltage codes

AF09..ZB..RT ...AF38..ZB..RT
NFZB..RT

AF40B ... AF370B..RT

21

11

22

12

23

13

AC operated

Rated control circuit voltage

$U_{c \min.} \dots U_{c \max.}$
acc. to IEC 60947-4-1
0.85 $U_{c \min.} \dots 1.1 U_{c \max.}$

V AC 50/60 Hz

24...60

48...130

100...250

250...500

Coil voltage codes

AF09..(Z)B..RT ...AF38..(Z)B..RT
NF(Z)B..RT

AF40B ... AF370B..RT

21

11

22

12

23

13

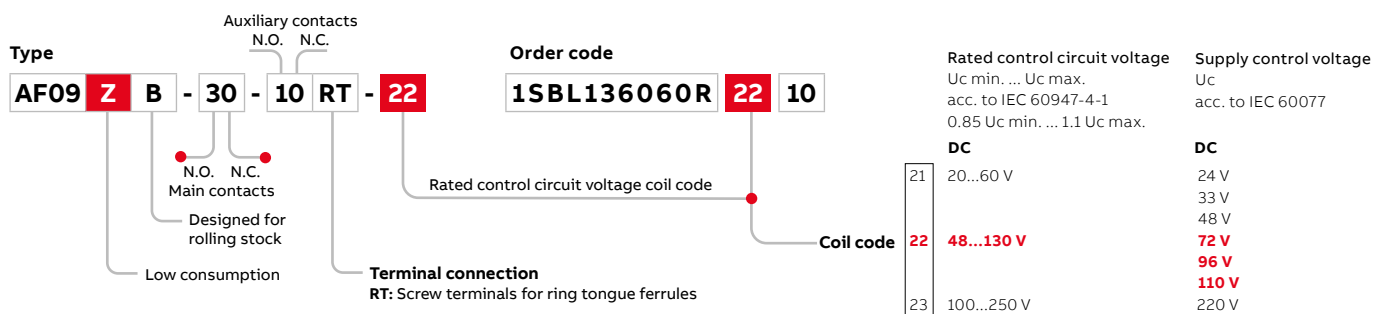
14

14

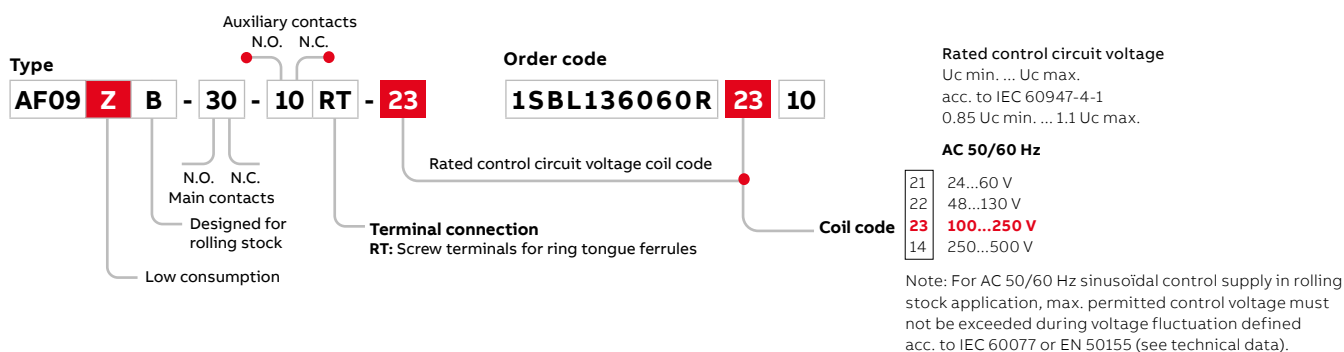
Voltage code table

AF09(Z)B ... AF96B..RT 3 and 4-pole contactors

DC operated

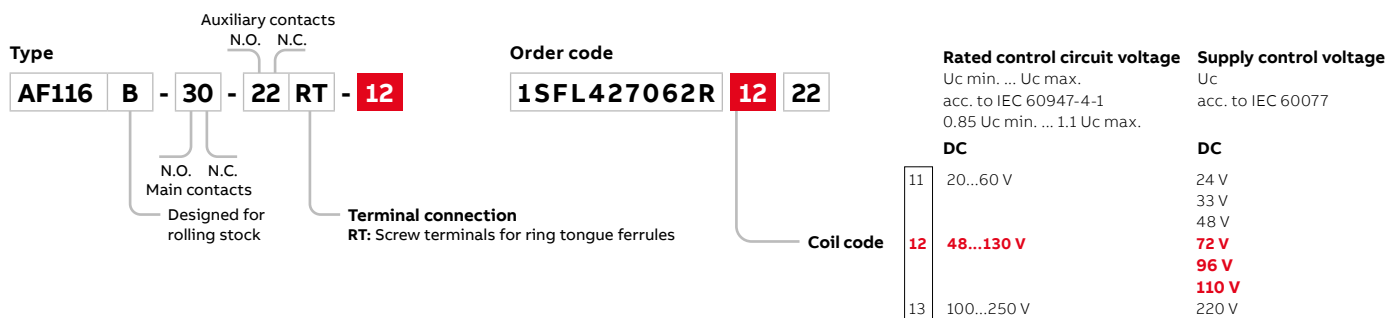


AC operated

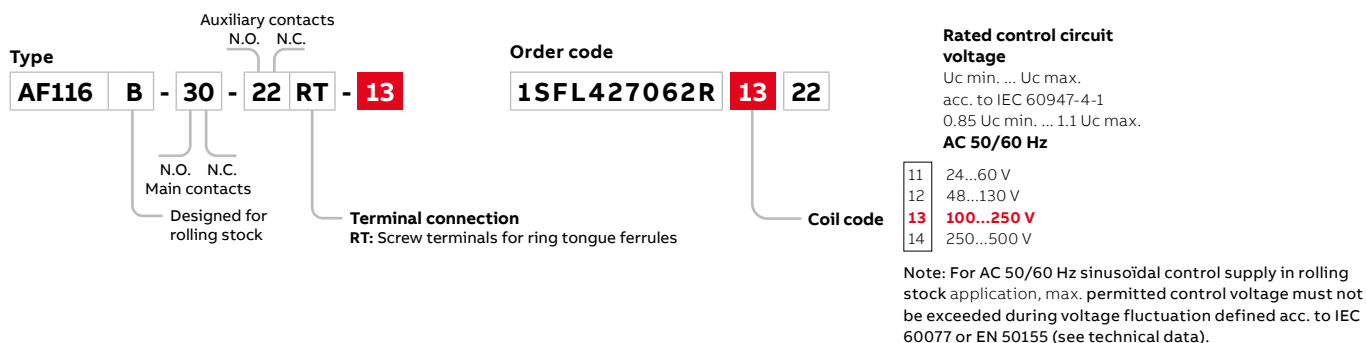


AF40B ... AF370B..RT 3 and 4-pole contactors

DC operated



AC operated



NF(Z)B..RT contactor relays

DC operated

Type

NF Z B - 22 - E RT - 22

N.O. N.C. Auxiliary contacts

Designed for rolling stock

Low consumption

Order code

1SBH136060R 22 22

Rated control circuit voltage coil code

Terminal connection
RT: Screw terminals for ring tongue ferrules

Coil code

Rated control circuit voltage

Uc min. ... Uc max.
acc. to IEC 60947-4-1
0.85 Uc min. ... 1.1 Uc max.

DC

21	20...60 V
22	48...130 V
23	100...250 V

Supply control voltage

Uc
acc. to IEC 60077

DC

24 V
33 V
48 V
72 V
96 V
110 V
220 V

AC operated

Type

NF Z B - 22 - E RT - 23

N.O. N.C. Auxiliary contacts

Designed for rolling stock

Low consumption

Order code

1SBH136060R 23 22

Rated control circuit voltage coil code

Terminal connection
RT: Screw terminals for ring tongue ferrules

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 sinusoidal 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

5/11 Terminal marking and positioning

5/12 Dimensions

M mini contactors and mini contactor 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, $\theta \leq 40^{\circ}\text{C}$	A	20

K mini contactor relays



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

TBC7 3-pole mini contactors – connection with standard ferrules

4 to 5.5 kW

DC operated – large coil voltage range



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:

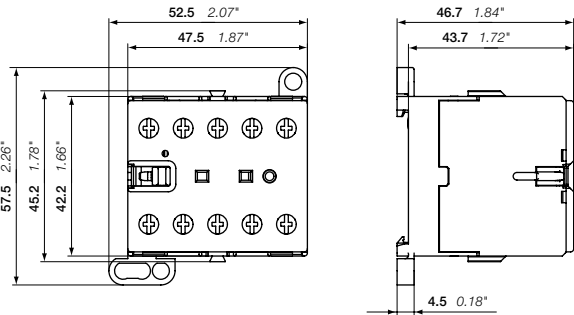
- control circuit: DC operated, 5 W at pull-in and at holding
- hum-free coil
- contacts configuration 30-01 fulfills the requirements for Mirror contacts acc. to annex F of IEC/EN 60947-4-1
- expanded ambient temperature range -30 ... +70 °C
- no auxiliary contact block permitted for mounting
- suitable 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 $\theta \leq 40\text{ }^{\circ}\text{C}$						
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

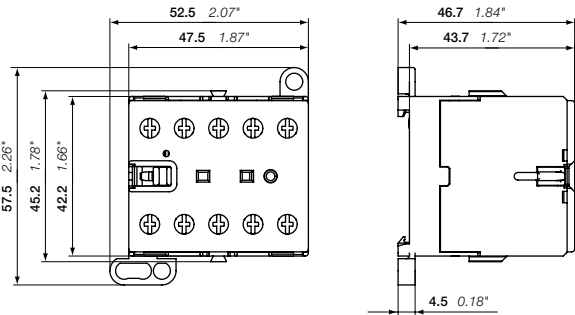
TBC7 4-pole mini contactors are compact control products mainly used for switching resistive loads or motor loads up to 690 V AC.

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 control circuit voltage Uc min ... Uc max (1)	Auxiliary contacts fitted	Type	Order code	Pkg qty	Weight (1 pce)
Rated operational current θ ≤ 40 °C AC-1 A	V DC					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.

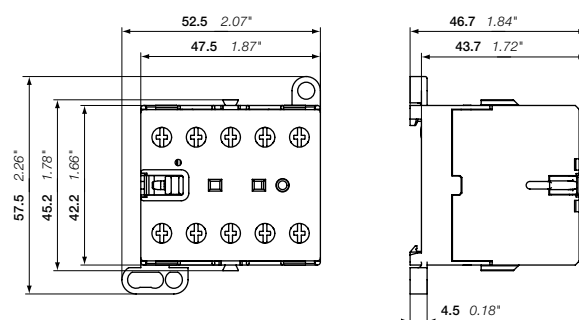
These contactors are designed with 4 poles with various contact combinations:

- 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 U_e max		690 V AC, 220 V DC
Rated frequency (without derating)		DC or 50 / 60 Hz
Conventional free-air thermal current I_{th} acc. to IEC/EN 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$, with conductor cross-sectional area		20 A
AC-1 Utilization category for air temperature close to contactor $\theta \leq 40^\circ\text{C}$		
I_e / Rated operational current AC-1	240 V	20 A
U_e 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 $\theta \leq 55^\circ\text{C}$		
I_e / Rated operational current AC-1	240 V	16 A
U_e 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 $\theta \leq 55^\circ\text{C}$		
I_e / 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 I_e AC-3 acc. to IEC/EN 60947-4-1; 13 x I_e AC-3e acc. to IEC/EN 60947-4-1
Rated breaking capacity		8 x I_e AC-3 acc. to IEC/EN 60947-4-1; 8.5 x I_e 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 I_{cw} at 40°C ambient temperature, in free air from a cold state	10 s	96 A
Maximum breaking capacity $\cos \phi = 0.45$	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 $\theta \leq 55^\circ\text{C}$

I_e / Rated operational current	DC-1 L/R ≤ 1 ms	DC-3 L/R ≤ 2 ms	DC-5 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

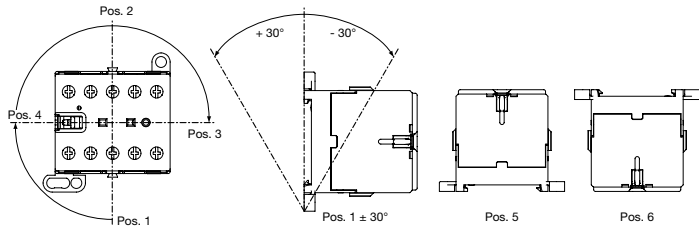
TBC7 3- and 4-pole mini contactors

Technical data

General technical data

Contactors types	DC operated	TBC7
Rated insulation voltage U_i		
acc. to IEC/EN 60947-4-1		690 V
Rated impulse withstand voltage U_{imp}		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

Contactors 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 U_e max	690 V AC, 250 V DC	
Rated frequency (without derating)	DC or 50 / 60 Hz	
Conventional free-air thermal current $I_{th} \theta \leq 40^\circ\text{C}$	6 A	
I_e / 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
I_e / 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 mm ²
 Flexible without ferrule	1 or 2 x	1 ... 2.5 mm ²
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 mm ²
 Flexible without ferrule	1 or 2 x	1 ... 2.5 mm ²
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

Contactors types	DC operated	TKC6
Standards		IEC/EN 60947-1, IEC/EN 60947-5-1, IEC/EN 61373, EN 45545-2
Rated operational voltage U _{emax}		690 V AC, 250 V DC
Rated frequency (without derating)		DC or 50 / 60 Hz
Conventional free-air thermal current I _{th} θ ≤ 40 °C		6 A
I _e / 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
I _e / 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

Contactors relay types	DC operated	TKC6
Rated insulation voltage U _i		690 V
acc. to IEC/EN 60947-5-1		
Rated impulse withstand voltage U _{imp}		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	

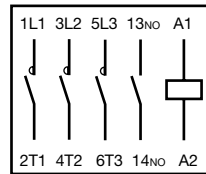
Connecting characteristics

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 mm ²
Flexible without ferrule	1 or 2 x	1 ... 2.5 mm ²
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

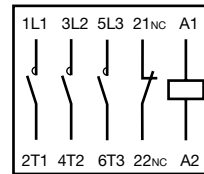
Terminal marking and positioning

Mini contactors



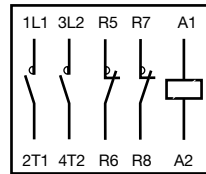
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TBC7-30-10-..



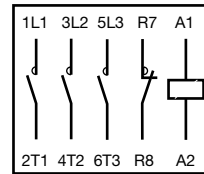
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TBC7-30-01-..



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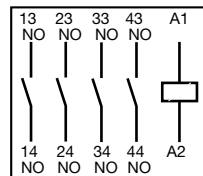
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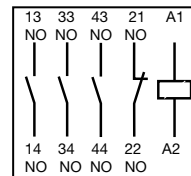
TBC7-31-..

Mini contactor relays



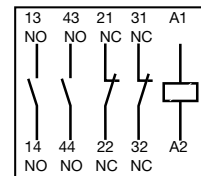
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TKC6-40-..



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TKC6-31-..

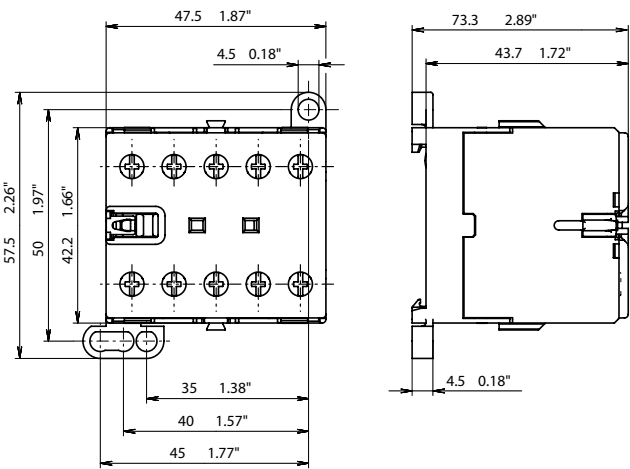


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TKC6-22-..

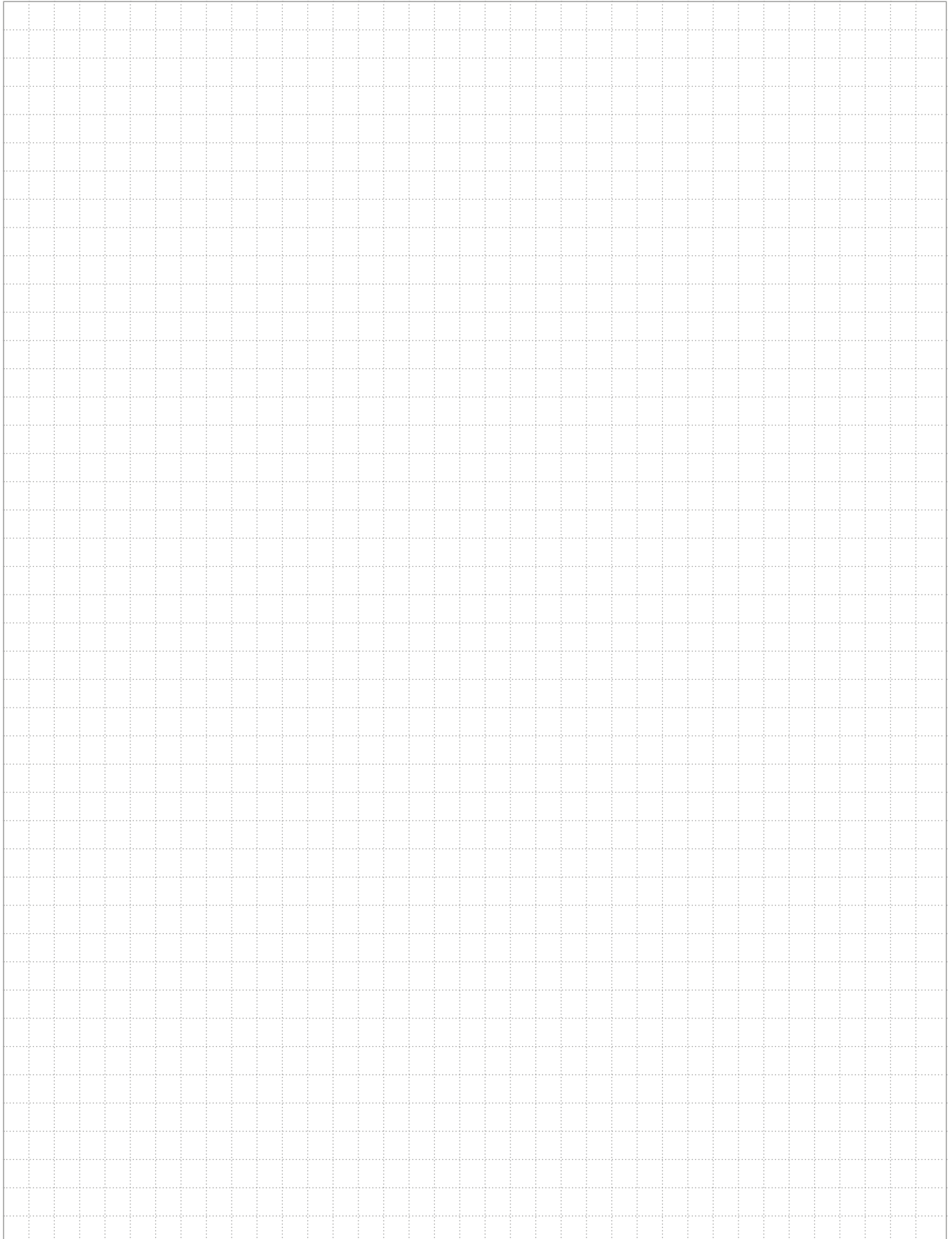
Mini contactors and contactor relays

Dimension

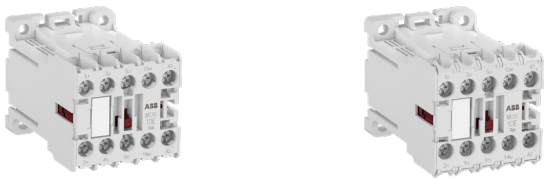


TBC7 3 and 4-pole mini contactors, TKC6 4-pole mini contactor relays

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)
		θ ≤ 55 °C	A	20	20	20	20
UL/CSA	3-phase motor rating	55 ≤ θ ≤ 70 °C	A	16	16	16	16
		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
	General use rating	500-600 V AC	hp	5	10	5	10
		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

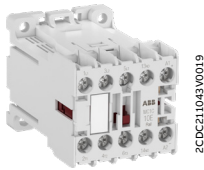


			Screw terminals for standard ferrules	Screw terminals for ring tongue ferrules	
DC Control supply					
4-pole contactor relays		Coil consumption 4 W	Type	MCRC..TW..-RAIL	MCRC..RW..-RAIL
IEC	Rated operational current AC-15	240 V	A	6	6
		400 V	A	4	4
		500 V	A	2.5	2.5
		690 V	A	1.5	1.5
	Rated operational 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

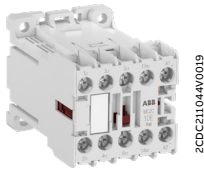
4 to 5.5 kW

DC operated



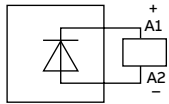
MC1C310AT-RAIL

2CDC211043V0019



MC2C310AT-RAIL

2CDC211044V0019



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 kW	3-phase motor rating 480 V AC-1 A hp	General use rating 600 V AC A				Pkg (1 pce) kg

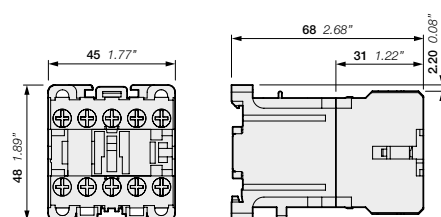
MC1C-RAIL mini contactors

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



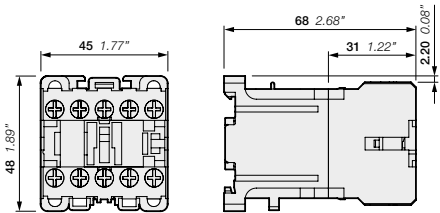
MC2C-RAIL 4-pole mini contactors are a high performance but space saving solution for the control of small motors and resistive loads up to 690 V AC and 220 V DC and comply with the latest railway rolling stock standards.

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	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current θ ≤ 55 °C	3-phase motor rating 480 V	General use rating 600 V AC	Uc min ... Uc max (1)				Pkg (1 pce)
AC-1							
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%)



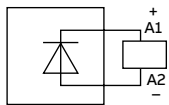
Main dimensions mm, inches

MCRC-RAIL 4-pole mini contactor relays for standard ferrules

DC operated



MCRC040AT-RAIL



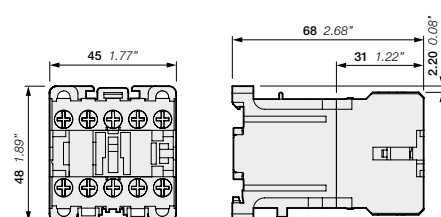
MCRC-RAIL 4-pole mini contactor relays are a high performance but space saving solution used for control functions or for switching small loads up to 6 A.

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) kg
V DC				
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

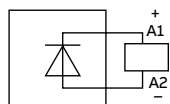
DC operated



MC1C310AR-RAIL



MC2C310AR-RAIL



MC1C..R, MC2C..R-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	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power	current $\theta \leq 55^\circ\text{C}$	3-phase motor rating	General use rating	Uc min ... Uc max (1)				Pkg (1 pce)
400 V AC-3 kW	AC-1 A	480 V hp	600 V AC A	V DC				kg

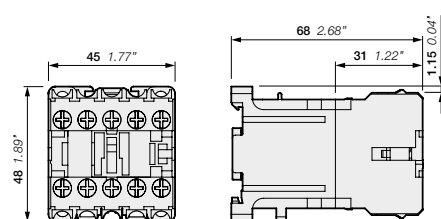
MC1C..R-RAIL mini contactors

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%)

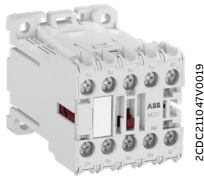


MC1C..R, MC2C..R-RAIL

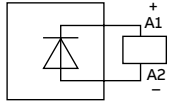
Main dimensions mm, inches

MC1C..R-RAIL 4-pole mini contactors for ring tongue ferrules

DC operated



MC1C400AR-RAIL



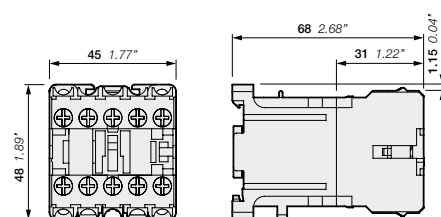
MC1C..R-RAIL 4-pole mini contactors are a high performance but space saving solution for the control of small motors and resistive loads up to 690 V AC and 220 V DC and comply with the latest railway rolling stock standards.

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	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
AC-1 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%)

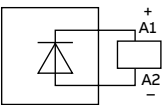


MC1C..R-RAIL

Main dimensions mm, inches

MC2C..R-RAIL 4-pole mini contactors for ring tongue ferrules

5.5 kW
DC operated



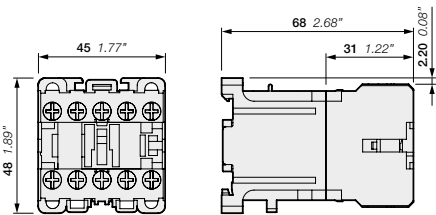
MC2C..R-RAIL 4-pole mini contactors are a high performance but space saving solution for the control of small motors and resistive loads up to 690 V AC and 220 V DC and comply with the latest railway rolling stock standards.

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	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
AC-1 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%)

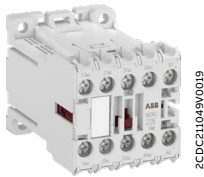


MC2C..R-RAIL

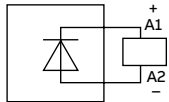
Main dimensions mm, inches

MCRC..R-RAIL 4-pole mini contactor relays for ring tongue ferrules

DC operated



MCRC040AR-RAIL



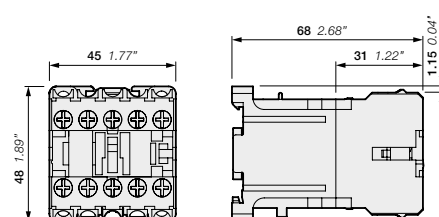
MCRC..R-RAIL 4-pole mini contactor relays are a high performance but space saving solution used for control functions or for switching small loads up to 6 A.

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)	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
VDC				
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%)

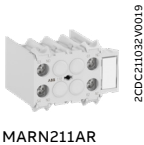
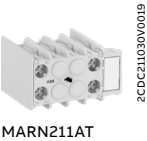


MCR..R-RAIL

Main dimensions mm, inches

Auxiliary contact blocks for MC1-RAIL and MC2-RAIL mini contactors

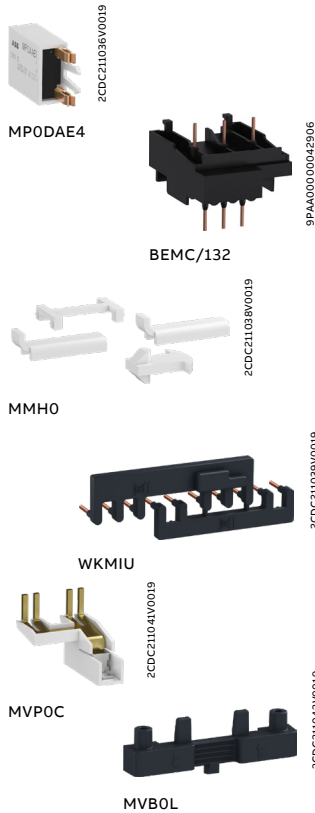
With screw terminals and special screw terminals for ring tongue ferrules



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	2 0	MARN220AT	1SAL100994R9906	0.030
Contacts in accordance with EN 50005	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	2 0	MARN220AR	1SAL103349R9906	0.030
Contacts in accordance with EN 50005	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



Suitable for	Rated control circuit voltage			Protection type	Type	Order code	Pkg qty	Weight (1 pce)
	Uc							
	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

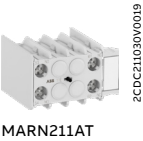
Parallel connecting link								
All MC1 and MC2 variants					MVP0C	1SAL100600R9906	1	0.010

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

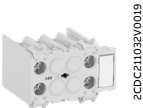
With screw terminals and special screw terminals for ring tongue ferrules



MARN211AT



MARN440AT



MARN211AR

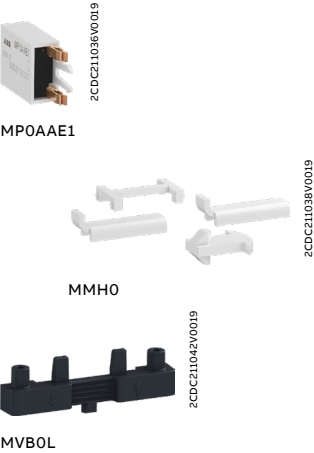


MARN440AR

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



Suitable for	Rated control circuit voltage			Protection type	Type	Order code	Pkg qty	Weight (1 pce)
	Uc							
	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 U _e max		690 V AC, 440 V DC	
Rated frequency (without derating)		DC or 50 / 60 Hz	
Conventional free-air thermal current I _{th} acc. to IEC/EN 60947-4-1, open contactors, $\theta \leq 55^\circ\text{C}$, with conductor cross-sectional area		20 A	
AC-1 Utilization category for air temperature close to contactor $\theta \leq 55^\circ\text{C}$			
I _e / Rated operational current AC-1	230 V	20 A	
U _e max $\leq 690\text{ V}$, 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 $55 < \theta \leq 70^\circ\text{C}$			
I _e / Rated operational current AC-1	230 V	16 A	
U _e max $\leq 690\text{ V}$, 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 $\theta \leq 55^\circ\text{C}$			
I _e / Rated operational current AC-3	230 V	9 A	12 A
 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
 1500 r.p.m. 50 Hz	400 V	4 kW	5.5 kW
 1800 r.p.m. 60 Hz	500 V	4 kW	5.5 kW
 3-phase motors	690 V	4 kW (1)	4 kW
AC-4 Utilization category for air temperature close to contactor $\theta \leq 55^\circ\text{C}$			
I _e / Rated operational current AC-4	230 V	9 A	
 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	
 1500 r.p.m. 50 Hz	400 V	4 kW (1)	
 1800 r.p.m. 60 Hz	500 V	4 kW	
 3-phase motors	690 V	4 kW (1)	
DC-1 Utilization category for air temperature close to contactor $\theta \leq 55^\circ\text{C}$			
I _e / 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 $\theta \leq 55^\circ\text{C}$			
I _e / 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 $\theta \leq 55^\circ\text{C}$			
I _e / 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 I _e AC-3 acc. to IEC/EN 60947-4-1, 12 x I _e AC-4 acc. to IEC/EN 60947-4-1	
Rated breaking capacity		8 x I _e AC-3 acc. to IEC/EN 60947-4-1, 10 x I _e 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 I _{cw} at 40 °C ambient temperature, in free air from a cold state	0.1 s	500 A	
	10 s	72 A	96 A
Maximum breaking capacity cos $\phi = 0.45$	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 $\theta \leq 40\text{ }^{\circ}\text{C}$			
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 $\theta \leq 40\text{ }^{\circ}\text{C}$			
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 U_i			
acc. to IEC/EN 60947-4-1		750 V	
acc. to UL/CSA 60947-4-1		600 V	
Rated impulse withstand voltage U_{imp}		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 U _e max	690 V AC, 440 V DC	
Rated frequency (without derating)	DC or 50 / 60 Hz	
Conventional free-air thermal current I _{th} θ ≤ 70 °C	16 A	
I _e / Rated operational current AC-15	240 V	6 A
	400 V	4 A
	500 V	2.5 A
	690 V	1.5 A
I _e / 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 mm ²
	2 x	0.75 ... 2.5 mm ²
 Flexible without ferrule	1 or 2 x	0.75 ... 2.5 mm ²
 Flexible with ferrule	1 x	0.75 ... 2.5 mm ²
 (insulated or not)	2 x	0.75 ... 1.5 mm ²
 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
Coil terminals		
 Rigid: solid	1 or 2 x	0.75 ... 2.5 mm ²
	1 or 2 x	0.75 ... 2.5 mm ²
 Flexible without ferrule	1 x	0.75 ... 2.5 mm ²
 Flexible with ferrule	2 x	0.75 ... 1.5 mm ²
 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

Contactors 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 U_e max		690 V AC, 440 V DC
Rated frequency (without derating)		DC or 50 / 60 Hz
Conventional free-air thermal current $I_{th} \theta \leq 70^\circ\text{C}$		16 A
I_e / Rated operational current AC-15	240 V	6 A
	400 V	4 A
	500 V	2.5 A
	690 V	1.5 A
I_e / 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

Contactors 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

Contact relay types	DC operated	MCRC
Rated insulation voltage U_i		
acc. to IEC/EN 60947-5-1		750 V
acc. to UL/CSA 60947-5-1		600 V
Rated impulse withstand voltage U_{imp}		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

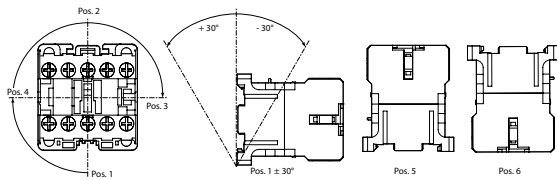
Magnet system characteristics for MCRC contactor relays

Contact relay types	DC operated	MCRC
Coil operating limits acc. to IEC/EN 60077-1	VC1	0.7 ... 1.25 x U_c
DC supply	VC3	0.85 ... 1.1 x U_c
DC control voltage		
Rated control circuit voltage U_c		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 mm ²
 Flexible without ferrule	2 x	0.75 ... 2.5 mm ²
 Flexible with ferrule	1 or 2 x	0.75 ... 2.5 mm ²
 Flexible with ferrule (insulated or not)	1 x	0.75 ... 2.5 mm ²
 Lugs	2 x	0.75 ... 1.5 mm ²
	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
Coil terminals		
 Rigid: solid	1 or 2 x	0.75 ... 2.5 mm ²
 Flexible without ferrule	1 or 2 x	0.75 ... 2.5 mm ²
 Flexible with ferrule	1 x	0.75 ... 2.5 mm ²
 Flexible with ferrule (insulated or not)	2 x	0.75 ... 1.5 mm ²
 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 U _e max	690 V AC, 440 V DC	
Rated frequency (without derating)	DC or 50 / 60 Hz	
Conventional free-air thermal current I _{th} θ ≤ 55 °C	10 A	
I _e / 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

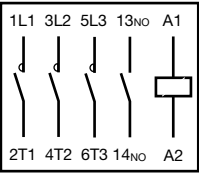
Types	MARN	
Standards	UL/CSA 60947-1, UL/CSA 60947-5-1	
Max. operational voltage	600 V AC	
Pilot duty	A600, Q600	

Connection characteristics

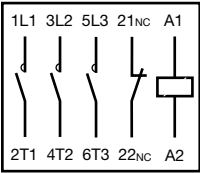
Terminals	 	
	Screw terminals with cable clamp	Conductors with insulated ring tongue ferrule
Connection capacity		
Auxiliary terminals		
 Rigid: solid	1 or 2 x	0.75 ... 2.5 mm ²
 Flexible without ferrule	1 or 2 x	0.75 ... 2.5 mm ²
 Flexible with ferrule	1 x	0.75 ... 2.5 mm ²
 (insulated or not)	2 x	0.75 ... 1.5 mm ²
 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

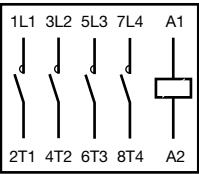


MC...C310A-RAIL

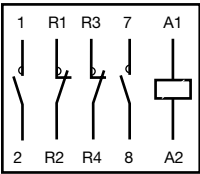


MC...C301A-RAIL

MC...RAIL 4-pole mini contactors

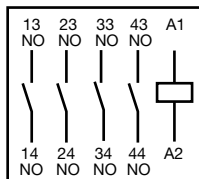


MC...C400A-RAIL

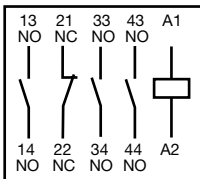


MC...CB00A-RAIL

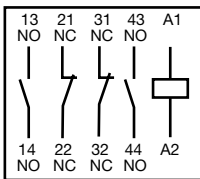
MC...RAIL 4-pole mini contactor relays



MCRC040A-RAIL



MCRC031A-RAIL

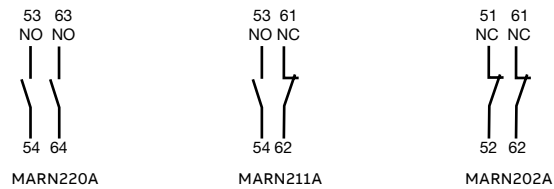


MCRC022A-RAIL

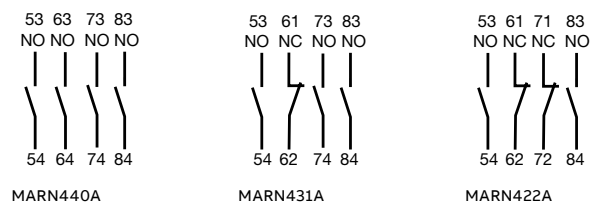
Auxiliary contact blocks for MC1-RAIL and MC2-RAIL mini contactors

Terminal marking and product positioning

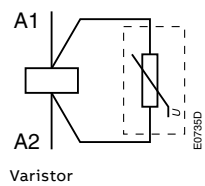
MACN..., MARN.. front mounted 2-pole auxiliary contact block



MACN..., MARN.. front mounted 4-pole auxiliary contact block

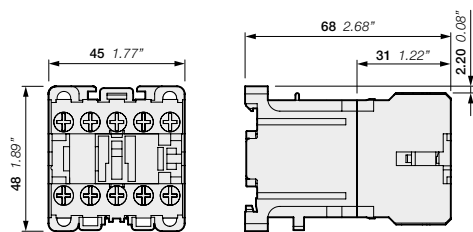


Surge suppressors

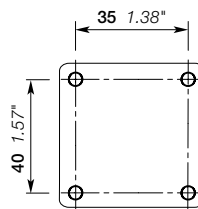


MC..-RAIL mini contactors and MCR..-RAIL mini contactor relays - DC operated with specific screw terminals for ring tongue ferrules

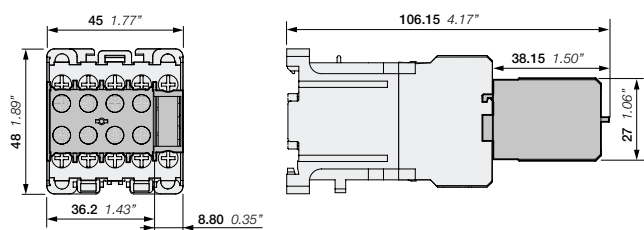
Dimensions



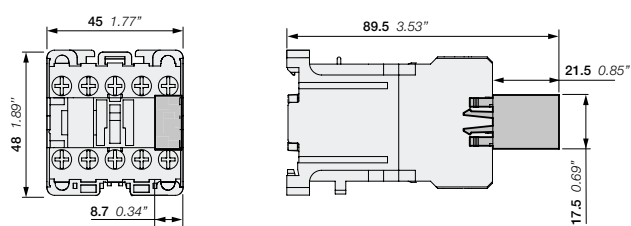
MC1C-RAIL, MC2C-RAIL, MCRC-RAIL, MC1C..R-RAIL, MC2C..R-RAIL, MCRC..R-RAIL



Drilling plan

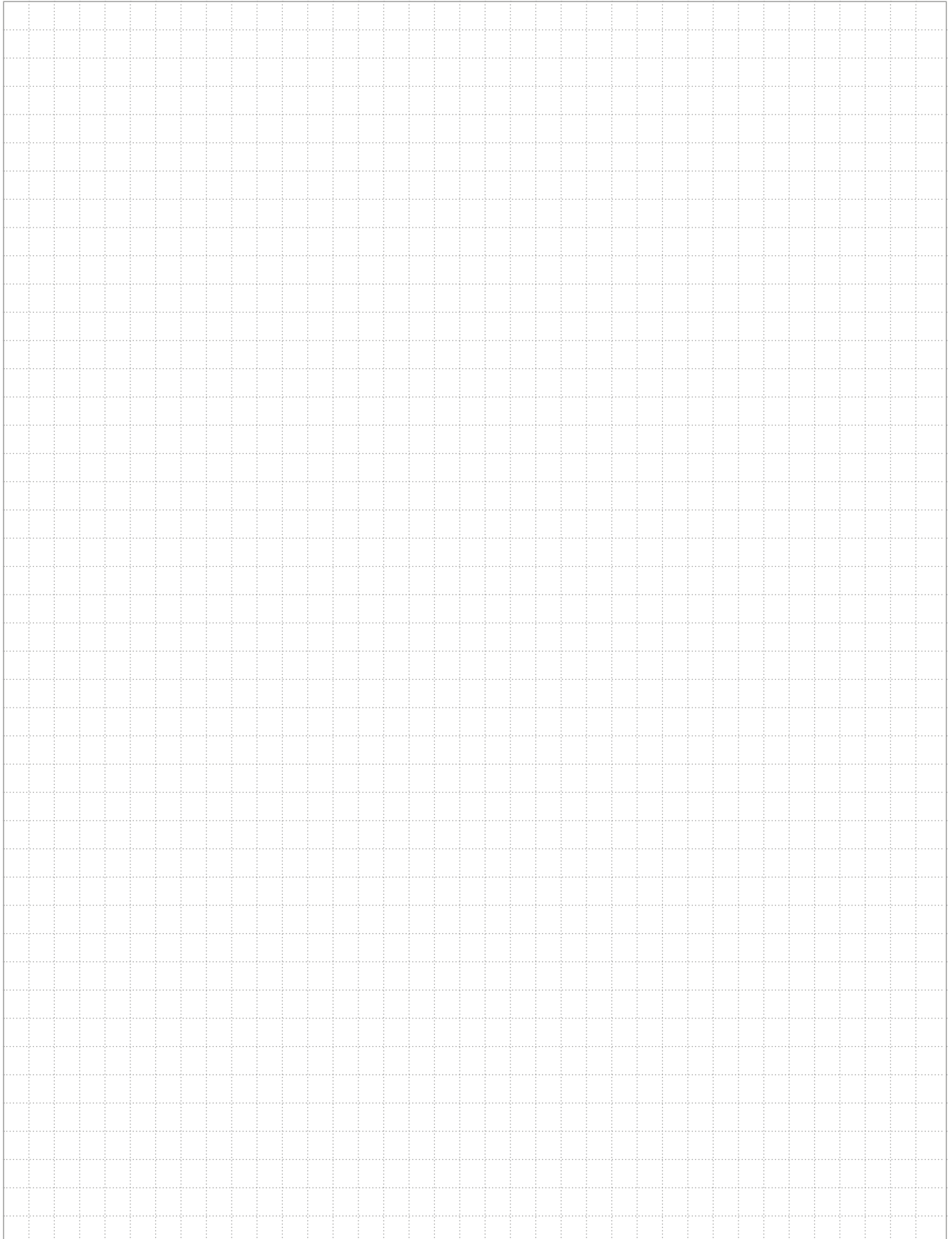


MC1C-RAIL, MC2C-RAIL, MC1C..R-RAIL, MC2C..R-RAIL,
+ MARN2.. 2-pole auxiliary contact block
MCRC-RAIL, MCRC..R-RAIL
+ MARN..2 and 4-pole auxiliary contact block



MC1C-RAIL, MC2C-RAIL, MCRC-RAIL, MC1C..R-RAIL, MC2C..R-RAIL,
MCRC..R-RAIL
+MP0A surge suppressor

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

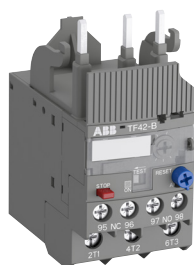


For direct product details information, use product type or order code, ex:

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.

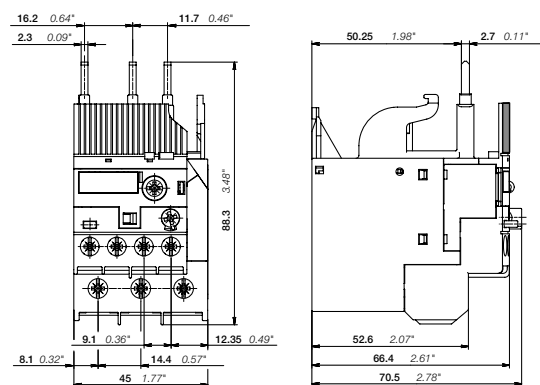
The thermal overload relays are three pole relays with bimetal tripping elements. The motor current flows through the bimetal tripping elements and heats them directly and indirectly. In case of an overload (over current), the bimetal elements bent as a result of the heating. This leads to a release 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 separate mounting kit.

Setting range	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce)
A					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

2CDC232005F0009

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

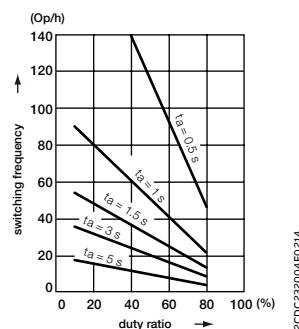
Main circuit – Utilization characteristics according to IEC/EN

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	
		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	
Group mounting	On request (1)	
Degree of protection	Housing	IP20
	Main circuit terminals	IP10

(1) See Application note 1SAC200122W0001

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 mm ²	1.5 ... 2.5 mm ² or 2.5 ... 10 mm ² (2)	
 Flexible with insulated ferrule	1 x or 2 x	0.75 ... 4 mm ²	2.5 ... 4 mm ² or 4 ... 6 mm ² (2)	
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 mm ²
 Flexible with ferrule	1 x or 2 x	0.75 ... 2.5 mm ²
 Flexible with insulated ferrule	1 x	0.75 ... 2.5 mm ²
	2 x	0.75 ... 1.5 mm ²
 Flexible	1 x or 2 x	0.75 ... 1 mm ² or 1 ... 2.5 mm ² (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)	

(2) 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
- Can be directly mounted on AF40..B up to AF65..B or can be used in combination with a separate mounting kit DB65.

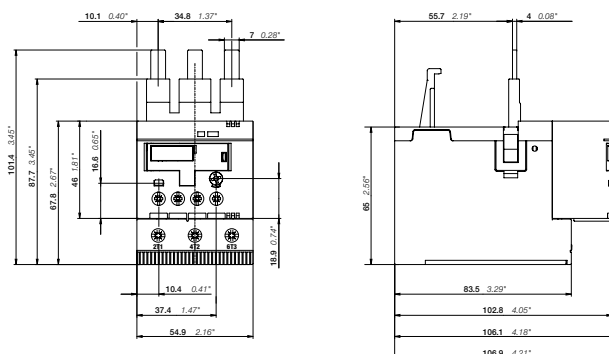
Setting range	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
A					

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

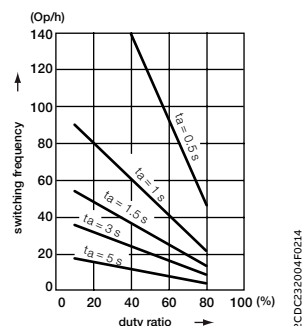
Main circuit – Utilization characteristics according to IEC/EN

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	
		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	
Group mounting	On request (1)	
Degree of protection	Housing	IP20
	Main circuit terminals	IP10

(1) See Application note 1SAC200122W0001

Electrical connection

Main circuit

Type	TF65-B	
Connecting capacity		
 Rigid	1 x or 2 x	2.5 ... 16 mm ²
	1 x	2.5 ... 35 mm ²
 Flexible with ferrule	1 x or 2 x	2.5 ... 10 mm ²
	1 x	2.5 ... 35 mm ²
 Flexible with insulated ferrule	1 x or 2 x	2.5 ... 10 mm ²
	1 x	2.5 ... 35 mm ²
 Flexible	1 x or 2 x	2.5 ... 16 mm ²
	1 x	2.5 ... 35 mm ²
	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 mm ²
 Flexible with ferrule	1 x or 2 x	0.75 ... 4 mm ²
 Flexible with insulated ferrule	1 x	0.75 ... 2.5 mm ²
	2 x	0.75 ... 1.5 mm ²
 Flexible	1 x or 2 x	0.75 ... 1 mm ² or 1 ... 2.5 mm ²
	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
- Can be directly mounted on AF80..B, AF96..B with screw terminals for standard ferrules or can be used in combination with a separate mounting kit DB96.

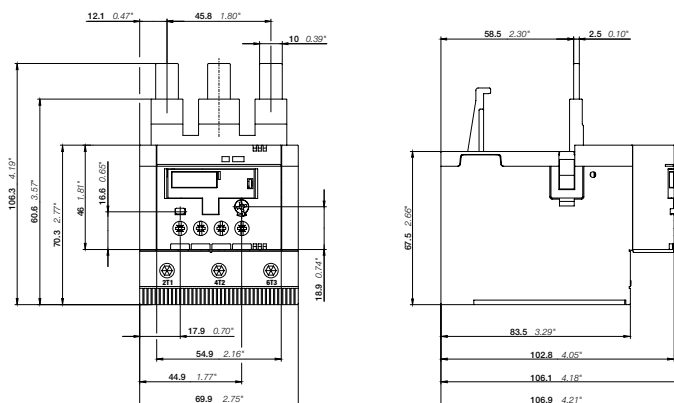
Setting range	Short-circuit protective device	Trip class	Type	Order code	Weight (1 pce) kg
A					

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

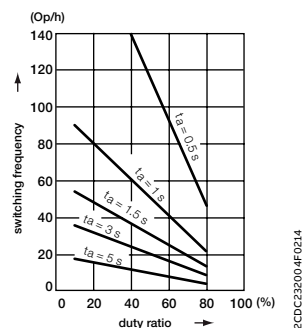
Main circuit – Utilization characteristics according to IEC/EN

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

2CD C23200-4F024

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		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	
Group mounting	On request (1)	
Degree of protection	Housing	IP20
	Main circuit terminals	IP10

(1) See Application note 1SAC200122W0001

Electrical connection

Main circuit

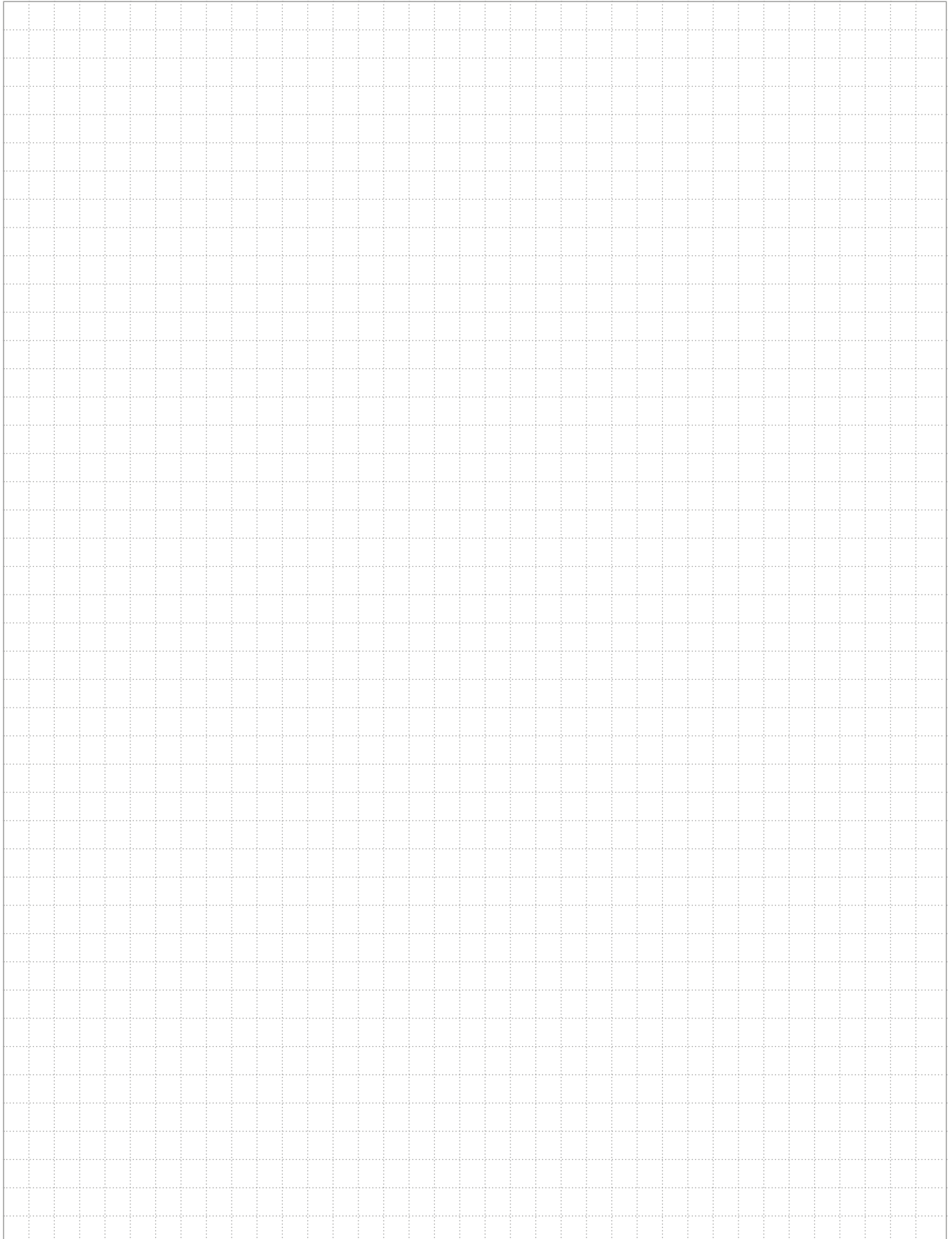
Type	TF96-B	
Connecting capacity		
 Rigid	1 x or 2 x	6 ... 35 mm ²
	1 x	6 ... 50 mm ²
 Flexible with ferrule	1 x or 2 x	6 ... 35 mm ²
	1 x	6 ... 50 mm ²
 Flexible with insulated ferrule	1 x or 2 x	6 ... 16 mm ²
	1 x	6 ... 50 mm ²
 Flexible	1 x or 2 x	6 ... 35 mm ²
	1 x	6 ... 50 mm ²
	1 x	AWG 8 ... 1
	2 x	AWG 8 ... 3
	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 mm ²
 Flexible with ferrule	1 x or 2 x	0.75 ... 4 mm ²
 Flexible with insulated ferrule	1 x	0.75 ... 2.5 mm ²
	2 x	0.75 ... 1.5 mm ²
 Flexible	1 x or 2 x	0.75 ... 1 mm ² or 1 ... 2.5 mm ²
	1 x or 2 x	AWG 18 ... 12
	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



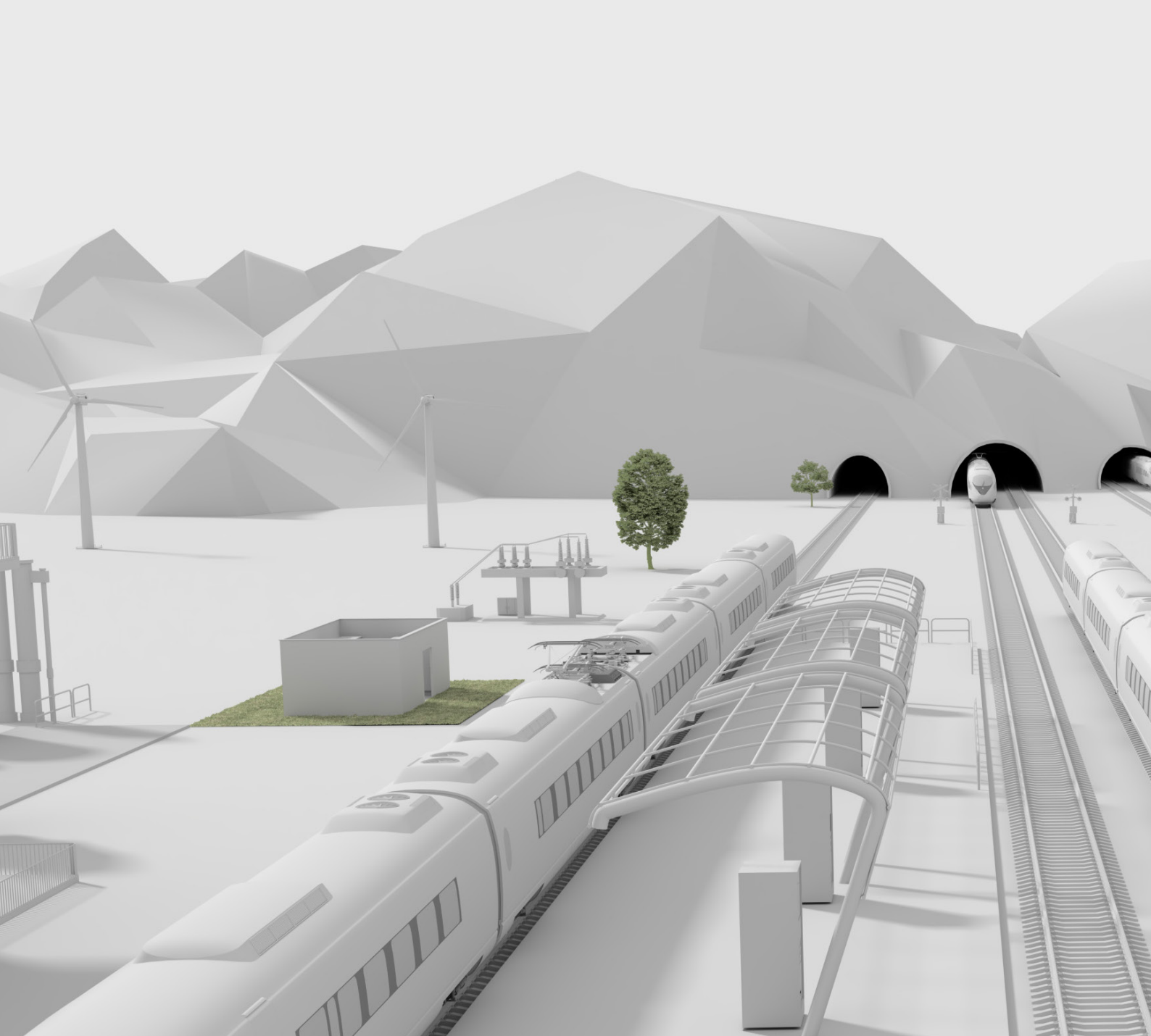
Electronic Relays and Control

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

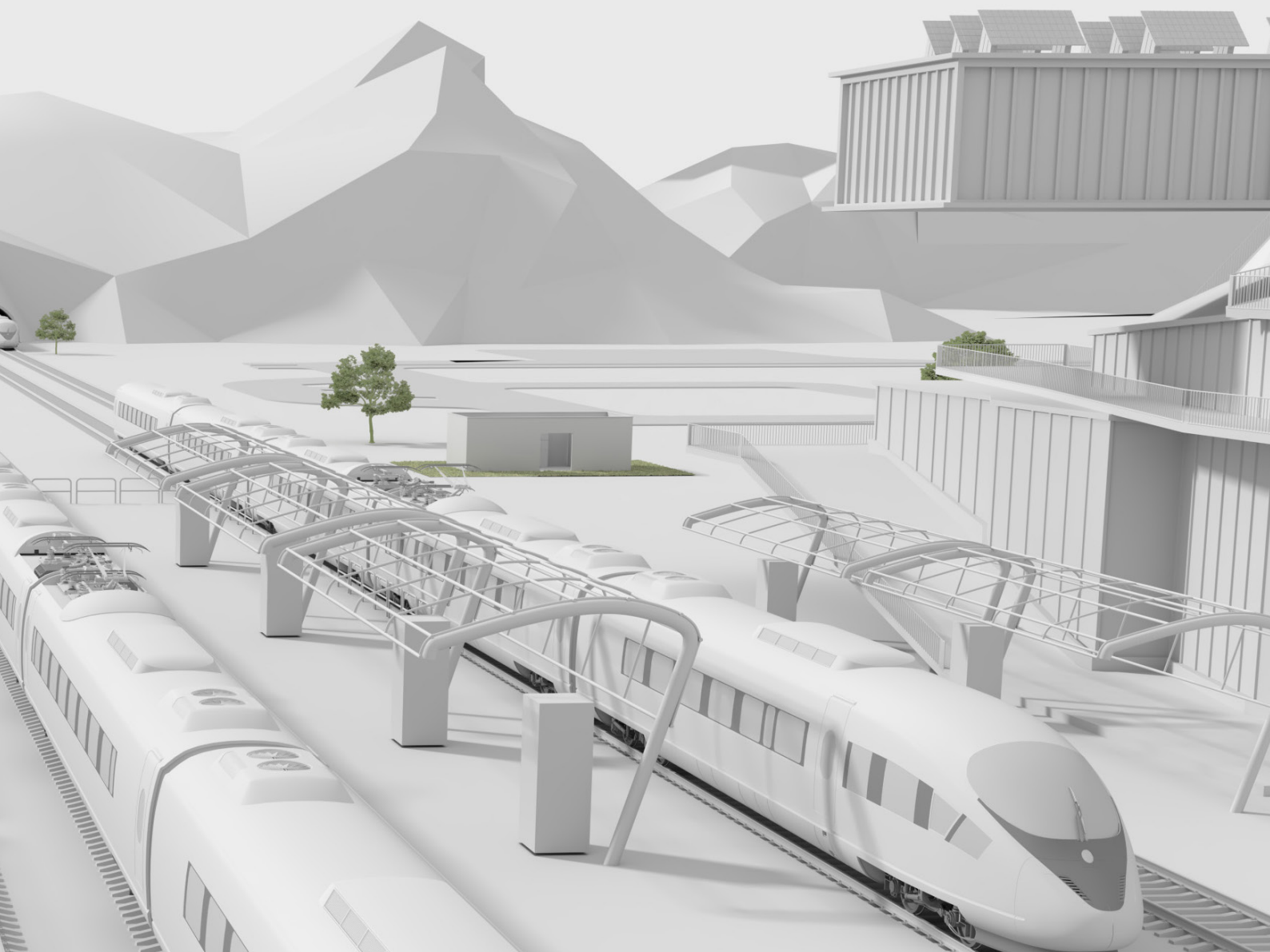


By developing solutions and products which are innovative, reliable, safe and easy to install, we are consistently meeting the high standard of safety expectations for transportation. We can contribute to the increased efficiency of your equipment and support transport operators throughout the whole 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.



Electrical, mechanical and environmental requirements

The following table shows the selected products from the Electronic Relays and Controls range which fulfill to some extent the train construction requirements.

Order code		Type	EN 50155						Temperature class	Shock and vibration EN 61373	Altitude class EN 50125-1	Coated PCB Board
			Voltage supply									
			Supply from accumulator battery	Supply by a static converter or a rotating set	Interrupts							
					S1 no interruptions	S2 interruptions of up to 10 ms	C1 0.6 x U _n over 100 ms	C2 0 x U _n over 30 ms				
Time relays												
1SVR7x0030R3300	CT-MXS.22x	48 V DC	24-110 V DC	230 V AC / 50 Hz	■	■	■	■	T3 ⁵⁾	Cat. 1, Class B	AX max. 2000 m ¹⁾	no
1SVR7x0010R0200	CT-MFS.21x	■			■	■	-					
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												
1SVR7x0885R3300	CM-MPS.21x	n/a ²⁾	3 x 400 V AC / 50 Hz ⁴⁾	■	■	2)	2)	T3 ⁵⁾	Cat.1, Class B	AX max. 2000 m ¹⁾	no	
1SVR7x0884R3300	CM-MPS.41x			■	■	2)	2)					
1SVR7x0884R4300	CM-MPS.43x			■	■	2)	2)					
1SVR7x0824R9300	CM-PFS.x			■	■	2)	2)					
1SVR7x0794R3300	CM-PVS.41x			■	■	2)	2)					
1SVR7x0794R1300	CM-PVS.31x		3 x 230 V AC / 50 Hz ⁴⁾	■	■	2)	2)					
Insulation monitoring relays												
1SVR7x0660R0100	CM-IWS.1x	24-110 V DC	230 V AC / 50 Hz	■	■	■	■	T3 ⁵⁾	Cat. 1, Class B	AX max. 2000 m ¹⁾	no	
1SVR7x0670R0200	CM-IWS.2x			■	■	■	■					
1SVR7x0660R0200	CM-IWN.1x			■	■	-	■					
1SVR7x0669R9400	CM-IVN.x	n/a ³⁾	n/a ³⁾	n/a ³⁾	n/a ³⁾	n/a ³⁾	n/a ³⁾					
1SVR7x0660R0200	CM-IWN.1x 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 - if continuous ambient temperature of +70 °C is expected, derate the output relay values to AC-15=1.5 A, DC-13=1.0 A and I_{the}=2.5 A

Order code and product type

Order code: 1SVR7x.....

x: 3/5 = screw connection

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

Product type: CM-IWN.1x

x: S = screw connection

x: P = Easy connect / push-in connection

Time relays

Ordering details



CT-MVS.21P

2CDC251024V0001



CT-ERS.21P

2CDC251030V0001

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
- 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)	n / n	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

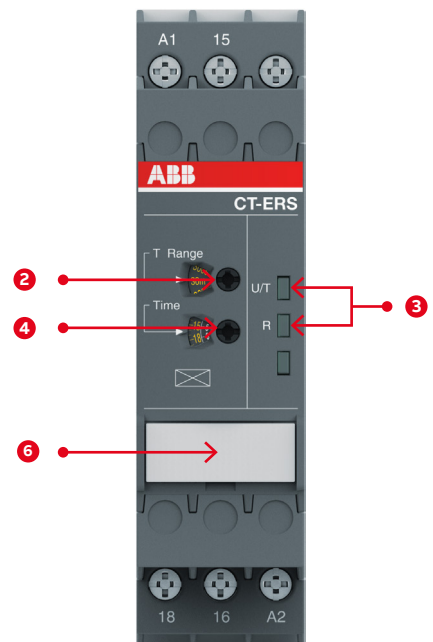
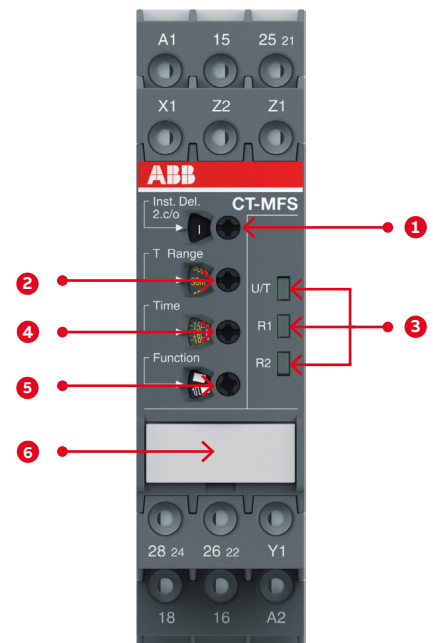
* S: screw connection
P: push-in / easy connect

	Type*	Order number*											
		CT-MVS.21●	1SVR7#0020R0200	CT-MXS.22●	1SVR7#0030R3300	CT-MFS.21●	1SVR7#0010R0200	CT-ERS.21●	1SVR7#0100R0300	CT-APS.21●	1SVR7#0180R0300	CT-ARS.21●	1SVR7#0120R3300
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				■									
ON/OFF function		■		■	■								
Impulse-ON		■			■								
Impulse-ON, accumulative					■								
Impulse-OFF w. aux. voltage		■			■								
Impulse-OFF w. aux. voltage, accumulative					■								
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				■									
Pulse former		■			■								
Star-delta change-over with impulse		■			■								
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	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



CM-SRS.22S

2CDP251054 V00011



CM-ESS.1S

2CDP251090 V00011

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
- 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

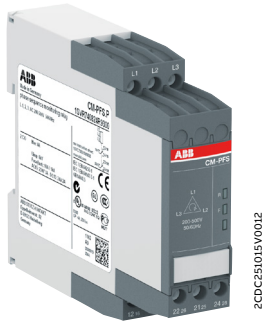
Rated control supply voltage	Function configurable	Tripping delay T_v	Outputs	Measuring range	Type *	Order code
24-240 V AC/DC	☒ ☒	without	1 c/o (SPDT) contact	3-30 mA 10-100 mA 0.1-1 A	CM-SRS.11S	1SVR730840R0200
					CM-SRS.11P	1SVR740840R0200
24-240 V AC/DC	☒ ☒	adjustable 0 or 0.1-30 s	2 c/o (SPDT) 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

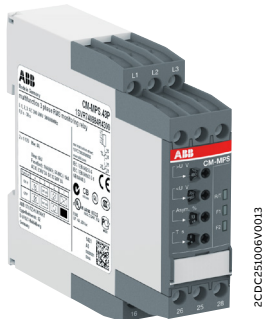
P: push-in / easy connect

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
- 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

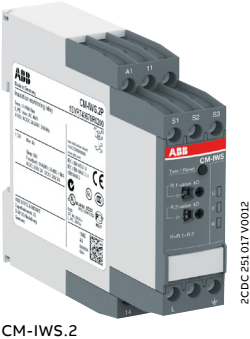
Ordering details - multi function devices

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
3x300-500 V AC (L-L)					CM-MPS.21P	1SVR740885R3300
					CM-MPS.41S	1SVR730884R3300
					CM-MPS.41P	1SVR740884R3300
3x300-500 V AC (L-L)			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 $U_n = 400\text{ V AC}$
- Superimposed DC signal
- One measuring range 1–100 k Ω
- Precise adjustment of the threshold value in 1 k Ω steps
- Interrupted wire detection
- Fault storage/latching configurable by control input
- 1 c/o (SPDT) contact, closed-circuit principle

 Classifications:
EN 50155 (applicable parts),
IEC 60571 (applicable parts), EN 45545-2

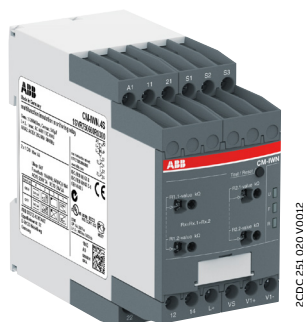
Ordering details - CM-IWS

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 μ F	1 c/o (SPDT) contact	1-100 k Ω	CM-IWS.1S	1SVR730660R0100
					CM-IWS.1P	1SVR740660R0100
24-240 V AC/DC	0-400 V AC	10 μ F		1-100 k Ω	CM-IWS.2S	1SVR730670R0200
					CM-IWS.2P	1SVR740670R0200

* S: screw connection
P: push-in / easy connect

Insulation monitoring relays

Ordering details



CM-IWN.1

2CDC 251 020 V0012

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 k $\square$
 - 1-100 k $\square$ + 2-200 k $\square$
- One or two configurable c/o contacts
- Precise adjustment of the measuring value in 1 or 2 k $\square$ 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_{sn} (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 μ F	2 x 1 or 1 x 2 c/o (SPDT) contacts configurable	1-100 k $\square$ 2-200 k $\square$ (activated / de-activated by DIP-switch)	CM-IWN.1S	1SVR750660R0200
					CM-IWN.1P	1SVR760660R0200

Ordering details - Coupling unit expansion for CM-IVN.xS/P

Rated control supply voltage = measuring voltage	Nominal voltage U_n 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.



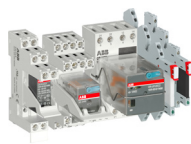
Universal Motor Controller

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 starting 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:

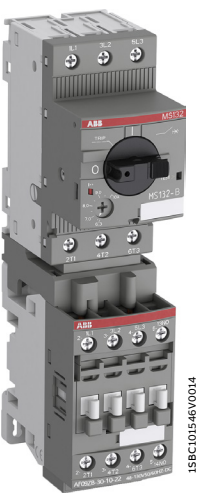
In order to confirm your starter combination ratings according to ABB's latest coordination test results, or to see other coordination of components please refer to the above mentioned SOC tool. SOC tool get constant updates and additions

General remarks applicable to all tables

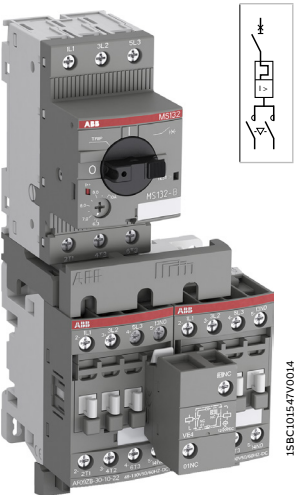
- Each table is defined for a maximum ambient temperature of 40 °C. For higher temperatures, apply a derating factor according to the following rules:
- Fuses: factor of 0.8 applied to In for an ambient temperature of 70 °C
- MCCBs and MCBs: factor of 0.8 applied to In for an ambient temperature of 60 °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 le 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



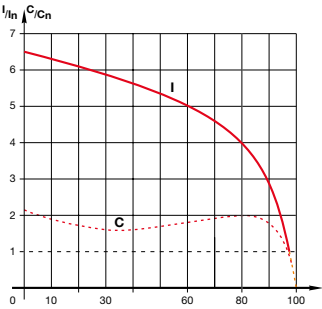
DOL starter
MS132-10B + BEA16-4
+ AF09ZB-30-10



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:

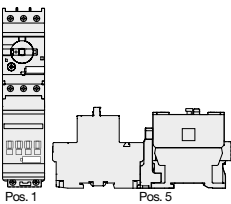
Type 1: In short-circuit conditions, the contactor or starter does not endanger persons or installations and will not be able to then operate without being repaired or having parts replaced.

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.

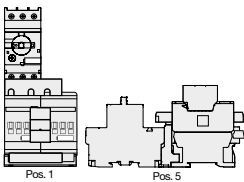
Main Technical Data

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		690 V acc. to IEC 60947-4-1 600 V acc. to UL / CSA
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 IEC 60715, EN 60715	Manual motor starter	on 35 x 7.5 mm or 35 x 15 mm rail
	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 F5116 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



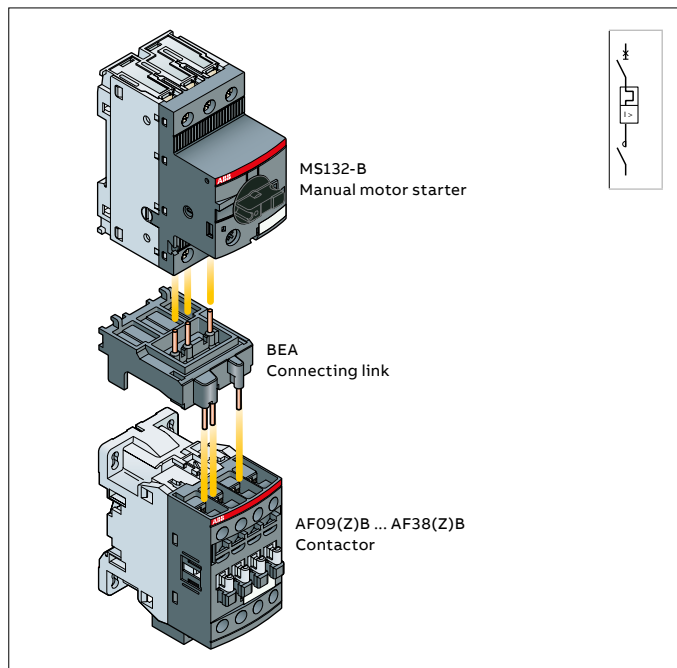
DOL starters



Reversing starters

DOL and reversing starters protected by manual motor starters

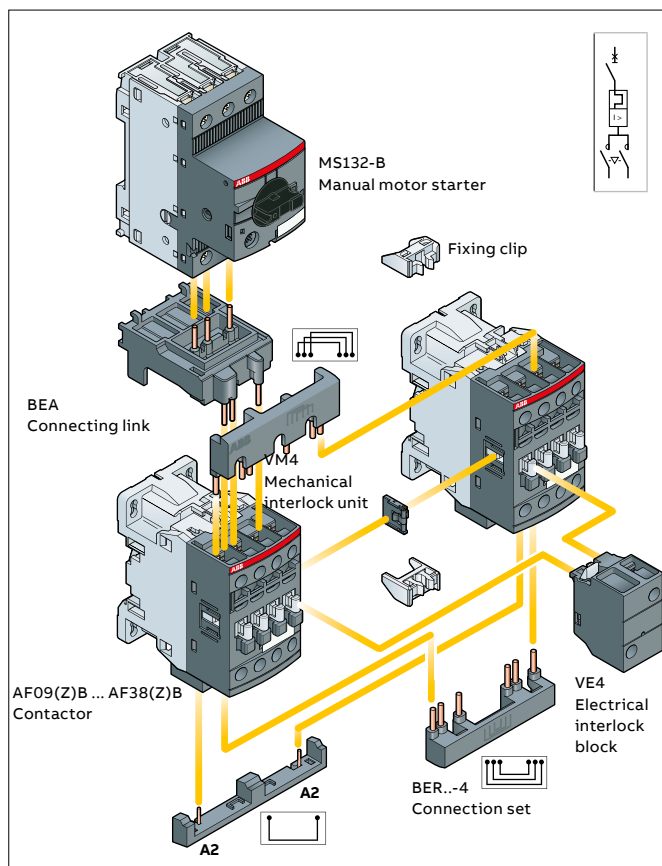
With AF..B contactors - open type version in kit form



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:

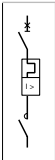
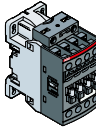
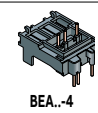
- BEA...-4 connecting link 3-pole insulated: it is used to electrically and mechanically connect MS132-B manual motor starter and AF09(Z)B ... AF38(Z)B contactor, AC or DC operated
- For AF09(Z)B ... AF38(Z)B, use VEM4 mechanical and electrical interlock set for reversing starter in 90 mm width. It includes:
 - 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, $I_q = 16$ 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

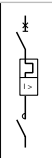
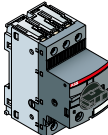
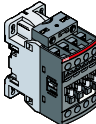
Manual motor starters					Contactors					Accessories			
										 BEA...-4  CA4-10			
IEC		Type	Order code	Current setting range	Magnetic tripping current	Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min.... Uc max. (IEC 60947-4-1)	Type	Order code	Allowed setting current	Type	Order code	
power kW	current A			A	A	VDC	VDC			A			
AC-3, 400 V Rated operational	0.06	0.2	MS132-0.25B	1SAM350200R1002	0.16...0.25	3.10	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	0.25	BEA16-4	1SBN081306T1000
	0.09	0.3	MS132-0.4B	1SAM350200R1003	0.25...0.40	5	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	0.4		
	0.12	0.44	MS132-0.63B	1SAM350200R1004	0.40...0.63	7.90	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	0.63		
	0.18	0.6	MS132-0.63B	1SAM350200R1004	0.40...0.63	7.90	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	0.63		
	0.25	0.85	MS132-1.0B	1SAM350200R1005	0.63...1.00	12.5	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	1		
	0.37	1.1	MS132-1.6B	1SAM350200R1006	1.00...1.60	20	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	1.6		
	0.55	1.5	MS132-1.6B	1SAM350200R1006	1.00...1.60	20	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	1.6		
	0.75	1.9	MS132-2.5B	1SAM350200R1007	1.60...2.50	31.3	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	2.5		
	1.1	2.7	MS132-4.0B	1SAM350200R1008	2.50...4.00	50	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	4		
	1.5	3.6	MS132-4.0B	1SAM350200R1008	2.50...4.00	50	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	4		
	2.2	4.9	MS132-6.3B	1SAM350200R1009	4.00...6.30	78.8	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	6.3		
	3	6.5	MS132-10B	1SAM350200R1010	6.30...10.0	150	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	9		
	4	8.5	MS132-10B	1SAM350200R1010	6.30...10.0	150	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	9		
	5.5	11.5	MS132-12B	1SAM350200R1012	8.00...12.0	180	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF12ZB-30-10-21 AF12ZB-30-10-22 AF12ZB-30-10-23	1SBL156061R2110 1SBL156061R2210 1SBL156061R2310	12		
	7.5	15.5	MS132-16B	1SAM350200R1011	10.0...16.0	240	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF16ZB-30-10-21 AF16ZB-30-10-22 AF16ZB-30-10-23	1SBL176061R2110 1SBL176061R2210 1SBL176061R2310	16		
11	22	MS132-25B	1SAM350200R1014	20.0...25.0	375	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF26ZB-30-00-21 AF26ZB-30-00-22 AF26ZB-30-00-23	1SBL236061R2100 1SBL236061R2200 1SBL236061R2300	25	+	BEA38-4 CA4-10	1SBN082306T2000 1SBN010110R1010
15	29	MS132-32B	1SAM350200R1015	25.0...32.0	480	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF30ZB-30-00-21 AF30ZB-30-00-22 AF30ZB-30-00-23	1SBL276061R2100 1SBL276061R2200 1SBL276061R2300	32			

(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		
												
IEC	Type	Order code	Current setting range	Magnetic tripping current	Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Type (2)	Order code	Allowed setting current	Type	Order code	
AC-3, 400 V Rated operational												
power kW	current A		A	A	VDC	VDC			A			
0.06	0.2	MS132-0.25B	1SAM350200R1002	0.16...0.25	3.10	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	0.25	BEA16-4	1SBN081306T1000
0.09	0.3	MS132-0.4B	1SAM350200R1003	0.25...0.40	5	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	0.4		
0.12	0.44	MS132-0.63B	1SAM350200R1004	0.40...0.63	7.90	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	0.63		
0.18	0.6	MS132-0.63B	1SAM350200R1004	0.40...0.63	7.90	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	0.63		
0.25	0.85	MS132-1.0B	1SAM350200R1005	0.63...1.00	12.5	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	1		
0.37	1.1	MS132-1.6B	1SAM350200R1006	1.00...1.60	20	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	1.6		
0.55	1.5	MS132-1.6B	1SAM350200R1006	1.00...1.60	20	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	1.6		
0.75	1.9	MS132-2.5B	1SAM350200R1007	1.60...2.50	31.3	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	2.5		
1.1	2.7	MS132-4.0B	1SAM350200R1008	2.50...4.00	50	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF26ZB-30-00-21 AF26ZB-30-00-22 AF26ZB-30-00-23	1SBL236061R2100 1SBL236061R2200 1SBL236061R2300	4	+ BEA26-4 CA4-10	1SBN082306T1000 1SBN010110R1010
1.5	3.6	MS132-4.0B	1SAM350200R1008	2.50...4.00	50	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF26ZB-30-00-21 AF26ZB-30-00-22 AF26ZB-30-00-23	1SBL236061R2100 1SBL236061R2200 1SBL236061R2300	4		
2.2	4.9	MS132-6.3B	1SAM350200R1009	4.00...6.30	78.8	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF26ZB-30-00-21 AF26ZB-30-00-22 AF26ZB-30-00-23	1SBL236061R2100 1SBL236061R2200 1SBL236061R2300	6.3		
3	6.5	MS132-10B	1SAM350200R1010	6.30...10.0	150	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF26ZB-30-00-21 AF26ZB-30-00-22 AF26ZB-30-00-23	1SBL236061R2100 1SBL236061R2200 1SBL236061R2300	10		
4	8.5	MS132-10B	1SAM350200R1010	6.30...10.0	150	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF26ZB-30-00-21 AF26ZB-30-00-22 AF26ZB-30-00-23	1SBL236061R2100 1SBL236061R2200 1SBL236061R2300	10		
5.5	11.5	MS132-12B	1SAM350200R1012	8.00...12.0	180	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF26ZB-30-00-21 AF26ZB-30-00-22 AF26ZB-30-00-23	1SBL236061R2100 1SBL236061R2200 1SBL236061R2300	12	+ BEA38-4 CA4-10	1SBN082306T2000 1SBN010110R1010
7.5	15.5	MS132-16B	1SAM350200R1011	10.0...16.0	240	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF30ZB-30-00-21 AF30ZB-30-00-22 AF30ZB-30-00-23	1SBL276061R2100 1SBL276061R2200 1SBL276061R2300	16		
11	22	MS132-25B	1SAM350200R1014	20.0...25.0	375	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF30ZB-30-00-21 AF30ZB-30-00-22 AF30ZB-30-00-23	1SBL276061R2100 1SBL276061R2200 1SBL276061R2300	25		
15	29	MS132-32B	1SAM350200R1015	25.0...32.0	480	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF30ZB-30-00-21 AF30ZB-30-00-22 AF30ZB-30-00-23	1SBL276061R2100 1SBL276061R2200 1SBL276061R2300	32		

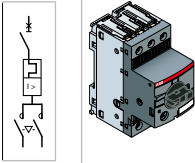
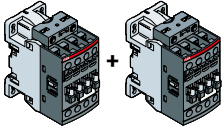
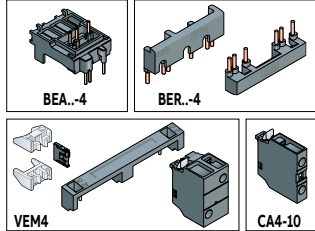
(1) For other control voltages, see "Voltage code table".

(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

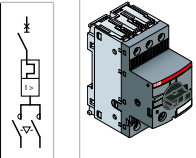
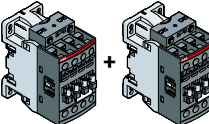
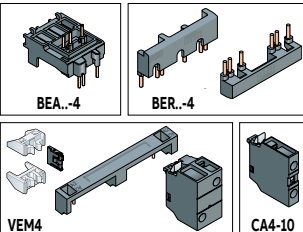
		Manual motor starters			Contactors					Accessories		
												
IEC	Type	Order code	Current setting range	Magnetic tripping current	Supply control voltage U _c (IEC 60077) (1)	Rated control circuit voltage U _c min. ... U _c max. (IEC 60947-4-1)	Type	Order code	Allowed setting current	Type	Order code	
AC-3, 400 V Rated operational power												
power kW	current A		A	A	VDC	VDC			A			
0.06	0.2	MS132-0.25B	ISAM350200R1002	0.16...0.25	3.10	24, 33, 48	20...60	AF09ZB-30-10-21	1SBL136061R2110	0.25	+ BEA16-4 BER16-4 VEM4	1SBN081306T1000 1SBN081311R1000 1SBN030111R1000
						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	ISAM350200R1003	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	ISAM350200R1004	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	ISAM350200R1004	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	ISAM350200R1005	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	ISAM350200R1006	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	ISAM350200R1006	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	ISAM350200R1007	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	ISAM350200R1008	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	ISAM350200R1008	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	ISAM350200R1009	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	ISAM350200R1010	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	ISAM350200R1010	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	ISAM350200R1012	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	ISAM350200R1011	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	ISAM350200R1014	20.0...25.0	375	24, 33, 48	20...60	AF26ZB-30-00-21	1SBL236061R2100	25	+ BEA38-4 BER38-4 VEM4 + 2x CA4-10	1SBN082306T2000 1SBN082311R1000 1SBN030111R1000 1SBN010110R1010
						72, 96, 110	48...130	AF26ZB-30-00-22	1SBL236061R2200			
						220	100...250	AF26ZB-30-00-23	1SBL236061R2300			
15	29	MS132-32B	ISAM350200R1015	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		Type	Order code	Current setting range	Magnetic tripping current	Supply control voltage Uc (IEC 60077) (1) VDC	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1) VDC	Type (2)	Order code	Allowed setting current	Type	Order code	
AC-3, 400 V Rated operational power kW	current A			A	A					A			
0.06	0.2	MS132-0.25B	1SAM350200R1002	0.16...0.25	3.10	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	0.25	+ + + VEM4	1SBN081306T1000 1SBN081311R1000 1SBN030111R1000	
0.09	0.3	MS132-0.4B	1SAM350200R1003	0.25...0.40	5	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	0.4			
0.12	0.44	MS132-0.63B	1SAM350200R1004	0.40...0.63	7.90	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	0.63			
0.18	0.6	MS132-0.63B	1SAM350200R1004	0.40...0.63	7.90	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	0.63			
0.25	0.85	MS132-1.0B	1SAM350200R1005	0.63...1.00	12.5	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	1			
0.37	1.1	MS132-1.6B	1SAM350200R1006	1.00...1.60	20	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	1.6			
0.55	1.5	MS132-1.6B	1SAM350200R1006	1.00...1.60	20	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	1.6			
0.75	1.9	MS132-2.5B	1SAM350200R1007	1.60...2.50	31.3	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF09ZB-30-10-21 AF09ZB-30-10-22 AF09ZB-30-10-23	1SBL136061R2110 1SBL136061R2210 1SBL136061R2310	2.5			
1.1	2.7	MS132-4.0B	1SAM350200R1008	2.50...4.00	50	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF26ZB-30-00-21 AF26ZB-30-00-22 AF26ZB-30-00-23	1SBL236061R2100 1SBL236061R2200 1SBL236061R2300	4	+ + + VEM4 + 2x CA4-10	1SBN082306T1000 1SBN082311R1000 1SBN030111R1000 1SBN010110R1010	
1.5	3.6	MS132-4.0B	1SAM350200R1008	2.50...4.00	50	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF26ZB-30-00-21 AF26ZB-30-00-22 AF26ZB-30-00-23	1SBL236061R2100 1SBL236061R2200 1SBL236061R2300	4			
2.2	4.9	MS132-6.3B	1SAM350200R1009	4.00...6.30	78.8	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF26ZB-30-00-21 AF26ZB-30-00-22 AF26ZB-30-00-23	1SBL236061R2100 1SBL236061R2200 1SBL236061R2300	6.3			
3	6.5	MS132-10B	1SAM350200R1010	6.30...10.0	150	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF26ZB-30-00-21 AF26ZB-30-00-22 AF26ZB-30-00-23	1SBL236061R2100 1SBL236061R2200 1SBL236061R2300	10			
4	8.5	MS132-10B	1SAM350200R1010	6.30...10.0	150	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF26ZB-30-00-21 AF26ZB-30-00-22 AF26ZB-30-00-23	1SBL236061R2100 1SBL236061R2200 1SBL236061R2300	10			
5.5	11.5	MS132-12B	1SAM350200R1012	8.00...12.0	180	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF26ZB-30-00-21 AF26ZB-30-00-22 AF26ZB-30-00-23	1SBL236061R2100 1SBL236061R2200 1SBL236061R2300	12	+ + + VEM4 + 2x CA4-10	1SBN082306T2000 1SBN082311R1000 1SBN030111R1000 1SBN010110R1010	
7.5	15.5	MS132-16B	1SAM350200R1011	10.0...16.0	240	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF30ZB-30-00-21 AF30ZB-30-00-22 AF30ZB-30-00-23	1SBL276061R2100 1SBL276061R2200 1SBL276061R2300	16			
11	22	MS132-25B	1SAM350200R1014	20.0...25.0	375	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF30ZB-30-00-21 AF30ZB-30-00-22 AF30ZB-30-00-23	1SBL276061R2100 1SBL276061R2200 1SBL276061R2300	25			
15	29	MS132-32B	1SAM350200R1015	25.0...32.0	480	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	AF30ZB-30-00-21 AF30ZB-30-00-22 AF30ZB-30-00-23	1SBL276061R2100 1SBL276061R2200 1SBL276061R2300	32			

(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.

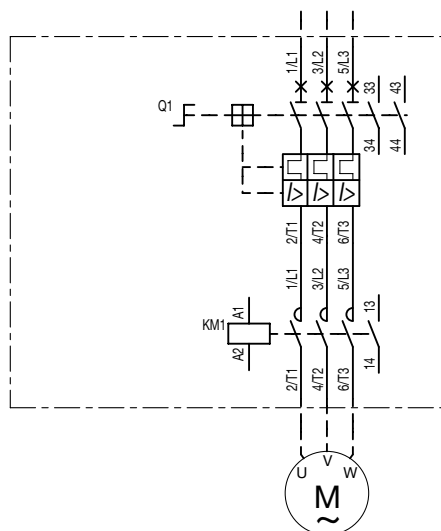
DOL and reversing starters protected by manual motor starters

With AF..B contactors - open type version in kit form

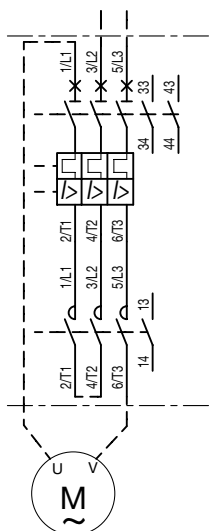
Wiring diagrams

Direct-on-line starters

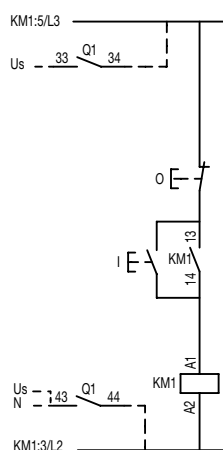
Power circuit



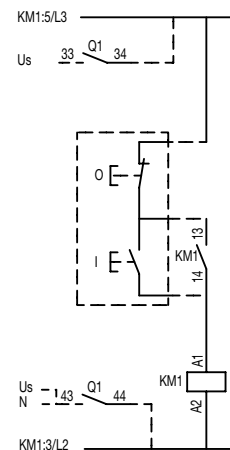
1-phase



AC or DC local control

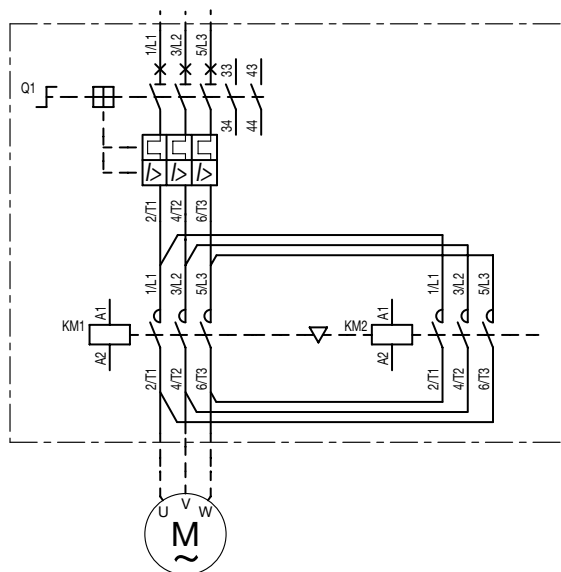


AC or DC remote control

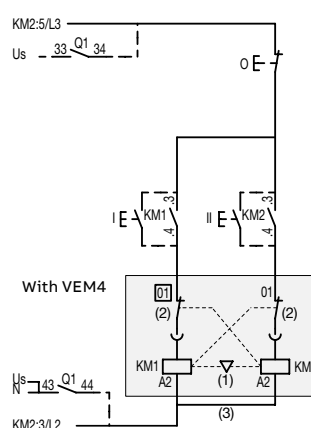


Reversing starters

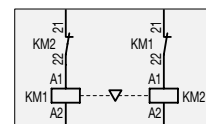
Power circuit



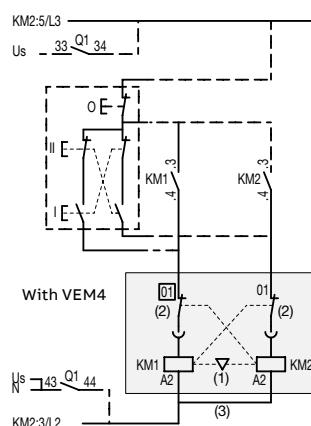
AC or DC local control



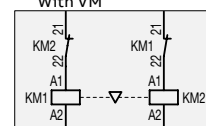
With VM



AC or DC remote control



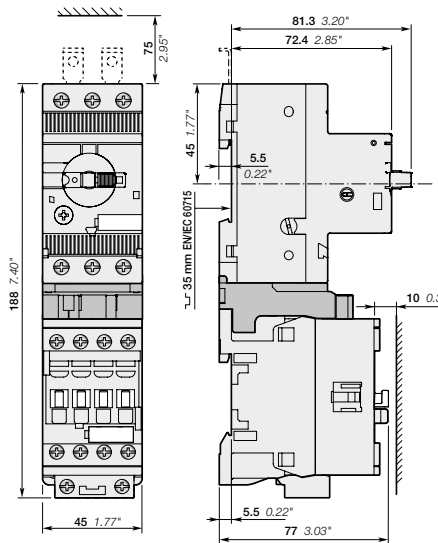
With VM



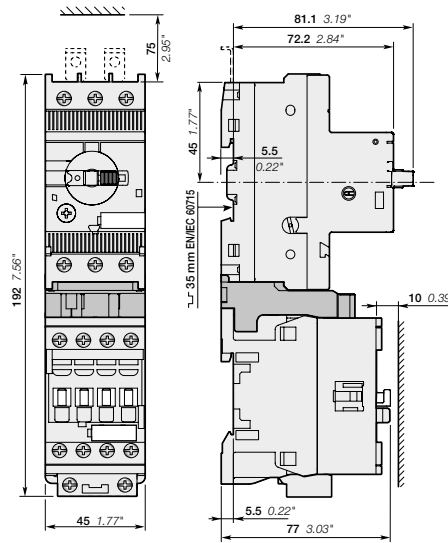
Note: - VEM4 = VM4 (1) + VE4 (2) with A2-A2 (3) connection.

DOL starters protected by M132-B manual motor starters

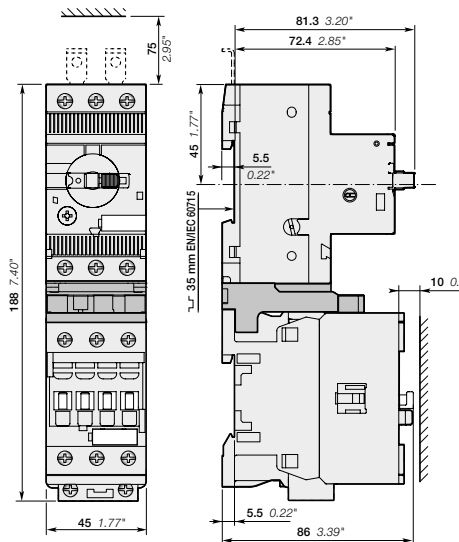
With AF..B contactors - open type version in kit form



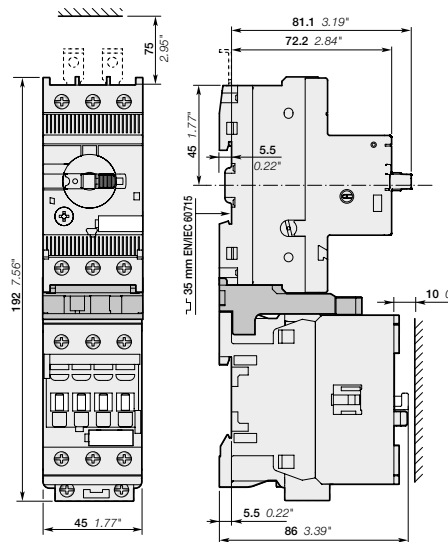
MS132-0.16B ... MS132-10B (+FS116)
+ BEA16-4
+ AF09(Z)B, AF12(Z)B, AF16(Z)B



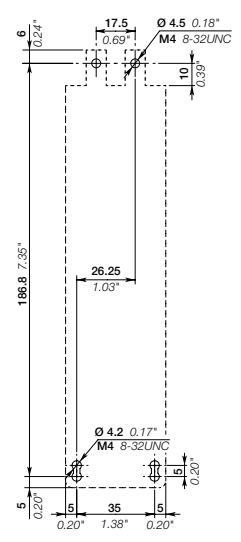
MS132-12B ... MS132-25B (+FS116)
+ BEA16-4
+ AF09(Z)B, AF12(Z)B, AF16(Z)B



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

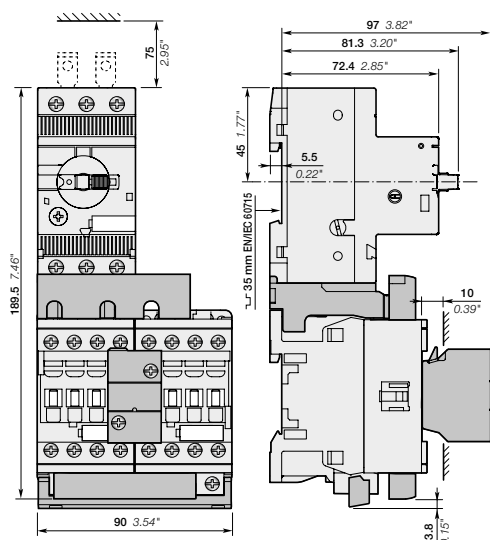


Note: contactor lateral distance to grounded component 2 mm 0.08" min.
When MS132-B is fixed on 35 mm rail, contactor must be fixed by screws according to drilling plan.

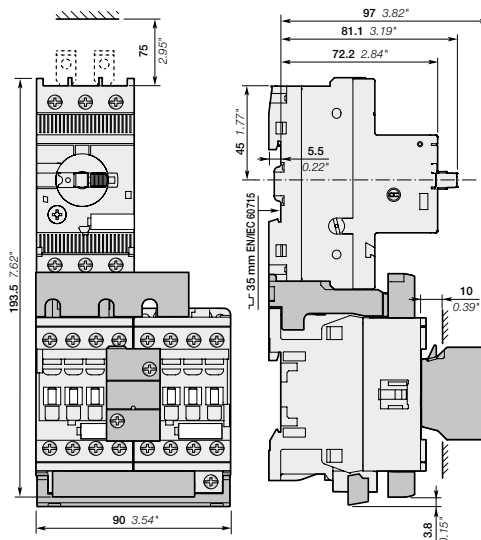
Main dimensions mm, inches

Reversing starters protected by M132-B manual motor starters

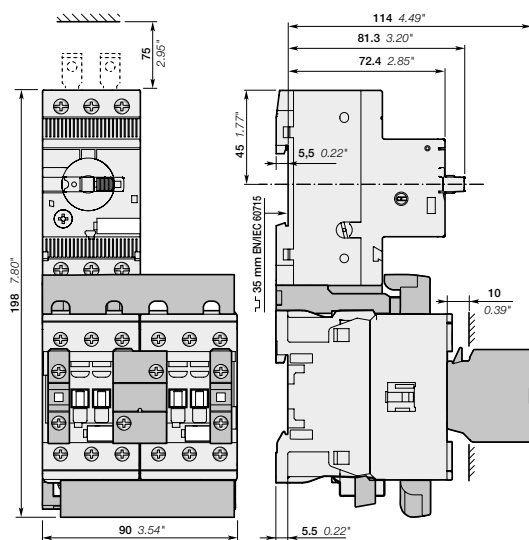
With AF..B contactors - open type version in kit form



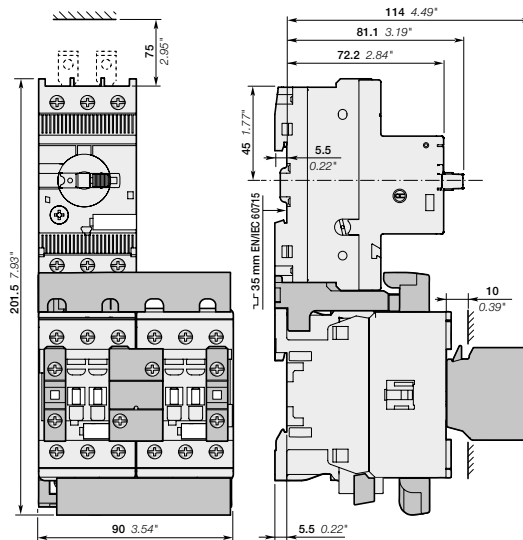
MS132-0.16B ... MS132-10B (+FS116)
+ BEA16-4, BER16-4, VEM4
+ AF09(Z)B, AF12(Z)B, AF16(Z)B



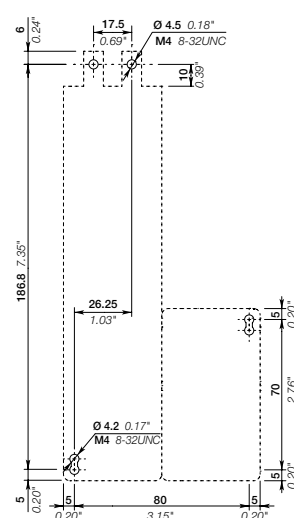
MS132-12B ... MS132-25B (+FS116)
+ BEA16-4, BER16-4, VEM4
+ AF09(Z)B, AF12(Z)B, AF16(Z)B



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

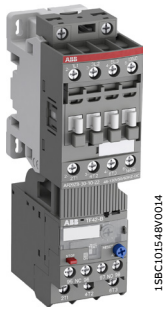


Note: contactor lateral distance to grounded component 2 mm 0.08" min.
When MS132-B is fixed on 35 mm rail, contactor must be fixed by screws according to drilling plan.

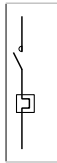
Main dimensions mm, inches

DOL and reversing starters protected by overload relays

With AF..B contactors - Open type version in kit form

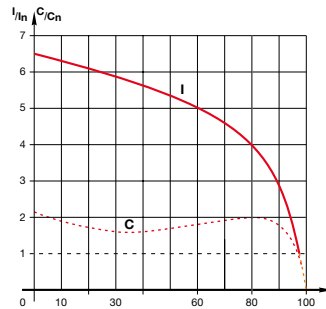


AF09ZB-30-10 + TF42-B



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.



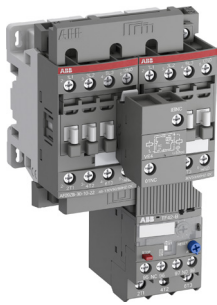
I = current
C = torque
In = nominal current
Cn = nominal torque

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.



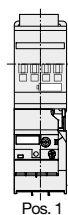
AF09ZB-30-10 + BER16-4 + VEM4 + TF42-B



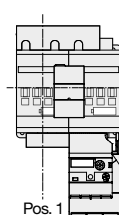
Main Technical Data

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 IEC 60715, EN 60715 By screws (not supplied)	Contactor	on 35 x 7.5 mm or 35 x 15 mm rail
	Overload relay	fitted on contactor or on separate assembling with DB42 single mounting kit
	Contactor	2 x M4 screws placed diagonally
	Overload relay	fitted on contactor or on separate assembling with DB42 single mounting kit

Mounting positions



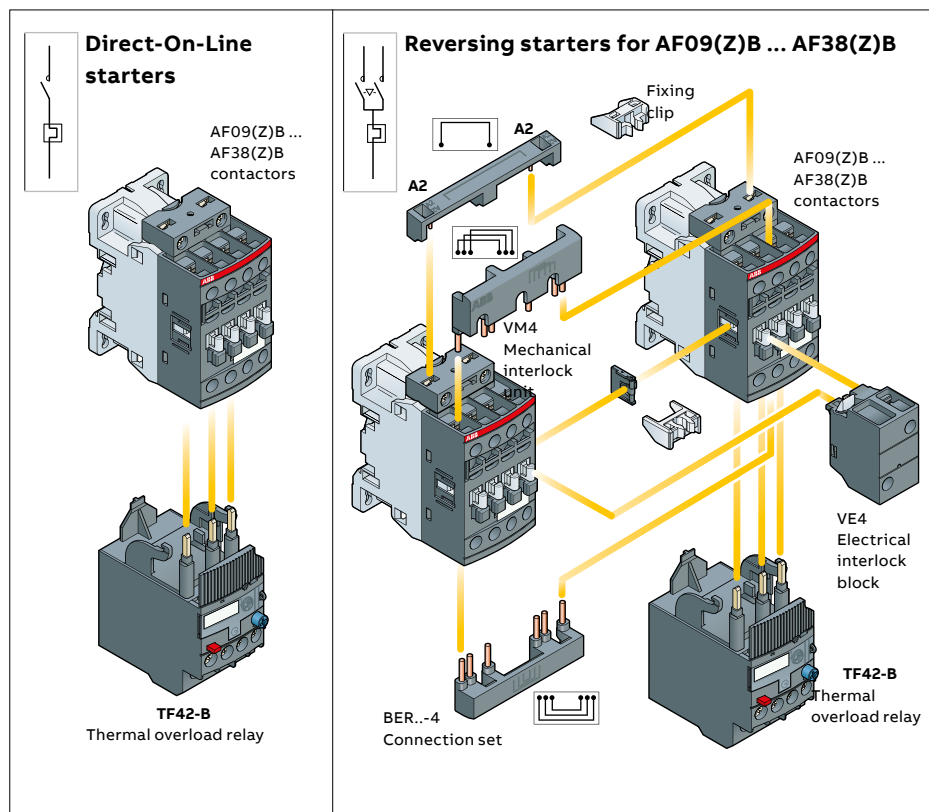
Direct-on-line



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.

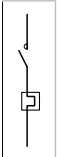
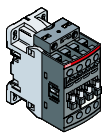
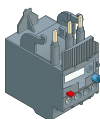
It includes:

- 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

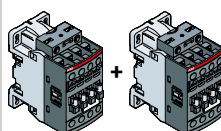
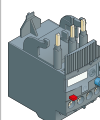
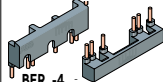
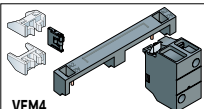
With AF..B contactors - Open type version in kit form

		  Contactors				 Thermal overload relays			Accessories
IEC AC-3, 400 V Rated power	Rated current	Supply control voltage Uc (IEC 60077) (1) VDC	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1) VDC	Type	Order code	Setting ranges	Type	Order code	
kW	A					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		
 									 BER..4  VEM4  CA4-10		
IEC AC-3, 400 V Rated power		Rated current	Supply control voltage Uc (IEC 60077) (1) VDC	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1) VDC	Type	Order code	Setting ranges	Type	Order code	Type	Order code
kW	A						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			
		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

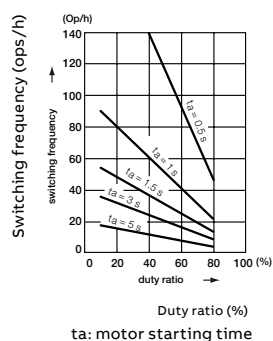
Switching frequency diagrams

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



Example:

Starting time of the motor: 1 second - Duty ratio: 40 % means a permitted switching frequency of max. 60 operating cycles per hour.

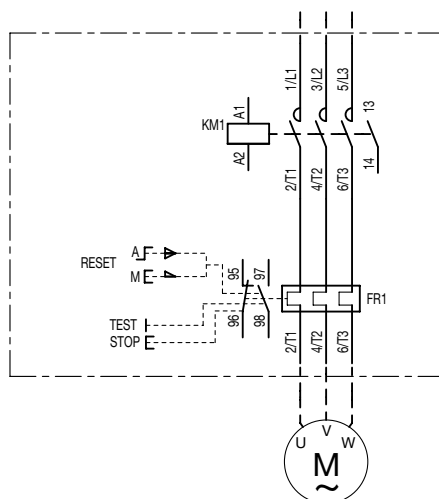
DOL and reversing starters protected by overload relays

With AF..B contactors - Open type version in kit form

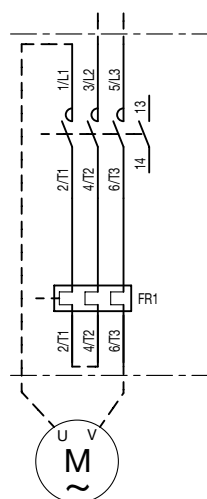
Wiring diagrams

Direct-on-line starters

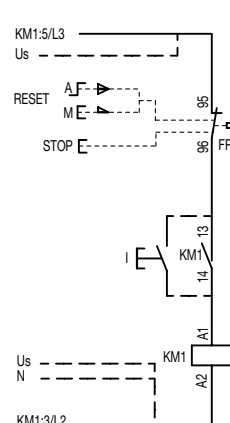
Power circuit



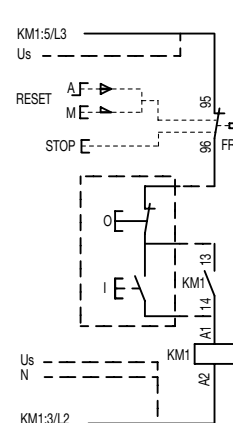
1-phase



AC or DC local control

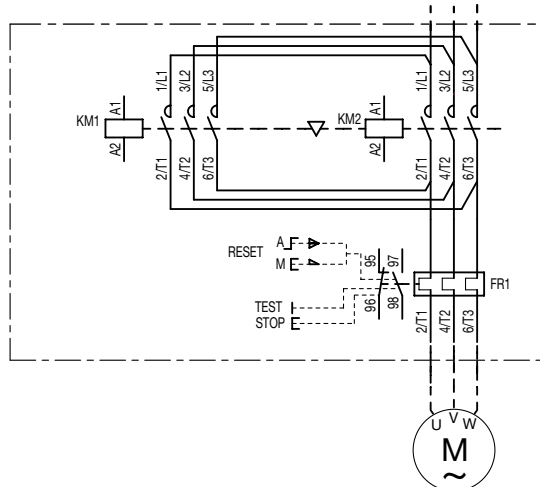


AC or DC remote control

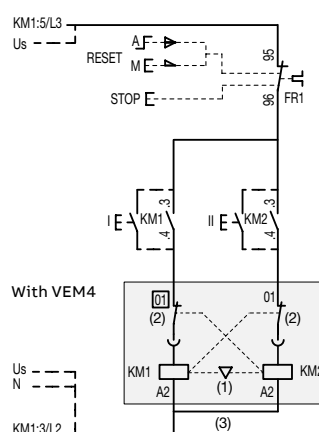


Reversing starters

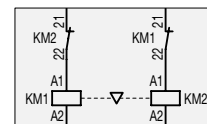
Power circuit



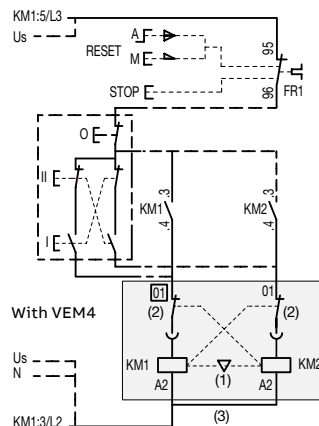
AC or DC local control



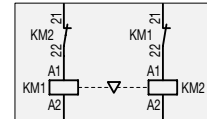
With VM



AC or DC remote control



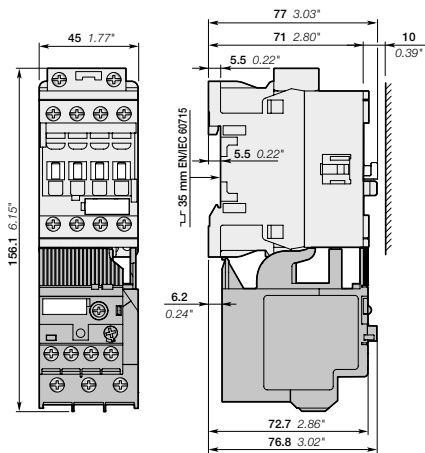
With VM



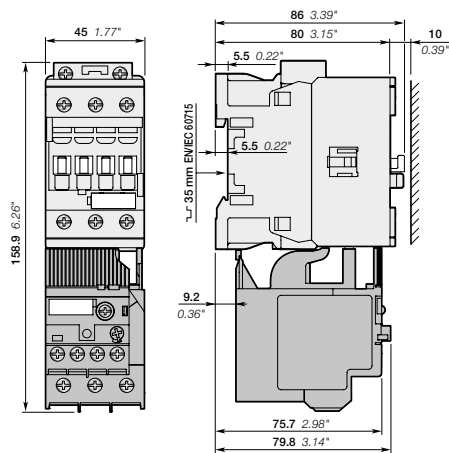
Note: - VEM4 = VM4 (1) + VE4 (2) with A2-A2 (3) connection.

DOL starters protected by thermal overload relays

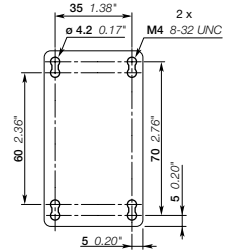
With AF..B contactors - open type version in kit form



AF09(Z)B, AF12(Z)B, AF16(Z)B
+ TF42-B thermal overload relay



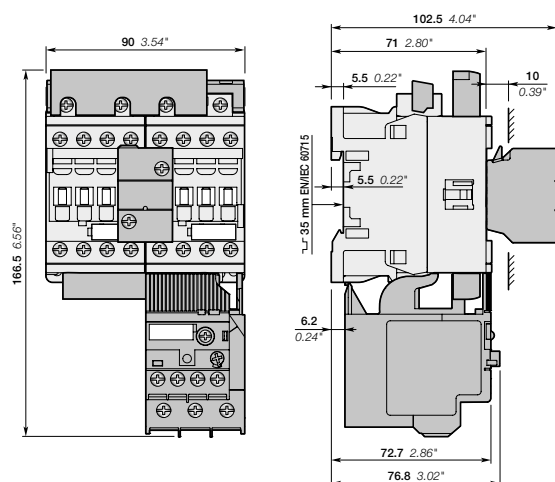
AF26(Z)B, AF30(Z)B, AF38(Z)B
+ TF42-B thermal overload relay



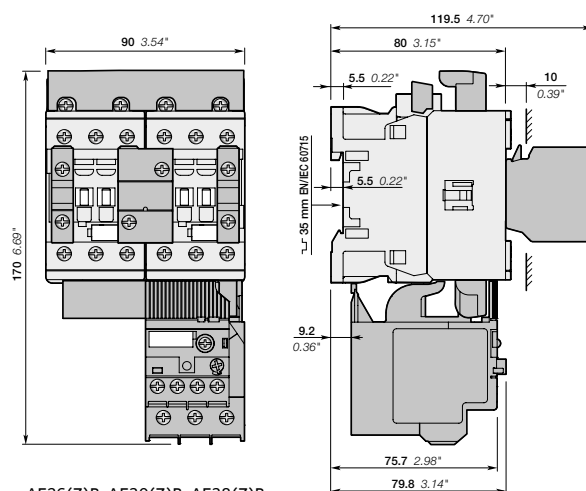
Note: contactor lateral distance to grounded component 2 mm 0.08" min.

Reversing starters protected by thermal overload relays

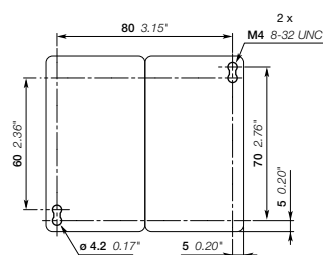
With AF..B contactors - open type version in kit form



AF09(Z)B, AF12(Z)B, AF16(Z)B
+ BER16-4, VEM4
+ TF42-B thermal overload relay



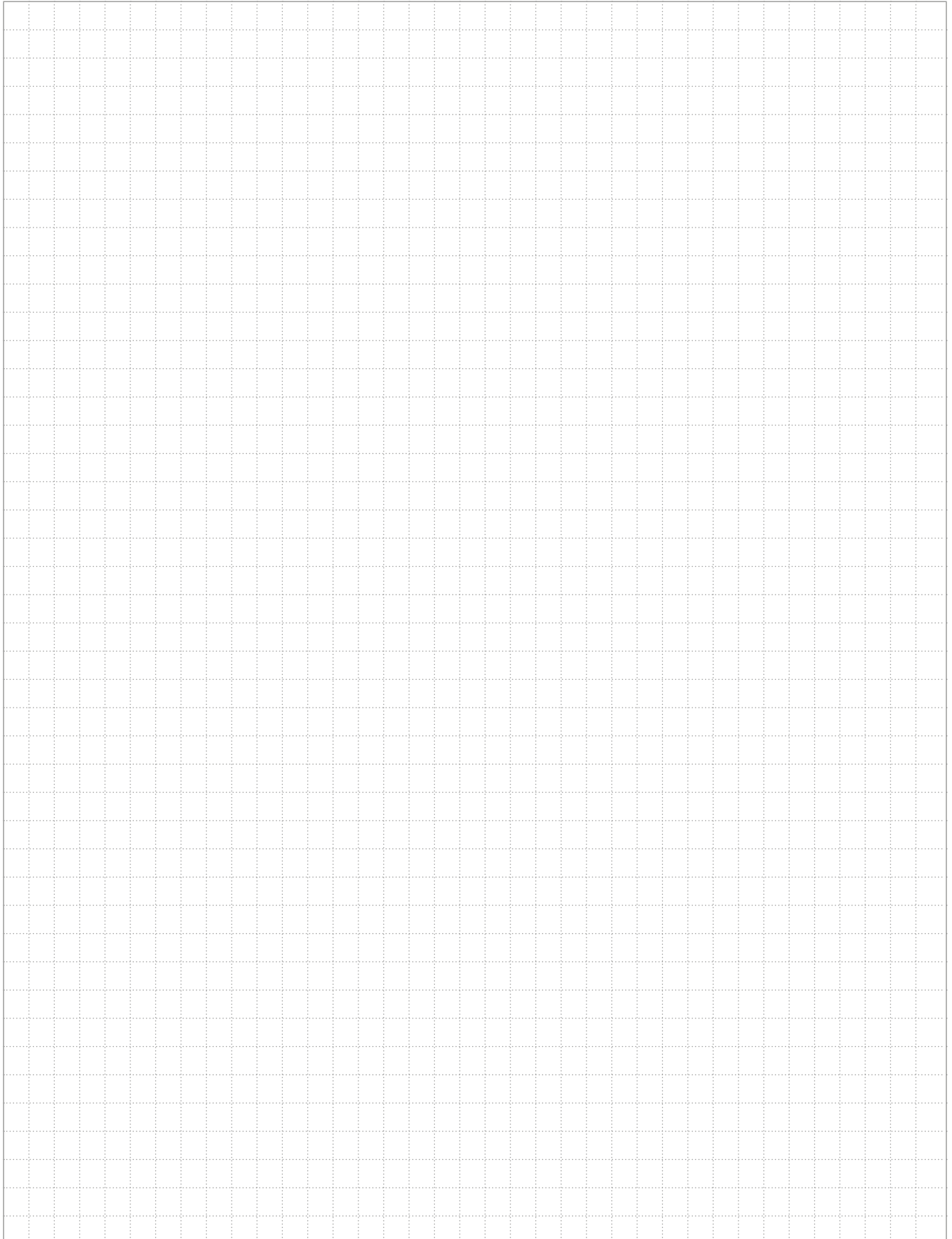
AF26(Z)B, AF30(Z)B, AF38(Z)B
+ BER38-4, VEM4, CA4-10
+ TF42-B thermal overload relay



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.

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
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
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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 EN45545-2.

European standard EN 45545-2 classification

EN45545 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 conceived
 - 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/R24 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 kWm ²	DS max.		≤ 600	≤ 300	≤ 150
	EN 17084 Method 2: 600 °C or Method 1: 25 kWm-2	CITNLP or CITG		≤ 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 kWm ²	DS max.		-	≤ 600	≤ 300
	EN 17084 Method 2: 600 °C or Method 1: 25 kWm-2	CITNLP or CITG		-	≤ 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.

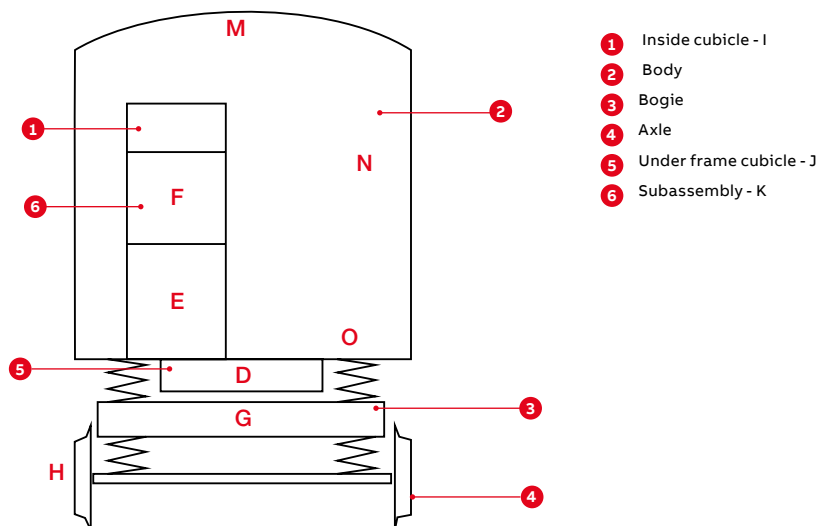
To gain assurance that the quality of the equipment is acceptable, it has to withstand tests of reasonable duration that simulate the service conditions seen throughout its expected life.

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



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Contactors and motor protection for railway applications

Sustainable mobility for a better world

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, overload relays and contactor relays are used in a wide variety of rolling stock applications.

Main benefits

- Simplify your installation thanks to compact solution and modular frame size
- Reduce train energy consumption with lighter devices increasing passenger capacity and less coil energy consumption improving power management.
- Optimize your logistics and stocks
- Protect persons and equipment with products specifically designed to meet the latest rolling stock requirements
- Secure uptime thanks to AF technology, handle the large voltage fluctuation to battery use
- Reduce maintenance costs, downtimes and make troubleshooting easier with real motor protection.

Main features

- 3 and 4-pole contactors up to 200 kW / 400 V - AC-3, 300 hp / 480 V, up to 600 V AC-1
- 4 and 8-pole contactor relays
- Starters protection by manual motor starters up to 30 kW and overload relays up to 18.5 kW
- Meet all rolling stock standards: EN / IEC 60077-1/2 and EN 50155 for applicable parts, EN / IEC 61373 cat.1 class B, fire and smoke European standards EN 45545-2 (HL2 or HL3)
- Compliant with RoHS directives
- ABB has IRIS certification (International Railway Industry Standard).

Are you looking for support or purchase information?

[Contact us](#)

Highlights

Contactors and motor protection for rolling stock

Our offering

Motor protection for railway applications
A complete motor protection concept

Contactors and contactor relays for railway applications
Secure uptime and optimize your design with latest AF technology up to 200 KW

Products and documents browser

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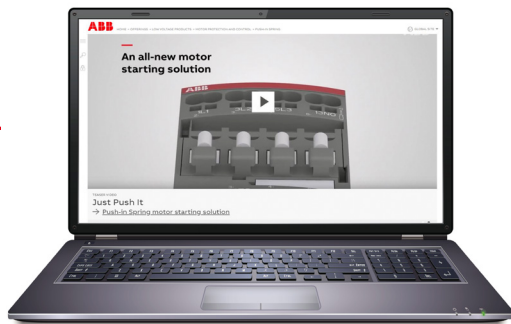
Application note (2)

Brochure (11)

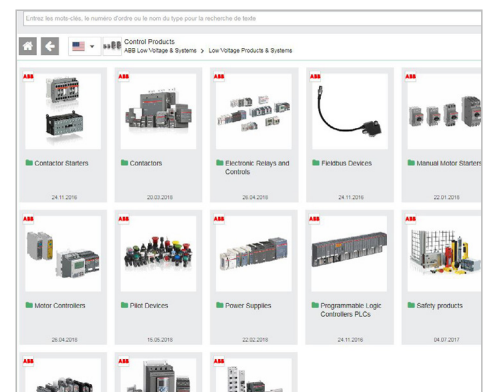
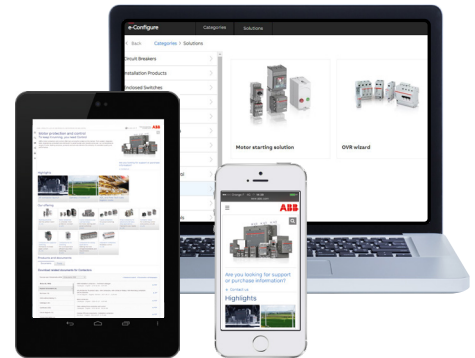
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Certificate - English, Chinese - 2021-01-11 - 1,44 MB

CQC Certificate, Contactor relays, K6,KC6,CA6,CAF6, Made in Germany
Summary: 证书产品范围:K6,KC6,CA6,CAF6; CQC证书编号:CQC2003010304064035 符合标准:GB/T 14048.5-2017 有效期至:2030/10/13 原产国:德国
Certificate - English, Chinese - 2021-01-11 - 1,16 MB

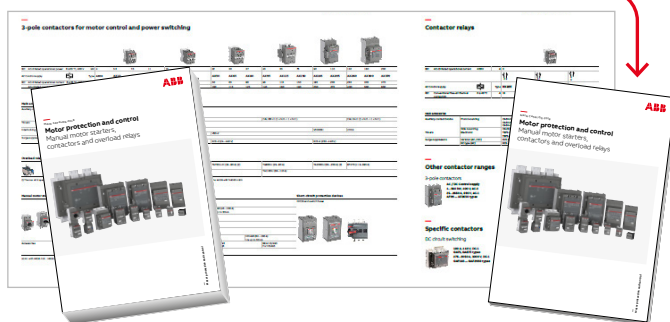
Videos, prints, technical presentations and more



Main online tools



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



Main catalog : 1SBC100220C0201



For direct product details information,
use product type or order code, ex:
www.abb.com/productdetails/AF092B-30-10-21
or
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**You can find the address of your local sales organization
on the ABB home page**



<http://new.abb.com/low-voltage/products/motor-protection>



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