PANORAMA

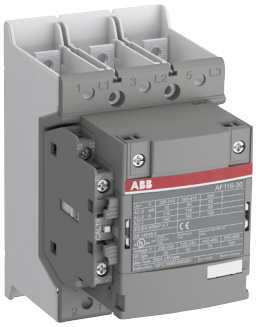
Manual motor starters, contactors and overload relays

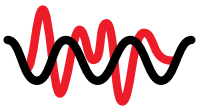
With a history spanning more than 130 years, ABB is a pioneering technology leader in electrification products, robotics and motion, and industrial automation, serving customers in utilities, industry and transport and infrastructure globally.

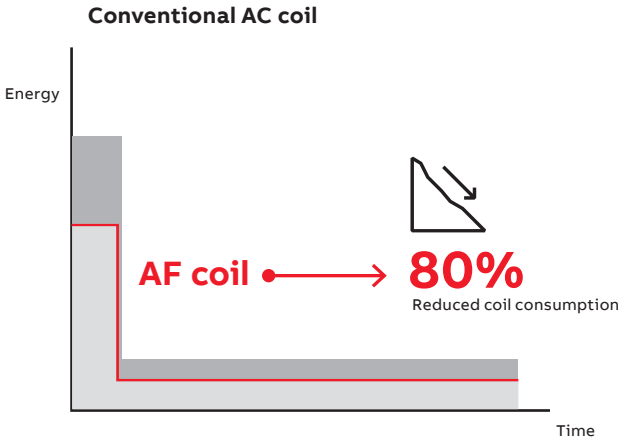
ABB offers a wide range of solutions to control and protect electrical motors. We realize that selection of the right components for motor starting applications can appear complex. The following information is provided to ease the overview and selection process.

Index

AF technology
Main Benefits

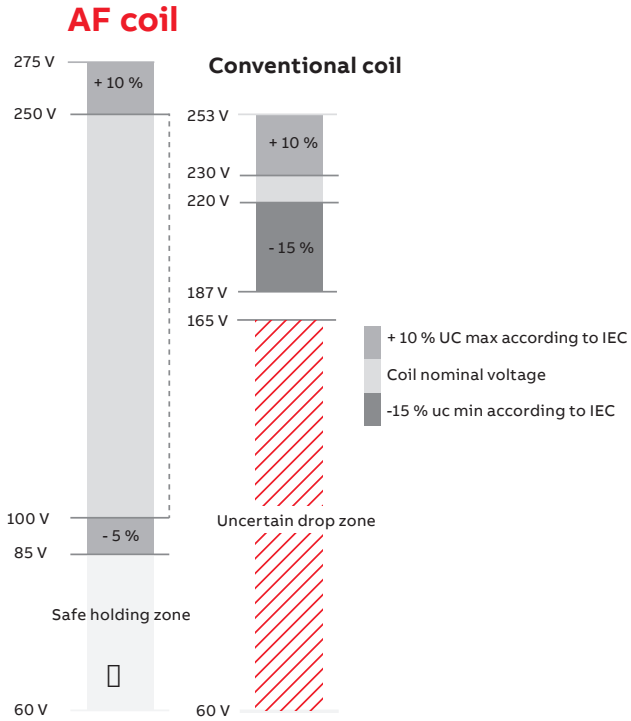


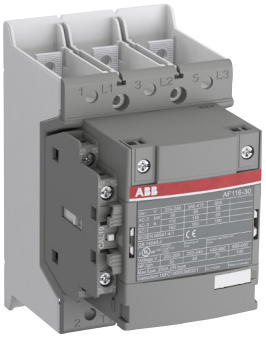


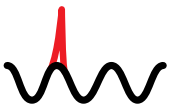


Reliable in all networks
The electronic system within the AF contactor continuously monitor the current and voltage apply to the coil. The contactor is safely operated in an always optimized condition and hum free.

Reduced coil consumption
AF coil and energy consumption is reduced up to 80%. This allows a reduction of the temperature rise, the size of control transformers and size of cabinets.







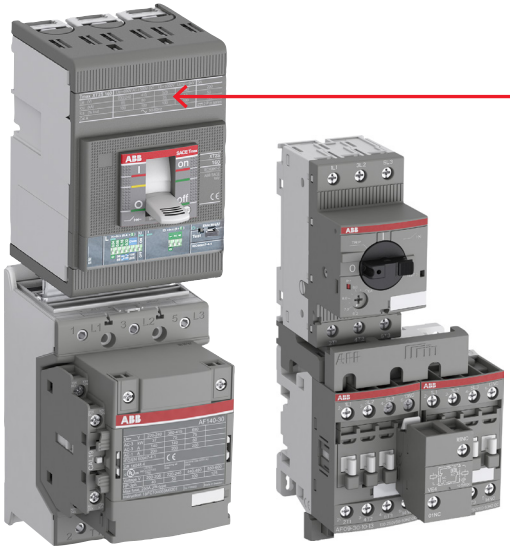
Wide control voltage range

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

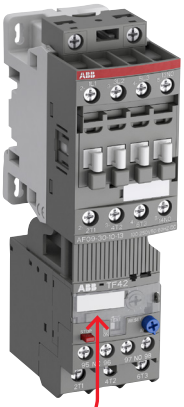
Built-in surge suppression

With conventional contactor technology, it is recommended to use an external surge suppressor, an accessory that could cost as much as half of the contactor. With the AF technology, the surges are handled by the contactor and never reach the control circuit. One less product and one less complication to worry about.

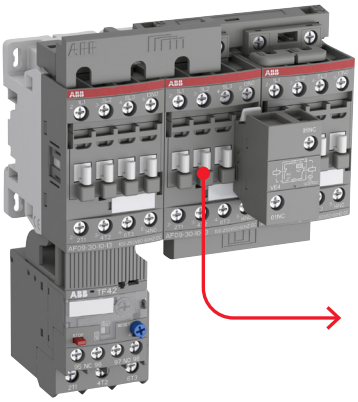
Contactors and motor protection
Advanced but simple



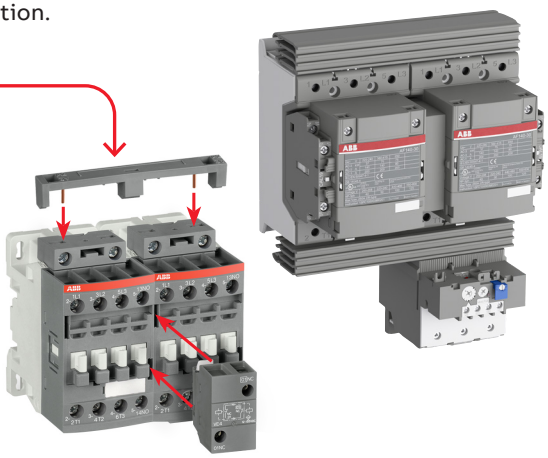
Easy, fast and secure starters assembly
The AF contactor range is perfect for motor starting applications and for solutions where space is limited. You can create any motor starting type and save assembly time with a complete range of accessories and connection sets.



Protect from overload in all conditions
Select thermal overload relays (trip class 10) or electronic overload relays (trip class 10E, 20E, 30E in the same product) to protect your motors against overload and phase failure.



Compact size
The AF contactor is compact in size and has had its width reduced by up to 30% thanks to an 80% coil consumption reduction.

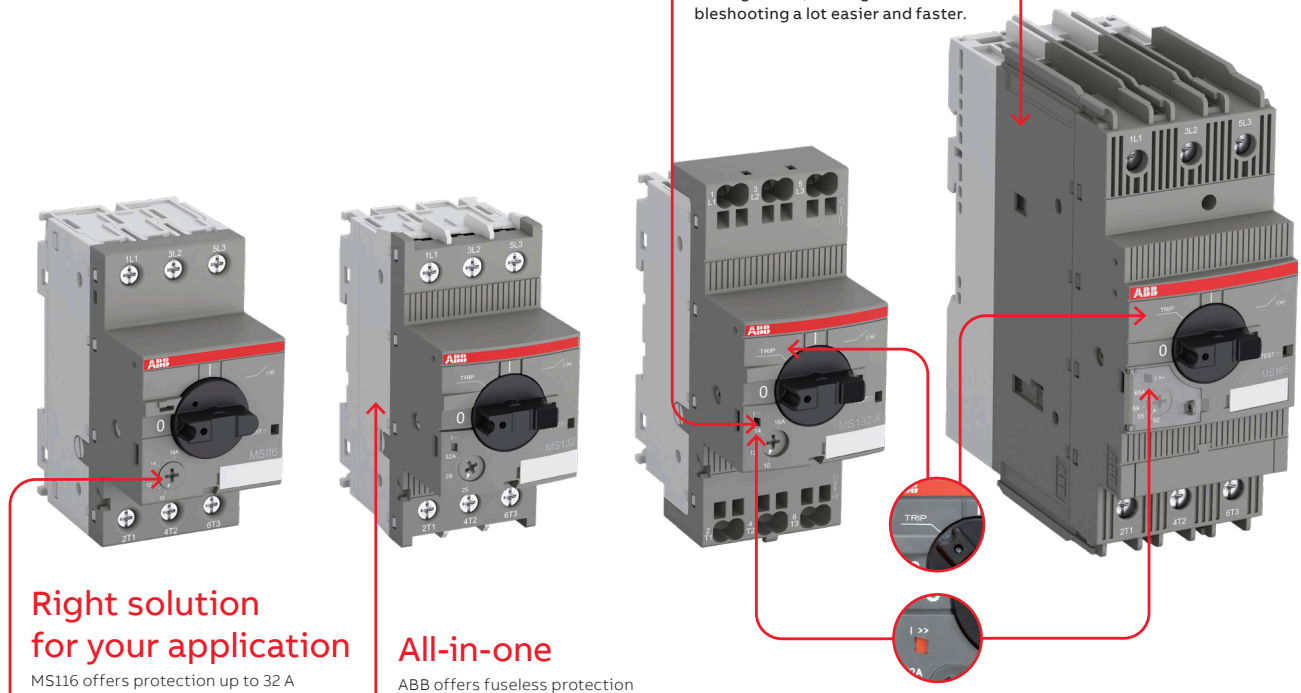


Save space
Interlocking reversing pairs require no spacing between contactors, meaning you can fit more functionality into cabinets or other enclosures.

MS and MO manual motor starters
A complete motor protection concept

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

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



Right solution for your application
MS116 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 standard applications.

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

Protection wherever you are
Manual motor starters are suitable for worldwide use. The wide range of certifications covers standards like IEC (CB), cULus, CCC and various ship approvals. MS132 and MS165 also apply to ATEX standards for hazardous areas.

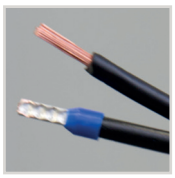
BV France · DNV · LR Gr. Britain · RINa Italy · ABS USA

Ready for IE3/IE4 motors
MS116/MS132/MO132/MS165/MO165 comply with the latest IE3/IE4 N/H and NE/HE motors. NE/HE requires utilization category AC-3e.

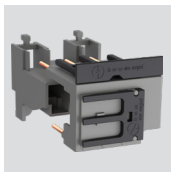
Just push it
With the new Push-in Spring terminals, one push is all you need for a faster than ever installation, an easier than ever wiring and a reliable as ever connection.

Push-in Spring solution
Complete range, complete efficiency

The Push-in Spring motor starting solution products provide you with a range of benefits.

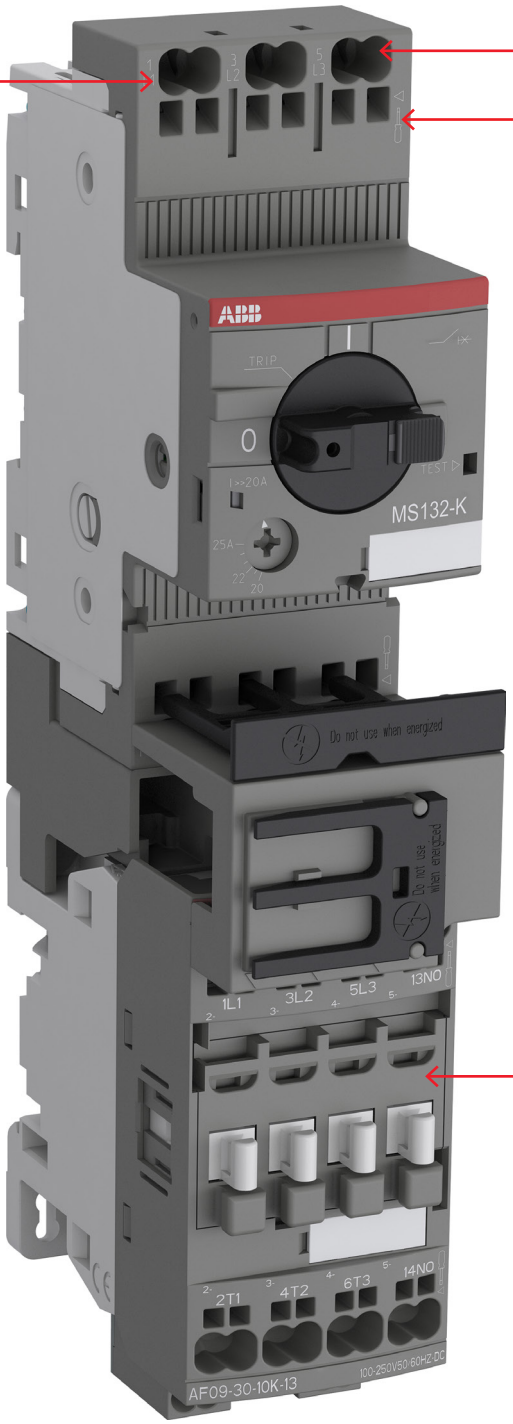


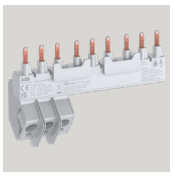
2-in-1
Benefit from both Push-in mode and Spring mode and use ferruled cables or cables without ferrules in the same terminal.



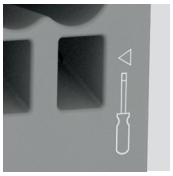
Tool-free connecting links
100% tool-free mounting connecting links.

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





Tool-free busbars
Parallel connection of manual motor starters without the need for tools (also certified for UL Type E/ Type F applications)



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

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

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Push-in Website

General overview motor protection and control

3-pole contactors

				Mini contactors				Contactors								
																
IEC (1)	**AC-3 Rated operational power**	θ ≤ 60 °C (2), 400 V	**kW**	4	5.5	4	5.5	4	5.5	7.5	4	5.5	7.5	11	15	18.5
UL/CSA	**3-phase motor rating**	480 V	**hp**	3	5	5	7.5	5	7.5	10	5	7.5	10	15	20	25
AC / DC Control supply			Type	—	—	—	—	—	—	—	**AF09**	**AF12**	**AF16**	**AF26**	**AF30**	**AF38**
AC Control supply			Type	**B6**	**B7**	**MC1A**	**MC2A**	**AS09**	**AS12**	**AS16**	**AFC09**	**AFC12**	**AFC16**	**AFC26**	**AFC30**	**AFC38**
DC Control supply (3)			Type	**BC6**	**BC7**	**MC1C, MC1I, MC1K**	**MC2C, MC2I, MC2K**	**ASL09**	**ASL12**	**ASL16**	**AF09Z**	**AF12Z**	**AF16Z**	**AF26Z**	**AF30Z**	**AF38Z**
IEC	AC-3 Rated operational current	θ ≤ 60 °C (2), 400 V	**A**	8.5	11.5	9	12	9	12	15.5	9	12	18	26	32	38
	AC-1 Rated operational current	θ ≤ 40 °C, 690 V	**A**	20 (400 V)	20 (400 V)	20 (2)	20 (2)	22	24	24	25	28	30	45	50	50
UL/CSA	General use rating	600 V	**A**	12 (300 V)	16 (600 V)	20	20	20	20	20	25	28	30	45	50	50
NEMA	NEMA Size			—	—	—	—	00	00	0	00	0	—	1	—	—

(1) 1000 V IEC ratings available for AF80, AF96 and AF146 ... AF2650 contactors. Available with Push-in Spring technology.
(2) θ ≤ 55 °C for mini contactors and AF400 ... AF2650 contactors.
(3) For AF range, shown variants have direct PLC control capacity. For AF40 ... AF96, use of RA4 relay is required.

Main accessories

Auxiliary contact blocks	Front mounting	**CAF6**	**MACN, MARN**	**CA3-10** (1 x N.O.) **CA3-01** (1 x N.C.)	**CA4-10 (1 x N.O.)** (7) **CA4-01 (1 x N.C.)** (7)	
	Side mounting	**CA6**	**MACL, MARL**		**CAL4-11 (1 x N.O. + 1 x N.C.)** (7)	
Timers	Electronic		**MREBC**	**TEF3-ON** **TEF3-OFF**	**TEF4-ON** **TEF4-OFF**	
Interlocking units (4)	Mechanical		**MMHO**	**VM3**	**VM4**	
	Mechanical / Electrical		—		**VEM4** (7)	
Connection sets	For reversing contactors	**BSM6-30**	**WKMIU**	**BER16C-3**	**BER16-4** (7)	**BER38-4** (7)
	For Star delta starters	**BEYs**		**BEYs**	**BEYs**	**BEYs**
Surge suppressors (5)	Varistor (AC/DC)	**RV-BC6**	**MP0DAE4, MP0DAE5, MP0DAE6**	**RV5** (24...440 V)	**RV4-1** (24...440 V)	
	RC type (AC)		**MP0DAE1, MP0DAE2**	**RC5-1** (24...440 V)	**RC4-1** (24...440 V)	
	Transil diode (DC)	**RD7**	**MP0DAE3**	**RT5** (12...264 V)	-	

(4) See available reversing contactors VB6, VB7 and VAS09 ... VAS16.
(5) AF series has built-in surge suppression. Accessories shown here are for AFC range.

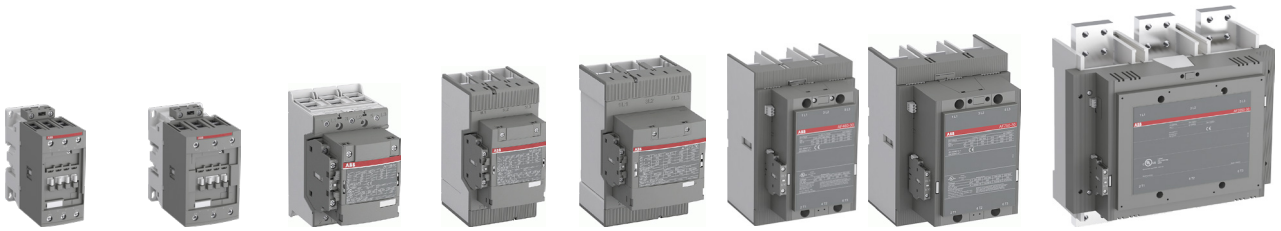
Overload relays

Thermal relays		Class 10 (Class 10A for TF140, TA200DU)	**T16 (0.10...13 A)**	**T16 (0.10...13 A)**	**T16** (0.10...16 A)	**TF42** (0.10...38 A)
Electronic relays		Class 10E, 20E, 30E	**E16DU (0.10...18.9 A)**	—		**EF19** (0.10...18.9 A) / **EF45** (9...45 A)
Accessories (for single mounting)		Thermal relays	**DB16**	**DB16**		**DB42**
		Electronic relays	**DB16E**	—		**DB19EF** / **DB45EF**

Manual motor starters

	Thermal / magnetic protection Class 10	**MS116 (0.10...32 A)** Ics up to 50 kA for class 10A	**MS116 (0.10...32 A)** Ics up to 50 kA for class 10A		**MS165 (10...80 A)** Ics up to 100 kA
		MS132 (0.10...32 A) (7) Ics up to 100 kA	**MS132 (0.10...32 A)** (7) Ics up to 100 kA		
	Magnetic only types	**MO132 (0.16...32A)** Ics up to 100 kA	**MO132 (0.16...32 A)** Ics up to 100 kA		**MO165 (16...80 A)** Ics up to 100 kA
Accessories	For contactor mounting	**BEA7/132**	**BEA16-3**	**BEA16-4** (7) | **BEA38-4** (7)	**BEA65-4** (6)

(6) BEA65-4 suitable for MS165 and MO165 only. (7) Available with Push-In Spring terminals. (8) -5 ... +40 °C for TA200-V1000.



	18.5	22	30	37	45	55	75	75	90	110	132	160	200	200	250	315	400	—	475	560	—	—	—
	30	40	50	60	60	75	100	100	125	150	200	250	300	350	400	500	600	—	800	900	—	—	—
	AF40	**AF52**	**AF65**	**AF80**	**AF96**	**AF116**	**AF140**	**AF146**	**AF190**	**AF205**	**AF265**	**AF305**	**AF370**	**AF400**	**AF460**	**AF580**	**AF750**	**AF1250**	**AF1350**	**AF1650**	**AF2050**	**AF2650**	**AF2850**
	AFC40	**AFC52**	**AFC65**	**AFC80**	**AFC96**	**AF116**	**AF140**	**AF146**	**AF190**	**AF205**	**AF265**	**AF305**	**AF370**	**AF400**	**AF460**	**AF580**	**AF750**	**AF1250**	**AF1350**	**AF1650**	**AF2050**	**AF2650**	**AF2850**
	—	**—**	**—**	**—**	**—**	**AF116**	**AF140**	**AF146**	**AF190**	**AF205**	**AF265**	**AF305**	**AF370**	**AF400**	**AF460**	**AF580**	**AF750**	**AF1250**	**AF1350**	**AF1650**	**AF2050**	**AF2650**	**AF2850**
	40	53	65	80	96	116	140	146	190	205	265	305	370	400	460	580	750	—	860	1060	—	—	—
	70	100	105	125	130	160	200	225	275	350	400	500	600	600	700	800	1050	1260	1350	1650	2050	2650	2850
	60	80	90	105	115	160	200	200	250	300	350	400	520	550	650	750	900	1210	1350	1650	2100	2700	2850
	2	—	—	3	—	—	4	—	—	—	5	—	—	—	6	—	7	—	—	8	—	—	—

						CAL19-11 (1 x N.O. + 1 x N.C.)								**CAL18-11** (1 x N.O. + 1 x N.C.)								
	VM96-4					**VM19** (for same size contactors)								**VM750H** **VM750V**					**VM1650H**				
	BER65-4		**BER96-4**			**BER140-4**			**BER205-4**		**BER370-4**			**BEM460-30**		**BEM750-30**						
	BEYs		**BEYs**			**BEYs**			**BEYs**		**BEYs**			**BEYs**		**BEYs**						
	RV4-2 (24...440 V)																				

	TF65 (22...67 A)		**TF96** (40...96 A)			**TF140DU** (66...142 A) θ ≤ 55 °C			**TA200DU**[8] (66...200 A) θ ≤ 55 °C												
	EF65 (20...70 A)		**EF96** (20...100 A)			**EF146** (54...150 A**)**			**EF205** (63...210 A)		**EF370** (115...380 A)			**EF460** (150...500 A)		**EF750** (250...800 A)		**EF1250DU** (350...1250 A)				
	DB65 (only for TF65)		**DB96**						**DB200**												
			DB96																		

General overview motor protection and control

4-pole contactors

Mini contactors



IEC	AC-1 Rated operational current	θ ≤ 40 °C, 690 V	A	16	20	20 (2)	20 (2)
UL/CSA	General use rating	600 V	A	12 (300 V)	16	20	20
AC / DC Control supply			Type	—	—	—	—
AC Control supply			Type	B6	B7	MC1A	MC2A
DC Control supply (1)			Type	BC6	BC7	MC1C, MC1I, MC1K	MC2C

(1) For AF range, shown variants have direct PLC control capacity. For AF40 ... AF96, use of RA4 relay is required.
(2) θ ≤ 55 °C for M mini contactors.

Contactor relays

Mini contactor relays


IEC	AC-15 Rated operational current	400 V	A	3			4		
UL/CSA	Pilot duty			A600			A600, Q600		
				2 2	3 1	4 0	2 2	3 1	4 0
AC Control supply			Type	K6-22Z	K6-31Z	K6-40E	—	—	—
DC Control supply			Type	KC6-22Z	KC6-31Z	KC6-40E	MCRA022	MCRA03	MCRA040
AC / DC Control supply			Type	—	—	—	MCRC022, MCRI022, MCRK022	MCRC031, MCRI031, MCRK031	MCRC040, MCRI040, MCRK040

Solutions for special applications

Transformer protection

MS132-T* (0.10...25A)
Ics up to 100kA for class 10

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

* Also available with Push-In Spring terminals.

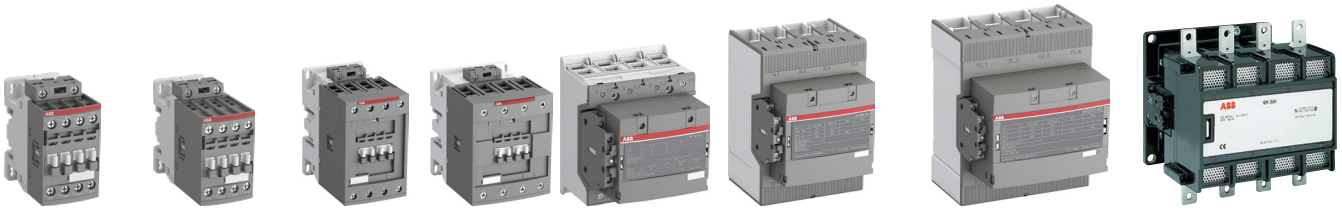
Specific contactors

DC Circuit switching

100 A, 440 V, DC-1
GA75, GAE75 types

275 to 2050 A, 1000 V, DC-1
GAF185 to GAF2050 types

Contactors



25	30	45	55	70	100	125	160	200	275	350	400	500	525	800	1000
25	30	45	55	60	80	105	160	175	230	250	300	350	420	540	—
AF09	**AF16**	**AF26**	**AF38**	**AF40**	**AF52**	**AF80**	**AF116**	**AF140**	**AF190**	**AF205**	**AF265**	**AF305**	**AF370**	—	—
AFC09	**AFC16**	**AFC26**	**AFC38**	**AFC40**	**AFC52**	**AFC80**	**AF116**	**AF140**	**AF190**	**AF205**	**AF265**	**AF305**	**AF370**	**EK550**	**EK1000**
AF09Z	**AF16Z**	**AF26Z**	**AF38Z**	—	—	—	**AF116**	**AF140**	**AF190**	**AF205**	**AF265**	**AF305**	**AF370**	**EK550**	**EK1000**

Contactor relays

3			**3**		
A600, Q300			**A600, Q600**		
2 2	3 1	4 0	2 2	3 1	4 0
NS22E	**NS31E**	**NS40E**	**NF22E**	**NF31E**	**NF40E**
NSL22E	**NSL31E**	**NSL40E**	**NF22E**	**NF31E**	**NF40E**
—	—	—	**NF22E**	**NF31E**	**NF40E**

Lamp Starting Solutions

The right solution to control and protect fixtures, for example in greenhouse horticulture applications.
The lamp starter combinations consist of a MS132-L or MS132-LC lamp circuit breaker and AF-...L lamp contactors.

Railway applications

Manual motor starters, contactors, overload relays and contactor relays are a common solution for a wide variety of rolling stock applications.

Capacitor switching

12.5 to 80 kvar
UA16..RA to UA110..RA types
UA16 to UA110 types

—
ABB France
Electrification Business
2 rue d'Arsonval
F-69687 Chassieu cedex / France

—
ABB STOTZ-KONTAKT GmbH
Electrification Business
Eppelheimer Straße 82
D-69123 Heidelberg / Germany

—
ABB AB
Electrification Business
SE-721 61 Västerås / Sweden

You can find the address of your local sales organization on the ABB home page

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