



Panorama

# Motor protection and control

## Manual motor starters, contactors and overload relays

Power and productivity  
for a better world™





# ABB sets a new standard in motor control and power switching

Featuring AF technology as standard, the latest range of ABB's contactors establishes a new industry benchmark. The electronically controlled coil offers multiple benefits over conventional alternatives, and together with ABB's wide product offering – an optimal configuration, every time.



### Access Global Support

The contactor and motor protection range from ABB is compatible with all major national and international standards and is available worldwide via a global distribution network. One contactor coil now handles 100 V – 250 V, AC / DC for use in Europe or Asia as well as North America.



### Simplify design

By reducing contactor coil energy consumption by up to 80 %, panels can be built smaller and transformers more compact. All the features of the AF technology, along with access to drawings and coordination tables online, simplifies your design and assembly process.



### Optimize logistics

With its contactor and motor protection range, ABB has managed to reduce the number of contactor coils to just four. The total number of product variants has been reduced by up to 90 %. This simplifies the customers' logistics and cuts administration costs.



### Secure uptime

Time to prevent stoppages caused by voltage fluctuations. The AF contactor ensures distinct operation in unstable networks and signifies a major advance in motor control and power switching. Voltage sags, dips and surges pose no threat. The AF contactor secures your uptime.



## MacGregor. Keeping turnarounds brief.

Until the AF range was installed, voltage sags were affecting MacGregor's deck cranes. Conventional contactors welded shut, leading to several stoppages a week. No longer. Known for superior quality and an ability to operate in the most hostile environments, MacGregor deck cranes enjoy a global reputation for reliability. A small but vital component, the AF contactor helps maintain this reputation.

To keep things moving, you need Control. Connect to Control.

Explore all our case studies at [www.abb.com/connecttocontrol](http://www.abb.com/connecttocontrol)

**SSAB**  
Making certainty standard

**Gamesa**  
Taming the wind

**LKAB**  
Providing fresh air



## Mini contactors 3-pole contactors for motor control and power switching

3-pole or 4-pole



IEC (1)	AC-3 Rated operational power	$\theta \leq 60^\circ\text{C}$ (2), 400 V	kW	4	5.5
UL/CSA	3-phase motor rating	480 V	hp	3	5
AC / DC Control supply		Type	—	—	—
AC Control supply		Type	B6	B7	—
DC Control supply		Type	BC6	BC7	—
IEC	AC-3 Rated operational current	$\theta \leq 60^\circ\text{C}$ (2), 400 V	A	8.5	11.5
	AC-1 Rated operational current	$\theta \leq 40^\circ\text{C}$ , 690 V	A	20 (400 V)	20 (400 V)
UL/CSA	General use rating	600 V	A	12 (300 V)	16
NEMA	NEMA Size			—	—

(1) 1000 V IEC ratings available for AF80, AF96 and AF146 ... AF2650 contactors.  
(2)  $\theta \leq 55^\circ\text{C}$  for mini contactors and AF400 ... AF2650 contactors.

### Main accessories

Auxiliary contact blocks	Front mounting	CAF6
	Side mounting	CA6
Timers	Electronic	
Interlocking units (3)	Mechanical	
	Mechanical / Electrical	
Connection sets	For reversing contactors	BSM6-30
Surge suppressors	Varistor (AC / DC)	RV-BC6
	RC type (AC)	
	Transil diode (DC)	RD7

(3) See available reversing contactors VB6, VB7 and VAS09 ... VAS16.

### Overload relays

Thermal relays	Class 10 (Class 10A for TF140, TA200DU)	T16 (0.10...16 A)
Electronic relays	Class 10E, 20E, 30E	E16DU (0.10...18.9 A)

### Manual motor starters

	Thermal / magnetic protection Class 10	MS116 (0.10...32 A) Ics up to 50 kA for class 10A
		MS132 (0.10...32 A) Ics up to 100 kA
	Magnetic only types	MO132 (0.16...32 A)

Accessories	For contactor mounting	BEA7/132
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(4) MS165/MO165 are suitable for use with AF09 ... AF30 for North American applications.  
(5) BEA65-4 suitable for MS165 and MO165 only.

4	5.5	7.5	4	5.5	7.5	11	15	18.5	18.5	22	30	37	45	55	75	75	90	110	132	160	200	200	250	315	400	—	475	560	—	—
5	7.5	10	5	7.5	10	15	20	25	30	40	50	60	60	75	100	100	125	150	200	250	300	350	400	500	600	—	800	900	—	—
—	—	—	AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
AS09	AS12	AS16	AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
ASL09	ASL12	ASL16	AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
9	12	15.5	9	12	18	26	32	38	40	53	65	80	96	116	140	146	190	205	265	305	370	400	460	580	750	—	860	1060	—	—
22	24	24	25	28	30	45	50	50	70	100	105	125	130	160	200	225	275	350	400	500	600	600	700	800	1050	1260	1350	1650	2050	2650
20	20	20	25	28	30	45	50	50	60	80	90	105	115	160	200	200	250	300	350	400	520	550	650	750	900	1210	1350	1650	2100	2700
00	00	0	00	0	—	1	—	—	2	—	—	3	—	—	4	—	—	—	5	—	—	—	6	—	7	—	—	8	—	—

CA3-10 (1 x N.O.) CA3-01 (1 x N.C.)	CA4-10 (1 x N.O.) CA4-01 (1 x N.C.)	CAL19-11 (1 x N.O. + 1 x N.C.)	CAL18-11 (1 x N.O. + 1 x N.C.)
TEF3-ON TEF3-OFF	TEF4-ON TEF4-OFF	VM3	VM4
VM3	VM4	VM96-4	VM19 (for same size contactors)
VM3	VM4	VM750H VM750V	VM1650H
BER16C-3	BER16-4	BER38-4	BER65-4
RV5 (24...440 V)	Built-in surge protection	BER96-4	BER140-4
RC5-1 (24...440 V)			BER205-4
RT5 (12...264 V)			BER370-4
			BEM460-30
			BEM750-30

T16 (0.10...16 A)	TF42 (0.10...38 A)	TF65 (22...67 A)	TF96 (40...96 A)	TF140DU (66...142 A) $\theta \leq 55^\circ\text{C}$	TA200DU (66...200 A) $\theta \leq 55^\circ\text{C}$	EF205 (63...210 A)	EF370 (115...380 A)	EF460 (150...500 A)	EF750 (250...800 A)	E1250DU (275...1250 A)
	EF19 (0.10...18.9 A)	EF19 (0.10...18.9 A)	EF19 (0.10...18.9 A)	EF146 (54...150 A)						
	EF45 (0...45 A)	EF65 (20...70 A)	EF96 (36...100 A)							

MS116 (0.10...32 A) Ics up to 50 kA for class 10A	MS165 (10...65 A) Ics up to 100 kA (4)	MS5100 (40...100 A) Ics up to 50 kA	MS495 (45...100 A) Ics up to 50 kA
MS132 (0.10...32 A) Ics up to 100 kA	MS497 (22...100 A) Ics up to 100 kA	MS5100 (70...100 A) Ics up to 35 kA	MO496 (32...100 A) Ics up to 100 kA
MO132 (0.16...32 A)	MO165 (16...65 A) Ics up to 100 kA (4)	MO5100 (70...100 A) Ics up to 35 kA	MO495 (63...100 A) Ics up to 50 kA
	MO496 (32...100 A) Ics up to 100 kA	MO495 (63...100 A) Ics up to 50 kA	
BEA16-3	BEA16-4	BEA38-4	BEA65-4 (5)

### Short-circuit protection devices

MCCB and switch-fuses



## 4-pole contactors



IEC	AC-1 Rated operational current	$\theta \leq 40^\circ\text{C}$ , 690 V	A	25	30	45	55	70	100	125	160	200	275	350	400	500	525	800	1000
UL/CSA	General use rating	600 V	A	25	30	45	55	60	80	105	160	175	230	250	300	350	420	540	—
AC / DC Control supply		Type	—	AF09	AF16	AF26	AF38	AF40	AF52	AF80	AF116	AF140	AF190	AF205	AF265	AF305	AF370	—	—
AC Control supply		Type	—	AF09	AF16	AF26	AF38	AF40	AF52	AF80	AF116	AF140	AF190	AF205	AF265	AF305	AF370	EK550	EK1000
DC Control supply		Type	—	AF09	AF16	AF26	AF38	AF40	AF52	AF80	AF116	AF140	AF190	AF205	AF265	AF305	AF370	EK550	EK1000

## Mini contactor relays

IEC	AC-15 Rated operational current	400 V	A	3	
UL/CSA	Pilot duty			A600	
AC Control supply		Type	K6-22Z	K6-31Z	K6-40E
DC Control supply		Type	KC6-22Z	KC6-31Z	KC6-40E
AC / DC Control supply		Type	—	—	—

## Contactor relays

IEC	AC-15 Rated operational current	400 V	A	3	
UL/CSA	Pilot duty			A600, Q300	
				A600, Q600	
AC Control supply		Type	NS22E	NS31E	NS40E
DC Control supply		Type	NLS22E	NLS31E	NLS40E
AC / DC Control supply		Type	—	—	—
			NF22E	NF31E	NF40E
			NF22E	NF31E	NF40E

## R contactors

DC Circuit switching	DC-1 Rated current up to 5000 A DC-3/DC-5 Rated current up to 2000 A 1500 V with poles in series	AC Circuit switching	AC-1 Rated current up to 5000 A AC-3 Rated power up to 1500 kW (1520 A - 440 V)	Special versions	AC / DC Coupling: LOR... contactors Slip ring motor control: FOR... contactors Field discharge: AM(F)-CC-JORE contactors AC / DC Switching (N.C./N.O. main poles): NOR & JOR contactors Latching contactors for energy saving and safety requirements: AMA or AME contactors
	IOR...63...-CC to IOR...5100...-CC		IOR...63...-MT to IOR...5100...-MT		

## Specific contactors

Capacitor switching	12.5 to 80 kvar UA16 to UA110 types UA16...RA to UA110...RA types	DC Circuit switching	100 A, 440 V, DC-1 GA75, GAE75 types	275 to 2050 A, 1000 V, DC-1 GAF185 to GAF2050 types
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<http://new.abb.com/low-voltage/products/motor-protection>



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