AF, EK contactors and NF contactor relays

AF contactors for motor starting and power switching up to 2850 A

The latest technology of electronically controlled coil is our standard. It offers multiple benefits over conventional alternatives, and together with ABB's wide product offering, it is an optimal configuration, every time.

Optimized logistics

Cut your costs

With its contactor and motor protection range, ABB has managed to reduce the number of contactor coils to just four.

Total number of product variants has been reduced by up to 90%. This simplifies the customers' logistics while cutting storage and administration costs.

Continuous operation

Secure uptime

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.

Speed up your projects

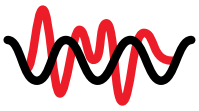
Simplify design

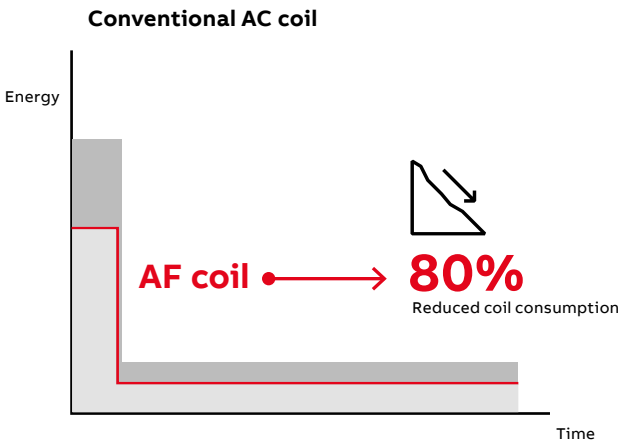
Use the same part number in Europe, Asia and North America as one contactor coil now handles 100 V – 250 V AC / DC, 50 / 60 Hz.

By reducing contactor coil energy consumption by up to 80%, panels can be built smaller and transformers more compact.

1SBC100200S0201 - Rev. A

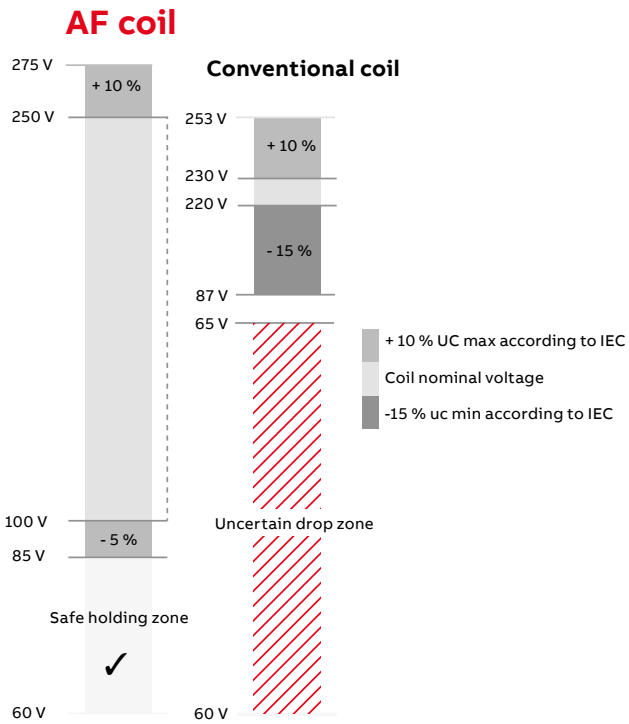
AF technology
Main Benefits

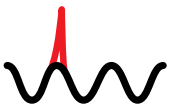




Reliable in all networks
The electronic system within the AF contactor continuously monitor the current and voltage apply to the coil. The contactor is safely operated in an always optimized condition and hum free.

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

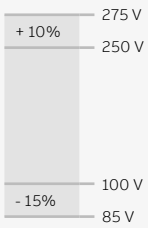
With conventional contactor technology, it is recommended to use an external surge suppressor, an accessory that could cost as much as half of the contactor. With the AF technology, the surges are handled by the contactor and never reach the control circuit. One less product and one less complication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

1SBC100202S0201

Select AF contactor dedicated to your control circuit application

Direct coil control
Contactor coils are operated directly with an auxiliary contact or PLC-output or indirectly through an interface relay. For direct coil control, the switching capacity of coil operating device (auxiliary contact, solid state PLC-output, ...) must be verified versus the coil consumption at closing and at holding.

AF09...AF2850 - 4 to 400kW - AC / DC operated



AF09...AF370		Coil code
24...60 V	AC / DC	11
48...130 V	AC / DC	12
100...250 V	AC / DC	13
250 V...500 V	AC / DC	14
AF400...AF1250		
24...60 V	DC	68
48...130 V	AC / DC	69
100...250 V	AC / DC	70
250 V...500 V	AC / DC	71
AF1350...AF2850		
100...250 V	AC / DC	70

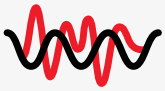
- AC / DC operation
- Wide control voltage range
- With built-in surge protection

AF09Z...AF38Z designed for PLC - 4 to 18.5 kW - 24 V DC operated

Voltage range	Coil code
24 V DC	30

- Allow direct control by 24 V DC ≥ 250 mA PLC-output
- Pull-in consumption 6 W 250 mA
- Holding consumption 1.7 W
- NO contact opening time 29 ms and closing time 53 ms
- With built-in surge protection

AF09Z...AF38Z for specific applications - 4 to 18.5 kW - AC / DC operated



Voltage range		Coil code
12...60 V	DC	20
24...60 V	AC / DC	21
48...130 V	AC / DC	22
100 V...250 V	AC / DC	23

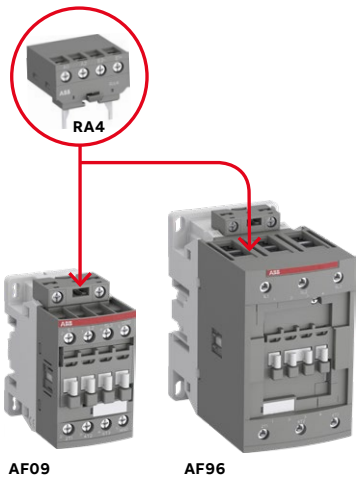
- Coil 20 covers 12 ... 20 V DC applications
- Coil allow direct control by 24 V DC ≥ 500 mA PLC-output
- Coil 21, 22 and 23 can withstand short voltage sags ans dips with reference to SEMI F47 conditions of use
- With built-in surge protection

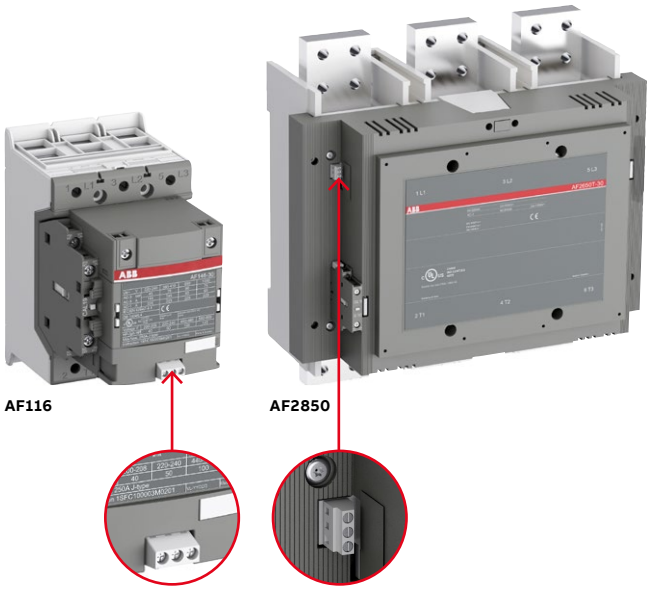
1SBC100202502 01

Select your AF coil interface for PLC

For contactors up to 2850 A AC-1 / General use

Coil interfaces are offered to operate all contactor size up to AF2850 with very low PLC ouput signals. They allow a galvanic isolation between the PLC circuit and the contactor coil circuit.

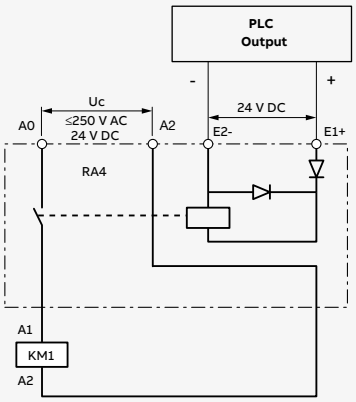




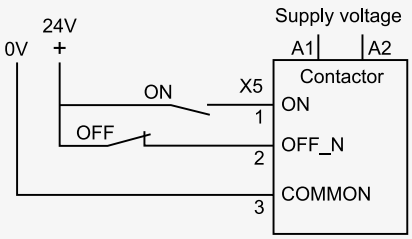
Interface relay
For control with 24 V DC ≥ 20 mA PLC output. RA4 interface relay can be used for rated control circuit voltages Uc 24 ... 250 V 50/60Hz and 24 V DC with the standard AF contactors up to 45kW - 400 V / 60hp - 480 V and with NF contactor relays.

Built-in PLC interface
For control with 24 V DC ≥ 10 mA PLC output. The built-in PLC interface operates the 100 ... 250 V AC / DC or 250 ... 500 V AC / DC AF contactor coil. Available for AF contactors from 55 kW - 400 V / 75 hp up to 560 kW - 400 V /900 hp 480 V and up to 2850 A AC-1 / General use. Dedicated coil code from AF116 up to AF370 and standard feature from AF400 up to AF2850.

Control circuit with interface relay



Control inputs with PLC plug



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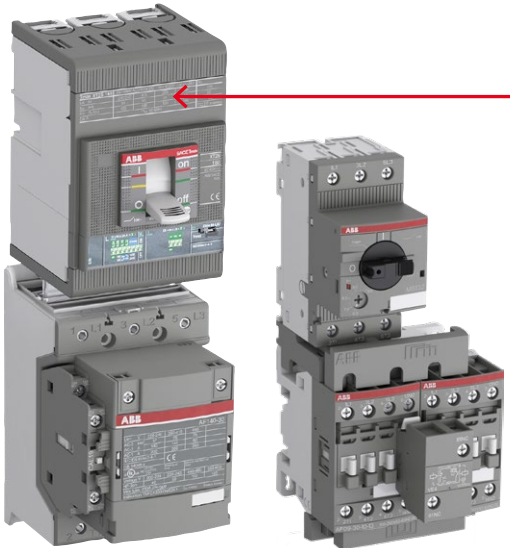
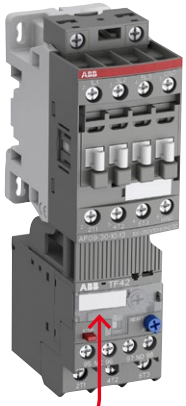
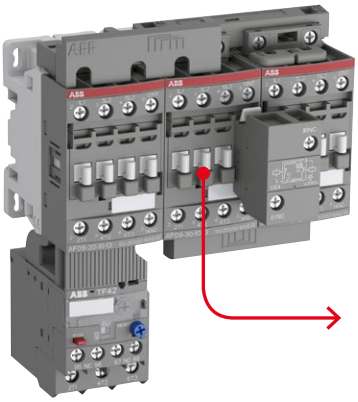
Contactors and motor protection
Advanced but simple



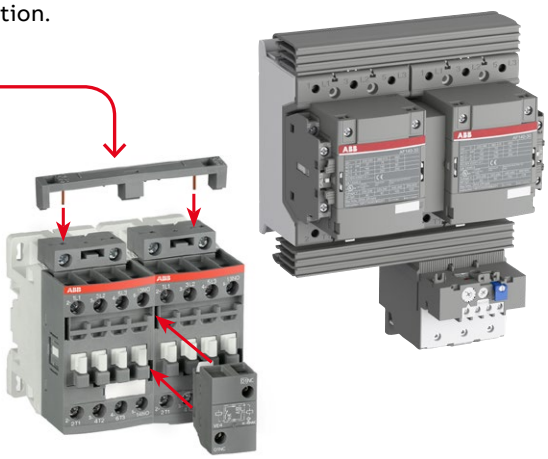
Easy, fast and secure starters assembly
The AF contactor range is perfect for motor starting applications and for solutions where space is limited. You can create any motor starting type and save assembly time with a complete range of accessories and connection sets.



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.

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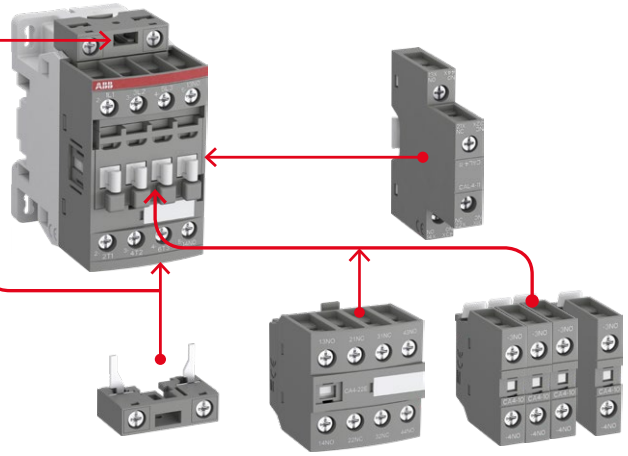
Contactors and motor protection
Flexible and safe

Easy to use accessories

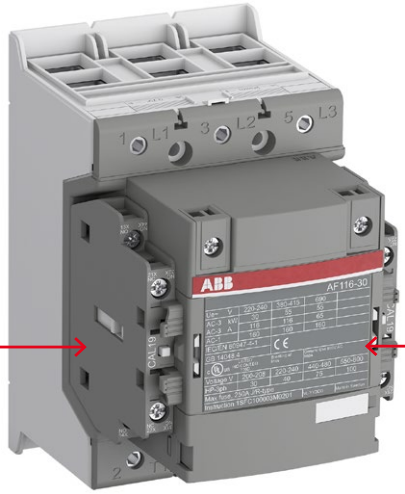
Up to 96 A

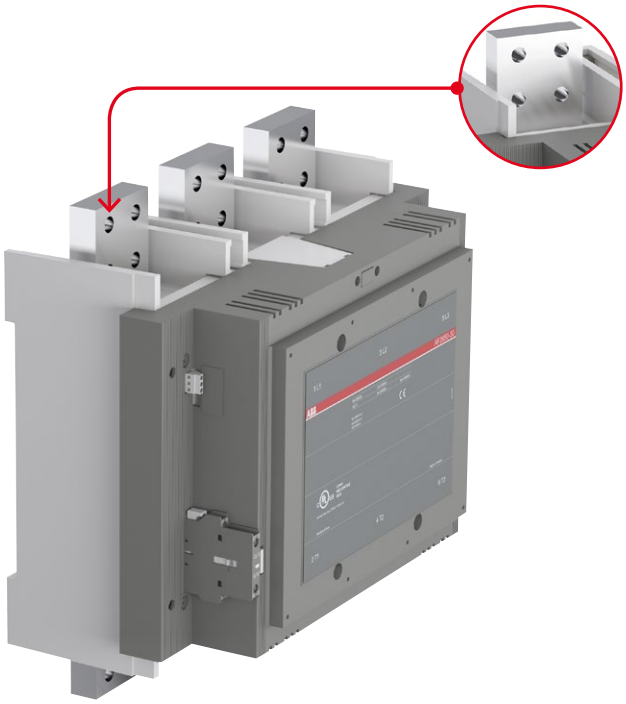
Great flexibility for coil terminal access
Contactors offer free choice of coil terminal access from top, bottom, both top and bottom or front.



Easy to use accessories
1-pole, 2-pole and 4-pole auxiliary contact blocks, front or side mounted, are available for a great flexibility.

Up to 2850 A





2 side mounted auxiliary contact blocks
AF116 ... AF2850 contactors can take up to 2 side mounted auxiliary contact blocks without adding to its width. Coil connection terminals, mechanical and electrical interlocks and electronic timers are easily connected through the snap-to-connect function.

Simple connection and maintenance
The main terminals of AF116 ... AF2850 contactors are at the contactors' back to facilitate your bus bars connections. It also allows easy contact inspection and maintenance from AF400 and above.

1SBC100202S0201

Notes

AF 3-pole contactors

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**

3-pole contactors, for motor control and power switching




AC / DC Control supply				Type	AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96
IEC	AC-3	Rated operational power	220 - 230 - 240 V	kW	2.2	3	4	6.5	9	11	11	15	18.5	22	25
		θ ≤ 60 °C for AF09 ... AF370	380 - 400 V	kW	4	5.5	7.5	11	15	18.5	18.5	22	30	37	45
		θ ≤ 55 °C for AF400 ... AF2650	415 V	kW	4	5.5	9	11	15	18.5	22	30	37	45	55
			440 V	kW	4	5.5	9	15	18.5	22	22	30	37	45	55
			500 V	kW	5.5	7.5	9	15	18.5	22	22	30	37	45	55
			690 V	kW	5.5	7.5	9	15	18.5	22	22	30	37	45	55
			1000 V	kW	—	—	—	—	—	—	—	—	—	35	40
		Rated operational current	380 - 400 V	A	9	12	18	26	32	38	40	53	65	80	96
	AC-1	Rated operational current	θ ≤ 40 °C, 690 V	A	25	28	30	45	50	50	70	100	105	125	130

UL / CSA	1-phase motor rating	120 V	hp	0.75	1	1.5	2	2	2	3	3	5	7.5	7.5
		240 V	hp	1.5	2	3	3	5	5	7.5	10	15	15	20
	3-phase motor rating	200 - 208 V	hp	2	3	5	7.5	10	10	10	15	20	25	30
		220 - 240 V	hp	2	3	5	7.5	10	10	15	20	25	30	30
		440 - 480 V	hp	5	7.5	10	15	20	25	30	40	50	60	60
		550 - 600 V	hp	7.5	10	15	20	25	30	40	50	60	75	75
	General use rating	600 V	A	25	28	30	45	50	50	60	80	90	105	115
NEMA	NEMA Size			00	0	—	1	—	—	2	—	—	3	—

Main accessories

Auxiliary contact blocks	Front mounting	CA4-10 (1 x N.O.) CA4-01 (1 x N.C.)			
	Side mounting	CAL4-11 (1 x N.O. + 1 x N.C.)			
Timers	Electronic	TEF4-ON TEF4-OFF			
Interlocking units	Mechanical	VM4		VM96-4	
	Mechanical / Electrical	VEM4			
Connection sets	For reversing contactors	BER16-4	BER38-4	BER65-4	BER96-4
Surge suppressors		Built-in surge protection			

Overload relays

	Thermal relays	Class 10 (Class 10A for TF140, TA200DU)	TF42 (0.10...38 A)	TF65 (22...67 A)	TF96 (40...96 A)
	Electronic relays	Class 10E, 20E, 30E	EF19 (0.10...18.9 A)	EF19 (0.10...18.9 A) EF45 (9...45 A)	EF65 (20...70 A)	EF96 (36...100 A)

Manual motor starters

	Thermal / magnetic protection Class 10	MS116 (0.10...32 A) Ics up to 50 kA for class 10 A		MS165 (10...80 A) Ics up to 100 kA (1)
		MS132 (0.10...32 A) Ics up to 100 kA		
	Magnetic only types	MO132 (0.16...32 A) Ics up to 100 kA		MO165 (16...80 A) Ics up to 100 kA (1)
Accessories	For contactor mounting	BEA16-4	BEA38-4	BEA65-4 (2)

(1) MS165/MO165 are suitable for use with AF09 ... AF30 for North american applications.
(2) BEA65-4 suitable for MS165 and MO165 only.

	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650	AF2850
	30	37	45	55	55	75	90	110	110	132	160	220	—	257	315	—	—	—
	55	75	75	90	110	132	160	200	200	250	315	400	—	475	560	—	—	—
	55	75	75	90	110	132	160	200	220	250	355	425	—	500	630	—	—	—
	75	90	90	110	132	160	160	200	220	250	355	450	—	560	710	—	—	—
	75	90	90	110	132	160	200	250	250	315	400	520	—	560	710	—	—	—
	55	75	90	132	160	200	250	315	315	355	500	600	—	800	1000	—	—	—
	—	—	75	110	132	160	185	200	220	280	355	400	—	—	—	—	—	—
	116	140	146	190	205	265	305	370	400	460	580	750	—	860	1060	—	—	—
	160	200	225	275	350	400	500	600	600	700	800	1050	1260	1350	1650	2050	2650	2850

	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	30	40	40	50	60	75	100	125	125	150	200	250	—	—	—	—	—	—
	40	50	50	60	75	100	125	150	150	200	250	300	—	400	450	—	—	—
	75	100	100	125	150	200	250	300	350	400	500	600	—	800	900	—	—	—
	100	125	125	150	200	250	300	350	400	500	600	700	—	1000	1150	—	—	—
	160	200	200	250	300	350	400	520	550	650	750	900	1210	1350	1650	2100	2700	2850
	—	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.)		
	VM19 (for same size contactors)			VM750H VM750V		VM1650H
	BER140-4	BER205-4	BER370-4	BEM460-30	BEM750-30	

	TF140DU (66...142 A) θ ≤ 55 °C	TA200DU (66...200 A) θ ≤ 55 °C				
	EF146 (54...150 A)	EF205 (63...210 A)	EF370 (115...380 A)	EF460 (150...500 A)	EF750 (250...800 A)	EF1250DU (350...1250 A)

03

AF09 ... AF38 3-pole contactors

4 to 18.5 kW

AC / DC operated

1SBC101011V0014

AF09-30-10

1SBC101001V0014

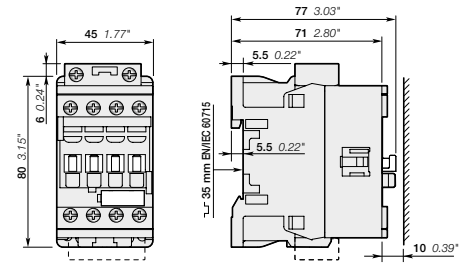
AF26-30-00

AF09 ... AF38 contactors 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.

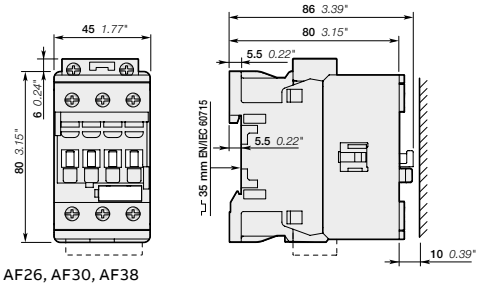
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening.
- built-in surge suppression
- 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.			Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC							Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC					kg
4	25	5	25	24...60	20...60	(1)	1 0	AF09-30-10-11	1SBL137001R1110	0.270
							0 1	AF09-30-01-11	1SBL137001R1101	0.270
				48...130	48...130		1 0	AF09-30-10-12	1SBL137001R1210	0.270
							0 1	AF09-30-01-12	1SBL137001R1201	0.270
				100...250	100...250		1 0	AF09-30-10-13	1SBL137001R1310	0.270
							0 1	AF09-30-01-13	1SBL137001R1301	0.270
				250...500	250...500		1 0	AF09-30-10-14	1SBL137001R1410	0.310
							0 1	AF09-30-01-14	1SBL137001R1401	0.310
5.5	28	7.5	28	24...60	20...60	(1)	1 0	AF12-30-10-11	1SBL157001R1110	0.270
							0 1	AF12-30-01-11	1SBL157001R1101	0.270
				48...130	48...130		1 0	AF12-30-10-12	1SBL157001R1210	0.270
							0 1	AF12-30-01-12	1SBL157001R1201	0.270
				100...250	100...250		1 0	AF12-30-10-13	1SBL157001R1310	0.270
							0 1	AF12-30-01-13	1SBL157001R1301	0.270
				250...500	250...500		1 0	AF12-30-10-14	1SBL157001R1410	0.310
							0 1	AF12-30-01-14	1SBL157001R1401	0.310
7.5	30	10	30	24...60	20...60	(1)	1 0	AF16-30-10-11	1SBL177001R1110	0.270
							0 1	AF16-30-01-11	1SBL177001R1101	0.270
				48...130	48...130		1 0	AF16-30-10-12	1SBL177001R1210	0.270
							0 1	AF16-30-01-12	1SBL177001R1201	0.270
				100...250	100...250		1 0	AF16-30-10-13	1SBL177001R1310	0.270
							0 1	AF16-30-01-13	1SBL177001R1301	0.270
				250...500	250...500		1 0	AF16-30-10-14	1SBL177001R1410	0.310
							0 1	AF16-30-01-14	1SBL177001R1401	0.310
11	45	15	45	24...60	20...60	(1)	0 0	AF26-30-00-11	1SBL237001R1100	0.310
				48...130	48...130		0 0	AF26-30-00-12	1SBL237001R1200	0.310
				100...250	100...250		0 0	AF26-30-00-13	1SBL237001R1300	0.310
				250...500	250...500		0 0	AF26-30-00-14	1SBL237001R1400	0.350
15	50	20	50	24...60	20...60	(1)	0 0	AF30-30-00-11	1SBL277001R1100	0.310
				48...130	48...130		0 0	AF30-30-00-12	1SBL277001R1200	0.310
				100...250	100...250		0 0	AF30-30-00-13	1SBL277001R1300	0.310
				250...500	250...500		0 0	AF30-30-00-14	1SBL277001R1400	0.350
18.5	50	25	50	24...60	20...60	(1)	0 0	AF38-30-00-11	1SBL297001R1100	0.310
				48...130	48...130		0 0	AF38-30-00-12	1SBL297001R1200	0.310
				100...250	100...250		0 0	AF38-30-00-13	1SBL297001R1300	0.310
				250...500	250...500		0 0	AF38-30-00-14	1SBL297001R1400	0.350

(1) AF..-30-..-11 not suitable for direct control by PLC-output.



AF09, AF12, AF16



AF26, AF30, AF38

Main dimensions mm, inches

1SBC101371S0201 - Rev. D

AF09Z ... AF38Z 3-pole contactors

4 to 18.5 kW

24 V DC operated designed for PLC

1SBC101525V0014

AF09Z-30-10

1SBC101525V0014

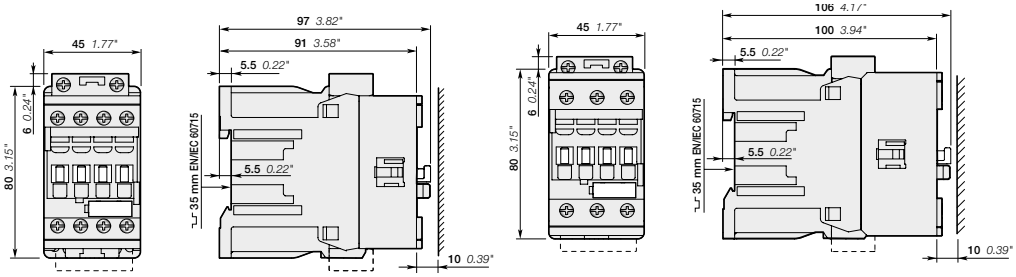
AF26Z-30-00

AF09Z ... AF38Z contactors 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.

- control circuit: 24 V DC operated with electronic coil interface allowing low holding consumption up to 1.7 W and reduced panel energy consumption
  - allow direct control by PLC-output ≥ 250 mA 24 V DC
  - very distinct closing and opening
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC		UL/CSA		Rated control circuit voltage Uc	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
kW	A	hp	A	V DC				kg
4	25	5	25	24	1 0	AF09Z-30-10-30	1SBL136001R3010	0.430
					0 1	AF09Z-30-01-30	1SBL136001R3001	0.430
5.5	28	7.5	28	24	1 0	AF12Z-30-10-30	1SBL156001R3010	0.430
					0 1	AF12Z-30-01-30	1SBL156001R3001	0.430
7.5	30	10	30	24	1 0	AF16Z-30-10-30	1SBL176001R3010	0.430
					0 1	AF16Z-30-01-30	1SBL176001R3001	0.430
11	45	15	45	24	0 0	AF26Z-30-00-30	1SBL236001R3000	0.480
15	50	20	50	24	0 0	AF30Z-30-00-30	1SBL276001R3000	0.480
18.5	50	25	50	24	0 0	AF38Z-30-00-30	1SBL296001R3000	0.480

Note: AF..Z contactors with DC control voltage 24 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.



AF09Z, AF12Z, AF16Z

AF26Z, AF30Z, AF38Z

Main dimensions mm, inches

1SBC100328S0201 - Rev. A

AF09Z ... AF38Z 3-pole contactors

4 to 18.5 kW

AC / DC operated for specific applications

AF09Z-30-10

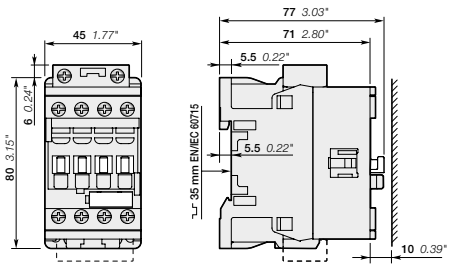
AF26Z-30-00

AF09Z ... AF38Z contactors 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.

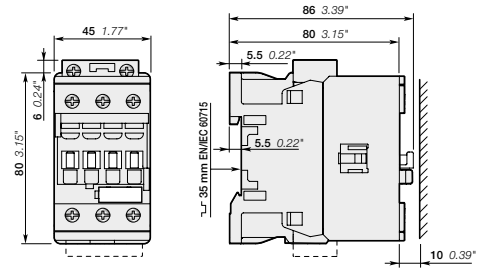
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...250 V 50/60 Hz and 12...250 V DC
  - can manage large control voltage variations
  - allow direct control by PLC-output ≥ 24 V DC 500 mA
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- built-in surge suppression
- 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.		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
4	25	5	25	-	12...20	1 0	AF09Z-30-10-20	1SBL136001R2010	0.310
						0 1	AF09Z-30-01-20	1SBL136001R2001	0.310
				24...60	20...60	1 0	AF09Z-30-10-21	1SBL136001R2110	0.310
						0 1	AF09Z-30-01-21	1SBL136001R2101	0.310
				48...130	48...130	1 0	AF09Z-30-10-22	1SBL136001R2210	0.310
						0 1	AF09Z-30-01-22	1SBL136001R2201	0.310
				100...250	100...250	1 0	AF09Z-30-10-23	1SBL136001R2310	0.310
						0 1	AF09Z-30-01-23	1SBL136001R2301	0.310
5.5	28	7.5	28	-	12...20	1 0	AF12Z-30-10-20	1SBL156001R2010	0.310
						0 1	AF12Z-30-01-20	1SBL156001R2001	0.310
				24...60	20...60	1 0	AF12Z-30-10-21	1SBL156001R2110	0.310
						0 1	AF12Z-30-01-21	1SBL156001R2101	0.310
				48...130	48...130	1 0	AF12Z-30-10-22	1SBL156001R2210	0.310
						0 1	AF12Z-30-01-22	1SBL156001R2201	0.310
				100...250	100...250	1 0	AF12Z-30-10-23	1SBL156001R2310	0.310
						0 1	AF12Z-30-01-23	1SBL156001R2301	0.310
7.5	30	10	30	-	12...20	1 0	AF16Z-30-10-20	1SBL176001R2010	0.310
						0 1	AF16Z-30-01-20	1SBL176001R2001	0.310
				24...60	20...60	1 0	AF16Z-30-10-21	1SBL176001R2110	0.310
						0 1	AF16Z-30-01-21	1SBL176001R2101	0.310
				48...130	48...130	1 0	AF16Z-30-10-22	1SBL176001R2210	0.310
						0 1	AF16Z-30-01-22	1SBL176001R2201	0.310
				100...250	100...250	1 0	AF16Z-30-10-23	1SBL176001R2310	0.310
						0 1	AF16Z-30-01-23	1SBL176001R2301	0.310
11	45	15	45	-	12...20	0 0	AF26Z-30-00-20	1SBL236001R2000	0.350
				24...60	20...60	0 0	AF26Z-30-00-21	1SBL236001R2100	0.350
				48...130	48...130	0 0	AF26Z-30-00-22	1SBL236001R2200	0.350
				100...250	100...250	0 0	AF26Z-30-00-23	1SBL236001R2300	0.350
15	50	20	50	-	12...20	0 0	AF30Z-30-00-20	1SBL276001R2000	0.350
				24...60	20...60	0 0	AF30Z-30-00-21	1SBL276001R2100	0.350
				48...130	48...130	0 0	AF30Z-30-00-22	1SBL276001R2200	0.350
				100...250	100...250	0 0	AF30Z-30-00-23	1SBL276001R2300	0.350
18.5	50	25	50	-	12...20	0 0	AF38Z-30-00-20	1SBL296001R2000	0.350
				24...60	20...60	0 0	AF38Z-30-00-21	1SBL296001R2100	0.350
				48...130	48...130	0 0	AF38Z-30-00-22	1SBL296001R2200	0.350
				100...250	100...250	0 0	AF38Z-30-00-23	1SBL296001R2300	0.350

Note: Only AF..Z contactors with DC control voltage 12...20 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.



AF09Z, AF12Z, AF16Z



AF26Z, AF30Z, AF38Z

Main dimensions mm, inches

1SBC101372S0201 - Rev. C

AF40 ... AF96 3-pole contactors

18.5 to 45 kW

AC / DC operated

1SBC101014V0014

AF40-30-00

1SBC101016V0014

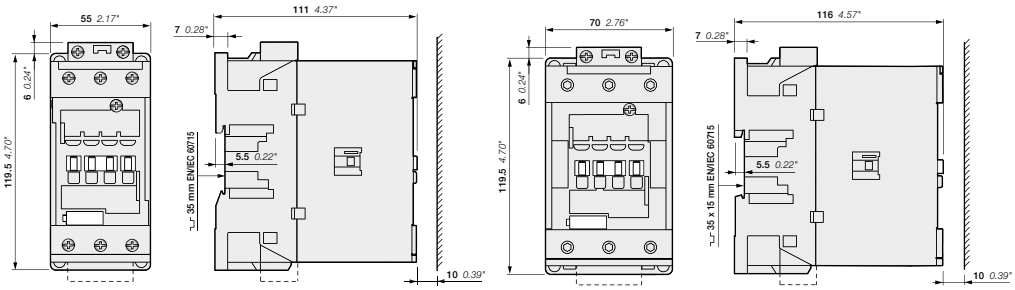
AF80-30-00

AF40 ... AF96 contactors 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.

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- built-in surge suppression
- 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.		Auxiliary contacts fitted	Type (1)	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
18.5	70	30	60	24...60	20...60 (1)	0 0	AF40-30-00-11	1SBL347001R1100	0.970
				48...130	48...130	0 0	AF40-30-00-12	1SBL347001R1200	0.970
				100...250	100...250	0 0	AF40-30-00-13	1SBL347001R1300	0.950
				250...500	250...500	0 0	AF40-30-00-14	1SBL347001R1400	0.950
22	100	40	80	24...60	20...60 (1)	0 0	AF52-30-00-11	1SBL367001R1100	0.970
				48...130	48...130	0 0	AF52-30-00-12	1SBL367001R1200	0.970
				100...250	100...250	0 0	AF52-30-00-13	1SBL367001R1300	0.950
				250...500	250...500	0 0	AF52-30-00-14	1SBL367001R1400	0.950
30	105	50	90	24...60	20...60 (1)	0 0	AF65-30-00-11	1SBL387001R1100	0.970
				48...130	48...130	0 0	AF65-30-00-12	1SBL387001R1200	0.970
				100...250	100...250	0 0	AF65-30-00-13	1SBL387001R1300	0.950
				250...500	250...500	0 0	AF65-30-00-14	1SBL387001R1400	0.950
37	125	60	105	24...60	20...60 (1)	0 0	AF80-30-00-11	1SBL397001R1100	1.220
				48...130	48...130	0 0	AF80-30-00-12	1SBL397001R1200	1.220
				100...250	100...250	0 0	AF80-30-00-13	1SBL397001R1300	1.170
				250...500	250...500	0 0	AF80-30-00-14	1SBL397001R1400	1.170
45	130	60	115	24...60	20...60 (1)	0 0	AF96-30-00-11	1SBL407001R1100	1.220
				48...130	48...130	0 0	AF96-30-00-12	1SBL407001R1200	1.220
				100...250	100...250	0 0	AF96-30-00-13	1SBL407001R1300	1.170
				250...500	250...500	0 0	AF96-30-00-14	1SBL407001R1400	1.170

(1) For control by PLC-output, use RA4 interface relay.



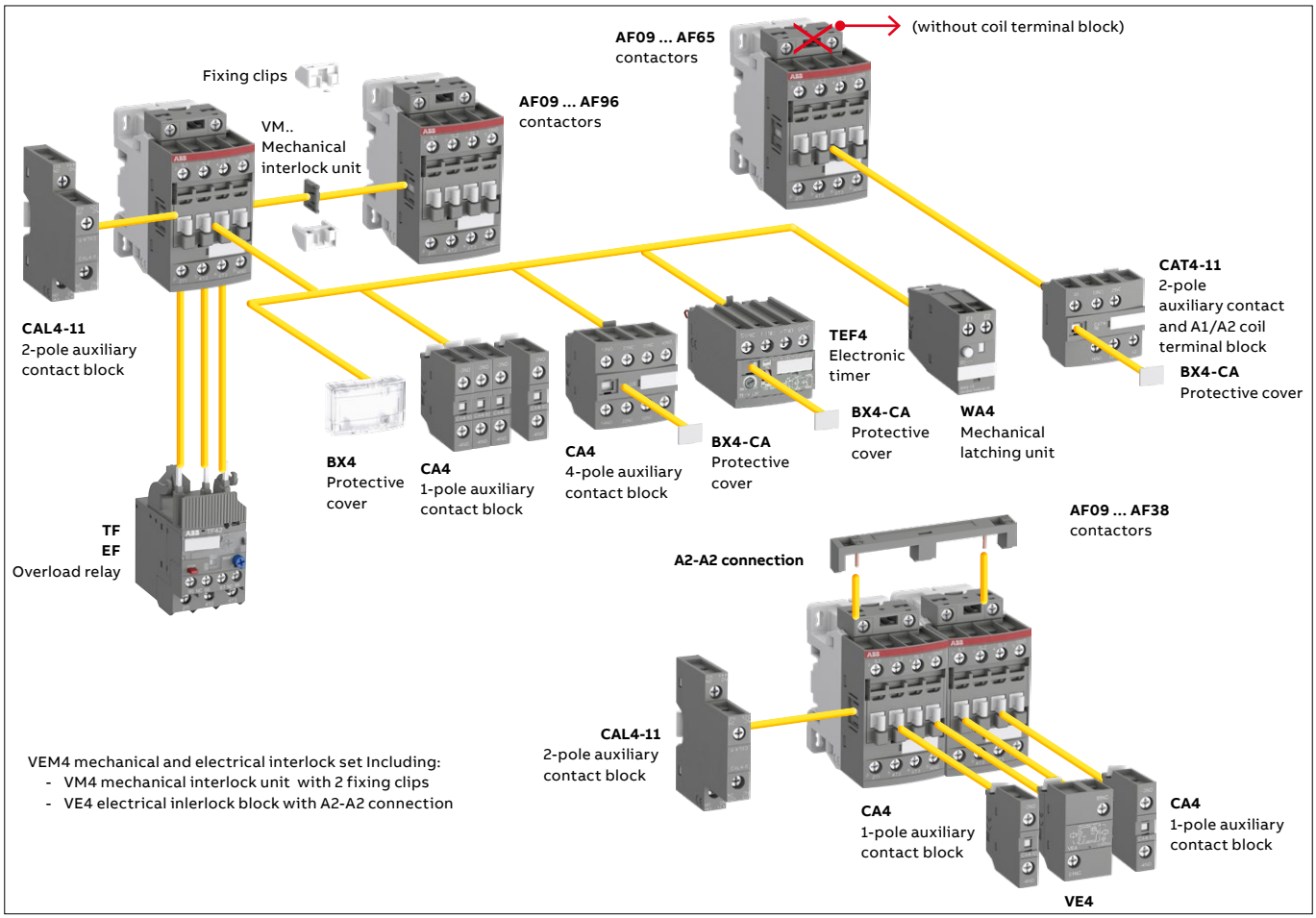
AF40, AF52, AF65

AF80, AF96

Main dimensions mm, inches

AF09 ... AF96 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 Auxiliary contact blocks 1-pole CA4	2-pole CAT4-11	4-pole CA4	Electronic timer TEF4	Mechanical latching unit WA4 (2)	Electrical and mechanical interlock set (between 2 contactors) VEM4	Side-mounted accessories Auxiliary contact blocks 2-pole CAL4-11 Left side	Right side
AF09(Z) ... AF38(Z) (1)										
AF09 ... AF16	3 0	0 1	4 max.	or 1	or 1	or 1	or 1	–	+ 1	–
AF09 ... AF16	3 0	1 0	2 max.	or 1	–	or 1	or 1	–	+ 1	+ 1
AF26 ... AF38	3 0	0 0	3 max.	–	–	–	–	+ 1 (3)	+ 1	or 1
AF09Z ... AF38Z 24 V DC designed for PLC - coil 30 (1)										
AF09Z ... AF16Z	3 0	0 1	4 max.	–	or 1	or 1	–	– (3)	or 1	+ 1
AF09Z ... AF16Z	3 0	1 0	2 max.	–	–	or 1	–	– (3)	+ 1	or 1
AF26Z ... AF38Z	3 0	0 0	–	–	–	1	–	–	+ 1	+ 1
AF40 ... AF96										
AF40 ... AF65	3 0	0 0	4 max.	or 1	or 1	or 1	or 1	–	+ 1	+ 1
AF80, AF96	3 0	0 0	4 max.	–	or 1	or 1	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.
(2) Use WA4 for AF09...AF65 and WA4-96 for AF80, AF96.
Accept 1-pole CA4 auxiliary contacts (1 block on each side of the mechanical latch) in respect to the total number of built-in or additional N.C. auxiliary contacts.
For WA4 accessory use with contactor coil 30, please consult your ABB local sales organization.
(3) VEM4 not suitable for AF..Z contactors with DC control voltages 12...20 V DC (coil 20) and 24 V DC (coil 30). Use VM4 side-mounted mechanical interlock unit.

Overload relays fitting details (4)

Contactor types	Thermal overload relays	Electronic overload relays
AF09 ... AF38	TF42 (0.10...38 A)	EF19 (0.10...19 A)
AF26 ... AF38	TF42 (0.10...38 A)	EF45 (9...45 A)
AF40 ... AF65	TF65 (22...67 A)	EF65 (20...70 A)
AF80, AF96	TF96 (40...96 A)	EF96 (36...100 A)

The addition of an overload relay on the contactor does not prevent fitting of many other accessories as shown above.
(4) Direct mounting - No kit required.

1SBC101748S0201 - Rev. A

AF116 ... AF146 3-pole contactors

55 to 75 kW

AC / DC operated

1SFC101005V0001

AF146-30-00

1SFC101006V0001

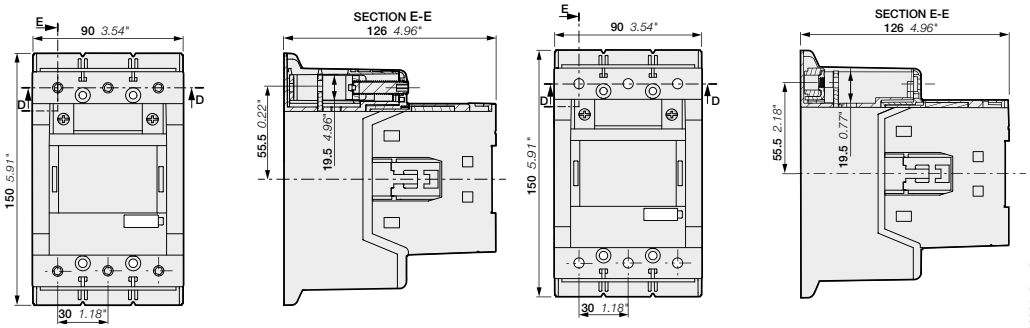
AF146-30-00B

AF116 ... AF140 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC, AF146 up to 1000 V AC and AF116 ... AF146 up to 260 V DC. These contactors are of the block type design with 3 main poles.

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- 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.		Auxiliary contacts fitted	Type (1)	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
For connection with built-in cable clamps									
55	160	75	160	24...60	20...60	0 0	AF116-30-00-11	1SFL427001R1100	1.750
				48...130	48...130	0 0	AF116-30-00-12	1SFL427001R1200	1.750
				100...250	100...250	0 0	AF116-30-00-13	1SFL427001R1300	1.750
				250...500	250...500	0 0	AF116-30-00-14	1SFL427001R1400	1.750
75	200	100	200	24...60	20...60	0 0	AF140-30-00-11	1SFL447001R1100	1.750
				48...130	48...130	0 0	AF140-30-00-12	1SFL447001R1200	1.750
				100...250	100...250	0 0	AF140-30-00-13	1SFL447001R1300	1.750
				250...500	250...500	0 0	AF140-30-00-14	1SFL447001R1400	1.750
75	225	100	200	24...60	20...60	0 0	AF146-30-00-11	1SFL467001R1100	1.750
				48...130	48...130	0 0	AF146-30-00-12	1SFL467001R1200	1.750
				100...250	100...250	0 0	AF146-30-00-13	1SFL467001R1300	1.750
				250...500	250...500	0 0	AF146-30-00-14	1SFL467001R1400	1.750
With bar connections									
55	160	75	160	24...60	20...60	0 0	AF116-30-00B-11	1SFL427002R1100	1.500
				48...130	48...130	0 0	AF116-30-00B-12	1SFL427002R1200	1.500
				100...250	100...250	0 0	AF116-30-00B-13	1SFL427002R1300	1.500
				250...500	250...500	0 0	AF116-30-00B-14	1SFL427002R1400	1.500
75	200	100	200	24...60	20...60	0 0	AF140-30-00B-11	1SFL447002R1100	1.500
				48...130	48...130	0 0	AF140-30-00B-12	1SFL447002R1200	1.500
				100...250	100...250	0 0	AF140-30-00B-13	1SFL447002R1300	1.500
				250...500	250...500	0 0	AF140-30-00B-14	1SFL447002R1400	1.500
75	225	100	200	24...60	20...60	0 0	AF146-30-00B-11	1SFL467002R1100	1.500
				48...130	48...130	0 0	AF146-30-00B-12	1SFL467002R1200	1.500
				100...250	100...250	0 0	AF146-30-00B-13	1SFL467002R1300	1.500
				250...500	250...500	0 0	AF146-30-00B-14	1SFL467002R1400	1.500

(1) For other auxiliary contacts arrangements, please contact your ABB local sales organization.



AF116, AF140, AF146-30-00

AF116, AF140, AF146-30-00B

Main dimensions mm, inches

1SFC101088C0201 - Rev. D

03

AF116 ... AF146 3-pole contactors with built-in PLC interface

55 to 75 kW

AC / DC operated for faster opening utilization

1SFC101182V0001

AF146-30-00

1SFC101185V0001

AF146-30-00B

AF116 ... AF146 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC, AF146 up to 1000 V AC and AF116 ... AF146 up to 260 V DC. These contactors are of the block type design with 3 main poles.

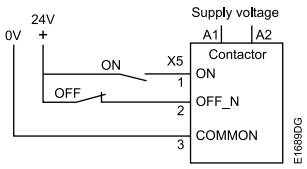
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...500 V AC and DC), only 2 coils to cover control voltages between 100...500 V 50/60 Hz and 100...250 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request)
  - opening time below 20 ms.
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

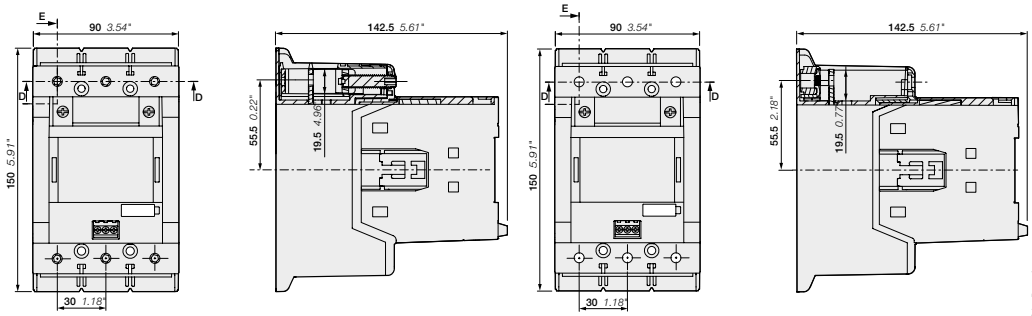
IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted	Type (1)	Order code	Weight
Rated operational power 400 V AC-3 kW	current θ ≤ 40 °C AC-1 A	3-phase motor rating 480 V hp	General use rating 600 V AC A	V 50/60 Hz	V DC				Pkg (1 pce) kg
For connection with built-in cable clamps									
55	160	75	160	100...250	100...250	0 0	AF116-30-00-33	1SFL427001R3300	1.750
				250...500	250...500	0 0	AF116-30-00-34	1SFL427001R3400	1.750
75	200	100	200	100...250	100...250	0 0	AF140-30-00-33	1SFL447001R3300	1.750
				250...500	250...500	0 0	AF140-30-00-34	1SFL447001R3400	1.750
75	225	100	200	100...250	100...250	0 0	AF146-30-00-33	1SFL467001R3300	1.750
				250...500	250...500	0 0	AF146-30-00-34	1SFL467001R3400	1.750
With bar connections									
55	160	75	160	100...250	100...250	0 0	AF116-30-00B-33	1SFL427002R3300	1.500
				250...500	250...500	0 0	AF116-30-00B-34	1SFL427002R3400	1.500
75	200	100	200	100...250	100...250	0 0	AF140-30-00B-33	1SFL447002R3300	1.500
				250...500	250...500	0 0	AF140-30-00B-34	1SFL447002R3400	1.500
75	225	100	200	100...250	100...250	0 0	AF146-30-00B-33	1SFL467002R3300	1.500
				250...500	250...500	0 0	AF146-30-00B-34	1SFL467002R3400	1.500

(1) For other auxiliary contacts arrangements, please contact your ABB local sales organization.

AF116 ... AF146 are equipped with low voltage inputs for control, for example by a PLC.

Control inputs





AF116, AF140, AF146-30-00

AF116, AF140, AF146-30-00B

Main dimensions mm, inches

1SFC101164C0201 - Rev. A

AF190 ... AF370 3-pole contactors

90 to 200 kW

AC / DC operated

1SFC101276V0001

AF205-30-00

1SFC101273V0001

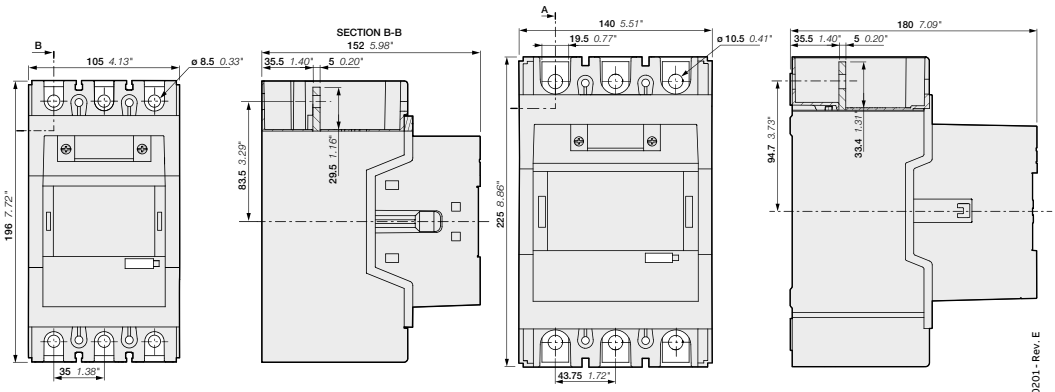
AF370-30-00

AF190 ... AF370 contactors are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC and 340 V DC. These contactors are of the block type design with 3 main poles.

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- 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.		Auxiliary contacts fitted	Type (1)	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
90	275	125	250	24...60	20...60	0 0	AF190-30-00-11	1SFL487002R1100	3.000
				48...130	48...130	0 0	AF190-30-00-12	1SFL487002R1200	3.000
				100...250	100...250	0 0	AF190-30-00-13	1SFL487002R1300	3.000
				250...500	250...500	0 0	AF190-30-00-14	1SFL487002R1400	3.000
110	350	150	300	24...60	20...60	0 0	AF205-30-00-11	1SFL527002R1100	3.000
				48...130	48...130	0 0	AF205-30-00-12	1SFL527002R1200	3.000
				100...250	100...250	0 0	AF205-30-00-13	1SFL527002R1300	3.000
				250...500	250...500	0 0	AF205-30-00-14	1SFL527002R1400	3.000
132	400	200	350	24...60	20...60	0 0	AF265-30-00-11	1SFL547002R1100	4.605
				48...130	48...130	0 0	AF265-30-00-12	1SFL547002R1200	4.605
				100...250	100...250	0 0	AF265-30-00-13	1SFL547002R1300	4.605
				250...500	250...500	0 0	AF265-30-00-14	1SFL547002R1400	4.605
160	500	250	400	24...60	20...60	0 0	AF305-30-00-11	1SFL587002R1100	4.605
				48...130	48...130	0 0	AF305-30-00-12	1SFL587002R1200	4.605
				100...250	100...250	0 0	AF305-30-00-13	1SFL587002R1300	4.605
				250...500	250...500	0 0	AF305-30-00-14	1SFL587002R1400	4.605
200	600	300	520	24...60	20...60	0 0	AF370-30-00-11	1SFL607002R1100	4.605
				48...130	48...130	0 0	AF370-30-00-12	1SFL607002R1200	4.605
				100...250	100...250	0 0	AF370-30-00-13	1SFL607002R1300	4.605
				250...500	250...500	0 0	AF370-30-00-14	1SFL607002R1400	4.605

(1) For other auxiliary contacts arrangements, please contact your ABB local sales organization.



AF190, AF205

AF265, AF305, AF370

Main dimensions mm, inches

1SFC101089C0201 - Rev. E

AF190 ... AF370 3-pole contactors with built-in PLC interface

90 to 200 kW

AC / DC operated for faster utilization

1SFC101271V0001

AF205-30-00

1SFC101268V0001

AF370-30-00

AF190 ... AF370 contactors are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC and 340 V DC. These contactors are of the block type design with 3 main poles.

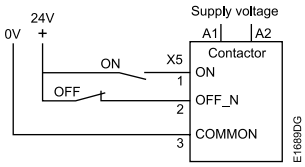
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 2 coils to cover control voltages between 100...500 V 50/60 Hz and 100...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request)
  - opening time below 20 ms.
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

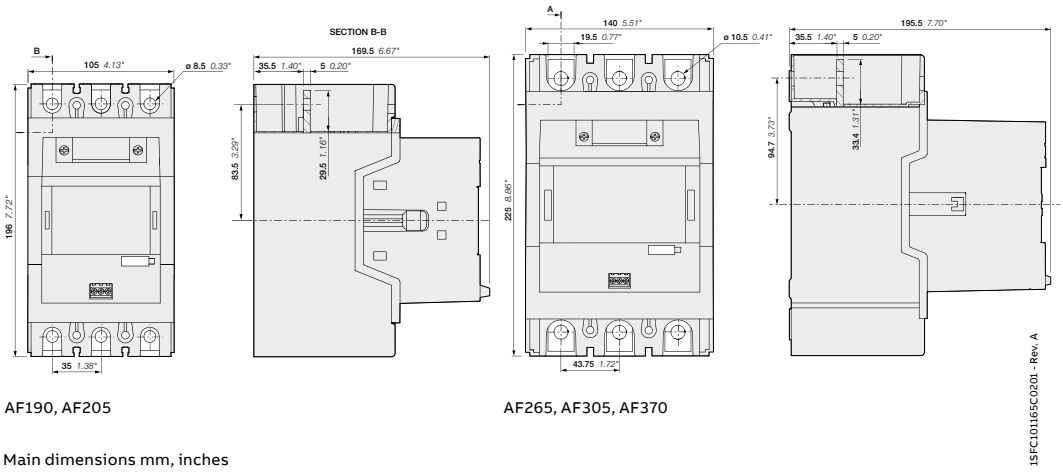
IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted	Type (1)	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
90	275	125	250	100...250	100...250	0 0	AF190-30-00-33	1SFL487002R3300	3.000
				250...500	250...500	0 0	AF190-30-00-34	1SFL487002R3400	3.000
110	350	150	300	100...250	100...250	0 0	AF205-30-00-33	1SFL527002R3300	3.000
				250...500	250...500	0 0	AF205-30-00-34	1SFL527002R3400	3.000
132	400	200	350	100...250	100...250	0 0	AF265-30-00-33	1SFL547002R3300	4.605
				250...500	250...500	0 0	AF265-30-00-34	1SFL547002R3400	4.605
160	500	250	400	100...250	100...250	0 0	AF305-30-00-33	1SFL587002R3300	4.605
				250...500	250...500	0 0	AF305-30-00-34	1SFL587002R3400	4.605
200	600	300	520	100...250	100...250	0 0	AF370-30-00-33	1SFL607002R3300	4.605
				250...500	250...500	0 0	AF370-30-00-34	1SFL607002R3400	4.605

(1) For other auxiliary contacts arrangements, please contact your ABB local sales organization.

AF190 ... AF370 are equipped with low voltage inputs for control, for example by a PLC.

Control inputs





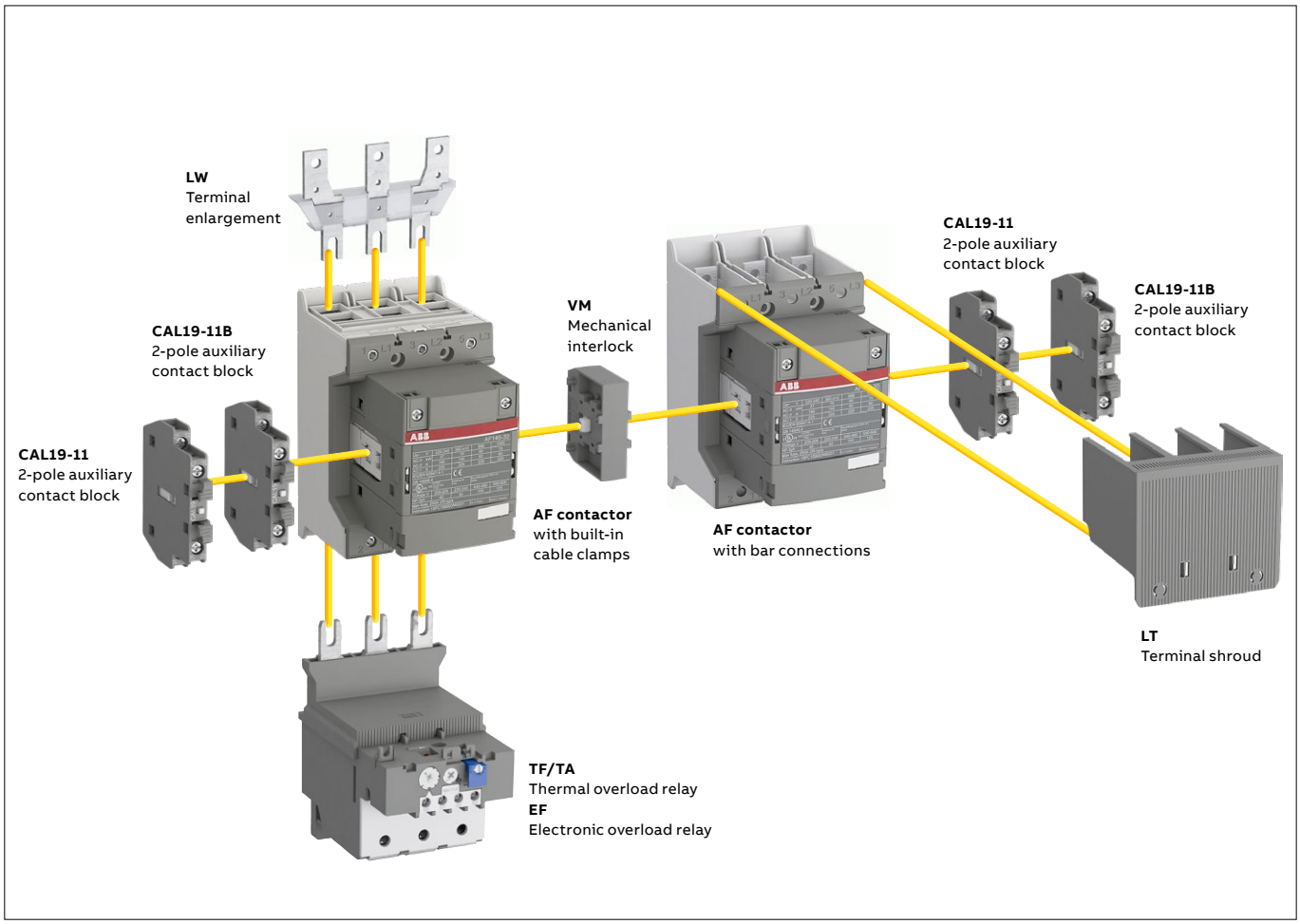
AF190, AF205

AF265, AF305, AF370

Main dimensions mm, inches

AF116 ... AF370 3-pole contactors

Contactors and main accessories



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

Contactor types	Main poles	Available auxiliary contacts	Side-mounted accessories Auxiliary contact blocks		Mechanical interlock units (between two contactors)
			CAL19-11 (3)	CAL19-11B	
AF116 ... AF370	3 0	0 0	2 x CAL19-11	+ 2 x CAL19-11B	–
AF116 ... AF370	3 0	0 0	2 x CAL19-11 (1)	+ 2 x CAL19-11B (1)	+ VM... (2)

(1) Total number of auxiliary contact blocks for the two contactors.
(2) Interlock type, according to the contactor ratings (see "Accessories").
(3) The CEL19 auxiliary contact blocks can replace the CAL19-11 and CAL19-11B. Though, no auxiliary contact block can be mounted outside the CEL19.

Overload relays fitting details (1)

Contactor types	Thermal overload relays	Electronic overload relays
AF116 ... AF140	TF140DU (66...142 A)	EF146 (54...150 A)
AF146	–	EF146 (54...150 A)
AF190, AF205	TA200DU (66...200 A)	EF205 (63...210 A)
AF265 ... AF370	–	EF370 (115...380 A)

The addition of a thermal or electronic overload relay on the contactor does not prevent fitting of many other accessories as shown in "Main accessory fitting details" table.
(1) Direct mounting - No kit required.

1SFC101135C0201 - Rev. A

AF26 ... AF38 3-pole contactors

4 to 18.5 kW

AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

1SBC101003V0014

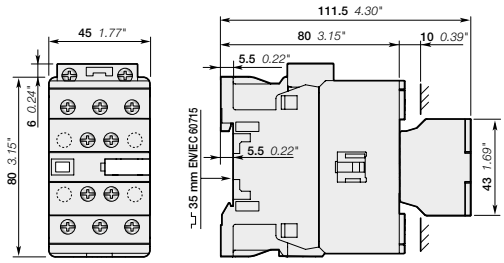
AF26-30-11

AF26 ... AF38 contactors 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 (1st stack):

- 2nd stack with permanently fixed auxiliary contact block. The built-in auxiliary contact elements are mechanically linked (side-marked symbol) and the N.C. auxiliary contacts are mirror contacts
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening.
- built-in surge suppression
- 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.		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	Rated operational current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
11	45	15	45	24...60	20...60 (1)	1 1	AF26-30-11-11	1SBL237001R1111	0.350
				48...130	48...130	1 1	AF26-30-11-12	1SBL237001R1211	0.350
				100...250	100...250	1 1	AF26-30-11-13	1SBL237001R1311	0.350
				250...500	250...500	1 1	AF26-30-11-14	1SBL237001R1411	0.390
15	50	20	50	24...60	20...60 (1)	1 1	AF30-30-11-11	1SBL277001R1111	0.350
				48...130	48...130	1 1	AF30-30-11-12	1SBL277001R1211	0.350
				100...250	100...250	1 1	AF30-30-11-13	1SBL277001R1311	0.350
				250...500	250...500	1 1	AF30-30-11-14	1SBL277001R1411	0.390
18.5	50	25	50	24...60	20...60 (1)	1 1	AF38-30-11-11	1SBL297001R1111	0.350
				48...130	48...130	1 1	AF38-30-11-12	1SBL297001R1211	0.350
				100...250	100...250	1 1	AF38-30-11-13	1SBL297001R1311	0.350
				250...500	250...500	1 1	AF38-30-11-14	1SBL297001R1411	0.390

(1) AF..-30-..-11 not suitable for direct control by PLC-output.



AF26, AF30, AF38

Main dimensions mm, inches

1SBC100492S0201 - Rev. C

AF26Z ... AF38Z 3-pole contactors

4 to 18.5 kW

AC / DC operated for specific applications with 1 N.O. + 1 N.C. contacts

1SBC101003V0014

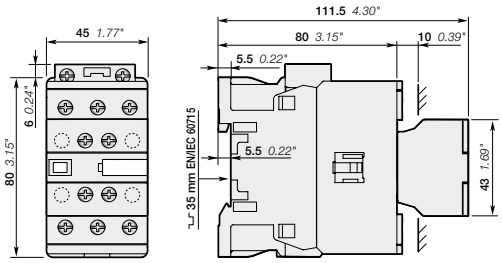
AF26Z-30-11

AF26Z ... AF38Z contactors 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 (1st stack):

- 2nd stack with permanently fixed auxiliary contact block. The built-in auxiliary contact elements are mechanically linked (side-marked symbol) and the N.C. auxiliary contacts are mirror contacts
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...250 V 50/60 Hz and 12...250 V DC
  - can manage large control voltage variations, allow direct control by PLC-output ≥ 24 V DC 500 mA, reduced panel energy consumption, very distinct closing and opening,
  - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- built-in surge suppression
- 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.		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
11	45	15	45	-	12...20	1 1	AF26Z-30-11-20	1SBL236001R2011	0.390
				24...60	20...60	1 1	AF26Z-30-11-21	1SBL236001R2111	0.390
				48...130	48...130	1 1	AF26Z-30-11-22	1SBL236001R2211	0.390
				100...250	100...250	1 1	AF26Z-30-11-23	1SBL236001R2311	0.390
15	50	20	50	-	12...20	1 1	AF30Z-30-11-20	1SBL276001R2011	0.390
				24...60	20...60	1 1	AF30Z-30-11-21	1SBL276001R2111	0.390
				48...130	48...130	1 1	AF30Z-30-11-22	1SBL276001R2211	0.390
				100...250	100...250	1 1	AF30Z-30-11-23	1SBL276001R2311	0.390
18.5	50	25	50	-	12...20	1 1	AF38Z-30-11-20	1SBL296001R2011	0.390
				24...60	20...60	1 1	AF38Z-30-11-21	1SBL296001R2111	0.390
				48...130	48...130	1 1	AF38Z-30-11-22	1SBL296001R2211	0.390
				100...250	100...250	1 1	AF38Z-30-11-23	1SBL296001R2311	0.390

Note: Only AF..Z contactors with DC control voltage 12...20 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole



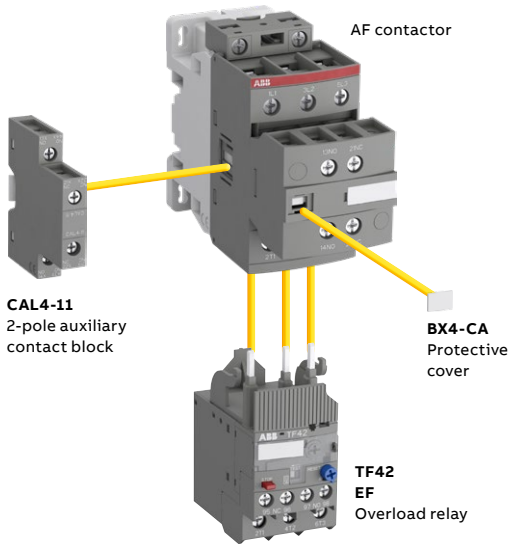
AF26Z, AF30Z, AF38Z

Main dimensions mm, inches

1SBC100493S0201 - Rev. B

AF26 ... AF38 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

Contactor types	Main poles	Built-in auxiliary contacts	Side-mounted accessories Mechanical interlock unit (between 2 contactors)	Auxiliary contact blocks	
			VM4	2-pole CAL4-11 Left side	Right side
AF26 ... AF38	3 0	1 1	1	+ 1	or 1
			–	+ 1	+ 1

Overload relays fitting details (1)

Contactor types	Thermal overload relays	Electronic overload relays
AF26 ... AF38	TF42 (0.10...38 A)	EF19 (0.10...19 A)
		EF45 (9...45 A)

The addition of an overload relay on the contactor does not prevent fitting of many other accessories as shown above.
(1) Direct mounting - No kit required.

1SBC101750S0201 - Rev. B

AF40 ... AF96 3-pole contactors

18.5 to 30 kW

AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

1SBC101005V0014

AF40-30-11

1SBC101017V0014

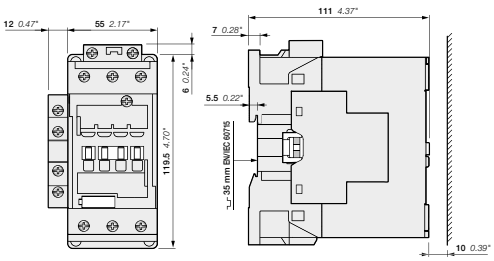
AF80-30-11

AF40 ... AF96 contactors 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 (1st stack):

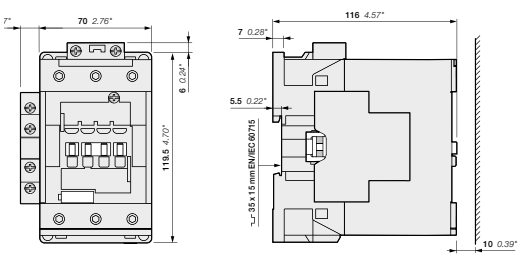
- with 1 N.O. + 1 N.C. side mounted auxiliary contact block
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- built-in surge suppression
- 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.		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
185	70	30	60	24...60	20...60 (1)	1 1	AF40-30-11-11	1SBL347001R1111	1.010
				48...130	48...130	1 1	AF40-30-11-12	1SBL347001R1211	1.010
				100...250	100...250	1 1	AF40-30-11-13	1SBL347001R1311	0.990
				250...500	250...500	1 1	AF40-30-11-14	1SBL347001R1411	0.990
22	100	40	80	24...60	20...60 (1)	1 1	AF52-30-11-11	1SBL367001R1111	1.010
				48...130	48...130	1 1	AF52-30-11-12	1SBL367001R1211	1.010
				100...250	100...250	1 1	AF52-30-11-13	1SBL367001R1311	0.990
				250...500	250...500	1 1	AF52-30-11-14	1SBL367001R1411	0.990
30	105	50	90	24...60	20...60 (1)	1 1	AF65-30-11-11	1SBL387001R1111	1.010
				48...130	48...130	1 1	AF65-30-11-12	1SBL387001R1211	1.010
				100...250	100...250	1 1	AF65-30-11-13	1SBL387001R1311	0.990
				250...500	250...500	1 1	AF65-30-11-14	1SBL387001R1411	0.990
37	125	60	105	24...60	20...60 (1)	1 1	AF80-30-11-11	1SBL397001R1111	1.260
				48...130	48...130	1 1	AF80-30-11-12	1SBL397001R1211	1.260
				100...250	100...250	1 1	AF80-30-11-13	1SBL397001R1311	1.210
				250...500	250...500	1 1	AF80-30-11-14	1SBL397001R1411	1.210
45	130	60	115	24...60	20...60 (1)	1 1	AF96-30-11-11	1SBL407001R1111	1.260
				48...130	48...130	1 1	AF96-30-11-12	1SBL407001R1211	1.260
				100...250	100...250	1 1	AF96-30-11-13	1SBL407001R1311	1.210
				250...500	250...500	1 1	AF96-30-11-14	1SBL407001R1411	1.210

(1) For control by PLC-output, use RA4 interface relay.



AF40, AF52, AF65-30-11-..



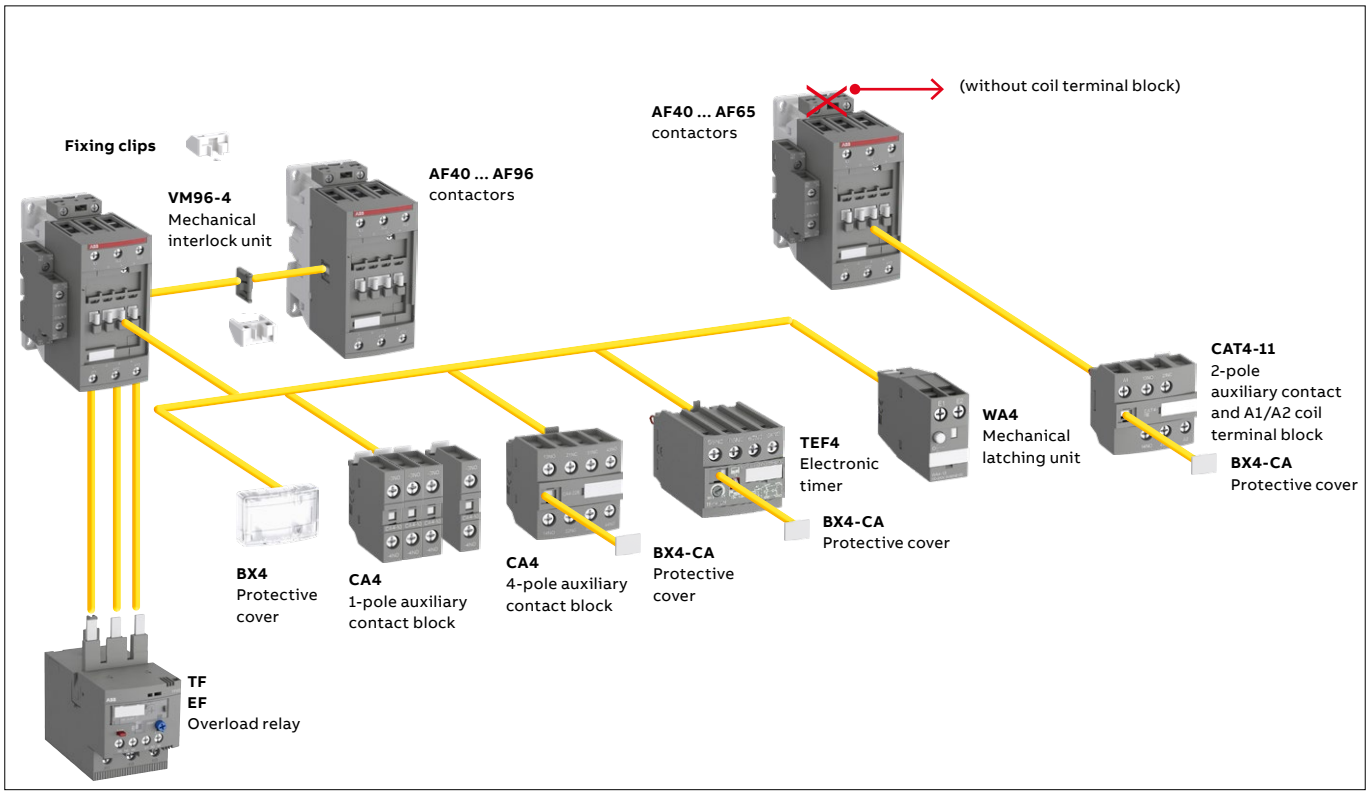
AF80, AF96-30-11-..

Main dimensions mm, inches

1SBC100487S0201 - Rev. A

AF40 ... AF96 3-pole contactors with 1 N.O. + 1 N.C. auxiliary contacts

Contactors and main accessories



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

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

Contactor types	Main poles	Built-in auxiliary contacts	Front-mounted accessories Auxiliary contact blocks			Electronic timer	Mechanical latching unit (1)	Side-mounted accessories Mechanical interlock set (between 2 contactors)		Auxiliary contact blocks	
			1-pole CA4	2-pole CAT4-11	4-pole CA4	TEF4	WA4	VM96-4		2-pole CAL4-11 Left side	Right side
AF40 ... AF65	3 0	1 1	4 max.	or 1	or 1	or 1	or 1	+ 1		–	–
			4 max.	or 1	or 1	or 1	or 1	–	+	–	1
AF80, AF96	3 0	1 1	4 max.	–	or 1	or 1	or 1	+ 1		–	–
			4 max.	–	or 1	or 1	or 1	–	+	–	1

(1) Use WA4 for AF09...AF65 and WA4-96 for AF80, AF96.
Accept 1-pole CA4 auxiliary contacts on each side of the mechanical latch.

Overload relays fitting details (2)

Contactor types	Thermal overload relays	Electronic overload relays
AF40 ... AF65	TF65 (22...67 A)	EF65 (20...70 A)
AF80, AF96	TF96 (40...96 A)	EF96 (36...100 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.

1SBC100495S0201 - Rev. B

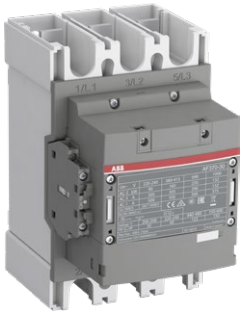
AF116 ... AF146 3-pole contactors

55 to 75 kW

AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

1SFC101266V0001

AF146-30-11



1SFC101263V0001

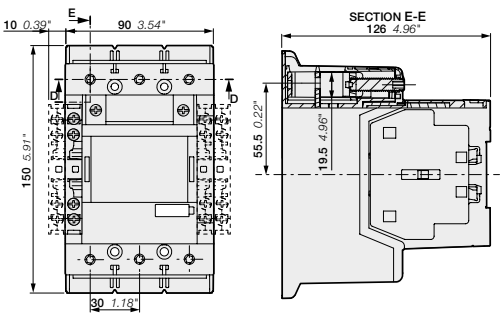
AF146-30-11B

AF116 ... AF140 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC, AF146 up to 1000 V AC and AF116 ... AF146 up to 260 V DC. These contactors are of the block type design with 3 main poles.

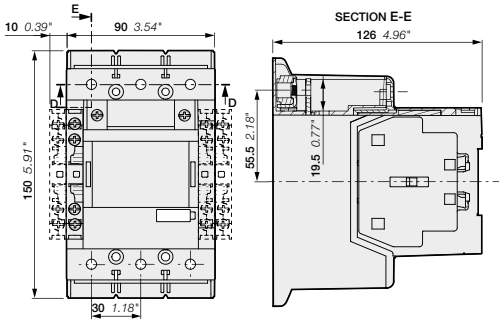
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- 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.		Auxiliary contacts fitted	Type (1)	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
For connection with built-in cable clamps									
55	160	75	160	24...60	20...60	1 1	AF116-30-11-11	1SFL427001R1111	1.750
				48...130	48...130	1 1	AF116-30-11-12	1SFL427001R1211	1.750
				100...250	100...250	1 1	AF116-30-11-13	1SFL427001R1311	1.750
				250...500	250...500	1 1	AF116-30-11-14	1SFL427001R1411	1.750
75	200	100	200	24...60	20...60	1 1	AF140-30-11-11	1SFL447001R1111	1.750
				48...130	48...130	1 1	AF140-30-11-12	1SFL447001R1211	1.750
				100...250	100...250	1 1	AF140-30-11-13	1SFL447001R1311	1.750
				250...500	250...500	1 1	AF140-30-11-14	1SFL447001R1411	1.750
75	225	100	200	24...60	20...60	1 1	AF146-30-11-11	1SFL467001R1111	1.750
				48...130	48...130	1 1	AF146-30-11-12	1SFL467001R1211	1.750
				100...250	100...250	1 1	AF146-30-11-13	1SFL467001R1311	1.750
				250...500	250...500	1 1	AF146-30-11-14	1SFL467001R1411	1.750
With bar connections									
55	160	75	160	24...60	20...60	1 1	AF116-30-11B-11	1SFL427002R1111	1.500
				48...130	48...130	1 1	AF116-30-11B-12	1SFL427002R1211	1.500
				100...250	100...250	1 1	AF116-30-11B-13	1SFL427002R1311	1.500
				250...500	250...500	1 1	AF116-30-11B-14	1SFL427002R1411	1.500
75	200	100	200	24...60	20...60	1 1	AF140-30-11B-11	1SFL447002R1111	1.500
				48...130	48...130	1 1	AF140-30-11B-12	1SFL447002R1211	1.500
				100...250	100...250	1 1	AF140-30-11B-13	1SFL447002R1311	1.500
				250...500	250...500	1 1	AF140-30-11B-14	1SFL447002R1411	1.500
75	225	100	200	24...60	20...60	1 1	AF146-30-11B-11	1SFL467002R1111	1.500
				48...130	48...130	1 1	AF146-30-11B-12	1SFL467002R1211	1.500
				100...250	100...250	1 1	AF146-30-11B-13	1SFL467002R1311	1.500
				250...500	250...500	1 1	AF146-30-11B-14	1SFL467002R1411	1.500

(1) For other auxiliary contacts arrangements, please contact your ABB local sales organization.



AF116, AF140, AF146-30-11



AF116, AF140, AF146-30-11B

Main dimensions mm, inches

1SFC101090C0201 - Rev. D

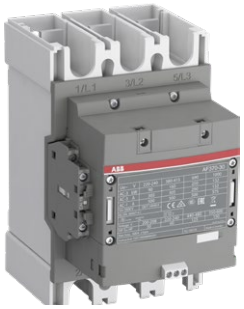
AF116 ... AF146 3-pole contactors with built-in PLC interface

55 to 75 kW

AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts for faster opening utilization

1SFC101261V0001

AF146-30-11



1SFC101258V0001

AF146-30-11B

AF116 ... AF140 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC, AF146 up to 1000 V AC and AF116 ... AF146 up to 260 V DC. These contactors are of the block type design with 3 main poles.

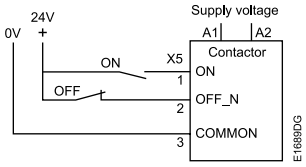
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 2 coils to cover control voltages between 100...500 V 50/60 Hz and 100...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request)
  - opening time below 20 ms.
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

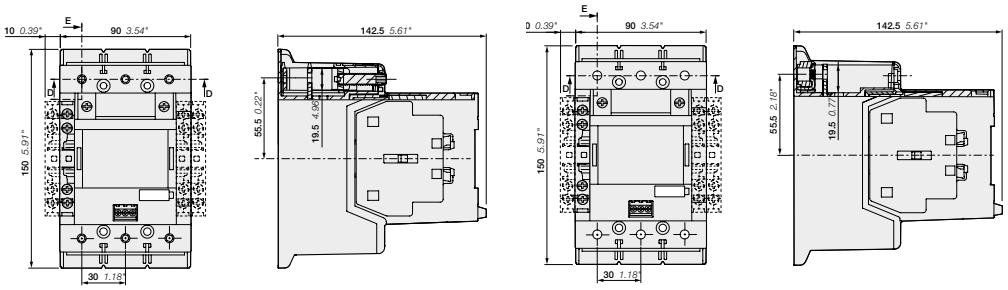
IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted		Type (1)	Order code	Weight
Rated operational power 400 V AC-3 kW	current θ ≤ 40 °C AC-1 A	3-phase motor rating 480 V hp	General use rating 600 V AC A	V 50/60 Hz	V DC					Pkg (1 pce) kg
For connection with built-in cable clamps										
55	160	75	160	100...250	100...250	1	1	AF116-30-11-33	1SFL427001R3311	1.750
				250...500	250...500	1	1	AF116-30-11-34	1SFL427001R3411	1.750
75	200	100	200	100...250	100...250	1	1	AF140-30-11-33	1SFL447001R3311	1.750
				250...500	250...500	1	1	AF140-30-11-34	1SFL447001R3411	1.750
75	225	100	200	100...250	100...250	1	1	AF146-30-11-33	1SFL467001R3311	1.750
				250...500	250...500	1	1	AF146-30-11-34	1SFL467001R3411	1.750
With bar connections										
55	160	75	160	100...250	100...250	1	1	AF116-30-11B-33	1SFL427002R3311	1.500
				250...500	250...500	1	1	AF116-30-11B-34	1SFL427002R3411	1.500
75	200	100	200	100...250	100...250	1	1	AF140-30-11B-33	1SFL447002R3311	1.500
				250...500	250...500	1	1	AF140-30-11B-34	1SFL447002R3411	1.500
75	225	100	200	100...250	100...250	1	1	AF146-30-11B-33	1SFL467002R3311	1.500
				250...500	250...500	1	1	AF146-30-11B-34	1SFL467002R3411	1.500

(1) For other auxiliary contacts arrangements, please contact your ABB local sales organization.

AF116 ... AF146 are equipped with low voltage inputs for control, for example by a PLC.

Control inputs





AF116, AF140, AF146-30-11

AF116, AF140, AF146-30-11B

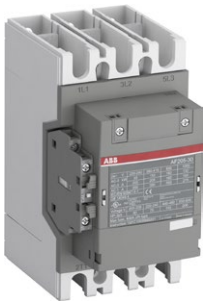
Main dimensions mm, inches

1SFC101166C0201 - Rev. A

AF190 ... AF370 3-pole contactors

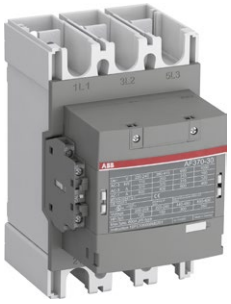
90 to 200 kW

AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts



1SFC101013V0001

AF205-30-11



1SFC101018V0001

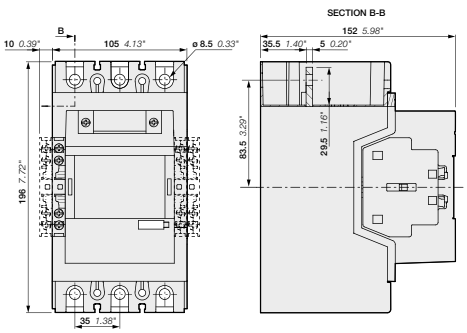
AF370-30-11

AF190 ... AF370 contactors are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC and up to 340 V DC. These contactors are of the block type design with 3 main poles.

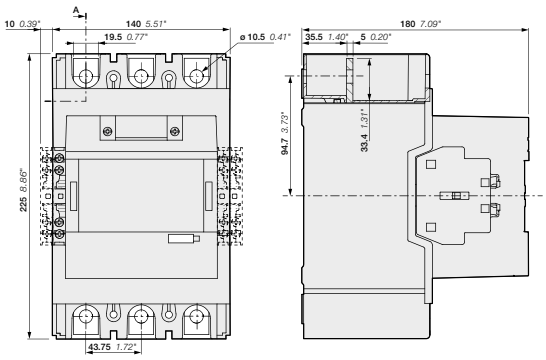
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- 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.		Auxiliary contacts fitted		Type (1)	Order code	Weight
Rated operational power 400 V AC-3 kW	current θ ≤ 40 °C AC-1 A	3-phase motor rating 480 V hp	General use rating 600 V AC A	V 50/60 Hz	V DC					Pkg (1 pce) kg
90	275	125	250	24...60	20...60	1	1	AF190-30-11-11	1SFL487002R1111	3.000
				48...130	48...130	1	1	AF190-30-11-12	1SFL487002R1211	3.000
				100...250	100...250	1	1	AF190-30-11-13	1SFL487002R1311	3.000
				250...500	250...500	1	1	AF190-30-11-14	1SFL487002R1411	3.000
110	350	150	300	24...60	20...60	1	1	AF205-30-11-11	1SFL527002R1111	3.000
				48...130	48...130	1	1	AF205-30-11-12	1SFL527002R1211	3.000
				100...250	100...250	1	1	AF205-30-11-13	1SFL527002R1311	3.000
				250...500	250...500	1	1	AF205-30-11-14	1SFL527002R1411	3.000
132	400	200	350	24...60	20...60	1	1	AF265-30-11-11	1SFL547002R1111	4.640
				48...130	48...130	1	1	AF265-30-11-12	1SFL547002R1211	4.640
				100...250	100...250	1	1	AF265-30-11-13	1SFL547002R1311	4.640
				250...500	250...500	1	1	AF265-30-11-14	1SFL547002R1411	4.640
160	500	250	400	24...60	20...60	1	1	AF305-30-11-11	1SFL587002R1111	4.640
				48...130	48...130	1	1	AF305-30-11-12	1SFL587002R1211	4.640
				100...250	100...250	1	1	AF305-30-11-13	1SFL587002R1311	4.640
				250...500	250...500	1	1	AF305-30-11-14	1SFL587002R1411	4.640
200	600	300	520	24...60	20...60	1	1	AF370-30-11-11	1SFL607002R1111	4.640
				48...130	48...130	1	1	AF370-30-11-12	1SFL607002R1211	4.640
				100...250	100...250	1	1	AF370-30-11-13	1SFL607002R1311	4.640
				250...500	250...500	1	1	AF370-30-11-14	1SFL607002R1411	4.640

(1) For other auxiliary contacts arrangements, please contact your ABB local sales organization.



AF190, AF205



AF265, AF305, AF370

Main dimensions mm, inches

1SFC101091C0201 - Rev. E

03

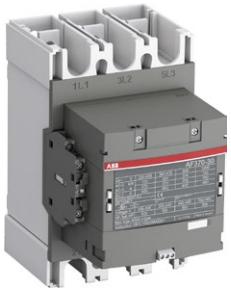
AF190 ... AF370 3-pole contactors with built-in PLC interface

90 to 200 kW

AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts for faster opening utilization

1SFC101165V0001

AF205-30-11



1SFC101133V0001

AF370-30-11

AF190 ... AF370 contactors are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC and up to 340 V DC. These contactors are of the block type design with 3 main poles.

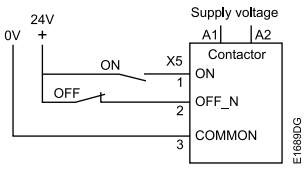
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 2 coils to cover control voltages between 100...500 V 50/60 Hz and 100...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request)
  - opening time below 20 ms.
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

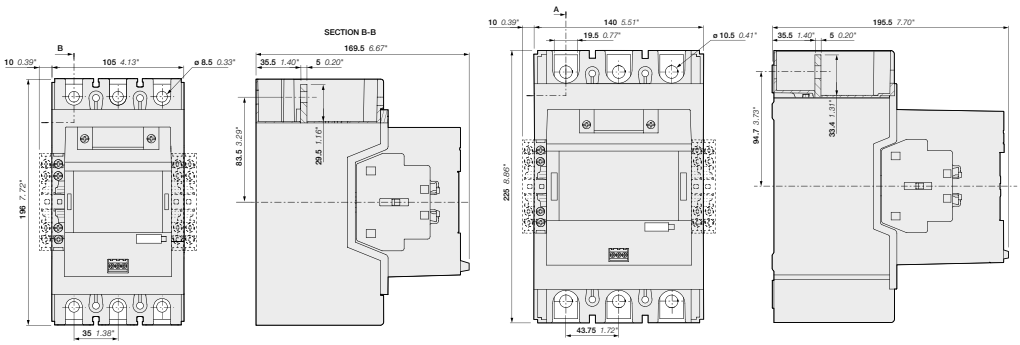
IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted		Type (1)	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC							Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC					kg
90	275	125	250	100...250	100...250	1	1	AF190-30-11-33	1SFL487002R3311	3.000
				250...500	250...500	1	1	AF190-30-11-34	1SFL487002R3411	3.000
110	350	150	300	100...250	100...250	1	1	AF205-30-11-33	1SFL527002R3311	3.000
				250...500	250...500	1	1	AF205-30-11-34	1SFL527002R3411	3.000
132	400	200	350	100...250	100...250	1	1	AF265-30-11-33	1SFL547002R3311	4.640
				250...500	250...500	1	1	AF265-30-11-34	1SFL547002R3411	4.640
160	500	250	400	100...250	100...250	1	1	AF305-30-11-33	1SFL587002R3311	4.640
				250...500	250...500	1	1	AF305-30-11-34	1SFL587002R3411	4.640
200	600	300	520	100...250	100...250	1	1	AF370-30-11-33	1SFL607002R3311	4.640
				250...500	250...500	1	1	AF370-30-11-34	1SFL607002R3411	4.640

(1) For other auxiliary contacts arrangements, please contact your ABB local sales organization.

AF190 ... AF370 are equipped with low voltage inputs for control, for example by a PLC.

Control inputs





AF190, AF205

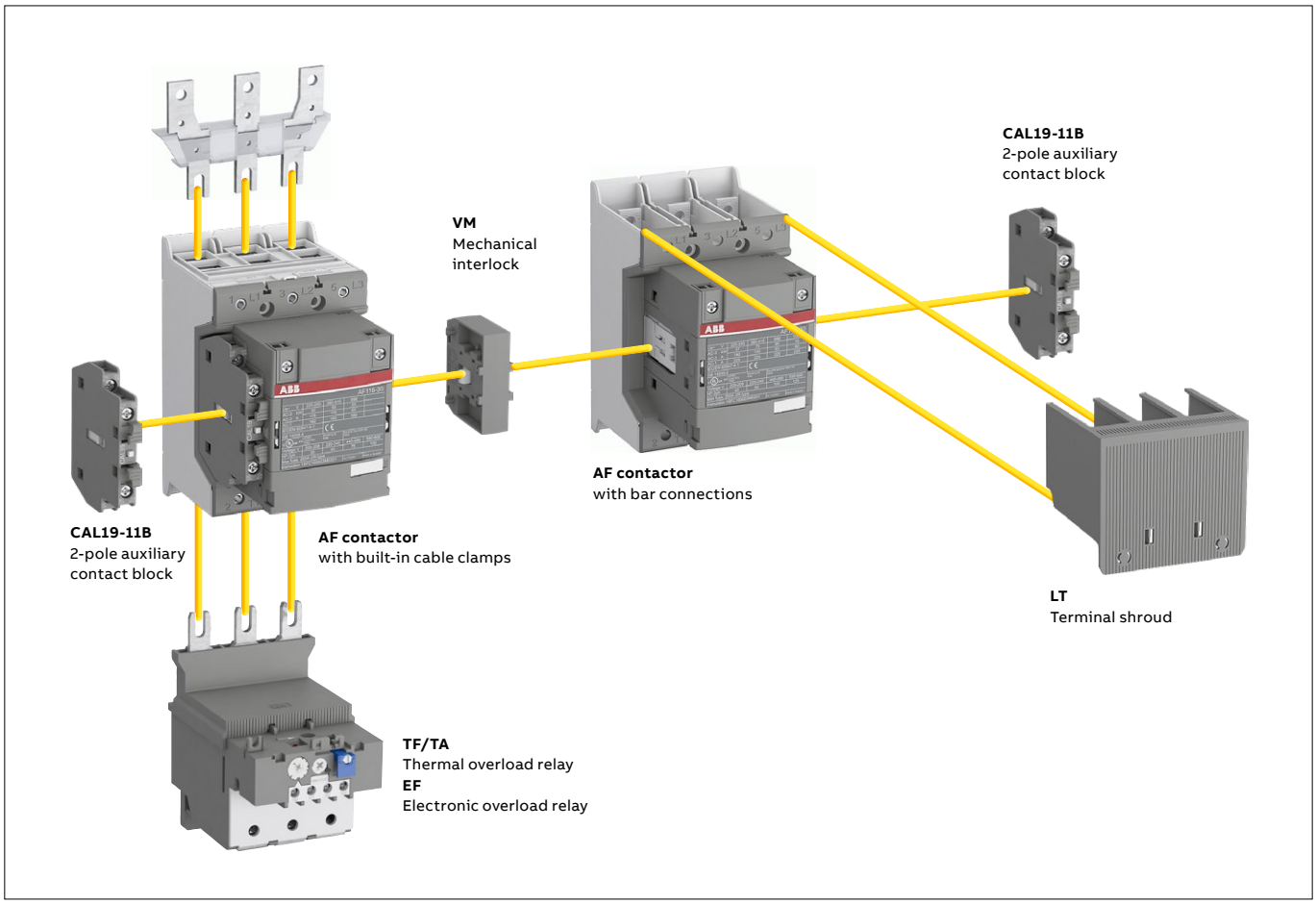
AF265, AF305, AF370

Main dimensions mm, inches

1SFC101167C0201 - Rev. A

AF116 ... AF370 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

Contactor types	Main poles	Available auxiliary contacts	Side-mounted accessories Auxiliary contact blocks		Mechanical interlock units (between two contactors)
			CAL19-11 (3)	CAL19-11B (3)	
AF116 ... AF370	3 0	1 1	1 x CAL19-11	+ 2 x CAL19-11B	–
AF116 ... AF370	3 0	1 1	–	+ 2 x CAL19-11B (1)	+ VM... (2)

(1) Total number of auxiliary contact blocks for the two contactors.
(2) Interlock type, according to the contactor ratings (see "Accessories").
(3) The CEL19 auxiliary contact blocks can replace the CAL19-11 and CAL19-11B. Though, no auxiliary contact block can be mounted outside the CEL19.

Overload relays fitting details (1)

Contactor types	Thermal overload relays	Electronic overload relays
AF116 ... AF140	TF140DU (66...142 A)	EF146 (54...150 A)
AF146	–	EF146 (54...150 A)
AF190, AF205	TA200DU (66...200 A)	EF205 (63...210 A)
AF265 ... AF370	–	EF370 (115...380 A)

The addition of a thermal or electronic overload relay on the contactor does not prevent fitting of many other accessories as shown in "Main accessory fitting details" table.
(1) Direct mounting - No kit required.

1SFC101132C0201- Rev. A

03

AF400 ... AF750 3-pole contactors

200 to 400 kW

AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

1SFC101022V0001

AF460-30-11

1SFC101025V0001

AF750-30-11

AF400 ... AF750 contactors are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC or 600 V DC (2). These contactors are of the block type design with 3 main poles.

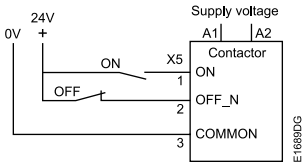
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 48...500 V 50/60 Hz and 24...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltages sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

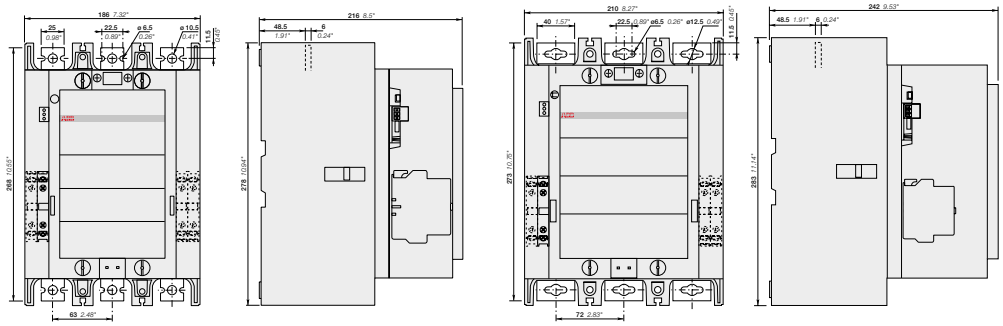
IEC		UL/CSA		Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C 690 V AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
200	600	350	550	-	24...60	1 1	AF400-30-11	1SFL577001R6811 (1)	12.000
				48...130	48...130	1 1	AF400-30-11	1SFL577001R6911	12.000
				100...250	100...250	1 1	AF400-30-11	1SFL577001R7011	12.000
				250...500	250...500	1 1	AF400-30-11	1SFL577001R7111	12.000
250	700	400	650	-	24...60	1 1	AF460-30-11	1SFL597001R6811 (1)	12.000
				48...130	48...130	1 1	AF460-30-11	1SFL597001R6911	12.000
				100...250	100...250	1 1	AF460-30-11	1SFL597001R7011	12.000
				250...500	250...500	1 1	AF460-30-11	1SFL597001R7111	12.000
315	800	500	750	-	24...60	1 1	AF580-30-11	1SFL617001R6811 (1)	15.000
				48...130	48...130	1 1	AF580-30-11	1SFL617001R6911	15.000
				100...250	100...250	1 1	AF580-30-11	1SFL617001R7011	15.000
				250...500	250...500	1 1	AF580-30-11	1SFL617001R7111	15.000
400	1050	600	900	-	24...60	1 1	AF750-30-11	1SFL637001R6811 (1)	15.000
				48...130	48...130	1 1	AF750-30-11	1SFL637001R6911	15.000
				100...250	100...250	1 1	AF750-30-11	1SFL637001R7011	15.000
				250...500	250...500	1 1	AF750-30-11	1SFL637001R7111	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 AF580, AF750.

AF400 ... AF750 are equipped with low voltage inputs for control, for example by a PLC.

Control inputs





AF400, AF460

AF580, AF750

Main dimensions mm, inches

1SFC101013C0201 - Rev. A

AF1250 ... AF2850 3-pole contactors

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

AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

1SFC101027V0001

AF1250-30-11

1SFC101031V0001

AF2650-30-11

AF1250 ... AF2050 contactors are mainly used for controlling power circuits up to 1000 V AC or 850 V DC, AF2650 and AF2850 for controlling power up to 1000 V AC. These contactors are of the block type design with 3 main poles.
– control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range

(e.g. 100...250 V AC and DC)

- only 4 coils for AF1250 to cover control voltages between 48...500 V 50/60 Hz and 24...500 V DC
- only 1 coil for AF1350 ... AF2850 to cover control voltages between 100...250 V 50/60 Hz and 100...250 V DC
- can manage large control voltage variations
- reduced panel energy consumption
- very distinct closing and opening
- can withstand short voltage dips and voltages sags (SEMI F47 conditions of use on request).

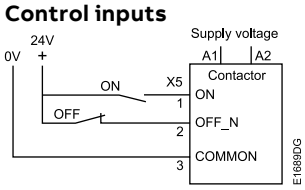
• built-in surge suppression
• add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC		UL/CSA		Rated control circuit voltage Uc (1)		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C 690 V AC-1	3-phase motor rating 480 V	General use rating 600 V AC (2)						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
-	1260	-	1210	-	24...60	1 1	AF1250-30-11	1SFL647001R6811 (1)	16.000
				48...130	48...130	1 1	AF1250-30-11	1SFL647001R6911	16.000
				100...250	100...250	1 1	AF1250-30-11	1SFL647001R7011	16.000
				250...500	250...500	1 1	AF1250-30-11	1SFL647001R7111	16.000
475	1350	800	1350	100...250	100...250	1 1	AF1350-30-11	1SFL657001R7011	34.000
560	1650	900	1650	100...250	100...250	1 1	AF1650-30-11	1SFL677001R7011	35.000
-	2050	-	2100	100...250	100...250	1 1	AF2050-30-11	1SFL707001R7011	35.000
-	2650	-	2700	100...250	100...250	1 1	AF2650-30-11	1SFL667001R7011	45.000
-	2850	-	2850	100...250	100...250	1 1	AF2850-30-11	1SFL687001R7011	45.000

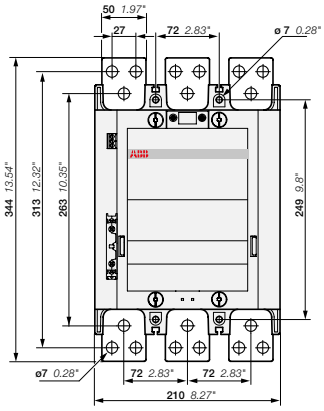
(1) The connection polarities indicated close to the coil terminals must be respected: A1 for the positive pole and A2 for the negative pole.(2) AF2650: Maximum operational voltage = 1000 V according to UL / CSA.

AF1250 ... AF2850 are equipped with low voltage inputs for control, for example by a PLC

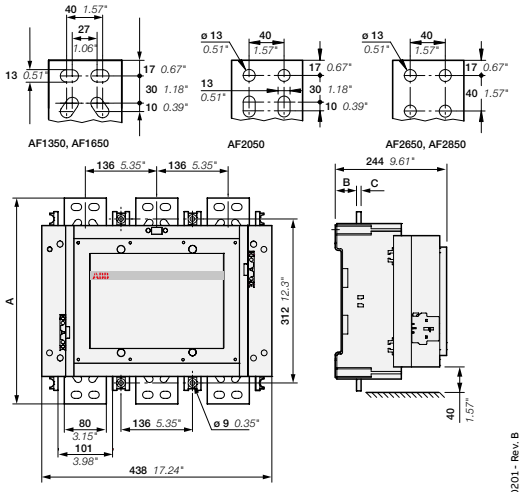
Control inputs



	AF1350, AF1650, AF2050	AF2650, AF2850
A	392 mm / 15.43"	422 mm / 16.61"
B	47 mm / 1.85"	53 mm / 2.09"
C	10 mm / 0.39"	25 mm / 0.98"



AF1250



AF1350, AF1650, AF2050, AF2650, AF2850

Main dimensions mm, inches

1SFC101094C0201 - Rev. B

AF1350T ... AF2850T 3-pole contactors with built-in LVRT

475 to 560 kW and 1350 to 2850 A AC-1

AC operated with 1 N.O. + 1 N.C. auxiliary contacts

1SFC101216V0001

AF2650-30T-11

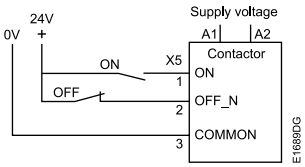
AF1350T .. AF2850T contactors are designed to meet the Low Voltage Ride Through requirements for grid connections withstand voltage drop-outs up to 1 sec without opening. These contactors are often used in grid connected applications where the demand of non interrupted power is required. When controlled through built-in PLC connection the contactor is operated directly without delay function.

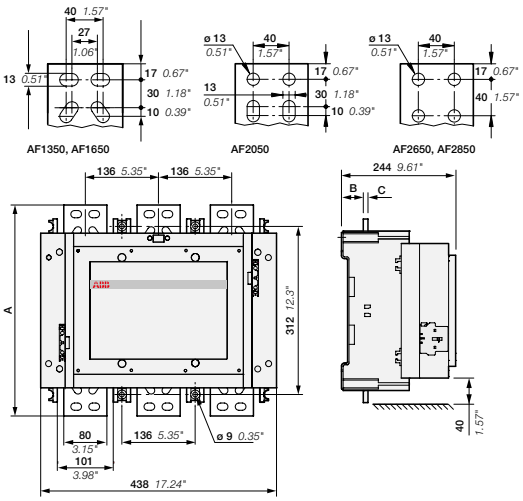
- Control circuit: AC or DC operated with electronic coil interface
  - can withstand voltage drop-outs according to Low Voltage Ride Through requirements
  - equipped with low voltage inputs for direct control by a PLC
  - distinct closing and opening
  - add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC		UL/CSA		Rated control circuit voltage Uc	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	Rated operational current θ ≤ 40 °C 690 V AC-1	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz				kg
475	1350	800	1350	220 ... 240	1 1	AF1350T-30-11 (1)	1SFL657001R9101	34.000
560	1650	900	1650	220 ... 240	1 1	AF1650T-30-11 (1)	1SFL677001R9101	35.000
-	2050	-	2100	220 ... 240	1 1	AF2050T-30-11 (1)	1SFL707001R9101	35.000
-	2650	-	2700	220 ... 240	1 1	AF2650T-30-11 (1)	1SFL667001R9101	45.000
-	2850	-	2850	220 ... 240	1 1	AF2850T-30-11 (1)	1SFL687001R9101	45.000

(1) Types -00 and -22 on request.

Control inputs





AF1350T-30-11, AF1650T-30-11, AF2050T-30-11, AF2650T-30-11, AF2850T-30-10-11

Main dimensions mm, inches

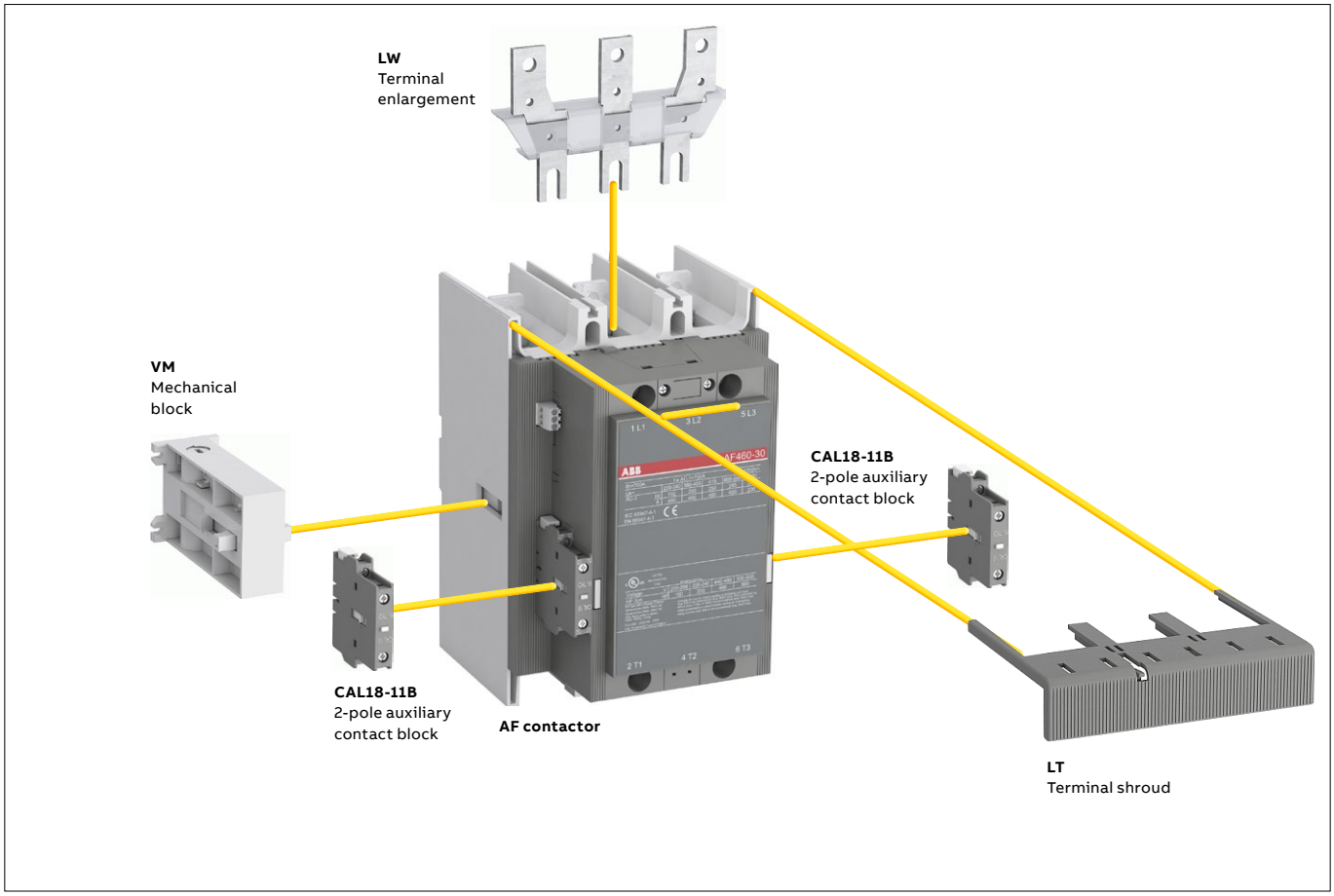
	AF1350, AF1650, AF2050	AF2650, AF2850
A	392 mm / 15.43"	422 mm / 16.61"
B	47 mm / 1.85"	53 mm / 2.09"
C	10 mm / 0.39"	25 mm / 0.98"

1SFC101076D0201 - Rev. A

AF400 ... AF2850 3-pole contactors with 1 N.O. + 1 N.C. auxiliary contacts

Contactors and main accessories

Main accessories (other accessories available)



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 (3)	Mechanical interlock units (between two contactors)
Contactors + auxiliary contact blocks					
AF400 ... AF2850	3 0	1 1	1 x CAL18-11	+ 2 x CAL18-11B	–
Contactors with mechanical interlocking + auxiliary contact blocks					
AF400 ... AF2850	3 0	1 1	2 x CAL18-11 (1)	+ 4 x CAL18-11B (1)	+ VM...H (2)

(1) Total number of auxiliary contact blocks for the two contactors. (2) Interlock type, according to the contactor ratings (see "Accessories").
(3) The CEL18-.. auxiliary contact blocks can replace the CAL18-11 and CAL18-11B. Though, no auxiliary contact block can be mounted outside the CEL18-..

Overload relays fitting details

Contactor types	Thermal overload relays	Electronic overload relays
AF400, AF460	–	EF460 (150...500 A) (1)
AF580, AF750	–	EF750 (250...800 A) (1)
AF1350, AF1650	–	EF1250DU (375...1250 A) (1)

The addition of a thermal or electronic overload relay on the contactor does not prevent fitting of many other accessories as shown in "Main accessory fitting details" table.
(1) Mounting kit required (see "Motor protection").

1SFC101126C0201 - Rev. B

AF09 ... AF38 3-pole contactors

4 to 18.5 kW

AC / DC operated with 2 N.O. + 2 N.C. auxiliary contacts

1SBC101002V0014

AF09-30-22

1SBC101004V0014

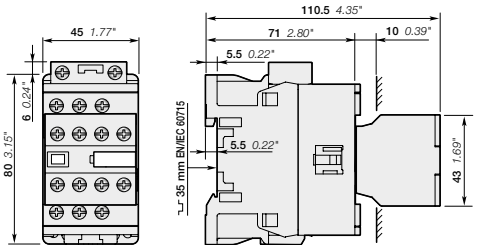
AF26-30-22

AF09 ... AF38 contactors 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 (1st stack):

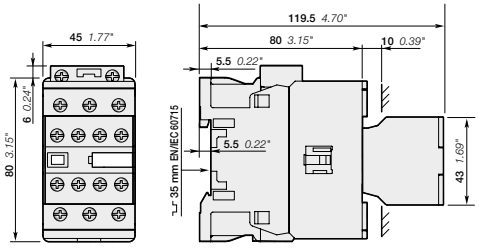
- 2nd stack with permanently fixed auxiliary contact block. The built-in auxiliary contact elements are mechanically linked (side-marked symbol) and the N.C. auxiliary contacts are mirror contacts
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening.
- built-in surge suppression
- 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.			Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC							Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC					kg
4	25	5	25	24...60	20...60	(1)	2 2	AF09-30-22-11	1SBL137001R1122	0.320
				48...130	48...130		2 2	AF09-30-22-12	1SBL137001R1222	0.320
				100...250	100...250		2 2	AF09-30-22-13	1SBL137001R1322	0.320
				250...500	250...500		2 2	AF09-30-22-14	1SBL137001R1422	0.360
5.5	28	7.5	28	24...60	20...60	(1)	2 2	AF12-30-22-11	1SBL157001R1122	0.320
				48...130	48...130		2 2	AF12-30-22-12	1SBL157001R1222	0.320
				100...250	100...250		2 2	AF12-30-22-13	1SBL157001R1322	0.320
				250...500	250...500		2 2	AF12-30-22-14	1SBL157001R1422	0.360
7.5	30	10	30	24...60	20...60	(1)	2 2	AF16-30-22-11	1SBL177001R1122	0.320
				48...130	48...130		2 2	AF16-30-22-12	1SBL177001R1222	0.320
				100...250	100...250		2 2	AF16-30-22-13	1SBL177001R1322	0.320
				250...500	250...500		2 2	AF16-30-22-14	1SBL177001R1422	0.360
11	45	15	45	24...60	20...60	(1)	2 2	AF26-30-22-11	1SBL237001R1122	0.360
				48...130	48...130		2 2	AF26-30-22-12	1SBL237001R1222	0.360
				100...250	100...250		2 2	AF26-30-22-13	1SBL237001R1322	0.360
				250...500	250...500		2 2	AF26-30-22-14	1SBL237001R1422	0.400
15	50	20	50	24...60	20...60	(1)	2 2	AF30-30-22-11	1SBL277001R1122	0.360
				48...130	48...130		2 2	AF30-30-22-12	1SBL277001R1222	0.360
				100...250	100...250		2 2	AF30-30-22-13	1SBL277001R1322	0.360
				250...500	250...500		2 2	AF30-30-22-14	1SBL277001R1422	0.400
18.5	50	25	50	24...60	20...60	(1)	2 2	AF38-30-22-11	1SBL297001R1122	0.360
				48...130	48...130		2 2	AF38-30-22-12	1SBL297001R1222	0.360
				100...250	100...250		2 2	AF38-30-22-13	1SBL297001R1322	0.360
				250...500	250...500		2 2	AF38-30-22-14	1SBL297001R1422	0.400

(1) AF..-30-..-11 not suitable for direct control by PLC-output.



AF09, AF12, AF16



AF26, AF30, AF38

Main dimensions mm, inches

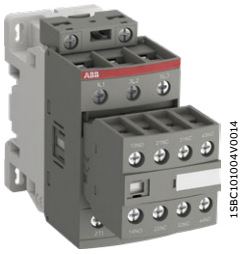
1SBC101373S0201 - Rev. D

AF09Z ... AF38Z 3-pole contactors

4 to 18.5 kW

AC / DC operated for specific applications with 2 N.O. + 2 N.C. auxiliary contacts

AF09Z-30-22



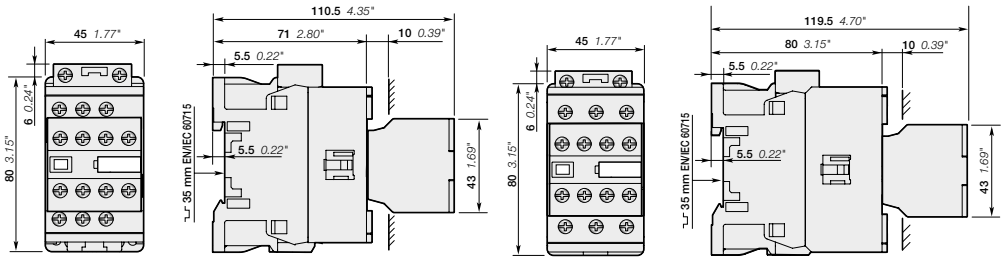
AF26Z-30-22

AF09Z ... AF38Z contactors 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 (1st stack):

- 2nd stack with permanently fixed auxiliary contact block. The built-in auxiliary contact elements are mechanically linked (side-marked symbol) and the N.C. auxiliary contacts are mirror contacts
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...250 V 50/60 Hz and 12...250 V DC
  - can manage large control voltage variations,
  - allow direct control by PLC-output ≥ 24 V DC 500 mA,
  - reduced panel energy consumption,
  - very distinct closing and opening,
  - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- built-in surge suppression
- 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.		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
4	25	5	25	-	12...20	2 2	AF09Z-30-22-20	1SBL136001R2022	0.360
				24...60	20...60	2 2	AF09Z-30-22-21	1SBL136001R2122	0.360
				48...130	48...130	2 2	AF09Z-30-22-22	1SBL136001R2222	0.360
				100...250	100...250	2 2	AF09Z-30-22-23	1SBL136001R2322	0.360
5.5	28	7.5	28	-	12...20	2 2	AF12Z-30-22-20	1SBL156001R2022	0.360
				24...60	20...60	2 2	AF12Z-30-22-21	1SBL156001R2122	0.360
				48...130	48...130	2 2	AF12Z-30-22-22	1SBL156001R2222	0.360
				100...250	100...250	2 2	AF12Z-30-22-23	1SBL156001R2322	0.360
7.5	30	10	30	-	12...20	2 2	AF16Z-30-22-20	1SBL176001R2022	0.360
				24...60	20...60	2 2	AF16Z-30-22-21	1SBL176001R2122	0.360
				48...130	48...130	2 2	AF16Z-30-22-22	1SBL176001R2222	0.360
				100...250	100...250	2 2	AF16Z-30-22-23	1SBL176001R2322	0.360
11	45	15	45	-	12...20	2 2	AF26Z-30-22-20	1SBL236001R2022	0.400
				24...60	20...60	2 2	AF26Z-30-22-21	1SBL236001R2122	0.400
				48...130	48...130	2 2	AF26Z-30-22-22	1SBL236001R2222	0.400
				100...250	100...250	2 2	AF26Z-30-22-23	1SBL236001R2322	0.400
15	50	20	50	-	12...20	2 2	AF30Z-30-22-20	1SBL276001R2022	0.400
				24...60	20...60	2 2	AF30Z-30-22-21	1SBL276001R2122	0.400
				48...130	48...130	2 2	AF30Z-30-22-22	1SBL276001R2222	0.400
				100...250	100...250	2 2	AF30Z-30-22-23	1SBL276001R2322	0.400
18.5	50	25	50	-	12...20	2 2	AF38Z-30-22-20	1SBL296001R2022	0.400
				24...60	20...60	2 2	AF38Z-30-22-21	1SBL296001R2122	0.400
				48...130	48...130	2 2	AF38Z-30-22-22	1SBL296001R2222	0.400
				100...250	100...250	2 2	AF38Z-30-22-23	1SBL296001R2322	0.400

Note: Only AF..Z contactors with DC control voltage 12...20 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole



AF09Z, AF12Z, AF16Z

AF26Z, AF30Z, AF38Z

Main dimensions mm, inches

AF40 ... AF96 3-pole contactors

18.5 to 30 kW

AC / DC operated with 2 N.O. + 2 N.C. auxiliary contacts

1SBC101006V0014

AF40-30-22

1SBC101007V0014

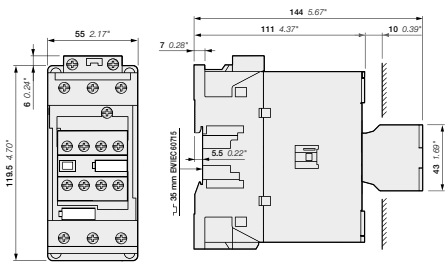
AF80-30-22

AF40 ... AF96 contactors 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 (1st stack):

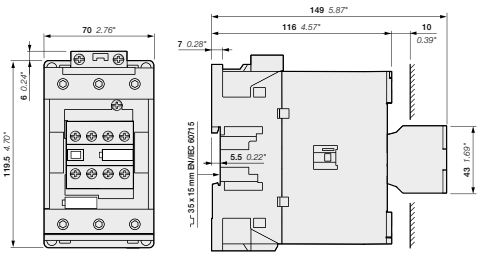
- 2nd stack with permanently fixed auxiliary contact block. The built-in auxiliary contact elements are mechanically linked (side-marked symbol) and the N.C. auxiliary contacts are mirror contacts
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- built-in surge suppression
- 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.		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
18.5	70	30	60	24...60	20...60 (1)	2 2	AF40-30-22-11	1SBL347001R1122	1.020
				48...130	48...130	2 2	AF40-30-22-12	1SBL347001R1222	1.020
				100...250	100...250	2 2	AF40-30-22-13	1SBL347001R1322	1.000
				250...500	250...500	2 2	AF40-30-22-14	1SBL347001R1422	1.000
22	100	40	80	24...60	20...60 (1)	2 2	AF52-30-22-11	1SBL367001R1122	1.020
				48...130	48...130	2 2	AF52-30-22-12	1SBL367001R1222	1.020
				100...250	100...250	2 2	AF52-30-22-13	1SBL367001R1322	1.000
				250...500	250...500	2 2	AF52-30-22-14	1SBL367001R1422	1.000
30	105	50	90	24...60	20...60 (1)	2 2	AF65-30-22-11	1SBL387001R1122	1.020
				48...130	48...130	2 2	AF65-30-22-12	1SBL387001R1222	1.020
				100...250	100...250	2 2	AF65-30-22-13	1SBL387001R1322	1.000
				250...500	250...500	2 2	AF65-30-22-14	1SBL387001R1422	1.000
37	125	60	105	24...60	20...60 (1)	2 2	AF80-30-22-11	1SBL397001R1122	1.270
				48...130	48...130	2 2	AF80-30-22-12	1SBL397001R1222	1.270
				100...250	100...250	2 2	AF80-30-22-13	1SBL397001R1322	1.220
				250...500	250...500	2 2	AF80-30-22-14	1SBL397001R1422	1.220
45	130	60	115	24...60	20...60 (1)	2 2	AF96-30-22-11	1SBL407001R1122	1.270
				48...130	48...130	2 2	AF96-30-22-12	1SBL407001R1222	1.270
				100...250	100...250	2 2	AF96-30-22-13	1SBL407001R1322	1.220
				250...500	250...500	2 2	AF96-30-22-14	1SBL407001R1422	1.220

(1) For control by PLC-output, use RA4 interface relay.



AF40, AF52, AF65-30-22-..



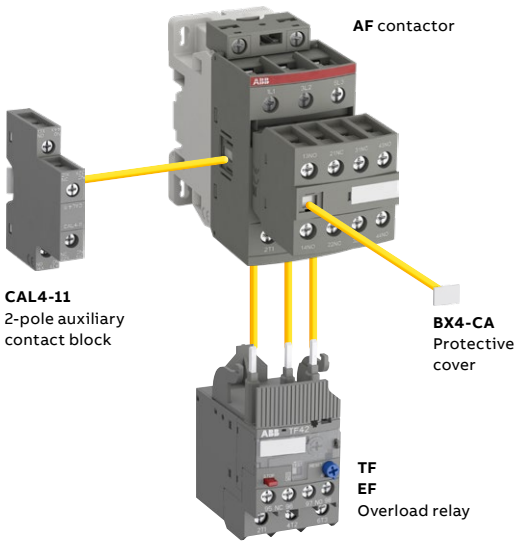
AF80, AF96-30-22-..

Main dimensions mm, inches

1SBC101742S0201 - Rev. A

AF09 ... AF96 3-pole contactors with 2 N.O. + 2 N.C. auxiliary contacts

Contactors and main accessories



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

Contactor types	Main poles	Built-in auxiliary contacts	Side-mounted accessories Mechanical interlock unit (between 2 contactors) VM..		Auxiliary contact blocks 2-pole CAL4-11 Left side	Right side
AF09 ... AF38	3 0	2 2	1	+	1	**or** 1
AF40 ... AF96	3 0	2 2	1	+	1	**or** 1
			–	+	1	+ 1

Overload relays fitting details (1)

Contactor types	Thermal overload relays	Electronic overload relays
AF09 ... AF38	TF42 (0.10...38 A)	EF19 (0.10...19 A)
AF26 ... AF38	TF42 (0.10...38 A)	EF45 (9...45 A)
AF40 ... AF65	TF65 (22...67 A)	EF65 (20...70 A)
AF80 , AF96	TF96 (40...96 A)	EF96 (36...100 A)

The addition of an overload relay on the contactor does not prevent fitting of many other accessories as shown above.
(1) Direct mounting - No kit required.

1SBC100494S0201 - Rev. B

AF116 ... AF146 3-pole contactors

55 to 75 kW

AC / DC operated with 2 N.O. + 2 N.C. auxiliary contacts

1SFC101009V0001

AF146-30-22

1SFC101010V0001

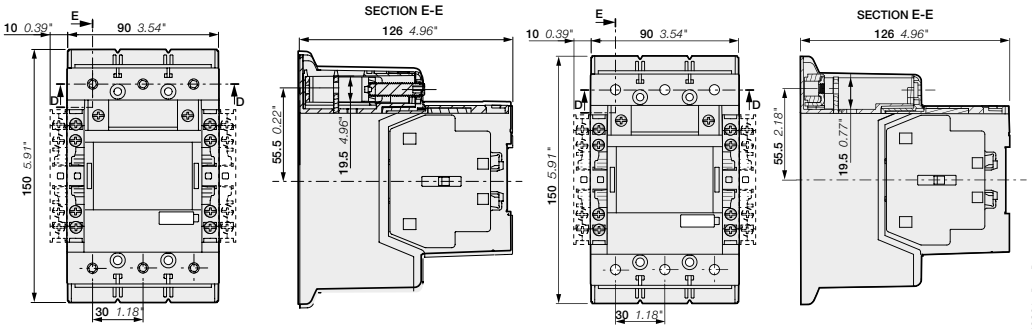
AF146-30-22B

AF116 ... AF140 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC, AF146 up to 1000 V AC and AF116 ... AF146 up to 260 V DC. These contactors are of the block type design with 3 main poles.

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- 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.		Auxiliary contacts fitted	Type (1)	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
For connection with built-in cable clamps									
55	160	75	160	24...60	20...60	2 2	AF116-30-22-11	1SFL427001R1122	1.750
				48...130	48...130	2 2	AF116-30-22-12	1SFL427001R1222	1.750
				100...250	100...250	2 2	AF116-30-22-13	1SFL427001R1322	1.750
				250...500	250...500	2 2	AF116-30-22-14	1SFL427001R1422	1.750
75	200	100	200	24...60	20...60	2 2	AF140-30-22-11	1SFL447001R1122	1.750
				48...130	48...130	2 2	AF140-30-22-12	1SFL447001R1222	1.750
				100...250	100...250	2 2	AF140-30-22-13	1SFL447001R1322	1.750
				250...500	250...500	2 2	AF140-30-22-13	1SFL447001R1422	1.750
75	225	100	200	24...60	20...60	2 2	AF146-30-22-11	1SFL467001R1122	1.750
				48...130	48...130	2 2	AF146-30-22-12	1SFL467001R1222	1.750
				100...250	100...250	2 2	AF146-30-22-13	1SFL467001R1322	1.750
				250...500	250...500	2 2	AF146-30-22-14	1SFL467001R1422	1.750
With bar connections									
55	160	75	160	24...60	20...60	2 2	AF116-30-22B-11	1SFL427002R1122	1.500
				48...130	48...130	2 2	AF116-30-22B-12	1SFL427002R1222	1.500
				100...250	100...250	2 2	AF116-30-22B-13	1SFL427002R1322	1.500
				250...500	250...500	2 2	AF116-30-22B-14	1SFL427002R1422	1.500
75	200	100	200	24...60	20...60	2 2	AF140-30-22B-11	1SFL447002R1122	1.500
				48...130	48...130	2 2	AF140-30-22B-12	1SFL447002R1222	1.500
				100...250	100...250	2 2	AF140-30-22B-13	1SFL447002R1322	1.500
				250...500	250...500	2 2	AF140-30-22B-14	1SFL447002R1422	1.500
75	225	100	200	24...60	20...60	2 2	AF146-30-22B-11	1SFL467002R1122	1.500
				48...130	48...130	2 2	AF146-30-22B-12	1SFL467002R1222	1.500
				100...250	100...250	2 2	AF146-30-22B-13	1SFL467002R1322	1.500
				250...500	250...500	2 2	AF146-30-22B-14	1SFL467002R1422	1.500

(1) For other auxiliary contacts arrangements, please contact your ABB local sales organization.



AF116, AF140, AF146-30-22

AF116, AF140, AF146-30-22B

Main dimensions mm, inches

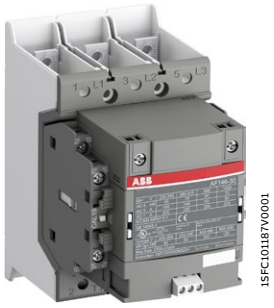
1SFC101092C0201 - Rev. D

AF116 ... AF146 3-pole contactors with built-in PLC interface

55 to 75 kW

AC / DC operated with 2 N.O. + 2 N.C. auxiliary contacts for faster opening utilization

AF146-30-22



AF146-30-22B

AF116 ... AF146 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC, AF146 up to 1000 V AC and AF116 ... AF146 up to 260 V DC. These contactors are of the block type design with 3 main poles.

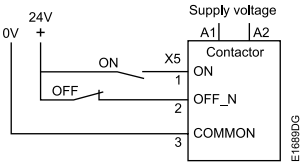
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 2 coils to cover control voltages between 100...500 V 50/60 Hz and 100...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request)
  - opening time below 20 ms.
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

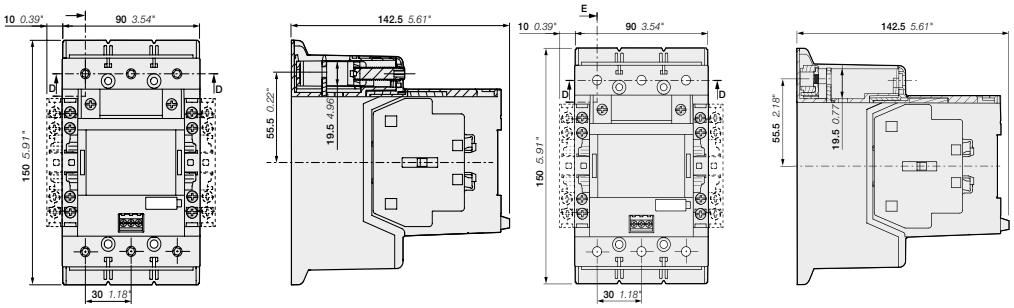
IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted	Type (1)	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
For connection with built-in cable clamps									
55	160	75	160	100...250	100...250	2 2	AF116-30-22-33	1SFL427001R3322	1.750
				250...500	250...500	2 2	AF116-30-22-34	1SFL427001R3422	1.750
75	200	100	200	100...250	100...250	2 2	AF140-30-22-33	1SFL447001R3322	1.750
				250...500	250...500	2 2	AF140-30-22-34	1SFL447001R3422	1.750
75	225	100	200	100...250	100...250	2 2	AF146-30-22-33	1SFL467001R3322	1.750
				250...500	250...500	2 2	AF146-30-22-34	1SFL467001R3422	1.750
With bar connections									
55	160	75	160	100...250	100...250	2 2	AF116-30-22B-33	1SFL427002R3322	1.500
				250...500	250...500	2 2	AF116-30-22B-34	1SFL427002R3422	1.500
75	200	100	200	100...250	100...250	2 2	AF140-30-22B-33	1SFL447002R3322	1.500
				250...500	250...500	2 2	AF140-30-22B-34	1SFL447002R3422	1.500
75	225	100	200	100...250	100...250	2 2	AF146-30-22B-33	1SFL467002R3322	1.500
				250...500	250...500	2 2	AF146-30-22B-34	1SFL467002R3422	1.500

For other auxiliary contacts arrangements, please contact your ABB local sales organization.

AF116 ... AF146 are equipped with low voltage inputs for control, for example by a PLC.

Control inputs





AF116, AF140, AF146-30-22

AF116, AF140, AF146-30-22B

Main dimensions mm, inches

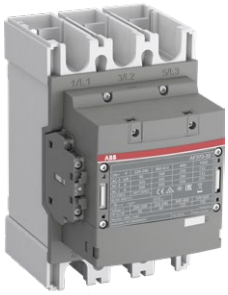
AF190 ... AF370 3-pole contactors

90 to 200 kW

AC / DC operated with 2 N.O. + 2 N.C. auxiliary contacts

1SFC101256V0001

AF205-30-22



1SFC101253V0001

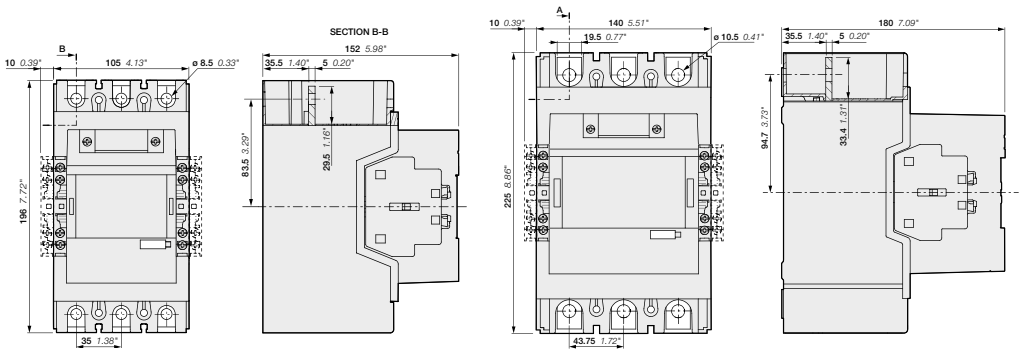
AF370-30-22

AF190 ... AF370 contactors are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC and up to 340 V DC. These contactors are of the block type design with 3 main poles.

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- 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.		Auxiliary contacts fitted	Type (1)	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
90	275	125	250	24...60	20...60	2 2	AF190-30-22-11	1SFL487002R1122	3.000
				48...130	48...130	2 2	AF190-30-22-12	1SFL487002R1222	3.000
				100...250	100...250	2 2	AF190-30-22-13	1SFL487002R1322	3.000
				250...500	250...500	2 2	AF190-30-22-14	1SFL487002R1422	3.000
110	350	150	300	24...60	20...60	2 2	AF205-30-22-11	1SFL527002R1122	3.000
				48...130	48...130	2 2	AF205-30-22-12	1SFL527002R1222	3.000
				100...250	100...250	2 2	AF205-30-22-13	1SFL527002R1322	3.000
				250...500	250...500	2 2	AF205-30-22-14	1SFL527002R1422	3.000
132	400	200	350	24...60	20...60	2 2	AF265-30-22-11	1SFL547002R1122	4.675
				48...130	48...130	2 2	AF265-30-22-12	1SFL547002R1222	4.675
				100...250	100...250	2 2	AF265-30-22-13	1SFL547002R1322	4.675
				250...500	250...500	2 2	AF265-30-22-14	1SFL547002R1422	4.675
160	500	250	400	24...60	20...60	2 2	AF305-30-22-11	1SFL587002R1122	4.675
				48...130	48...130	2 2	AF305-30-22-12	1SFL587002R1222	4.675
				100...250	100...250	2 2	AF305-30-22-13	1SFL587002R1322	4.675
				250...500	250...500	2 2	AF305-30-22-14	1SFL587002R1422	4.675
200	600	300	520	24...60	20...60	2 2	AF370-30-22-11	1SFL607002R1122	4.675
				48...130	48...130	2 2	AF370-30-22-12	1SFL607002R1222	4.675
				100...250	100...250	2 2	AF370-30-22-13	1SFL607002R1322	4.675
				250...500	250...500	2 2	AF370-30-22-14	1SFL607002R1422	4.675

(1) For other auxiliary contacts arrangements, please contact your ABB local sales organization.



AF190, AF205

AF265, AF305, AF370

Main dimensions mm, inches

1SFC101093C0201 - Rev. E

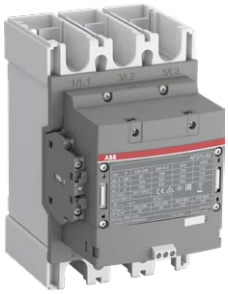
AF190 ... AF370 3-pole contactors with built-in PLC interface

90 to 200 kW

AC / DC operated with 2 N.O. + 2 N.C. auxiliary contacts for faster opening utilization

1SFC101251V0001

AF205-30-22



1SFC101248V0001

AF370-30-22

AF190 ... AF370 contactors are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC and up to 340 V DC. These contactors are of the block type design with 3 main poles.

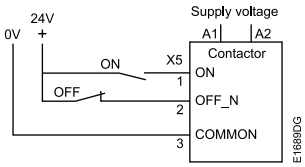
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 2 coils to cover control voltages between 100...500 V 50/60 Hz and 100...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request)
  - opening time below 20 ms.
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

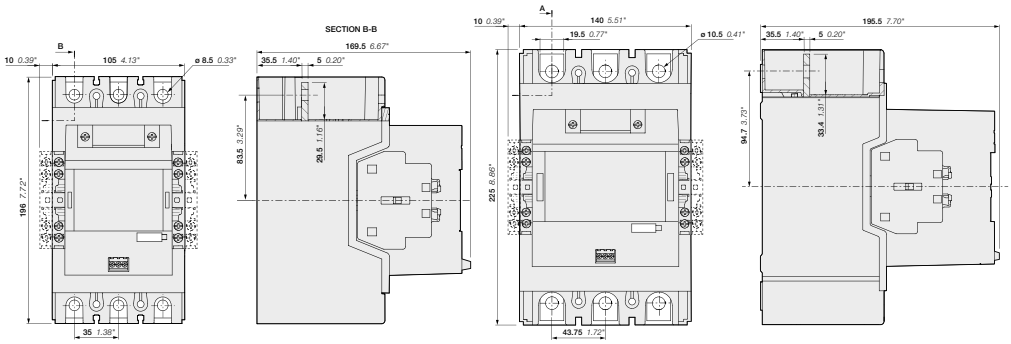
IEC		UL / CSA		Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted	Type (1)	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
90	275	125	250	100...250	100...250	2 2	AF190-30-22-33	1SFL487002R3322	3.000
				250...500	250...500	2 2	AF190-30-22-34	1SFL487002R3422	3.000
110	350	150	300	100...250	100...250	2 2	AF205-30-22-33	1SFL527002R3322	3.000
				250...500	250...500	2 2	AF205-30-22-34	1SFL527002R3422	3.000
132	400	200	350	100...250	100...250	2 2	AF265-30-22-33	1SFL547002R3322	4.675
				250...500	250...500	2 2	AF265-30-22-34	1SFL547002R3422	4.675
160	500	250	400	100...250	100...250	2 2	AF305-30-22-33	1SFL587002R3322	4.675
				250...500	250...500	2 2	AF305-30-22-34	1SFL587002R3422	4.675
200	600	300	520	100...250	100...250	2 2	AF370-30-22-33	1SFL607002R3322	4.675
				250...500	250...500	2 2	AF370-30-22-34	1SFL607002R3422	4.675

(1) For other auxiliary contacts arrangements, please contact your ABB local sales organization.

AF190 ... AF370 are equipped with low voltage inputs for control, for example by a PLC.

Control inputs





AF190, AF205

AF265, AF305, AF370

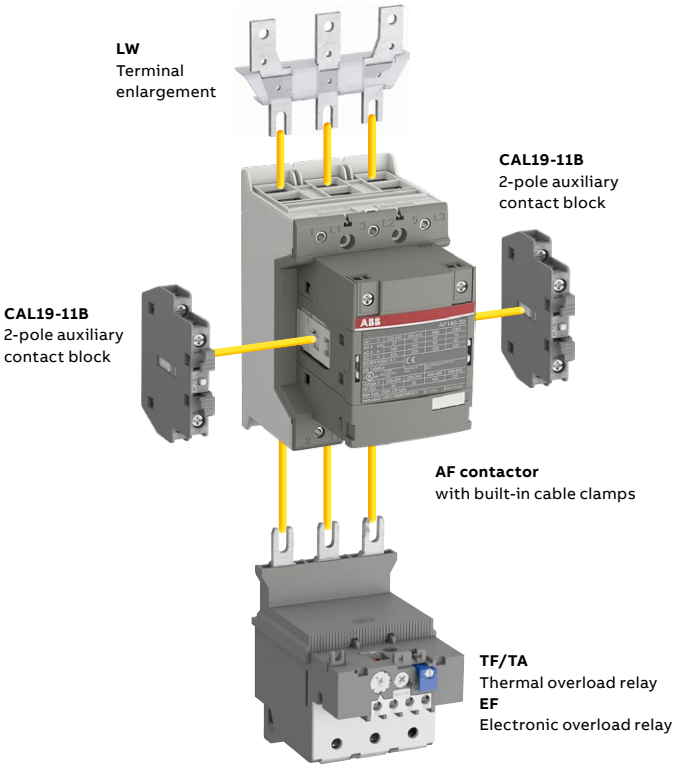
Main dimensions mm, inches

1SFC101169C0201 - Rev. A

AF116 ... AF370 3-pole contactors with 2 N.O. + 2 N.C. auxiliary contacts

Main accessories

Main accessories (other accessories available)



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 (2)	CAL19-11B (2)	
AF116 ... AF370	3 0	2 2	2 x CAL19-11 included	+ 2 x CAL19-11B	–

(2) The CEL19 auxiliary contact blocks can replace the CAL19-11 and CAL19-11B. Though, no auxiliary contact block can be mounted outside the CEL19.

Overload relays fitting details (1)

Contactor types	Thermal overload relays	Electronic overload relays
AF116 ... AF140	TF140DU (66...142 A)	EF146 (54...150 A)
AF146	–	EF146 (54...150 A)
AF190, AF205	TA200DU (66...200 A)	EF205 (63...210 A)
AF265 ... AF370	–	EF370 (115...380 A)

The addition of a thermal or electronic overload relay on the contactor does not prevent fitting of many other accessories as shown in "Main accessory fitting details" table.
(1) Direct mounting - No kit required.

1SFC101133C0201 - Rev. B

AF400 ... AF750 3-pole contactors

200 to 400 kW

AC / DC operated with 2 N.O. + 2 N.C. auxiliary contacts

1SFC101081V0001

AF460-30-22

1SFC101091V0001

AF750-30-22

AF400 ... AF750 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC or 600 V DC (2). These contactors are of the block type design with 3 main poles.

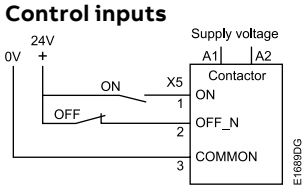
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 48...500 V 50/60 Hz and 24...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltages sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

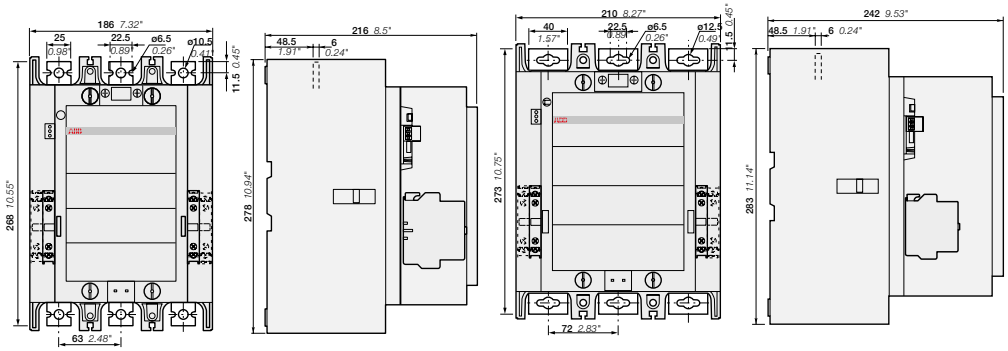
IEC		UL/CSA		Rated control circuit voltage Uc		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C 690 V AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
200	600	350	550	-	24...60	2 2	AF400-30-22	1SFL577001R6822 (1)	12.000
				48...130	48...130	2 2	AF400-30-22	1SFL577001R6922	12.000
				100...250	100...250	2 2	AF400-30-22	1SFL577001R7022	12.000
				250...500	250...500	2 2	AF400-30-22	1SFL577001R7122	12.000
250	700	400	650	-	24...60	2 2	AF460-30-22	1SFL597001R6822 (1)	12.000
				48...130	48...130	2 2	AF460-30-22	1SFL597001R6922	12.000
				100...250	100...250	2 2	AF460-30-22	1SFL597001R7022	12.000
				250...500	250...500	2 2	AF460-30-22	1SFL597001R7122	12.000
315	800	500	750	-	24...60	2 2	AF580-30-22	1SFL617001R6822 (1)	15.000
				48...130	48...130	2 2	AF580-30-22	1SFL617001R6922	15.000
				100...250	100...250	2 2	AF580-30-22	1SFL617001R7022	15.000
				250...500	250...500	2 2	AF580-30-22	1SFL617001R7122	15.000
400	1050	600	900	-	24...60	2 2	AF750-30-22	1SFL637001R6822 (1)	15.000
				48...130	48...130	2 2	AF750-30-22	1SFL637001R6922	15.000
				100...250	100...250	2 2	AF750-30-22	1SFL637001R7022	15.000
				250...500	250...500	2 2	AF750-30-22	1SFL637001R7122	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 AF580, AF750.

AF400...AF750 are equipped with low voltage inputs for control, for example by a PLC.

Control inputs





AF400, AF460

AF580, AF750

Main dimensions mm, inches

1SFC101014C0201 - Rev. A

AF1250 ... AF2850 3-pole contactors

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

AC / DC operated with 2 N.O. + 2 N.C. auxiliary contacts

1SFC101092V0001

AF1250-30-22

1SFC101032V0001

AF2650-30-22

AF1250 ... AF2050 contactors are mainly used for controlling power circuits up to 1000 V AC or 850 V DC, AF2650 and AF2850 for controlling power up to 1000 V AC. These contactors are of the block type design with 3 main poles.

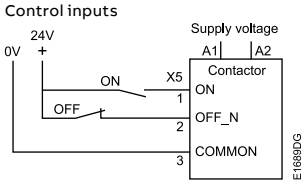
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
- only 4 coils for AF1250 to cover control voltages between 48...500 V 50/60 Hz and 24...500 V DC
- only 1 coil for AF1350 ... AF2850 to cover control voltages between 100...250 V 50/60 Hz and 100...250 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltages sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC		UL/CSA		Rated control circuit voltage Uc (1)		Auxiliary contacts fitted		Type	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C 690 V AC-1	3-phase motor rating 480 V	General use rating 600 V AC (2)							Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC					kg
-	1260	-	1210	-	24...60	2	2	AF1250-30-22	1SFL647001R6822 (1)	16.000
				48...130	48...130	2	2	AF1250-30-22	1SFL647001R6922	16.000
				100...250	100...250	2	2	AF1250-30-22	1SFL647001R7022	16.000
				250...500	250...500	2	2	AF1250-30-22	1SFL647001R7122	16.000
475	1350	800	1350	100...250	100...250	2	2	AF1350-30-22	1SFL657001R7022	34.000
560	1650	900	1650	100...250	100...250	2	2	AF1650-30-22	1SFL677001R7022	35.000
-	2050	-	2100	100...250	100...250	2	2	AF2050-30-22	1SFL707001R7022	35.000
-	2650	-	2700	100...250	100...250	2	2	AF2650-30-22	1SFL667001R7022	45.000
-	2850	-	2850	100...250	100...250	2	2	AF2850-30-22	1SFL687001R7022	45.000

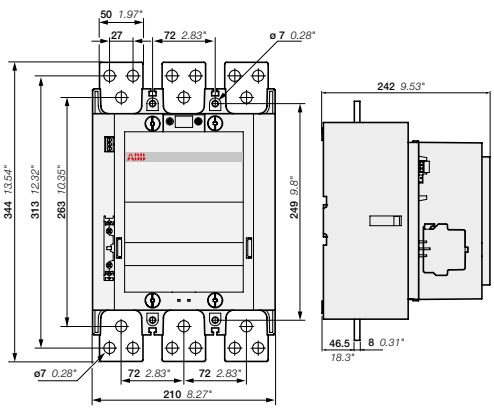
(1) The connection polarities indicated close to the coil terminals must be respected: A1 for the positive pole and A2 for the negative pole.
(2) AF2650 : Maximum operational voltage = 1000 V according to UL / CSA.

AF1250 ... AF2850 are equipped with low voltage inputs for control, for example by a PLC.

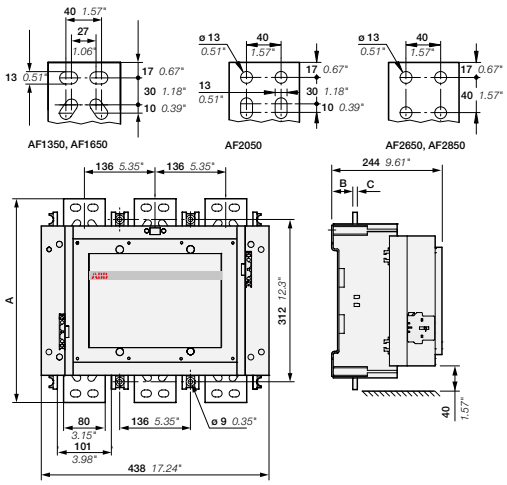
Control inputs



	AF1350, AF1650, AF2050	AF2650, AF2850
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"



AF1250



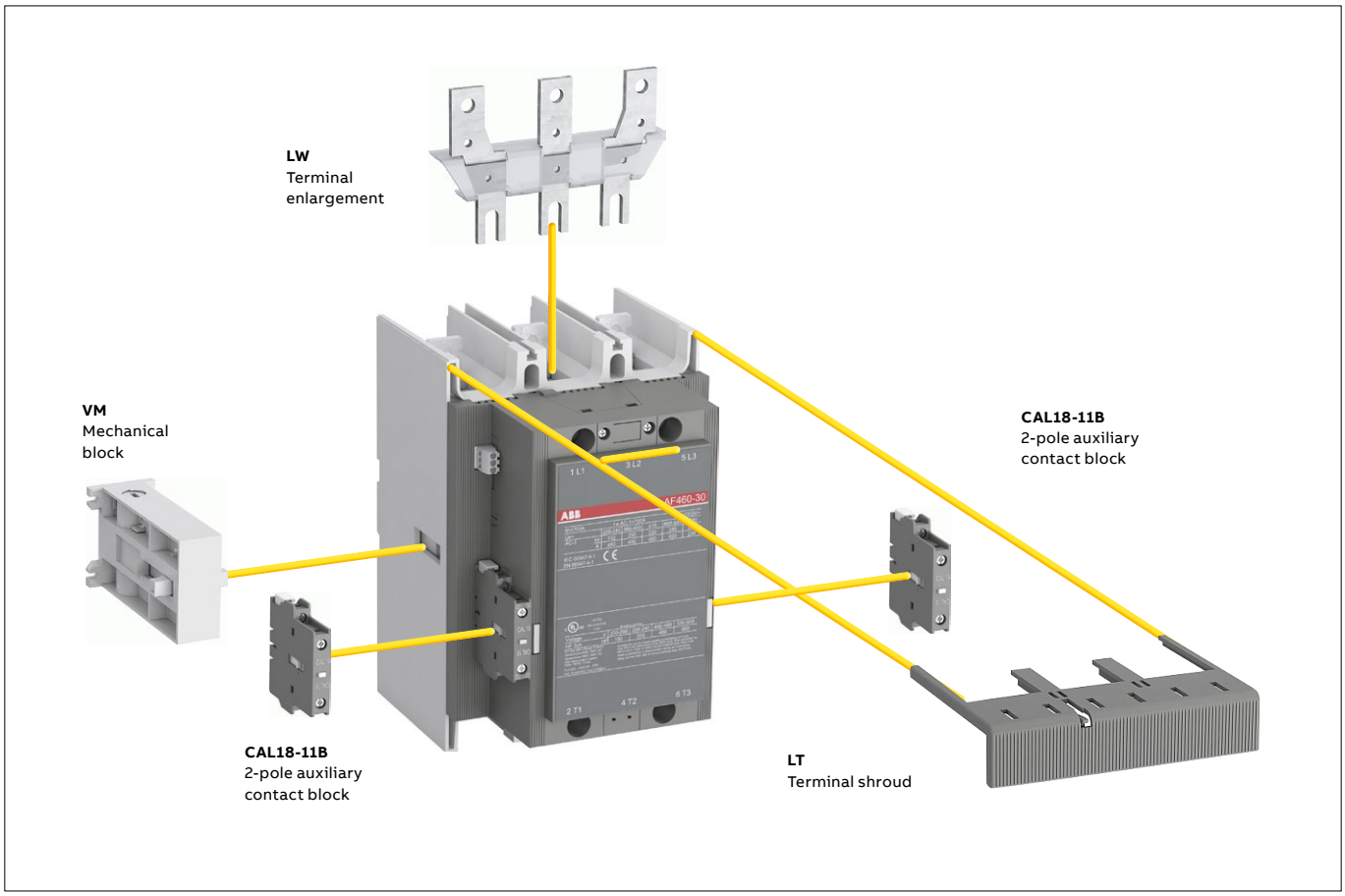
AF1350, AF1650, AF2050, AF2650, AF2850

Main dimensions mm, inches

1SFC101095C0201 - Rev. A

AF400... AF2850 3-pole contactors with 2 N.O. + 2 N.C. auxiliary contacts

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 (2)	Mechanical interlock units (between two contactors)
Contactors + auxiliary contact blocks					
AF145 ... AF2850	3 0	2 2	2 x CAL18-11 included	2 x CAL18-11B	–
Contactors with mechanical interlocking + auxiliary contact blocks					
AF400 ... AF2850	3 0	2 2	2 x CAL18-11 included	4 x CAL18-11B	+ VM...H (1)

(1) Interlock type, according to the contactor ratings (see "Accessories").
(2) The CEL18-.. auxiliary contact blocks can replace the CAL18-11 and CAL18-11B. Though, no auxiliary contact block can be mounted outside the CEL18-..

Overload relays fitting details

Contactor types	Thermal overload relays	Electronic overload relays
AF400, AF460	–	EF460 (150...500 A) (3)
AF580, AF750	–	EF750 (250...800 A) (3)
AF1350, AF1650	–	E1250DU (375...1250 A) (3)

The addition of a thermal or electronic overload relay on the contactor does not prevent fitting of many other accessories as shown in "Main accessory fitting details" table.
(3) Mounting kit required (see "Motor protection").

1SFC101127C0201 - Rev. A

AF09 ... AF38 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	AF09	AF12	AF16	AF26	AF30	AF38
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1					
Rated operational voltage Ue max.		690 V					
Rated frequency (without derating)		50 / 60 Hz					
Conventional free-air thermal current Ith							
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		35 A	35 A	35 A	50 A	50 A	50 A
With conductor cross-sectional area		6 mm²	6 mm²	6 mm²	10 mm²	10 mm²	10 mm²
AC-1 Utilization category							
For air temperature close to contactor							
Ie / Rated operational current AC-1	θ ≤ 40 °C	25 A	28 A	30 A	45 A	50 A	50 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 60 °C	25 A	28 A	30 A	40 A	42 A	42 A
	θ ≤ 70 °C	22 A	24 A	26 A	32 A	37 A	37 A
With conductor cross-sectional area		4 mm²	6 mm²	6 mm²	10 mm²	10 mm²	10 mm²
AC-3 Utilization category							
For air temperature close to contactor θ ≤ 60 °C							
Ie / Max. rated operational current AC-3 (1)							
3-phase motors	220-230-240 V	9 A	12 A	18 A	26 A	33 A	40 A
	380-400 V	9 A	12 A	18 A	26 A	32 A	38 A
	415 V	9 A	12 A	18 A	26 A	32 A	38 A
	440 V	9 A	12 A	18 A	26 A	32 A	38 A
	500 V	9.5 A	12.5 A	15 A	23 A	28 A	33 A
	690 V	7 A	9 A	10.5 A	17 A	21 A	24 A
Rated operational power AC-3 (1)							
1500 r.p.m. 50 Hz	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW	11 kW
1800 r.p.m. 60 Hz	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW	18.5 kW
3-phase motors	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		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					
AC-8a Utilization category							
(without thermal overload relay - Ue 400 V 50/60 Hz - θ ≤ 40 °C)							
Ie / Rated operational current AC-8a		12 A	16 A	22 A	30 A	40 A	50 A
Rated operational power AC-8a		5.5 kW	7.5 kW	11 kW	15 kW	20 kW	25 kW
Short-circuit protection device for contactors							
without thermal overload relay - Motor protection excluded (2)							
Ue ≤ 500 V AC - gG type fuse		25 A	32 A	32 A	50 A	63 A	63 A
Rated short-time withstand current Icw	1 s	300 A	300 A	300 A	700 A	700 A	700 A
at 40 °C ambient temperature,	10 s	150 A	150 A	150 A	350 A	350 A	350 A
in free air from a cold state	30 s	80 A	80 A	80 A	225 A	225 A	225 A
	1 min	60 A	60 A	60 A	150 A	150 A	150 A
	15 min	35 A	35 A	35 A	50 A	50 A	50 A
Maximum breaking capacity							
cos ϕ = 0.45	at 440 V	250 A	250 A	250 A	500 A	500 A	500 A
	at 690 V	106 A	106 A	106 A	200 A	200 A	200 A
Power dissipation per pole	Ie / AC-1	0.8 W	1 W	1.2 W	1.8 W	2.4 W	2.4 W
	Ie / AC-3	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	1200 cycles/h					
	AC-2, AC-4	300 cycles/h			150 cycles/h		

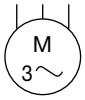
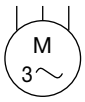
(1) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".
(2) For the protection of motor starters against short circuits, see "Coordination with short-circuit protection devices".

1SBC101425S0201

AF40 ... AF96 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	AF40	AF52	AF65	AF80	AF96
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1				
Rated operational voltage Ue max.		690 V			1000 V	
Rated frequency (without derating)		50 / 60 Hz				
Conventional free-air thermal current Ith						
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		105 A	105 A	105 A	130 A	130 A
With conductor cross-sectional area		35 mm²	35 mm²	35 mm²	50 mm²	50 mm²
AC-1 Utilization category						
For air temperature close to contactor						
Ie / Rated operational current AC-1	θ ≤ 40 °C	70 A	100 A	105 A	125 A	130 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 60 °C	60 A	80 A	90 A	100 A	105 A
	θ ≤ 70 °C	50 A	70 A	80 A	85 A	90 A
With conductor cross-sectional area		25 mm²	35 mm²	35 mm²	50 mm²	50 mm²
AC-3 Utilization category						
For air temperature close to contactor θ ≤ 60 °C						
Ie / Max. rated operational current AC-3 (1)						
	220-230-240 V	40 A	53 A	65 A	80 A	96 A
	380-400 V	40 A	53 A	65 A	80 A	96 A
 3-phase motors	415 V	40 A	53 A	65 A	80 A	96 A
	440 V	40 A	53 A	65 A	80 A	96 A
	500 V	35 A	45 A	55 A	65 A	80 A
	690 V	25 A	35 A	39 A	49 A	57 A
	1000 V	-	-	-	25 A	30A
Rated operational power AC-3 (1)						
	220-230-240 V	11 kW	15 kW	18.5 kW	22 kW	25 kW
	380-400 V	18.5 kW	22 kW	30 kW	37 kW	45 kW
 1500 r.p.m. 50 Hz	415 V	22 kW	30 kW	37 kW	45 kW	55 kW
1800 r.p.m. 60 Hz	440 V	22 kW	30 kW	37 kW	45 kW	55 kW
3-phase motors	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		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				
AC-8a Utilization category						
(without thermal overload relay						
Ue 400 V 50/60 Hz - θ ≤ 40 °C)						
Ie / Rated operational current AC-8a		53 A	70 A	85 A	105 A	120 A
Rated operational power AC-8a		25 kW	37 kW	45 kW	55 kW	65 kW
Short-circuit protection device for contactors						
without thermal overload relay - Motor protection excluded (2)						
Ue ≤ 500 V AC - gG type fuse		100 A	125 A	160 A	160 A	200 A
Rated short-time withstand current Icw	1 s	1000 A	1000 A	1000 A	1200 A	1200 A
at 40 °C ambient temperature,	10 s	600 A	600 A	600 A	780 A	780 A
in free air from a cold state	30 s	350 A	350 A	350 A	450 A	450 A
	1 min	250 A	250 A	250 A	300 A	300 A
	15 min	110 A	110 A	110 A	140 A	140 A
Maximum breaking capacity						
cos ϕ = 0.45	at 440 V	950 A	950 A	950 A	1150 A	1150 A
	at 690 V	600 A	600 A	600 A	750 A	750 A
Power dissipation per pole	Ie / AC-1	3 W	6.3 W	7 W	7.6 W	8.2 W
	Ie / AC-3	1 W	1.7 W	2.7 W	3 W	4.5 W
Max. electrical switching frequency	AC-1	600 cycles/h				
	AC-3	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".

1SBC101743S0201 - Rev. B

AF116 ... AF370 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1							
Rated operational voltage Ue max.		690 V	690 V	1000 V	1000 V	1000 V	1000 V	1000 V	1000 V
Rated frequency (without derating)		50 / 60 Hz							
Conventional free-air thermal current Ith									
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		160 A	200 A	225 A	275 A	350 A	400 A	500 A	600 A
With conductor cross-sectional area		70 mm²	95 mm²	95 mm²	150 mm²	240 mm² (3)	240 mm²	300 mm² (4)	2 x 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	225 A	275 A	350 A	400 A	500 A	600 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 60 °C	145 A	175 A	200 A	250 A	300 A	350 A	400 A	500 A
	θ ≤ 70 °C	130 A	160 A	175 A	200 A	240 A	290 A	325 A	400 A
Ie / Rated operational current AC-1	θ ≤ 40 °C	–	–	225 A	250 A	275 A	350 A	375 A	400 A
Ue max. ≤ 1000 V, 50/60 Hz	θ ≤ 60 °C	–	–	200 A	225 A	250 A	300 A	325 A	350 A
	θ ≤ 70 °C	–	–	175 A	185 A	200 A	240 A	260 A	290 A
With conductor cross-sectional area		70 mm²	95 mm²	95 mm²	150 mm²	240 mm² (3)	240 mm²	300 mm² (4)	2 x 185 mm² (4)
AC-3 Utilization category									
For air temperature close to contactor θ ≤ 60 °C									
Ie / Max. rated operational current AC-3 (1)									
	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
M 3~ 3-phase motors	415 V	116 A	140 A	146 A	190 A	205 A	265 A	305 A	370 A
	440 V	116 A	140 A	146 A	190 A	205 A	265 A	305 A	370 A
	500 V	110 A	130 A	130 A	156 A	186 A	250 A	290 A	350 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	113 A	131 A	141 A
Rated operational power AC-3 (1)									
	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
M 3~ 1500 r.p.m. 50 Hz	415 V	55 kW	75 kW	75 kW	90 kW	110 kW	132 kW	160 kW	200 kW
1800 r.p.m. 60 Hz	440 V	75 kW	90 kW	90 kW	110 kW	132 kW	160 kW	160 kW	200 kW
3-phase motors	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	160 kW	185 kW	200 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 (2)									
Ue ≤ 500 V AC - gG type fuse		250 A	315 A	315 A	355 A	400 A	500 A	500 A	630 A
Rated short-time withstand current Icw	1 s	1300 A	1460 A	1460 A	1900 A	2050 A	2650 A	3050 A	3700 A
at 40 °C ambient temperature,	10 s	928 A	1168 A	1168 A	1520 A	1640 A	2120 A	2440 A	2960 A
in free air from a cold state	30 s	536 A	674 A	674 A	878 A	947 A	1224 A	1409 A	1709 A
	1 min	379 A	477 A	477 A	621 A	670 A	865 A	996 A	1208 A
	15 min	160 A	200 A	225 A	275 A	350 A	400 A	500 A	600 A
Maximum breaking capacity									
cos ϕ = 0.45	at 440 V	2000 A	3000 A	3000 A	3300 A	3500 A	3800 A	4600 A	5000 A
(cos ϕ = 0.35 for Ie > 100 A)	at 690 V	1000 A	1500 A	1500 A	2200 A	2500 A	3300 A	3800 A	4000 A
Power dissipation per pole	Ie / AC-1	12 W	18 W	23 W	15 W	25 W	32 W	50 W	72 W
	Ie / AC-3	6 W	9 W	10 W	7 W	8 W	14 W	19 W	27 W
Maximum electrical switching frequency	AC-1	300 cycles/h							
	AC-3	300 cycles/h							
	AC-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".
(3) For currents above 275A use terminal enlargements or terminal extensions.
(4) For currents above 450A use terminal enlargements or terminal extensions.

1SFC101108C0201 - Rev. A

AF400 ... AF750 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	AF400	AF460	AF580	AF750
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1			
Rated operational voltage Ue max.		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		600 A	700 A	800 A	1050 A
With conductor cross-sectional area (3)		2x185 mm²	2x240 mm²	2x240 mm²	800 mm² (4)
AC-1 Utilization category					
For air temperature close to contactor					
Ie / Rated operational current AC-1	θ ≤ 40 °C	600 A	700 A	800 A	1050 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 55 °C	500 A	600 A	700 A	875 A
	θ ≤ 70 °C	400 A	480 A	580 A	720 A
Ie / Rated operational current AC-1	θ ≤ 40 °C	600 A	700 A	800 A	1000 A
Ue max. ≤ 1000 V, 50/60 Hz	θ ≤ 55 °C	500 A	600 A	700 A	875 A
	θ ≤ 70 °C	400 A	480 A	580 A	720 A
With conductor cross-sectional area		2x185 mm²	2x240 mm²	2x240 mm²	800 mm² (4)
AC-3 Utilization category					
For air temperature close to contactor θ ≤ 55 °C					
Ie / 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
M 3~ 3-phase motors	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
M 3~ 1500 r.p.m. 50 Hz 1800 r.p.m. 60 Hz 3-phase motors	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 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 (2)					
Ue ≤ 500 V AC - gG type fuse		630 A	800 A	1000 A	1000 A
Rated short-time withstand current Icw	1 s	4600 A	4600 A	7000 A	7000 A
at 40 °C ambient temperature,	10 s	4400 A	4400 A	6400 A	6400 A
in free air from a cold state	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 ϕ = 0.45	at 440 V	4000 A	5000 A	6000 A	7500 A
(cos ϕ = 0.35 for Ie > 100 A)	at 690 V	3500 A	4500 A	5000 A	7000 A
Power dissipation per pole	Ie / AC-1	30 W	42 W	32 W	50 W
	Ie / 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".
(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.

1SFC101110C0201 - Rev. E

AF1250 ... AF2850 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	AF1250	AF1350	AF1650	AF2050	AF2650	AF2850
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1					
Rated operational voltage Ue max.		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		1260 A	1350 A	1650 A	2050 A	2650 A	2850 A
With conductor cross-sectional area (3)		1000 mm² (4)	1000 mm² (5)	1500 mm² (5)	2000 mm² (5)	3000 mm² (5)	3000 mm² (5)
AC-1 Utilization category							
For air temperature close to contactor							
Ie / Rated operational current AC-1	θ ≤ 40 °C	1260 A	1350 A	1650 A	2050 A	2650 A	2850 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 55 °C	1040 A	1150 A	1450 A	1750 A	2350 A	2600 A
	θ ≤ 70 °C	875 A	1000 A	1270 A	1500 A	2120 A	2300 A
Ie / Rated operational current AC-1	θ ≤ 40 °C	1260 A	1350 A	1650 A	2050 A	2650 A	2850 A
Ue max. ≤ 1000 V, 50/60 Hz	θ ≤ 55 °C	1040 A	1150 A	1450 A	1750 A	2350 A	2600 A
	θ ≤ 70 °C	875 A	1000 A	1270 A	1500 A	2120 A	2300 A
With conductor cross-sectional area		1000 mm² (4)	1000 mm² (5)	1500 mm² (5)	2000 mm² (5)	3000 mm² (5)	3000 mm² (5)
AC-3 Utilization category							
For air temperature close to contactor θ ≤ 55 °C							
Ie / Max. rated operational current AC-3 (1)							
3-phase motors	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 (1)							
1500 r.p.m. 50 Hz, 1800 r.p.m. 60 Hz, 3-phase motors	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 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 (2) Ue ≤ 500 V AC - gG type fuse		Please consult us for coordination with circuit-breaker					
Rated short-time withstand current Icw	1 s	8000 A	10000 A	12000 A	12000 A	12000 A	12000 A
at 40 °C ambient temperature,	10 s	7200 A	8000 A	10000 A	10000 A	10000 A	10000 A
in free air from a cold state	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 ϕ = 0.45	at 440 V	7500 A	10000 A	12000 A	8400 A	8400 A	8400 A
(cos ϕ = 0.35 for Ie > 100 A)	at 690 V	7000 A	–	–	–	–	–
Power dissipation per pole	Ie / AC-1	80 W	80 W	80 W	125 W	200 W	200 W
	Ie / 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.

1SFC101110C0201 - Rev. E

AF09 ... AF38 3-pole contactors

Technical data

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

Contactor types	AC / DC operated	AF09	AF12	AF16	AF26	AF30	AF38
Standards		UL 508, CSA C22.2 N°60947-4-1					
Max. 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
1 pole	80 V DC	25 A	28 A	30 A	45 A	50 A	50 A
2 poles in serie	160 V DC	25 A	28 A	30 A	45 A	50 A	50 A
3 poles in serie	240 V DC	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 (3)
	550-600 V AC	9 A	11 A	17 A	22 A	27 A (2)	32 A (3)
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 (3)
	550-600 V AC	7-1/2 hp	10 hp	15 hp	20 hp	25 hp (2)	30 hp (3)
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							
High fault current		100 kA					
Fuse rating		30 A	30 A	60 A	60 A	100 A	100 A
Fuse type, 600 V		J					
Max. 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”.
(2) For contactors produced since week 49-2011.
(3) For contactors produced since week 36-2014.

1SBC101426S0201 - Rev. C

AF40 ... AF96 3-pole contactors

Technical data

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

Contactor types	AC / DC operated	AF40	AF52	AF65	AF80	AF96
Standards		UL 60947-4-1, CSA C22.2 N°60947-4-1				
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
1 pole	80 V DC	60 A	80 A	90 A	105 A	115 A
2 poles in serie	160 V DC	60 A	80 A	90 A	105 A	115 A
3 poles in serie	240 V DC	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	92 A
	220-240 V AC	42 A	54 A	68 A	80 A	80 A
	440-480 V AC	40 A	52 A	65 A	77 A	77 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	30 hp
	440-480 V AC	30 hp	40 hp	50 hp	60 hp	60 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".

1SBC101744S0201 - Rev. B

AF116 ... AF370 3-pole contactors

Technical data

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

Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
Standards		UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A							
Maximum operational voltage		600V							
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	–	50hp	–	–	–	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
UL / CSA maximum 1-phase motor rating									
Full load current	120 V AC	–	–	–	–	–	–	–	–
	240 V AC	–	–	–	–	–	–	–	–
Horse power rating	120 V AC	–	–	–	–	–	–	–	–
	240 V AC	–	–	–	–	–	–	–	–
UL / CSA maximum 3-phase motor rating									
Full load current (1)	200-208 V AC	92 A	120 A	120 A	150 A	177 A	221 A	285 A	359 A
	220-240 V AC	104 A	130 A	130 A	154 A	192 A	248 A	312 A	360 A
	440-480 V AC	96 A	124 A	124 A	156 A	180 A	240 A	302 A	361 A
	550-600 V AC	99 A	125 A	125 A	144 A	192 A	242 A	289 A	336 A
Horse power rating (1)	200-208 V AC	30 hp	40 hp	40 hp	50 hp	60 hp	75 hp	100 hp	125 hp
	220-240 V AC	40 hp	50 hp	50 hp	60 hp	75 hp	100 hp	125 hp	150 hp
	440-480 V AC	75 hp	100 hp	100 hp	125 hp	150 hp	200 hp	250 hp	300 hp
	550-600 V AC	100 hp	125 hp	125 hp	150 hp	200 hp	250 hp	300 hp	350 hp
Short-circuit protection device for contactors without thermal overload relay - Motor protection excluded									
High fault current		100 kA							
Fuse rating		225 A	250 A	250 A	450 A	400 A	500 A	600 A	800 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.

1SFC101109C0201 - Rev. B

AF400 ... AF750 3-pole contactors

Technical data

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

Contactor types	AC / DC operated	AF400	AF460	AF580	AF750
Standards		UL 60947-1 / 60947-4-1 and CSA C 22.2 N°60947-1 / 60947-4-1			
Maximum operational voltage		1000 V			
NEMA size		–	6	–	7
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	–	150 hp	–	–
	230 V AC	–	200 hp	–	300 hp
	460 V AC	–	400 hp	–	600 hp
	575 V AC	–	400 hp	–	600 hp
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”.

1SFC101111C0201 - Rev. G

AF1250 ... AF2850 3-pole contactors

Technical data

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

Contactor types	AC / DC operated	AF1250	AF1350	AF1650	AF2050	AF2650	AF2850
Standards		UL 60947-1 / 60947-4-1 and CSA C 22.2 N°60947-1 / 60947-4-1					
Maximum operational voltage		1000 V					
NEMA size		–	–	8	–	–	–
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	–	–	–	–	–	–
	230 V AC	300 hp	–	450 hp	–	–	–
	460 V AC	600 hp	–	900 hp	–	–	–
	575 V AC	600 hp	–	900 hp	–	–	–
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”.

1SFC101111C0201 - Rev. G

AF09 ... AF96 3-pole contactors

Technical data

Main pole utilization characteristics - 3 N.O. non-reversing contactors

Contactor types	AC / DC operated	AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96
HVAC application - UL / CSA												
Definite purpose heating rating - 3-phase												
Full Load Amps (FLA)		20 A	25 A	30 A	45 A	50 A	50 A	60 A	80 A	90 A	105 A	115 A
Locked Rotor Amps (LRA)	200-208 V AC	120 A	150 A	180 A	270 A	300 A	300 A	360 A	480 A	540 A	630 A	690 A
	220-240 V AC	120 A	150 A	180 A	270 A	300 A	300 A	360 A	480 A	540 A	630 A	690 A
	440-480 V AC	120 A	150 A	180 A	270 A	300 A	300 A	360 A	480 A	540 A	630 A	690 A
	550-600 V AC	80 A	100 A	120 A	180 A	200 A	200 A	240 A	320 A	360 A	420 A	460 A
Definite purpose air conditioning rating - 3-phase												
Full Load Amps (FLA)		20 A	25 A	30 A	45 A	50 A	50 A	60 A	80 A	90 A	105 A	115 A
Locked Rotor Amps (LRA)	200-208 V AC	120 A	150 A	180 A	270 A	300 A	300 A	360 A	480 A	540 A	630 A	690 A
	220-240 V AC	120 A	150 A	180 A	270 A	300 A	300 A	360 A	480 A	540 A	630 A	690 A
	440-480 V AC	120 A	150 A	180 A	270 A	300 A	300 A	360 A	480 A	540 A	630 A	690 A
	550-600 V AC	80 A	100 A	120 A	180 A	200 A	200 A	240 A	320 A	360 A	420 A	460 A
AC Resistance air heating												
Full Load Amps (FLA)	600 V AC	20 A	25 A	30 A	45 A	50 A	50 A	65 A	80 A	90 A	105 A	115 A
Elevator control, load switching, 500 000 electrical operating cycles acc. to CSA B44.1 / ASME 17.5 paragraph 19.2.1												
1-phase												
Horse power rating	110-120 V AC	1/4 hp	1/3 hp	(1)	1-1/2 hp	2 hp	2 hp	3 hp	3 hp	3 hp	5 hp	5 hp
	220-240 V AC	1/2 hp	3/4 hp	(1)	3 hp	3 hp	5 hp	5 hp	7-1/2 hp	10 hp	10 hp	10 hp
3-phase												
Horse power rating	200-208 V AC	1 hp	2 hp	(1)	5 hp	7-1/2 hp	7-1/2 hp	10 hp	10 hp	15 hp	15 hp	15 hp
	220-240 V AC	1 hp	2 hp	(1)	5 hp	7-1/2 hp	10 hp	10 hp	15 hp	20 hp	20 hp	20 hp
	440-480 V AC	3 hp	5 hp	(1)	15 hp	20 hp	20 hp	25 hp	30 hp	40 hp	40 hp	40 hp
	550-600 V AC	3 hp	5 hp	(1)	15 hp	20 hp	20 hp	30 hp	40 hp	40 hp	50 hp	50 hp
Elevator control, 500 000 mechanical operating cycles, 5 electrical operating cycles acc. to CSA B44.1 / ASME 17.5 paragraph 19.2.2												
1-phase												
Horse power rating	110-120 V AC	3/4 hp	1 hp	1-1/2 hp	2 hp	2 hp	3 hp	3 hp	3 hp	5 hp	7-1/2 hp	7-1/2 hp
	220-240 V AC	1-1/2 hp	2 hp	3 hp	3 hp	5 hp	7.5 hp	7-1/2 hp	7-1/2 hp	10 hp	15 hp	20 hp
3-phase												
Horse power rating	200-208 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp	10 hp	10 hp	15 hp	20 hp	25 hp	30 hp
	220-240 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp	10 hp	15 hp	20 hp	25 hp	30 hp	30 hp
	440-480 V AC	5 hp	7-1/2 hp	10 hp	15 hp	20 hp	25 hp	30 hp	40 hp	50 hp	60 hp	60 hp
	550-600 V AC	7-1/2 hp	10 hp	15 hp	20 hp	25 hp	30 hp	40 hp	50 hp	60 hp	75 hp	75 hp
Lighting application - UL / CSA												
Tungsten lamps												
1-phase per pole	347 V AC	20 A	25 A	30 A	45 A	50 A	50 A	65 A	80 A	90 A	105 A	115 A
3-phase break all lines	600 V AC	20 A	25 A	30 A	45 A	50 A	50 A	65 A	80 A	90 A	105 A	115 A
Electrical discharge lamps (ballast)												
1-phase per pole	347 V AC	20 A	25 A	30 A	45 A	50 A	50 A	65 A	80 A	90 A	105 A	115 A
3-phase break all lines	600 V AC	20 A	25 A	30 A	45 A	50 A	50 A	65 A	80 A	90 A	105 A	115 A

(1) 3-pole AF16 cannot be used. Select 4-pole non-reversing contactor AF16..-40-..

1SBC100065S0201

AF116 ... AF370 3-pole contactors

Technical data

Main pole utilization characteristics - 3 N.O. non-reversing contactors

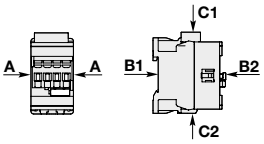
Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
HVAC application - UL / CSA									
Definite purpose heating rating - 3-phase									
Full Load Amps (FLA)		116 A	125 A	160 A	200 A	250 A	300 A	350 A	520 A
Locked Rotor Amps (LRA)	200-208 V AC	800 A	875 A	1050 A	1400 A	1500 A	2100 A	2450 A	3120 A
	220-240 V AC	800 A	875 A	1050 A	1400 A	1500 A	2100 A	2450 A	3120 A
	440-480 V AC	800 A	875 A	1050 A	1400 A	1500 A	2100 A	2450 A	3120 A
	550-600 V AC	800 A	875 A	1050 A	1400 A	1500 A	2100 A	2450 A	3120 A
Definite purpose air conditioning rating - 3-phase									
Full Load Amps (FLA)		116 A	125 A	160 A	200 A	250 A	300 A	350 A	520 A
Locked Rotor Amps (LRA)	200-208 V AC	800 A	875 A	1050 A	1400 A	1500 A	2100 A	2450 A	3120 A
	220-240 V AC	800 A	875 A	1050 A	1400 A	1500 A	2100 A	2450 A	3120 A
	440-480 V AC	800 A	875 A	1050 A	1400 A	1500 A	2100 A	2450 A	3120 A
	550-600 V AC	800 A	875 A	1050 A	1400 A	1500 A	2100 A	2450 A	3120 A
AC Resistance air heating									
Full Load Amps (FLA)	600 V AC	160 A	200 A	200 A	250 A	300 A	400 A	450 A	520 A
Elevator control, load switching, 500 000 electrical operating cycles acc. to CSA B44.1 / ASME 17.5 paragraph 19.2.1									
3-phase									
Horse power rating	200-208 V AC	15 hp	15 hp	15 hp	20 hp	30 hp	40 hp	40 hp	50 hp
	220-240 V AC	20 hp	20 hp	20 hp	25 hp	30 hp	40 hp	50 hp	60 hp
	440-480 V AC	40 hp	40 hp	40 hp	60 hp	75 hp	100 hp	100 hp	125 hp
	550-600 V AC	50 hp	50 hp	50 hp	75 hp	100 hp	125 hp	150 hp	150 hp
Elevator control, 500 000 mechanical operating cycles, 5 electrical operating cycles acc. to CSA B44.1 / ASME 17.5. paragraph 19.2.2									
3-phase									
Horse power rating	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
Lighting application - UL / CSA									
Tungsten lamps									
1-phase per pole	347 V AC	–	–	–	–	–	–	–	–
3-phase break all lines	600 V AC	–	–	–	–	–	–	–	–
Electrical discharge lamps (ballast)									
1-phase per pole	347 V AC	160 A	200 A	200 A	250 A	300 A	400 A	450 A	520 A
3-phase break all lines	600 V AC	160 A	200 A	200 A	250 A	300 A	400 A	450 A	520 A

1SBC100069S0201 - Rev. A

AF09 ... AF38 3-pole contactors

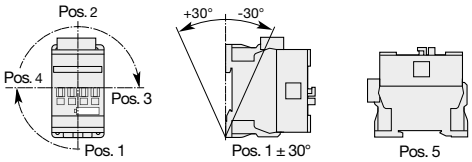
Technical data

General technical data

Contactor types	AC / DC operated	AF09	AF12	AF16	AF26	AF30	AF38
Rated insulation voltage Ui							
acc. to IEC 60947-4-1		690 V					
acc. to UL / CSA		600 V					
Rated impulse withstand voltage Uimp.		6 kV					
Electromagnetic compatibility		Devices complying with IEC 60947-1 / EN 60947-1 - Environment A and B (1)					
Ambient air temperature close to contactor							
Operation	Fitted with thermal overload relay	-25...+60 °C					
	Without thermal overload relay	-40...+70 °C					
Storage		-60...+80 °C					
Climatic withstand		Category B according to IEC 60947-1 Annex Q					
Maximum operating altitude (without derating)		3000 m					
Mechanical durability							
Number of operating cycles		10 millions operating cycles					
Max. switching frequency		3600 cycles/h					
Shock withstand acc. to IEC 60068-2-27 and EN 60068-2-27 Mounting position 1							
	Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position					
	A	30 g					
	B1	25 g closed position / 5 g open position					
	B2	15 g					
	C1	25 g					
	C2	25 g					
Vibration withstand acc. to IEC 60068-2-6		5...300 Hz 4 g closed position / 2 g open position					

(1) Environment B: all AF09...AF38 produced since week 08.2013.
AF09...AF38-..-..-12 (48 ...130 V 50 / 60 Hz - DC) compliant to environment A only: for environment B, select AF09...AF38Z-..-..-22.

Mounting characteristics and conditions for use

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

1SBC101427S0201 - Rev. C

AF09 ... AF38 3-pole contactors

Technical data

Magnet system characteristics for AF09 ... AF38 contactors - AC / DC operated

Contactor types	AC / DC operated	AF09	AF12	AF16	AF26	AF30	AF38
Coil operating limits acc. to IEC 60947-4-1	AC supply	At θ ≤ 60 °C 0.85 x Uc min...1.1 x Uc max. At θ ≤ 70 °C 0.85 x Uc min...Uc max.					
	DC supply	At θ ≤ 60 °C 0.85 x Uc min...1.1 x Uc max. At θ ≤ 70 °C 0.85 x Uc min...Uc max.					
AC control voltage 50/60 Hz							
Rated control circuit voltage Uc		24...500 V AC					
Coil consumption	Average pull-in value	50 VA					
	Average holding value	2.2 VA / 2 W					
DC control voltage							
Rated control circuit voltage Uc		20...500 V DC					
Coil consumption	Average pull-in value	50 W					
	Average holding value	2 W					
PLC-output control		Not suitable for direct control by PLC output					
Drop-out voltage		≤ 60 % of Uc min.					
Voltage sag immunity acc. to SEMI F47-0706		–					
Dips withstand -20 °C ≤ θ ≤ +60 °C		–					
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					

Magnet system characteristics for AF09Z ... AF38Z 24 DC operated - designed for PLC - coil 30

Contactor types	DC operated	AF09Z	AF12Z	AF16Z	AF26Z	AF30Z	AF38Z
Coil operating limits acc. to IEC 60947-4-1	DC supply	At θ ≤ 60 °C 0.85...1.1 x Uc At θ ≤ 70 °C Uc					
DC control voltage							
Rated control circuit voltage Uc		24 V DC					
Coil consumption	Average pull-in value	6 W					
	Average holding value	1.7 W					
PLC-output control		≥ 250 mA 24 V DC for PLCs and safety PLCs using broken wire detection					
Drop-out voltage		≤ 60 % of Uc min.					
Operating time							
Between coil energization and:	N.O. contact closing	27...53 ms					
	N.C. contact opening	20...35 ms					
Between coil de-energization and:	N.O. contact opening	17...29 ms					
	N.C. contact closing	22...57 ms					

Magnet system characteristics for AF09Z ... AF38Z for specific applications - coils 20, 21, 22, 23

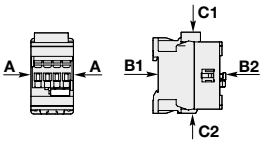
Contactor types	AC / DC operated	AF09Z	AF12Z	AF16Z	AF26Z	AF30Z	AF38Z
Coil operating limits acc. to IEC 60947-4-1	AC supply	At θ ≤ 60 °C 0.85 x Uc min...1.1 x Uc max. At θ ≤ 70 °C 0.85 x Uc min...Uc max.					
	DC supply	At θ ≤ 70 °C 0.85 x Uc min...1.1 x Uc max.					
AC control voltage							
Rated control circuit voltage Uc		24...250 V AC					
Coil consumption	Average pull-in value	16 VA					
	Average holding value	1.7 VA / 1.5 W					
DC control voltage							
Rated control circuit voltage Uc		12...250 V DC					
Coil consumption	Average pull-in value	12...16 W					
	Average holding value	1.7 W					
PLC-output control		(AF..Z coil 21) ≥ 500 mA 24 V DC for PLCs - not suitable for safety PLCs					
Drop-out voltage		≤ 60 % of Uc min.					
Voltage sag immunity acc. to SEMI F47-0706		(AF..Z coil 21, 22, 23) conditions of use on request					
Dips withstand -20 °C ≤ θ ≤ +60 °C		(AF..Z coil 21, 22, 23) 22 ms average for Uc ≥ 24 V 50/60 Hz or Uc ≥ 20 V DC					
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					

1SBC100489S0201 - Rev. C

AF40 ... AF96 3-pole contactors

Technical data

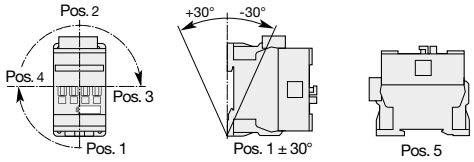
General technical data

Contactor types	AC / DC operated	AF40	AF52	AF65	AF80	AF96
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 / EN 60947-1 - Environment A and B (1)				
Ambient air temperature close to contactor						
Operation	Fitted with thermal overload relay	-40...+70 °C				
	Without thermal overload relay	-40...+70 °C				
Storage		-60...+80 °C				
Climatic withstand		Category B according to IEC 60947-1 Annex Q				
Maximum operating altitude (without derating)		3000 m				
Mechanical durability						
Number of operating cycles		10 millions operating cycles				
Max. switching frequency		3600 cycles/h				
Shock withstand acc. to IEC 60068-2-27 and EN 60068-2-27 Mounting position 1						
	Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position				
	A	25 g				
	B1	25 g closed position / 5 g open position				
	B2	15 g				
	C1	25 g				
	C2	25 g				
Vibration withstand acc. to IEC 60068-2-6		5...300 Hz 3 g closed position / 3 g open position				

Magnet system characteristics

Contactor types	AC / DC operated	AF40	AF52	AF65	AF80	AF96
Coil operating limits acc. to IEC 60947-4-1	AC supply	At θ ≤ 70 °C 0.85 x Uc min...1.1 x Uc max.				
	DC supply	At θ ≤ 70 °C 0.85 x Uc min...1.1 x Uc max.				
AC control voltage 50/60 Hz						
Rated control circuit voltage Uc		24...500 V AC				
Coil consumption	Average pull-in value	25 VA			40 VA	
	Average holding value	4 VA / 2 W				
DC control voltage						
Rated control circuit voltage Uc		20...500 V AC				
Coil consumption	Average pull-in value	25 W			40 W	
	Average holding value	2 W				
PLC-output control		–				
Drop-out voltage		≤ 60 % of Uc min.				
Voltage sag immunity acc. to SEMI F47-0706		conditions of use on request				
Dips withstand -20 °C ≤ θ ≤ +60 °C		24 ms average				
Operating time						
Between coil energization and:	N.O. contact closing	42...100 ms				
	N.C. contact opening	38...95 ms				
Between coil de-energization and:	N.O. contact opening	17...100 ms				
	N.C. contact closing	19...105 ms				

Mounting characteristics and conditions

Contactor types	AC / DC operated	AF40	AF52	AF65	AF80	AF96
Mounting positions						
		Max. N.C. built-in and add-on N.C. auxiliary contacts: see accessory fitting details for a 3-pole contactor AF40 ... AF96				
Mounting distances		The contactors can be assembled side by side				
Fixing						
On rail according to IEC 60715, 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				

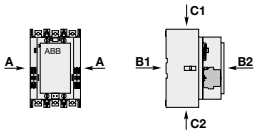
1SBC100488S0201 - Rev. C

AF116 ... AF370 3-pole contactors

Technical data

General technical data

Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
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		AF contactors comply with IEC 60947-1 / EN 60947-1 - Environment A							
Ambient air temperature close to contactor									
Operation Fitted with thermal overload relay		-25 to +55 °C							
Without thermal overload relay		-40 to +70 °C							
Storage		-40 to +70 °C							
Climatic withstand		Category B according to IEC 60947-1 Annex Q							
Maximum operating altitude (without derating)		3000 m							
Mechanical durability									
Number of operating cycles		5 million operating cycles							
Maximum switching frequency		300 cycles/h							
Shock withstand									
acc. to IEC 60068-2-27 and EN 60068-2-27									
Mounting position 1		No change in contact position, closed or open position							
	Shock direction	1/2 sinusoidal shock for 11 ms				1/2 sinusoidal shock for 30 ms			
	A	20 g				20 g			
	B1	15 g closed position / 3 g open position				15 g closed position / 3 g open position			
	B2	15 g closed position / 3 g open position				15 g closed position / 3 g open position			
	C1	20 g				20 g			
	C2	20 g				20 g			
Vibration withstand									
acc to IEC 60068-2-6		0.7 g closed position / 0.7 g open position 13.2...100 Hz							



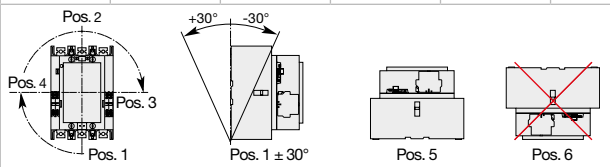
Magnet system characteristics

Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
Coil operating limits	AC supply	At θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max							
acc. to IEC 60947-4-1	DC supply	At θ ≤ 70 °C 0.80 x Uc min ... 1.1 x Uc max							
Rated control circuit voltage Uc		24...500 V AC, 20...500 V DC							
Coil consumption									
AC control voltage 50/60 Hz									
24...60 V AC	Average pull-in value	225 VA			165 VA		475 VA		
	Average holding value	5.5 VA			6 VA		8.5 VA		
48...130 V AC	Average pull-in value	170 VA			175 VA		340 VA		
	Average holding value	4 VA			4 VA		17 VA		
100...250 V AC	Average pull-in value	130 VA			220 VA		385 VA		
	Average holding value	6 VA			7 VA		17.5 VA		
250...500 V AC	Average pull-in value	205 VA			185 VA		420 VA		
	Average holding value	16 VA			16 VA		21 VA		
DC control voltage									
20...60 V DC	Average pull-in value	210 W			205 W		400 W		
	Average holding value	2.5 W			2.5 W		3.5 W		
48...130 V DC	Average pull-in value	130 W			130 W		360 W		
	Average holding value	2.5 W			2.5 W		2.5 W		
100...250 V DC	Average pull-in value	135 W			190 W		410 W		
	Average holding value	3 W			2.5 W		4.5 W		
250...500 V DC	Average pull-in value	205 W			190 W		600 W		
	Average holding value	4 W			4 W		4.7 W		
Drop-out voltage		55 % of Uc min							
Voltage sag immunity acc. to SEMI F47		Conditions of use on request							
Dips withstand		≥ 20 ms							
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		

(*) less than 20ms when using coil code -33 and -34

Mounting characteristics and conditions for use

Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
Mounting positions									
		Max. add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 3-pole contactor AF116 ... AF370							
Mounting distances		The contactors can be assembled side by side							
Fixing									
On rail acc. to IEC 60715, EN 60715		–							
By screws		4 x M4			4 x M5				

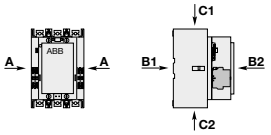


1SFC101112C0201 - Rev. B

AF400 ... AF750 3-pole contactors

Technical data

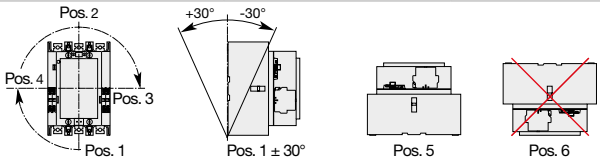
General technical data

Contactor types	AC / DC operated	AF400	AF460	AF580	AF750
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		AF contactors complying with IEC 60947-1 / EN 60947-1 - Environment A			
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			
Shock withstand acc. to IEC 60068-2-27 and EN 60068-2-27 Mounting position 1					
	Shock direction	1/2 sinusoidal shock for 30 ms: no change in contact position, closed or open position			
	A	5 g			
	B1	5 g			
	B2	5 g			
	C1	5 g			
	C2	5 g			
Vibration withstand acc to IEC 60068-2-6		0.7 g closed position / 0.7 g open position 13.2...100 Hz			

Magnet system characteristics

Contactor types	AC / DC operated	AF400	AF460	AF580	AF750
Coil operating limits	AC supply	At θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max			
acc. to IEC 60947-4-1	DC supply	At θ ≤ 70 °C 0.80 x Uc min ... 1.1 x Uc max			
Rated control circuit voltage Uc		48...500 V AC, 24...500 V DC			
Coil consumption					
AC control voltage 50/60 Hz					
48...130 V AC	Average pull-in value	1215 VA		1100 VA	
	Average holding value	12 VA		12 VA	
100...250 V AC	Average pull-in value	955 VA		880 VA	
	Average holding value	12 VA		12 VA	
250 ... 500 V AC	Average pull-in value	950 VA		985 VA	
	Average holding value	12 VA		12 VA	
DC control voltage					
24...60 V DC	Average pull-in value	900 W		785 W	
	Average holding value	5 W		5.5 W	
48...130 V DC	Average pull-in value	1150 W		1020 W	
	Average holding value	5 W		5 W	
100...250 V DC	Average pull-in value	895 W		880 W	
	Average holding value	5 W		5 W	
250 ... 500 V DC	Average pull-in value	885 W		910 W	
	Average holding value	7.5 W		7.5 W	
Drop-out voltage		55 % of Uc min.			
Voltage sag immunity acc. to SEMI F47		Conditions of use on request			
Dips withstand		≥ 20 ms			
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			
Control input for PLC's					
Between coil energization and:	Main contact closing	40...60 ms		40...90 ms	
Between coil de-energization and:	Main contact opening	10...30 ms			

Mounting characteristics and conditions for use

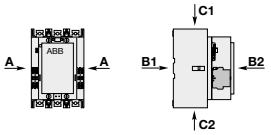
Contactor types	AC / DC operated	AF400	AF460	AF580	AF750
Mounting positions					
		Max. add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 3-pole contactor AF400 ... AF2650			
Mounting distances		The contactors can be assembled side by side			
Fixing					
On rail according to IEC 60715, EN 60715		–			
By screws		4 x M5		4 x M6	

1SFC101113C0201 - Rev. E

AF1250 ... AF2850 3-pole contactors

Technical data

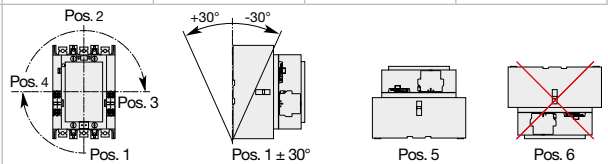
General technical data

Contactor types	AC / DC operated	AF1250	AF1350	AF1650	AF2050	AF2650	AF2850
Rated insulation voltage Ui							
acc. to IEC 60947-4-1							
acc. to UL / CSA			1000 V				
Rated impulse withstand voltage Uimp.							
Electromagnetic compatibility							
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 withstand							
acc. to IEC 60068-2-27 and EN 60068-2-27							
Mounting position 1							
	Shock direction						
	A	5 g	–				
	B1	5 g	–				
	B2	5 g	–				
	C1	5 g	–				
	C2	5 g	–				
Vibration withstand							
acc to IEC 60068-2-6		0.7 g closed position / 0.7 g open position 13.2...100 Hz					

Magnet system characteristics

Contactor types	AC / DC operated	AF1250	AF1350	AF1650	AF2050	AF2650	AF2850
Coil operating limits	AC supply						
acc. to IEC 60947-4-1	DC supply						
Rated control circuit voltage Uc			100...250 V AC or DC				
Coil consumption							
AC control voltage 50/60 Hz							
48...130 V AC	Average pull-in value	1100 VA	-				
	Average holding value	12 VA	-				
100...250 V AC	Average pull-in value	880 VA	2450 VA				
	Average holding value	12 VA	48 VA				
250 ... 500 V AC	Average pull-in value	985 VA	-				
	Average holding value	12 VA	-				
DC control voltage							
24...60 V DC	Average pull-in value	785 W	-				
	Average holding value	5.5 W	-				
48...130 V DC	Average pull-in value	1020 W	-				
	Average holding value	5 W	-				
100...250 V DC	Average pull-in value	880 W	2290 W				
	Average holding value	5 W	20.5 W				
250 ... 500 V DC	Average pull-in value	910 W	-				
	Average holding value	7.5 W	-				
Drop-out voltage		55 % of Uc min.					
Voltage sag immunity							
acc. to SEMI F47		Conditions of use on request					
Dips withstand		≥ 20 ms					
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				
Control input for PLC's							
Between coil energization and:	Main contact closing	40...90 ms	40...65 ms				
Between coil de-energization and:	Main contact opening	10...30 ms	10...30 ms				

Mounting characteristics and conditions for use

Contactor types	AC / DC operated	AF1250	AF1350	AF1650	AF2050	AF2650	AF2850
Mounting positions							
		Max. add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 3-pole contactor AF400 ... AF2650					
Mounting distances		The contactors can be assembled side by side					
Fixing							
On rail according to IEC 60715, EN 60715		–					
By screws		4 x M6	4 x M8				

1SFC101113C0201 - Rev. E

AF09 ... AF38 3-pole contactors

Technical data

Connecting characteristics

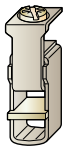
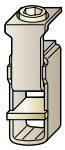
Contactor types	AC / DC operated		AF09	AF12	AF16	AF26	AF30	AF38
Main terminals			 Screw terminals with cable clamp					
Connection capacity (min. ... max.)								
Main conductors (poles)								
Rigid	Solid (≤ 4 mm²)	1 x	1...6 mm²			2.5...10 mm²		
	Stranded (≥ 6 mm²)	2 x	1...6 mm²			2.5...10 mm²		
Flexible with non insulated ferrule		1 x	0.75...6 mm²			1.5...10 mm²		
		2 x	0.75...6 mm²			1.5...10 mm²		
Flexible with insulated ferrule		1 x	0.75...4 mm²			1.5...10 mm²		
		2 x	0.75...2.5 mm²			1.5...4 mm²		
L 6 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		1 x	1...2.5 mm²					
		2 x	1...2.5 mm²					
Flexible with non insulated ferrule		1 x	0.75...2.5 mm²					
		2 x	0.75...2.5 mm²					
Flexible with insulated ferrule		1 x	0.75...2.5 mm²					
		2 x	0.75...1.5 mm²					
L 6 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 60947-1 / EN 60947-1 and IEC 60529 / 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					

1SBC101428S0201 - Rev. A

AF40 ... AF96 3-pole contactors

Technical data

Connecting characteristics

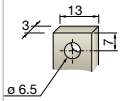
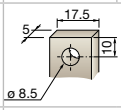
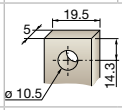
Contactor types	AC / DC operated	AF40	AF52	AF65	AF80	AF96
Main terminals		 Screw terminals with double connector 2 x (9.3 width x 7.9/10.3 depth)			 Screw terminals with double connector 2 x (12.4 width x 9.3/11.1 depth)	
Connection capacity (min. ... max.)						
Main conductors (poles)						
Rigid Stranded (≥ 6 mm²)	1 x	6...35 mm²			6...70 mm²	
	2 x	6...35 mm²			6...50 mm²	
Flexible with non insulated ferrule	1 x	4...35 mm²			6...50 mm²	
	2 x	4...35 mm²			6...50 mm²	
Flexible with insulated ferrule	1 x	4...35 mm²			6...50 mm²	
	2 x	4...35 mm²			6...50 mm²	
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	1 x	1...2.5 mm²				
	2 x	1...2.5 mm²				
Flexible with non insulated ferrule	1 x	0.75...2.5 mm²				
	2 x	0.75...2.5 mm²				
Flexible with insulated ferrule	1 x	0.75...2.5 mm²				
	2 x	0.75...1.5 mm²				
Lugs	L <	8 mm				
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14				
Stripping length		10 mm				
Tightening torque						
Coil terminals		1.2 Nm / 11 lb.in				
Built-in auxiliary terminals		1.2 Nm / 11 lb.in				
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / 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				

1SBC101746S0201

AF116 ... AF370 3-pole contactors

Technical data

Connecting characteristics

Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
Main terminals Flat type									
Connection capacity (min. ... max.)									
Main conductors (poles)									
Cu cable - Stranded	1 x	10...95 mm²			6...150 mm²		16...300 mm²		
Clamp type		LD... included (1)			1SDA066917R1		1SDA055016R1		
Tightening torque		8 Nm			14 Nm		25 Nm		
Cu cable - Stranded	2 x	10...95 mm²			50...120 mm²		70...185 mm²		
Clamp type		LD... included (1)			1SFN074709R1000, LZ185-2C/120		1SCA022194R0890, OZXB4		
Tightening torque		8 Nm			16 Nm		22 Nm		
Al cable - Stranded	1 x	–			95...185 mm²		185...240 mm²		
Clamp type		–			1SDA054988R1		1SDA055020R1		
Tightening torque		–			31 Nm		43 Nm		
Cu cable - Flexible	1 x	10...70 mm²			6...120 mm²		16...240 mm²		
Clamp type		LD... included (1)			1SDA066917R1		1SDA055016R1		
Tightening torque		8 Nm			14 Nm		25 Nm		
Cu cable - Flexible	2 x	10...70 mm²			50...95 mm²		70...185 mm²		
Clamp type		LD... included (1)			1SFN074709R1000, LZ185-2C/120		1SCA022194R0890, OZXB4		
Tightening torque		8 Nm			16 Nm		22 Nm		
Lugs	L ≤	22 mm (.866 in)			24 mm (.945 in)		32 mm (1.260 in)		
	Ø >	6 mm (.236 in)			8 mm (.315 in)		10 mm (.394 in)		
Socket type		LL... included			LL... included		LL... included		
Tightening torque		9 Nm / 80 lb.in			18 Nm / 160 lb.in		28 Nm / 248 lb.in		
Connection capacity acc. to UL / CSA	1 x	AWG 6...3/0			6...300 MCM		4...400 MCM		
Clamp type		LD... included (1)			ATK185 (2)		ATK300 (2)		
Tightening torque		8 Nm / 71 lb.in			34 Nm / 301 lb.in		42 Nm / 372 lb.in		
Connection capacity acc. to UL / CSA	2 x	AWG 6...3/0			–		4...500 MCM		
Clamp type		LD... included (1)			–		ATK300/2 (2)		
Tightening torque		8 Nm / 71 lb.in			–		42 Nm / 372 lb.in		
Auxiliary conductors (coil terminals)									
Solid / stranded	1 x	1...4 mm²							
	2 x	1...4 mm²							
Flexible	1 x	0.75...2.5 mm²							
	2 x	0.75...2.5 mm²							
Flexible with non insulated ferrule	1 x	0.75...2.5 mm²							
	2 x	0.75...2.5 mm²							
Flexible with insulated ferrule	1 x	0.75...2.5 mm²							
	2 x	0.75...2.5 mm²							
Lugs	L <	8 mm							
	l >	3.5 mm							
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...14							
Stripping length		9 mm							
Tightening torque		1.00 Nm / 9 lb.in							
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / 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							

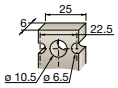
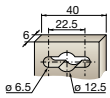
(1) LD... not included for AF116 ... AF146-30-..B.
(2) Available in North America only.

1SFC101114C0201 - Rev. A

AF400 ... AF750 3-pole contactors

Technical data

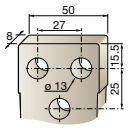
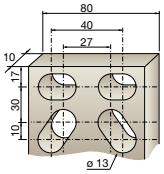
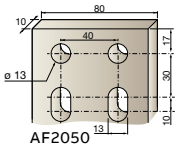
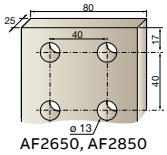
Connecting characteristics

Contactor types	AC / DC operated	AF400	AF460	AF580	AF750
Main terminals Flat type				 AF580 AF750	
Connection capacity (min. ... max.)					
Main conductors (poles)					
Cu cable - Stranded	2 x	240 mm²		–	
Clamp type		1SDA013922R1		–	
Tightening torque		35 Nm		–	
Cu cable - Stranded	3 x	–	185 mm²		
Clamp type		–	1SDA013956R1		
Tightening torque		35 Nm	45 Nm		
Al cable - Stranded	2 x	240 mm²		–	
Clamp type		1SDA013922R1		–	
Tightening torque		35 Nm		–	
	3 x	–	185 mm²		
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		K6TH alt. ATK580	–		
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)					
Solid / stranded	1 x	1...4 mm²			
	2 x	1...4 mm²			
Flexible	1 x	0.75...2.5 mm²			
	2 x	0.75...2.5 mm²			
Flexible with non insulated ferrule	1 x	0.75...2.5 mm²			
	2 x	0.75...2.5 mm²			
Flexible with insulated ferrule	1 x	0.75...2.5 mm²			
	2 x	0.75...2.5 mm²			
Lugs	L ≤	8 mm			
	l >	3.7 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			

AF1250 ... AF2850 3-pole contactors

Technical data

Connecting characteristics

Contactor types	AC / DC operated	AF1250	AF1350	AF1650	AF2050	AF2650	AF2850
Main terminals Flat type		 AF1250	 AF1350, AF1650		 AF2050	 AF2650, AF2850	
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	K7TK ATK1350/4	K7TK	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		ATK750/3	K8TL, K8TM, ATK1650/4	K8TL, K8TM, ATK1650/4, ATK1650/6	–		
Tightening torque		375 lb.in	500 lb.in		–		
Auxiliary conductors (coil terminals)							
Solid / stranded	1 x	1...4 mm²					
	2 x	1...4 mm²					
Flexible	1 x	0.75...2.5 mm²					
	2 x	0.75...2.5 mm²					
Flexible with non insulated ferrule	1 x	0.75...2.5 mm²					
	2 x	0.75...2.5 mm²					
Flexible with insulated ferrule	1 x	0.75...2.5 mm²					
	2 x	0.75...2.5 mm²					
Lugs	L ≤	8 mm					
	l >	3.7 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					

1SFC101115C0201 - Rev. C

AF09 ... AF96 3-pole contactors

Technical data

Built-in auxiliary contacts according to IEC

Contactor types	AC / DC operated	AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96
Rated operational voltage Ue max.		690 V										
Rated frequency (without derating)		50 / 60 Hz										
Conventional free air thermal current Ith - θ ≤ 40 °C		16 A										
Ie / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A										
	220-240 V 50/60 Hz	4 A										
	400-440 V 50/60 Hz	3 A										
	500 V 50/60 Hz	2 A										
	690 V 50/60 Hz	2 A										
Making capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1										
Breaking capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1										
Ie / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	6 A / 144 W										
	48 V DC	2.8 A / 134 W										
	72 V DC	1 A / 72 W										
	110 V DC	0.55 A / 60 W										
	125 V DC	0.55 A / 69 W										
	220 V DC	0.27 A / 60 W										
	250 V DC	0.27 A / 68 W										
	400 V DC	0.15 A / 60 W										
	500 V DC	0.13 A / 65 W										
	600 V DC	0.1 A / 60 W										
Short-circuit protection device gG type fuse		10 A										
Rated short-time withstand current Icw	for 1.0 s	100 A										
	for 0.1 s	140 A										
Minimum switching capacity		12 V / 3 mA										
with failure rate acc. to IEC 60947-5-4		10-7										
Non-overlapping time between N.O. and N.C. contacts		≥ 2 ms										
Power dissipation per pole at 6 A		0.1 W										
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		Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts (CA4, CAL4, CAT4 aux. contact blocks) are mechanically linked contacts.										
Mirror contacts acc. to annex F of IEC 60947-4-1		Built-in N.C. auxiliary contacts or additional N.C. auxiliary contacts (CA4, CAL4, CAT4 aux. contact blocks) are mirror contacts.										

Built-in auxiliary contacts according to UL / CSA

Contactor types	AC / DC operated	AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96
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										

1SBC101445S0201 - Rev. A

3-pole contactors

Electrical durability and utilization categories

General

Utilization categories determine the current making and breaking conditions relating to the characteristics of the loads to be controlled by the contactors. International standard IEC 60947-4-1 and European standard EN 60947-4-1 are the standards to be referred to.

If Ic is the current to be broken by the contactor and Ie the rated operational current normally drawn by the load, then:

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

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

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

Electrical durability is expressed in millions of operating cycles.

Curve utilization mode

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

- Note the characteristics of the load to be controlled:
  - Operational voltage .....Ue
  - Current normally drawn .....Ie (Ue / Ie / kW relation for motors, see "Motor rated operational powers and currents").
  - Utilization category .....AC-1, AC-2, AC-3 or AC-4
  - Breaking current .....Ic = Ie for AC-1 and for AC-3 ; Ic = 2.5 x Ie for AC-2 ; Ic = 6 x Ie for AC-4
- Define the number of operating cycles N required.
- On the diagram corresponding to the operational category, select the contactor with the curve immediately above the intersection point (Ic ; N).

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

- Note the characteristics of the motor to be controlled:
  - Operational voltage .....Ue
  - Current normally drawn while "motor running" .....Ie (Ue / Ie / kW relation for motors, see "Motor rated operational powers and currents")
  - Breaking current for AC-3 .....Ic = Ie
  - Breaking current for AC-4 while "motor accelerating" Ic = 6 x Ie
  - Percentage of AC-4 operating cycles .....K (on the basis of the total number of operating cycles)
- Define the total number of operating cycles N required.
- Note the smallest contactor rating compatible for AC-3 (Ue / Ie) on Main pole utilization characteristic table (see “Technical data”).
- For the selected contactor make a note of the following in relation to the voltage using diagram AC-3 in next pages:
  - The number of operating cycles A for Ic = Ie (AC-3)
  - The number of operating cycles B for Ic = 6 x Ie (AC-4)
- Calculate the estimated number of cycles N’ (N’ is always below A)

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

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

Case of uninterrupted duty

For uninterrupted duty, some verifications of preventing maintenance are necessary to check the functionality of the concerned product (consult us).

The 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.

1SBC101314S0201

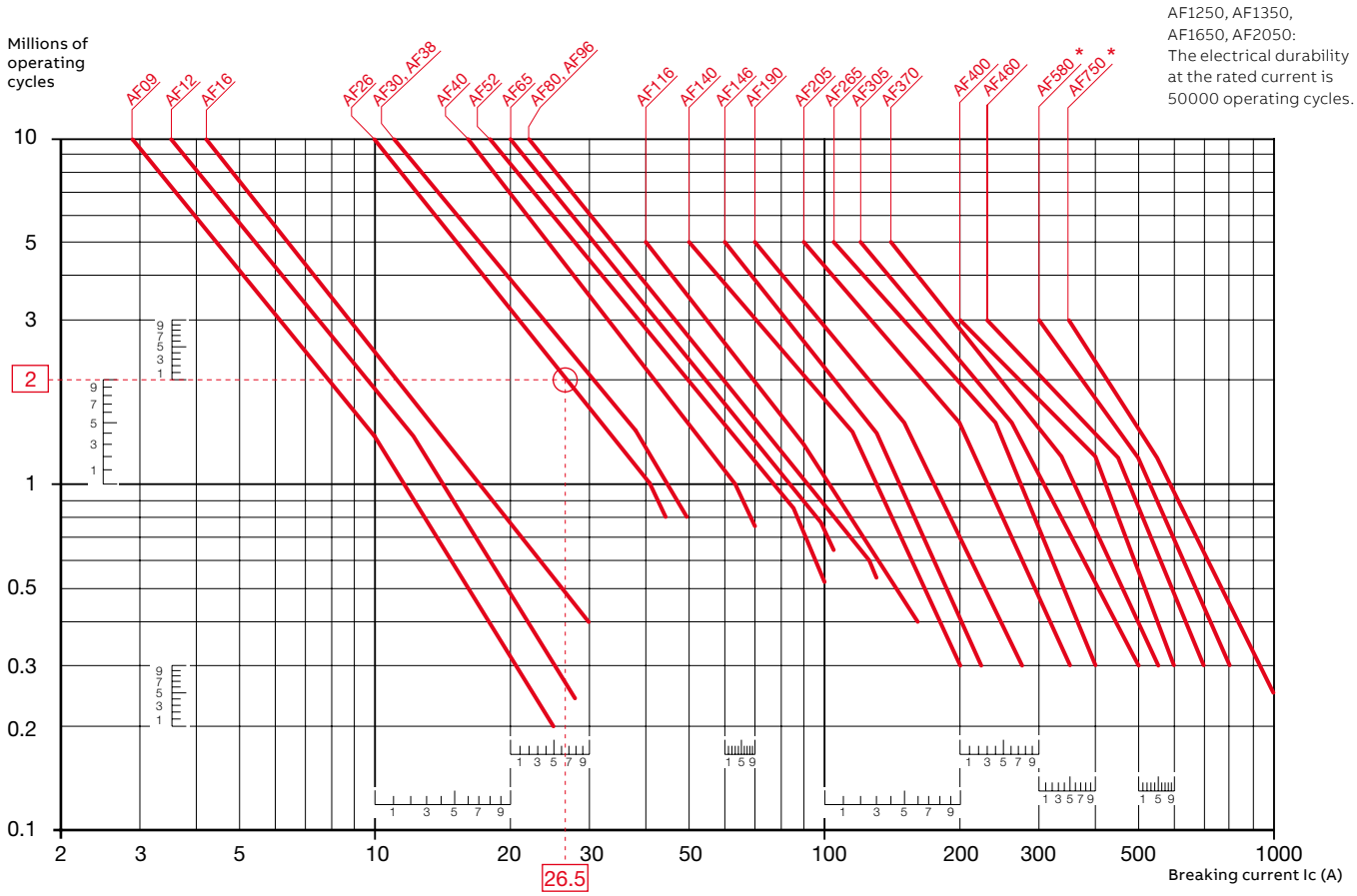
3-pole contactors

Electrical durability

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

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

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



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

Example:

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

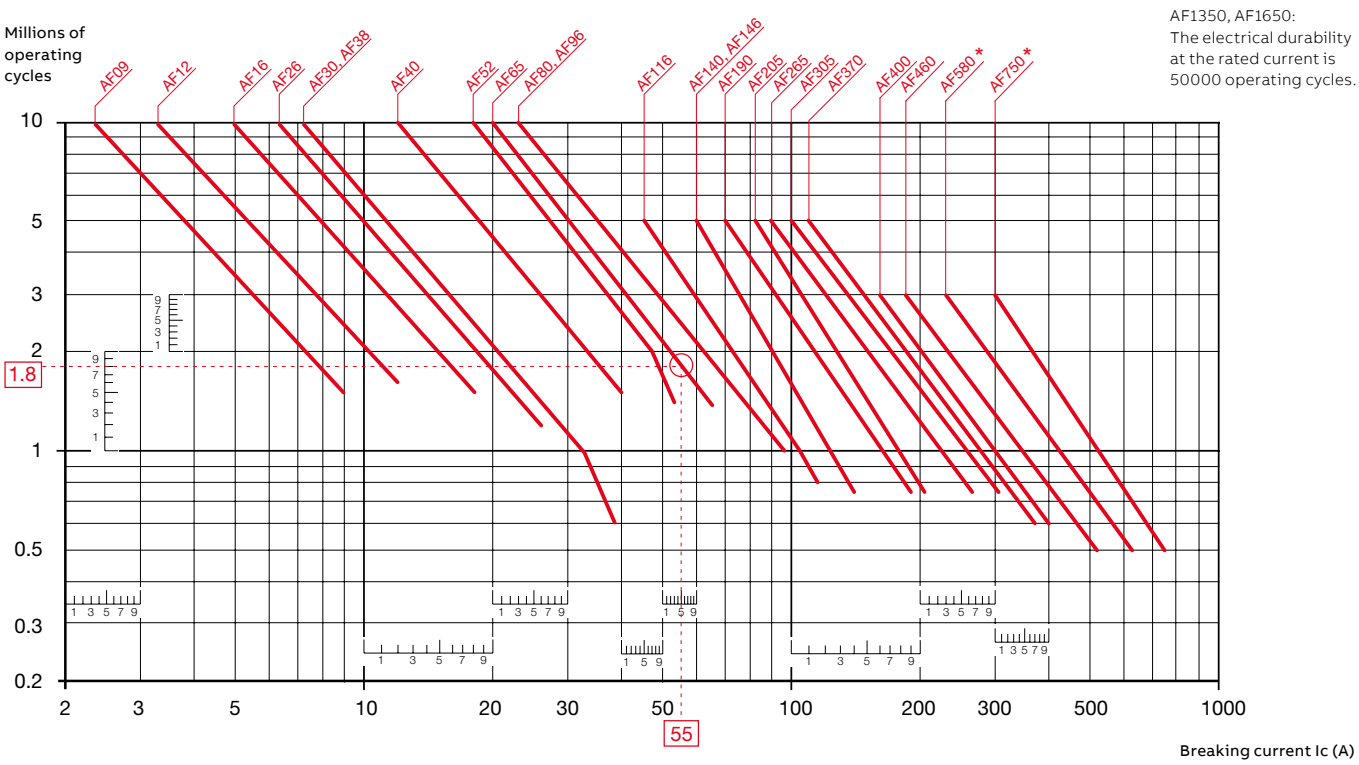
Using the AC-1 curves above select the AF26 contactor at intersection "○" (26.5 A / 2 millions operating cycles).

1SBC101940S0201

3-pole contactors

Electrical durability

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



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

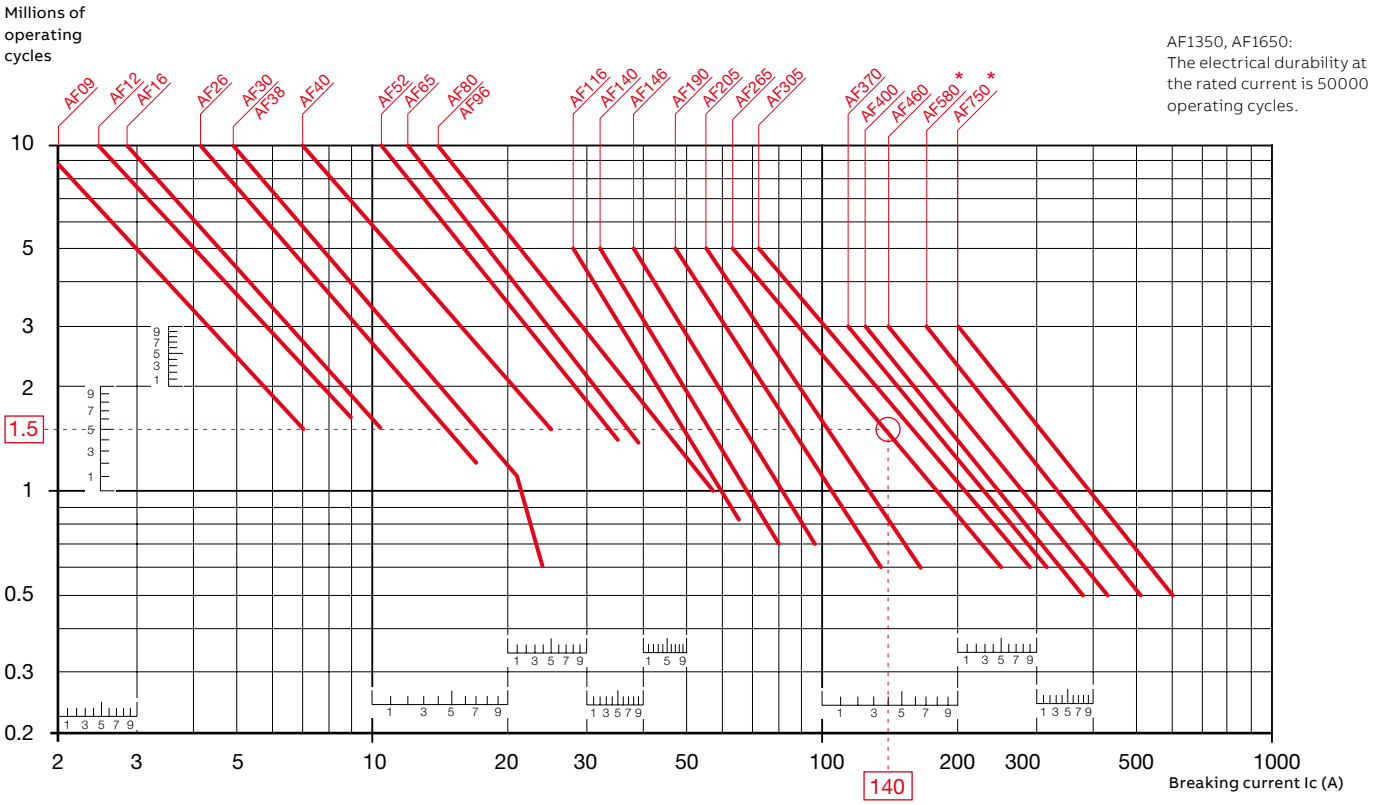
Example:
Motor power 30 kW for AC-3 - Ue = 400 V and Ie = 55 A utilization – Electrical durability required = 1.8 million operating cycles.
For AC-3: Ic = Ie. Select the AF65 contactor at intersection "○" (55 A / 1.8 million operating cycles) on the curves (AC-3 - Ue ≤ 440 V).

1SBC101941S0201

3-pole contactors

Electrical durability

Electrical durability for AC-3 utilization category - 440 V < Ue ≤ 690 V.
Switching cage motors: starting and switching off running motors. The breaking current Ic for AC-3 is equal to the rated operational current Ie (Ie = motor full load current).
Ambient temperature and maximum electrical switching frequency: see "Technical data".



AF1350, AF1650:
The electrical durability at the rated current is 50000 operating cycles.

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

Example:
Motor power 132 kW for AC-3 - Ue = 660 V and Ie = 140 A utilization – Electrical durability required = 1.5 million operating cycles.
For AC-3: Ic = Ie. Select the AF265 contactor at intersection "○" (140 A / 1.5 million operating cycles) on the curves (AC-3 - 440 V < Ue ≤ 690 V).

1SBC101955S0201

3-pole contactors

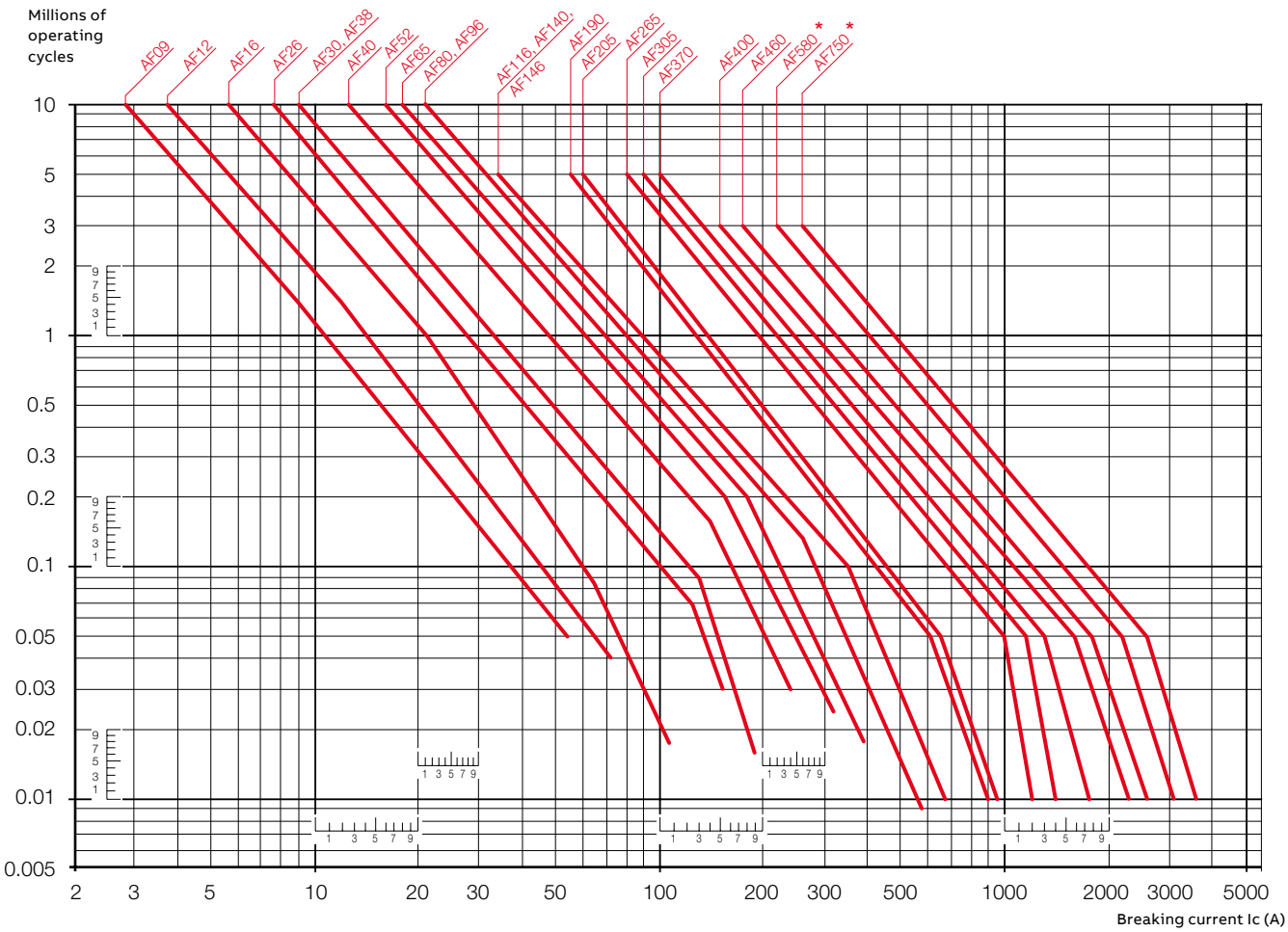
Electrical durability

Electrical durability for AC-2 or AC-4 utilization category - Ue ≤ 440 V

Ambient temperature ≤ 60 °C for AF09 ... AF370, ≤ 55 °C for AF400 ... AF1650

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

Maximum electrical switching frequency: see "Technical data".



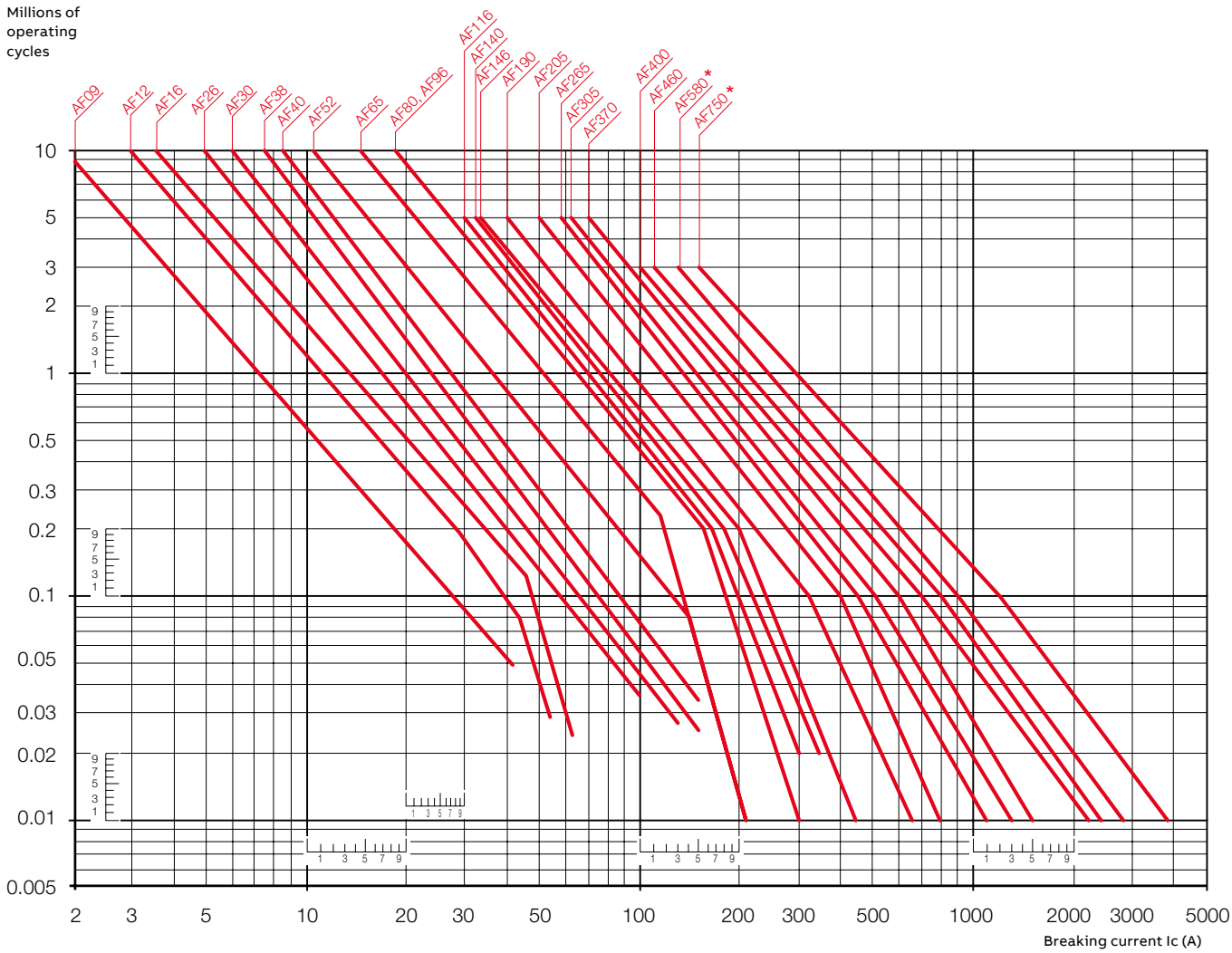
Note: * For AF580 and AF750 contacts needs to be replaced after 750k operations.

1SBC101942S0201 - Rev. A

3-pole contactors

Electrical durability

Electrical durability for AC-2 or AC-4 utilization category - 440 V < Ue ≤ 690 V
Ambient temperature ≤ 60 °C for AF09 ... AF370, ≤ 55 °C for AF400 ... AF750
Switching cage motors: starting, reverse operation and step-by-step operation. The breaking current Ic is equal to 2.5 x Ie for AC-2 and 6 x Ie for AC-4, keaping in mind tha Ie is the motor rated operational current (Ie = motor full load current). Maximum electrical switching frequency: see "Technical data".



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

1SBC101943502 01

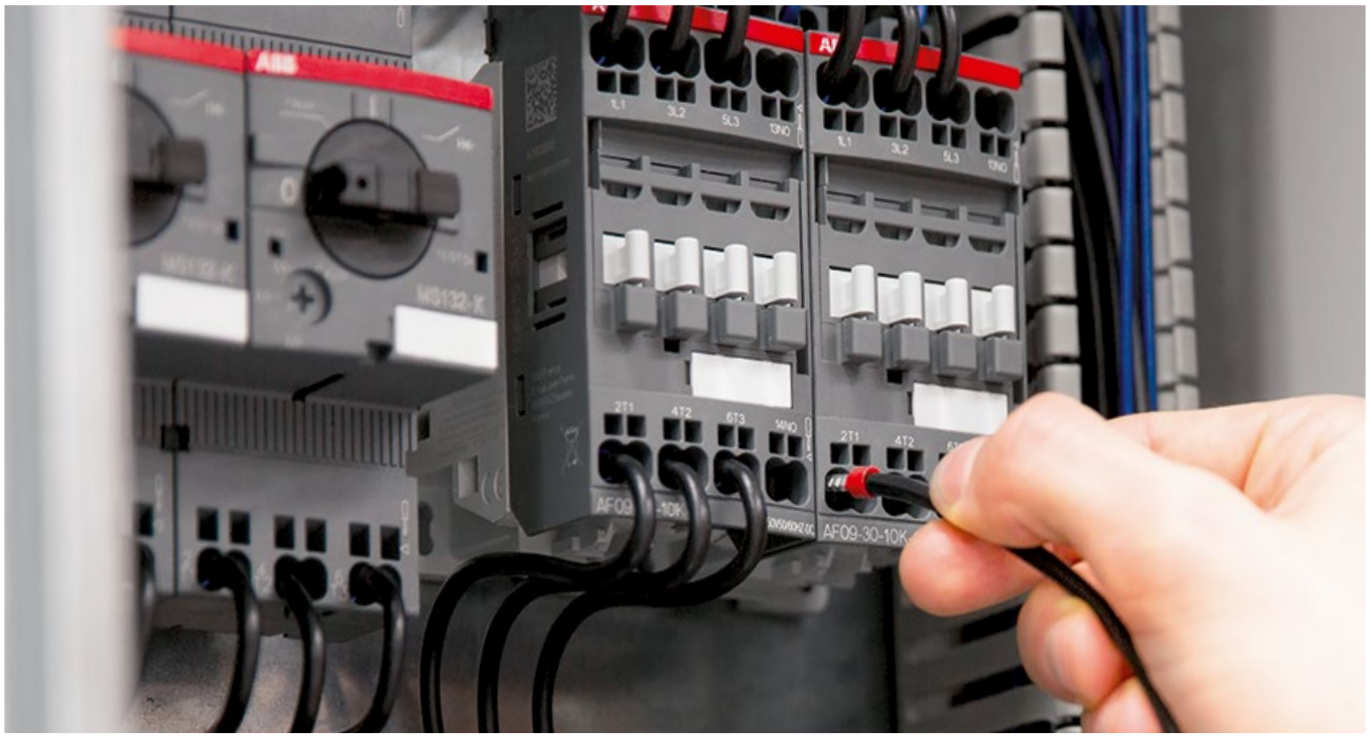
Push-in Spring motor starting solution

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**

1SBC100445020I

Just push it
Push-in Spring motor starting solution



With the new Push-in Spring motor starting solution, one push is all you need for extremely fast wiring. No tool is required, so you can save up to 50% wiring time with Push-in Spring compared to conventional spring solutions. And the connections are just as reliable. So for speed, ease and reliability, just push it.

Speed up your projects

Faster than ever installation

Imagine a motor starting solution that's twice as fast to install. With Push-in Spring, you no longer need to imagine – it's a reality. Push-in mode allows you to insert both ferruled and rigid cables without the need to use any tools, boosting your productivity like never before.

Easy to install

Easier than ever wiring

Push-in Spring technology opens up new possibilities. With its unmatched ease of use, wiring becomes far more intuitive. This eliminates the need for special training and reduces the chance of wiring error. What possibilities will it open up for you?

Continuous operation

Reliable as ever connections

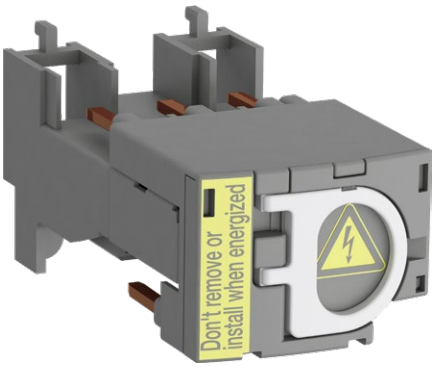
The speed and ease of Push-in Spring comes with the added reassurance of connections that are as reliable as ever. This gives you complete peace of mind when using the Push-in Spring motor starting solution.

1SBC100445S0201

Faster than ever installation

2-in-1 connection

For the very first time, ABB's 2-in-1 connection allows you to use ferruled and rigid cables (Push-in mode) or cables without ferrules (Spring mode) in the same terminal. In Push-in mode, cables can be inserted by just simply pushing them in by hand.



Smart accessories

100% tool-free connecting kits significantly reduce installation time.

Complete solution

High connection capacities are optimized for motor starting solutions up to 18.5 kW 400 V AC-3 and 50 A AC-1 (25 hp 480 V and 45 A general use). This includes short-circuit fuseless protection up to 100 kA. Push-in Spring accessories can be mounted on the standard screw range of manual motor starters and contactors.

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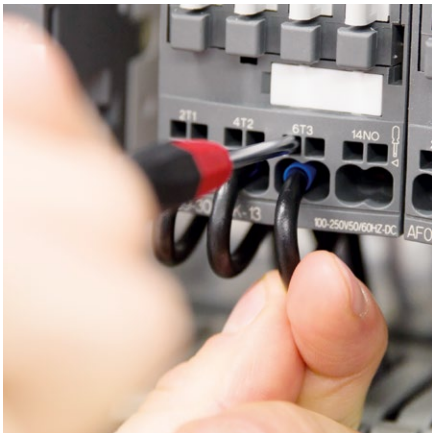
Easier than ever wiring

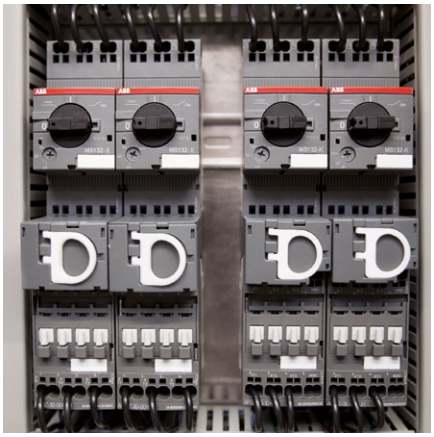
Intuitive wiring

With Push-in Spring, all cables and connecting links use the same round shape entry, whilst the square terminals above are clearly marked with screwdriver symbols. The result? Wiring and de-wiring that's intuitive and easily repeatable without cabling error, with little to no training required.



Just one screwdriver required

For de-wiring, only one screwdriver size is needed for the entire range. No twisting or turning is required either, so there's less chance of damage to the terminals and to your installation as a whole.



Automated wiring

The Push-in Spring motor starting solution features 90° cable insertion for all terminals. Front access to terminals aids smooth, robust insertion of cables and makes automated robot wiring possible.

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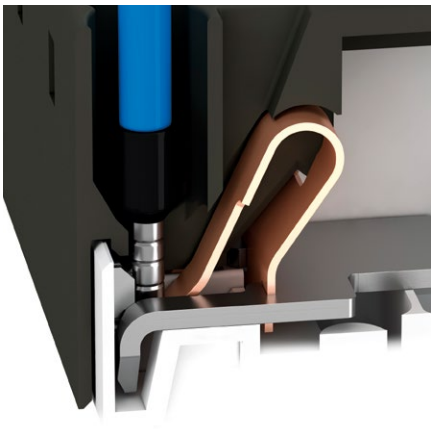
Reliable as ever connections



Robust electrical contact

The special spring design guarantees excellent electrical contact. The design provides strict control of contact strength, independent from operator, giving you complete assurance.

Vibration-proof

You can count on Push-in Spring connections, even in harsh environments. Push-in Spring technology has been shock and vibration tested according to IEC 60068-2-27 and IEC 60068-2-6 standards.

No need to re-tighten

With self-tightening terminals, there's no need to re-tighten after transportation or during the life cycle of the product. High connection strength is guaranteed throughout the whole lifetime of the device.

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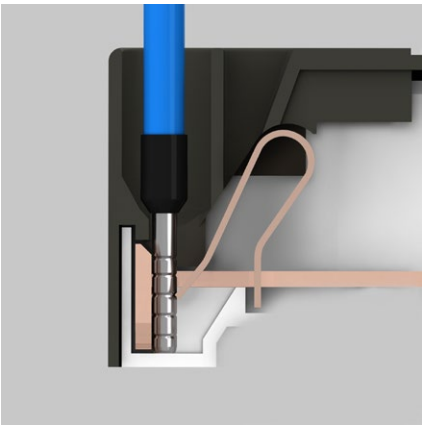
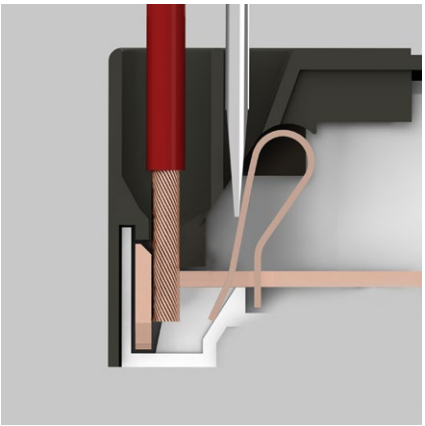


Push-in mode

Connect rigid cables or ferruled cables simply by pushing them into the cable holes – no need to use any tools. Push-in mode saves up to 50% wiring time compared to conventional spring solutions and makes installation a breeze. Benefit from intuitive wiring, self-tightening terminals and less chance of wiring error.



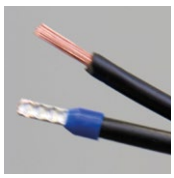
Spring Mode

This mode is used for small cable cross-sections or for cables without ferrules. It is also used for de-wiring the solution. Before inserting the cable, simply push a screwdriver into the clearly marked holes to open the terminal. ABB's Spring mode is easier to use than conventional spring technology, with less chance of damage to terminals as no twisting or turning is required.

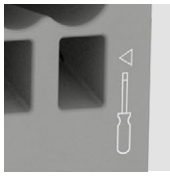
1SBC100446S0201

Push-in Spring solution
Complete range, complete efficiency

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

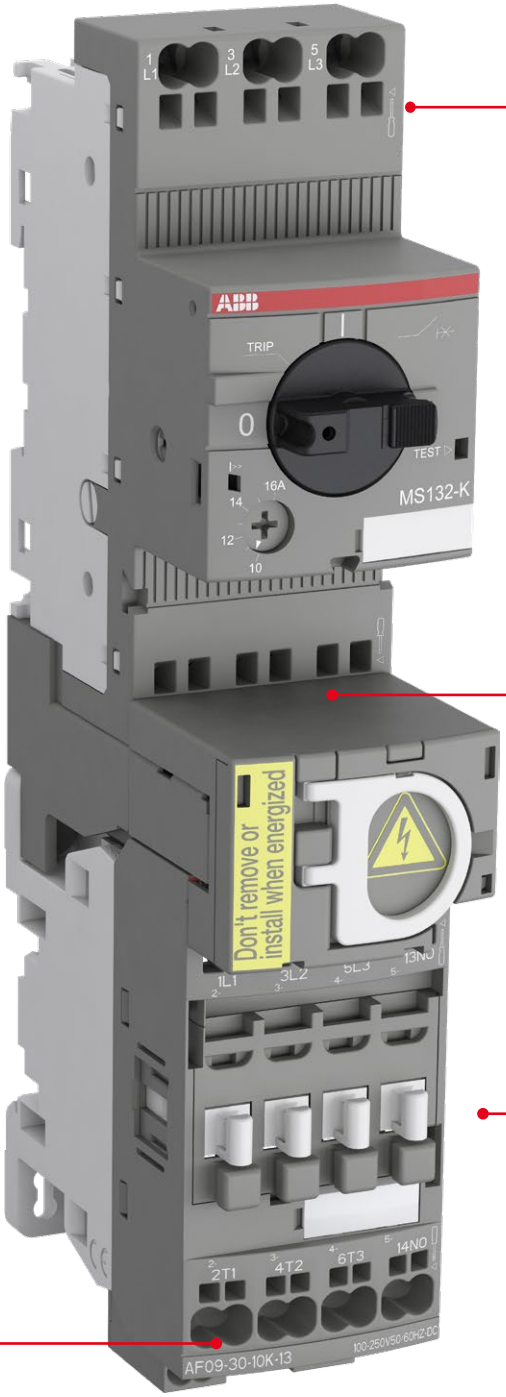


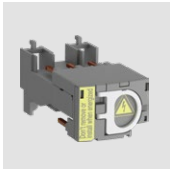
2-in-1
Benefit from both Push-in mode and Spring mode and use ferruled cables or cables without ferrules in the same terminal.



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

Compatible with screw range
Mount accessories for control circuits on the screw range up to 30 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-less connecting links
100% tool-less mounting connecting links.

Robust by design
Contact robustness by design, independent from operator.

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).

1SBC100407S0201

3-pole contactors and motor protection

AC / DC Control supply				Type	AF09..K	AF12..K	AF16..K	AF26..K	AF30..K	AF38..K
IEC	AC-3	Rated operational power	θ ≤ 60 °C, 380 - 400 V	kW	4	5.5	7.5	11	15	18.5
		Rated operational current	380 - 400 V	A	9	12	18	26	32	38
	AC-1	Rated operational current	θ ≤ 40 °C, 690 V	A	25	28	30	45	50	50
UL/CSA	3-phase Motor Rating		440 - 480 V	hp	5	7.5	10	15	20	25
	General Use Rating		600 V	A	25	28	30	42	45	45
NEMA	NEMA size				00	0	–	1	–	–

Main accessories for contactors

Auxiliary contact blocks		Front mounting	CA4-10K (1 N.O.) CA4-01K (1 N.C.)
		Side mounting	CAL4-11K
Interlocking units		Mechanical	VM4
		Mechanical / Electrical	VEM4K*
Surge protection			Built-in surge protection

* For product availability, please consult your ABB local sales organization.

1SBC100407S0201

AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

4 to 18.5 kW

AC / DC operated

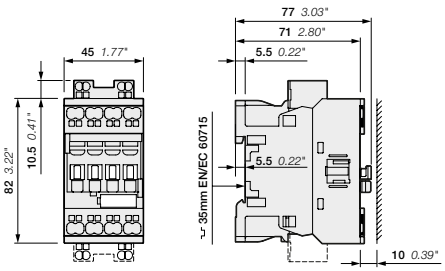
AF09-30-10K

AF26-30-00K

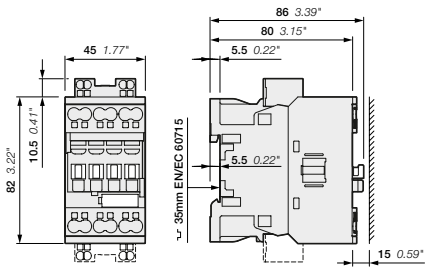
AF09..K ... AF38..K contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC. These contactors are of the block type design with 3 main poles.

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
- built-in surge suppression
- 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.		Auxiliary contacts fitted	Type (1)	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	AC-1								
kW	A	hp	A	V 50/60 Hz	V DC				kg
4	25	5	25	24 ... 60	20 ... 60	1 0	AF09-30-10K-11	1SBL137005R1110	0.285
						0 1	AF09-30-01K-11	1SBL137005R1101	0.285
				48 ... 130	48 ... 130	1 0	AF09-30-10K-12	1SBL137005R1210	0.285
						0 1	AF09-30-01K-12	1SBL137005R1201	0.285
				100 ... 250	100 ... 250	1 0	AF09-30-10K-13	1SBL137005R1310	0.285
						0 1	AF09-30-01K-13	1SBL137005R1301	0.285
				250 ... 500	250 ... 500	1 0	AF09-30-10K-14	1SBL137005R1410	0.325
						0 1	AF09-30-01K-14	1SBL137005R1401	0.325
5.5	28	7.5	28	24 ... 60	20 ... 60	1 0	AF12-30-10K-11	1SBL157005R1110	0.285
						0 1	AF12-30-01K-11	1SBL157005R1101	0.285
				48 ... 130	48 ... 130	1 0	AF12-30-10K-12	1SBL157005R1210	0.285
						0 1	AF12-30-01K-12	1SBL157005R1201	0.285
				100 ... 250	100 ... 250	1 0	AF12-30-10K-13	1SBL157005R1310	0.285
						0 1	AF12-30-01K-13	1SBL157005R1301	0.285
				250 ... 500	250 ... 500	1 0	AF12-30-10K-14	1SBL157005R1410	0.325
						0 1	AF12-30-01K-14	1SBL157005R1401	0.325
7.5	30	10	30	24 ... 60	20 ... 60	1 0	AF16-30-10K-11	1SBL177005R1110	0.285
						0 1	AF16-30-01K-11	1SBL177005R1101	0.285
				48 ... 130	48 ... 130	1 0	AF16-30-10K-12	1SBL177005R1210	0.285
						0 1	AF16-30-01K-12	1SBL177005R1201	0.285
				100 ... 250	100 ... 250	1 0	AF16-30-10K-13	1SBL177005R1310	0.285
						0 1	AF16-30-01K-13	1SBL177005R1301	0.285
				250 ... 500	250 ... 500	1 0	AF16-30-10K-14	1SBL177005R1410	0.325
						0 1	AF16-30-01K-14	1SBL177005R1401	0.325
11	45	15	42	24 ... 60	20 ... 60	0 0	AF26-30-00K-11	1SBL237005R1100	0.325
				48 ... 130	48 ... 130	0 0	AF26-30-00K-12	1SBL237005R1200	0.325
				100 ... 250	100 ... 250	0 0	AF26-30-00K-13	1SBL237005R1300	0.325
				250 ... 500	250 ... 500	0 0	AF26-30-00K-14	1SBL237005R1400	0.365
15	50	20	45	24 ... 60	20 ... 60	0 0	AF30-30-00K-11	1SBL277005R1100	0.330
				48 ... 130	48 ... 130	0 0	AF30-30-00K-12	1SBL277005R1200	0.330
				100 ... 250	100 ... 250	0 0	AF30-30-00K-13	1SBL277005R1300	0.330
				250 ... 500	250 ... 500	0 0	AF30-30-00K-14	1SBL277005R1400	0.370
18.5	50	25	45	24 ... 60	20 ... 60	0 0	AF38-30-00K-11	1SBL297005R1100	0.330
				48 ... 130	48 ... 130	0 0	AF38-30-00K-12	1SBL297005R1200	0.330
				100 ... 250	100 ... 250	0 0	AF38-30-00K-13	1SBL297005R1300	0.330
				250 ... 500	250 ... 500	0 0	AF38-30-00K-14	1SBL297005R1400	0.370



AF09..K, AF12..K, AF16..K



AF26..K, AF30..K, AF38..K

Main dimensions mm, inches

1SBC100428S0201

AF09Z..K ... AF38Z..K 3-pole contactors - with Push-in Spring terminals

4 to 18.5 kW

24 V DC operated - designed for PLC

1SBC101597V0014

AF09Z-30-10K

1SBC101599V0014

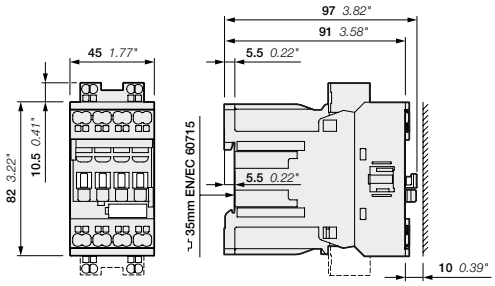
AF26Z-30-00K

AF09Z..K ... AF38Z..K contactors 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.

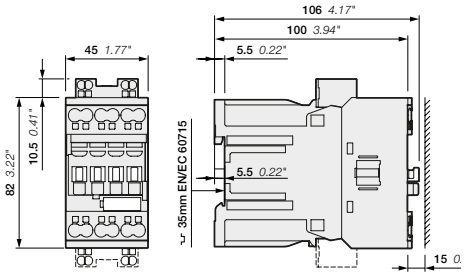
- control circuit: DC operated with electronic coil interface allowing low holding consumption up to 1.7 W and reduced panel energy consumption
  - allow direct control by PLC-output ≥ 250 mA 24 V DC
  - very distinct closing and opening
- built-in surge suppression
- add-on auxiliary contact blocks 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 power	current θ ≤ 40 °C	3-phase motor rating	General use rating	Uc min. ... Uc max.				Pkg (1 pce)
400 V		480 V	600 V AC					
AC-3	AC-1							
kW	A	hp	A	V DC				kg
4	25	5	25	24	1 0	AF09Z-30-10K-30	1SBL136005R3010	0.435
					0 1	AF09Z-30-01K-30	1SBL136005R3001	0.435
5.5	28	7.5	28	24	1 0	AF12Z-30-10K-30	1SBL156005R3010	0.435
					0 1	AF12Z-30-01K-30	1SBL156005R3001	0.435
7.5	30	10	30	24	1 0	AF16Z-30-10K-30	1SBL176005R3010	0.435
					0 1	AF16Z-30-01K-30	1SBL176005R3001	0.435
11	45	15	42	24	0 0	AF26Z-30-00K-30	1SBL236005R3000	0.440
15	50	20	45	24	0 0	AF30Z-30-00K-30	1SBL276005R3000	0.440
18.5	50	25	45	24	0 0	AF38Z-30-00K-30	1SBL296005R3000	0.440

Note: AF..Z contactors with 24V DC control voltage need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.
For product availability, please consult your ABB local sales organization.



AF09Z..K, AF12Z..K, AF16Z..K



AF26Z..K, AF30Z..K, AF38Z..K

Main dimensions mm, inches

1SBC100498S0201

AF09Z..K ... AF38Z..K 3-pole contactors - with Push-in Spring terminals

4 to 18.5 kW

AC / DC operated - for specific applications

AF09Z-30-10K

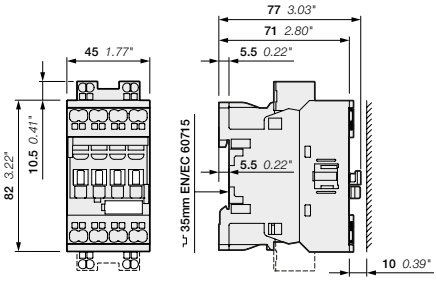
AF26Z-30-00K

AF09Z..K ... AF38Z..K contactors 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.

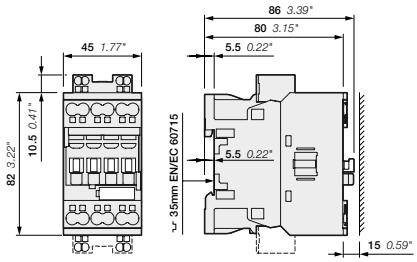
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...250 V 50/60 Hz and 12...250 V DC
  - can manage large control voltage variations
  - allow direct control by PLC-output ≥ 24 V DC 500 mA
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request)
- built-in surge suppression
- 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.		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	AC-1								
kW	A	hp	A	V 50/60 Hz	V DC				kg
4	25	5	25	–	12 ... 20	1 0	AF09Z-30-10K-20	1SBL136005R2010	0.315
						0 1	AF09Z-30-01K-20	1SBL136005R2001	0.315
				24 ... 60	20 ... 60	1 0	AF09Z-30-10K-21	1SBL136005R2110	0.315
						0 1	AF09Z-30-01K-21	1SBL136005R2101	0.315
				48 ... 130	48 ... 130	1 0	AF09Z-30-10K-22	1SBL136005R2210	0.315
						0 1	AF09Z-30-01K-22	1SBL136005R2201	0.315
				100 ... 250	100 ... 250	1 0	AF09Z-30-10K-23	1SBL136005R2310	0.315
						0 1	AF09Z-30-01K-23	1SBL136005R2301	0.315
5.5	28	7.5	28	–	12 ... 20	1 0	AF12Z-30-10K-20	1SBL156005R2010	0.315
						0 1	AF12Z-30-01K-20	1SBL156005R2001	0.315
				24 ... 60	20 ... 60	1 0	AF12Z-30-10K-21	1SBL156005R2110	0.315
						0 1	AF12Z-30-01K-21	1SBL156005R2101	0.315
				48 ... 130	48 ... 130	1 0	AF12Z-30-10K-22	1SBL156005R2210	0.315
						0 1	AF12Z-30-01K-22	1SBL156005R2201	0.315
				100 ... 250	100 ... 250	1 0	AF12Z-30-10K-23	1SBL156005R2310	0.315
						0 1	AF12Z-30-01K-23	1SBL156005R2301	0.315
7.5	30	10	30	–	12 ... 20	1 0	AF16Z-30-10K-20	1SBL176005R2010	0.315
						0 1	AF16Z-30-01K-20	1SBL176005R2001	0.315
				24 ... 60	20 ... 60	1 0	AF16Z-30-10K-21	1SBL176005R2110	0.315
						0 1	AF16Z-30-01K-21	1SBL176005R2101	0.315
				48 ... 130	48 ... 130	1 0	AF16Z-30-10K-22	1SBL176005R2210	0.315
						0 1	AF16Z-30-01K-22	1SBL176005R2201	0.315
				100 ... 250	100 ... 250	1 0	AF16Z-30-10K-23	1SBL176005R2310	0.315
						0 1	AF16Z-30-01K-23	1SBL176005R2301	0.315
11	45	15	42	–	12 ... 20	0 0	AF26Z-30-00K-20	1SBL236005R2000	0.355
				24 ... 60	20 ... 60	0 0	AF26Z-30-00K-21	1SBL236005R2100	0.355
				48 ... 130	48 ... 130	0 0	AF26Z-30-00K-22	1SBL236005R2200	0.355
				100 ... 250	100 ... 250	0 0	AF26Z-30-00K-23	1SBL236005R2300	0.355
15	50	20	45	–	12 ... 20	0 0	AF30Z-30-00K-20	1SBL276005R2000	0.360
				24 ... 60	20 ... 60	0 0	AF30Z-30-00K-21	1SBL276005R2100	0.360
				48 ... 130	48 ... 130	0 0	AF30Z-30-00K-22	1SBL276005R2200	0.360
				100 ... 250	100 ... 250	0 0	AF30Z-30-00K-23	1SBL276005R2300	0.360
18.5	50	25	45	–	12 ... 20	0 0	AF38Z-30-00K-20	1SBL296005R2000	0.360
				24 ... 60	20 ... 60	0 0	AF38Z-30-00K-21	1SBL296005R2100	0.360
				48 ... 130	48 ... 130	0 0	AF38Z-30-00K-22	1SBL296005R2200	0.360
				100 ... 250	100 ... 250	0 0	AF38Z-30-00K-23	1SBL296005R2300	0.360

Note: Only AF..Z contactors with 12...20 V DC control voltage need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.



AF09Z..K, AF12Z..K, AF16Z..K



AF26Z..K, AF30Z..K, AF38Z..K

Main dimensions mm, inches

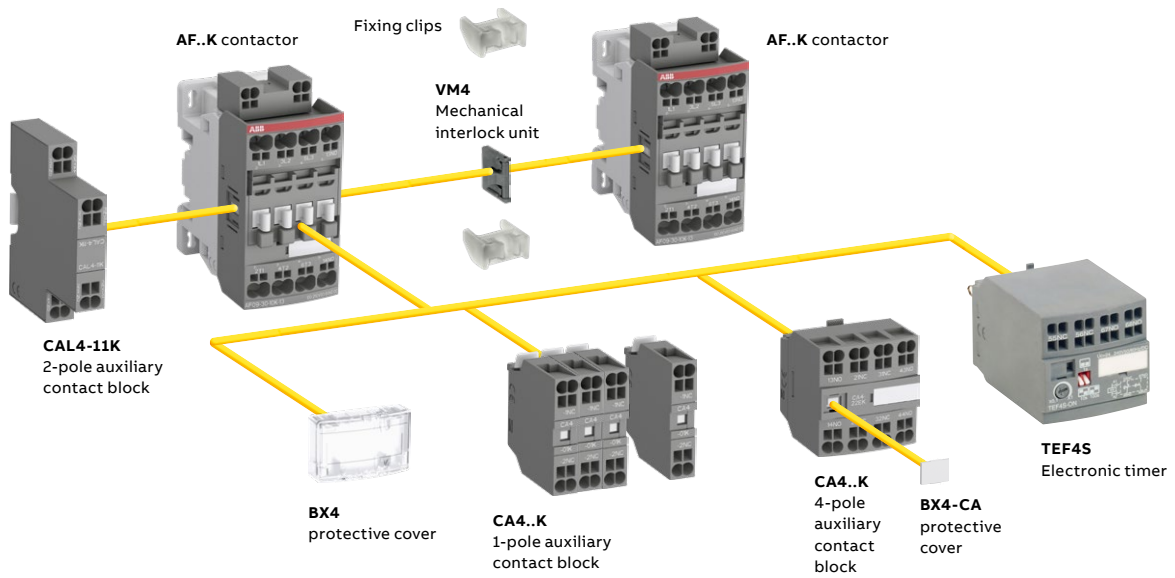
1SBC100429S0201

AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

Main accessories

Contactor and main accessories (other accessories available)

AF09..K ... AF38..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: Auxiliary contact blocks 1-pole CA4..K	Front-mounted accessories: Auxiliary contact blocks 4-pole CA4..K	Front-mounted accessories: Electronic timer TEF4S	Front-mounted accessories: Mechanical interlock unit (between 2 contactors) VM4		Side-mounted accessories: Auxiliary contact blocks Left side 2-pole CAL4-11K	Side-mounted accessories: Auxiliary contact blocks Right side
AF09(Z)..K ... AF38(Z)..K (1)									
AF09..K ... AF16..K	3 0	0 1	4 max.	**or** 1	**or** 1	–	+	1	–
AF09..K ... AF16..K	3 0	1 0	2 max.	–	**or** 1	–	+	1	+ 1
AF26..K ... AF38..K	3 0	0 0	4 max.	**or** 1	**or** 1	+ 1	+	1	**or** 1
AF09Z..K ... AF38Z..K 24 V DC designed for PLC - coil 30 (1)									
AF09Z..K ... AF16Z..K	3 0	0 1	4 max.	**or** 1	**or** 1	+ 1	**or**	1	+ 1
AF09Z..K ... AF16Z..K	3 0	1 0	2 max.	–	**or** 1	+ 1	+	1	**or** 1
AF26Z..K ... AF38Z..K	3 0	0 0			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

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AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

Technical data

Main pole - Utilization characteristics according to IEC

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

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AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

Technical data

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

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

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

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AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

Technical data

Main pole - Utilization characteristics - 3 N.O. non reversing contactors

Contactor types	AC / DC operated	AF09..K	AF12..K	AF16..K	AF26..K	AF30..K	AF38..K
AC Resistance air heating							
Full Load Amps (FLA)	600 V AC	20 A	25 A	30 A	42 A	45 A	45 A
Elevator control, load switching, 500,000 electrical operating cycles acc. to CSA B44.1 / ASME 17.5 paragraph 19.2.1							
1-phase							
Horse power rating	110-120 V AC	1/4 hp	1/3 hp	–	1-1/2 hp	2 hp	2 hp
	220-240 V AC	1/2 hp	3/4 hp	–	3 hp	3 hp	5 hp
3-phase							
Horse power rating	200-208 V AC	1 hp	2 hp	–	5 hp	7-1/2 hp	7-1/2 hp
	220-240 V AC	1 hp	2 hp	–	5 hp	7-1/2 hp	10 hp
	440-480 V AC	3 hp	5 hp	–	15 hp	20 hp	20 hp
	550-600 V AC	3 hp	5 hp	–	15 hp	20 hp	20 hp
Elevator control, 500,000 mechanical operating cycles, 5 electrical operating cycles acc. to CSA B44.1 / ASME 17.5 paragraph 19.2.2							
1-phase							
Horse power rating	110-120 V AC	3/4 hp	1 hp	1-1/2 hp	2 hp	2 hp	3 hp
	220-240 V AC	1-1/2 hp	2 hp	3 hp	3 hp	5 hp	7-1/2 hp
3-phase							
Horse power rating	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
Lighting application - UL/CSA							
Tungsten lamps							
1-phase per pole	347 V AC	20 A	25 A	30 A	42 A	45 A	45 A
3-phase break all lines	600 V AC	20 A	25 A	30 A	42 A	45 A	45 A
Electrical discharge lamps (ballast)							
1-phase per pole	347 V AC	20 A	25 A	30 A	42 A	45 A	45 A
3-phase break all lines	600 V AC	20 A	25 A	30 A	42 A	45 A	45 A

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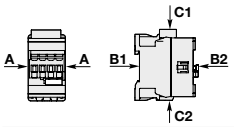
AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

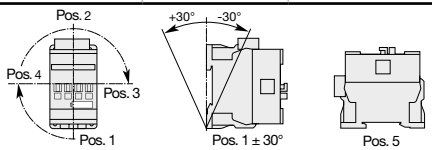
Technical data

General technical data

Contactor types	AC / DC operated	AF09..K	AF12..K	AF16..K	AF26..K	AF30..K	AF38..K
Rated insulation voltage Ui							
acc. to IEC 60947-4-1		690 V					
acc. to UL / CSA		600 V					
Rated impulse withstand voltage Uimp.		6 kV					
Electromagnetic compatibility		Devices complying with IEC 60947-1 / EN 60947-1 - Environment A and B (1)					
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 withstand							
acc. to IEC 60068-2-27 and EN 60068-2-27							
Mounting position 1	Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position					
	A	30 g					
	B1	25 g closed position / 5 g open position					
	B2	15 g					
	C1	25 g					
	C2	25 g					
Vibration withstand		5 ... 300 Hz					
acc. to IEC 60068-2-6		4 g Closed position / 2 g Open position					

(1) AF09 … AF38-..-..-12 (48...130 V 50/60 Hz-DC) compliant to environment A only. For environment B: select AF09 … AF38Z-..-..-22.

Mounting characteristics and conditions for use

Contactor types	AC / DC operated	AF09..K	AF12..K	AF16..K	AF26..K	AF30..K	AF38..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 ... AF38					
Mounting distances		The contactors can be assembled side by side					
Fixing							
On rail according to IEC 60715, EN 60715		35 x 7.5 mm or 35 x 15 mm					
By screws (not supplied)		2 x M4 screws placed diagonally					

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AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

Technical data

Magnet System Characteristics for AF09..K ... AF38..K contactors - AC / DC operated

Contactor types	AC / DC operated	AF09..K	AF12..K	AF16..K	AF26..K	AF30..K	AF38..K
Coil operating limits acc. to IEC 60947-4-1	AC supply	At θ ≤ 60 °C 0.85 x Uc min...1.1 x Uc max. At θ ≤ 70 °C 0.85 x Uc min...Uc max.					
	DC supply	At θ ≤ 60 °C 0.85 x Uc min...1.1 x Uc max. At θ ≤ 70 °C 0.85 x Uc min...Uc max.					
AC control voltage 50/60 Hz							
Rated control circuit voltage Uc		24 ... 500 V AC					
Coil consumption	Average pull-in value	50 VA					
	Average holding value	2.2 VA / 2 W					
DC control voltage							
Rated control circuit voltage Uc		20 ... 500 V DC					
Coil consumption	Average pull-in value	50 W					
	Average holding value	2 W					
PLC-output control		Not suitable for direct control by PLC-output					
Drop-out voltage		≤ 60 % 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					

Magnet System Characteristics for AF09Z..K ... AF38Z..K contactors 24V DC operated - designed for PLC - coil 30

Contactor types	AC / DC operated	AF09Z..K	AF12Z..K	AF16Z..K	AF26Z..K	AF30Z..K	AF38Z..K
Coil operating limits acc. to IEC 60947-4-1	DC supply	At θ ≤ 60 °C 0.85 ... 1.1 x Uc At θ ≤ 70 °C Uc					
DC control voltage							
Rated control circuit voltage Uc		24 V DC					
Coil consumption	Average pull-in value	6 W					
	Average holding value	1.7 W					
PLC-output control		≥ 250 mA 24 V DC for PLCs and safety PLCs using broken wire detection					
Drop-out voltage		≤ 60 % of Uc min.					
Operating time							
Between coil energization and:							
	N.O. contact closing	27 ... 53 ms					
	N.C. contact opening	20 ... 35 ms					
Between coil de-energization and:							
	N.O. contact opening	17 ... 29 ms					
	N.C. contact closing	22 ... 57 ms					

Magnet System Characteristics for AF09Z..K ... AF38Z..K contactors - for specific applications - coils 20, 21, 22, 23

Contactor types	AC / DC operated	AF09Z..K	AF12Z..K	AF16Z..K	AF26Z..K	AF30Z..K	AF38Z..K
Coil operating limits acc. to IEC 60947-4-1	AC supply	At θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max At θ ≤ 70 °C 0.85 x Uc min ... Uc max					
	DC supply	At θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max					
AC control voltage 50/60 Hz							
Rated control circuit voltage Uc		24 ... 250 V AC					
Coil consumption	Average pull-in value	16 VA					
	Average holding value	1.7 VA / 1.5 W					
DC control voltage							
Rated control circuit voltage Uc		12 ... 250 V DC					
Coil consumption	Average pull-in value	12 ... 16 W					
	Average holding value	1.7 W					
PLC-output control		(AF..Z coil 21) ≥ 500 mA 24 V DC for PLCs					
Drop-out voltage		≤ 60 % of Uc min.					
Voltage sag immunity acc. to SEMI F47-0706		(AF..Z coil 21, 22, 23) conditions of use on request					
Dips withstand -20 °C ≤ θ ≤ +60°C		(AF..Z coil 21, 22, 23) 20 ms average for Uc ≥ 24 V 50/60 Hz or Uc ≥ 20 V DC					
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					

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AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

Technical data

Connecting characteristics

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

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AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

Technical data

Built-in auxiliary contacts according to IEC

Contactor types	AC / DC operated	AF09..K	AF12..K	AF16..K	AF26..K	AF30..K	AF38..K
Rated operational voltage Ue max.		690 V					
Rated frequency (without derating)		50 / 60 Hz					
Conventional free air thermal current Ith - θ ≤ 40 °C		16 A					
Ie / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A					
	220-240 V 50/60 Hz	4 A					
	400-440 V 50/60 Hz	3 A					
	500 V 50/60 Hz	2 A					
	690 V 50/60 Hz	2 A					
Making capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1					
Breaking capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1					
Ie / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	6 A / 144 W					
	48 V DC	2.8 A / 134 W					
	72 V DC	1 A / 72 W					
	110 V DC	0.55 A / 60 W					
	125 V DC	0.55 A / 69 W					
	220 V DC	0.27 A / 60 W					
	250 V DC	0.27 A / 68 W					
	400 V DC	0.15 A / 60 W					
	500 V DC	0.13 A / 65 W					
	600 V DC	0.1 A / 60 W					
Short-circuit protection device gG type fuse		10 A					
Rated short-time withstand current Icw	for 1.0 s	100 A					
	for 0.1 s	140 A					
Minimum switching capacity 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.					
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	AC / DC operated	AF09..K	AF12..K	AF16..K	AF26..K	AF30..K	AF38..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					

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AF09..K ... AF38..K 3-pole contactors with Push-in Spring terminals

Electrical durability and utilization categories

General

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

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

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

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

Curve utilization mode

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

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

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

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

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

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

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

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

Case of uninterrupted duty

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

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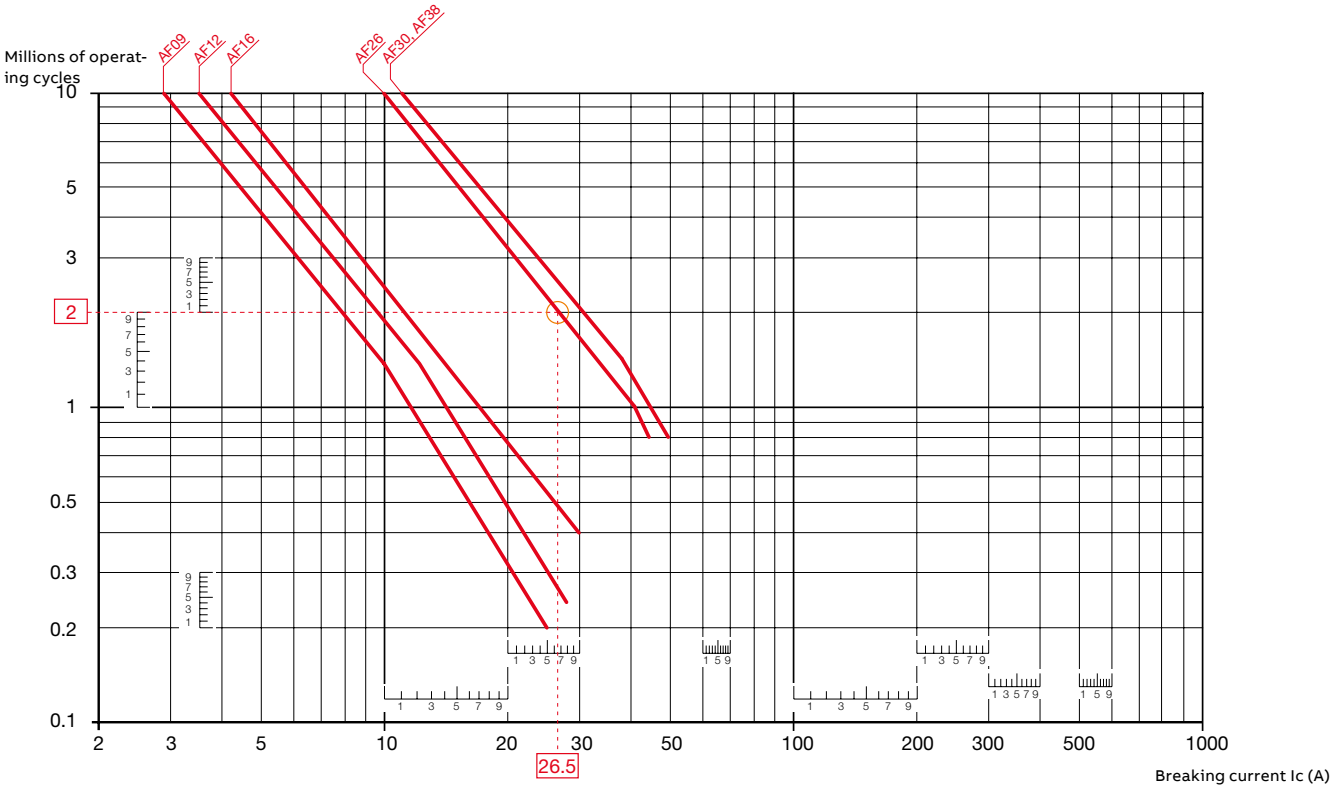
AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

Electrical durability

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



Example:

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

1SBC100424S0201

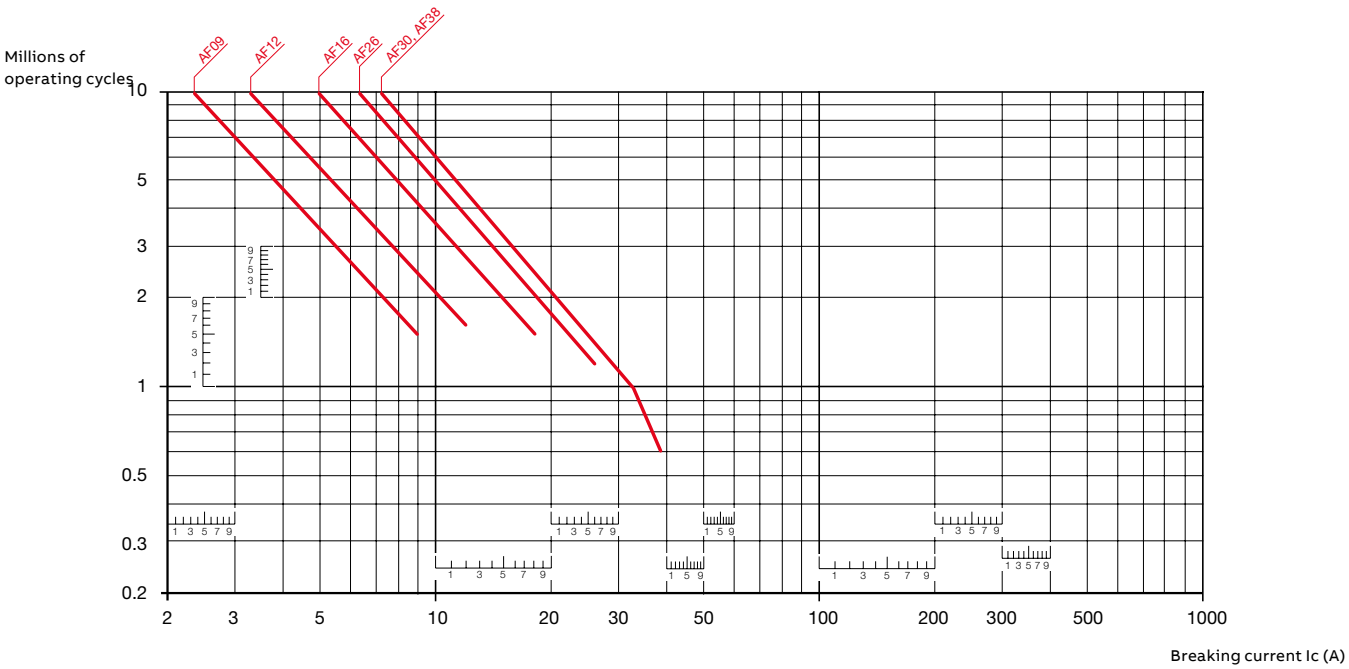
AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

Electrical durability

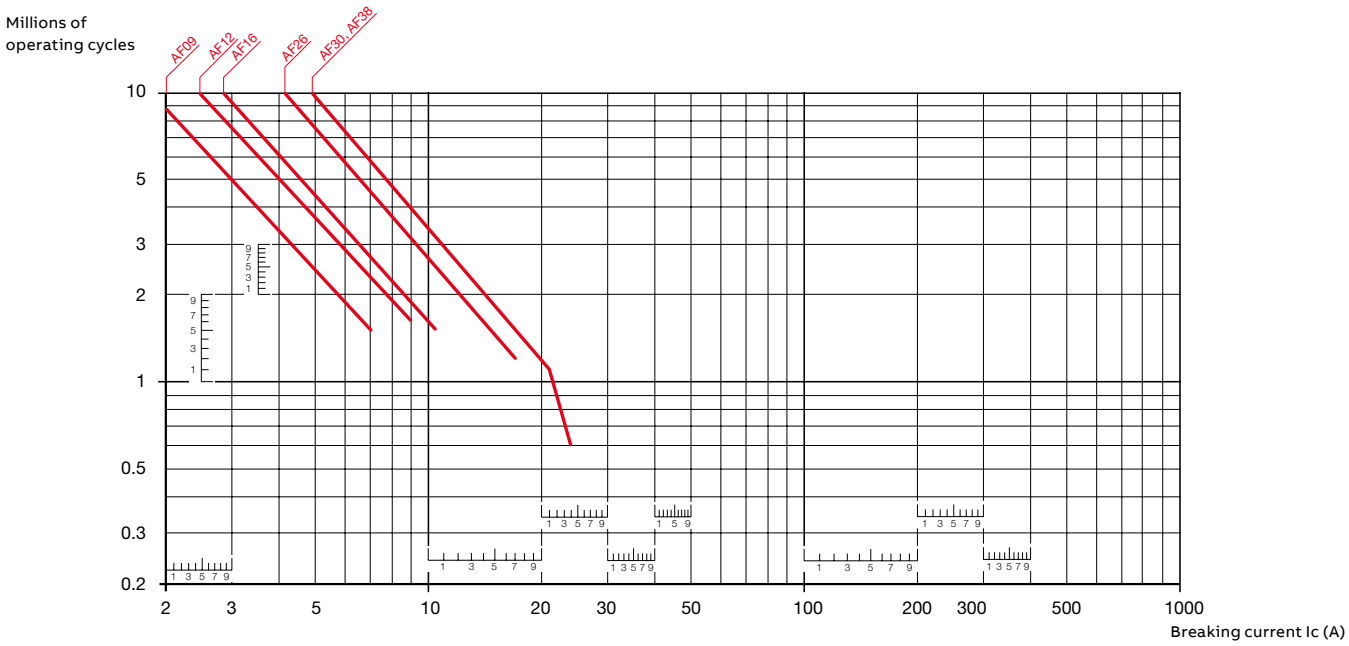
Electrical Durability for AC-3 Utilization Category

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

AC-3 - Ue ≤ 440 V



AC-3 - 440 V < Ue ≤ 690 V



1SBC100425S0201

AF09..K ... AF38..K 3-pole contactors - with Push-in Spring terminals

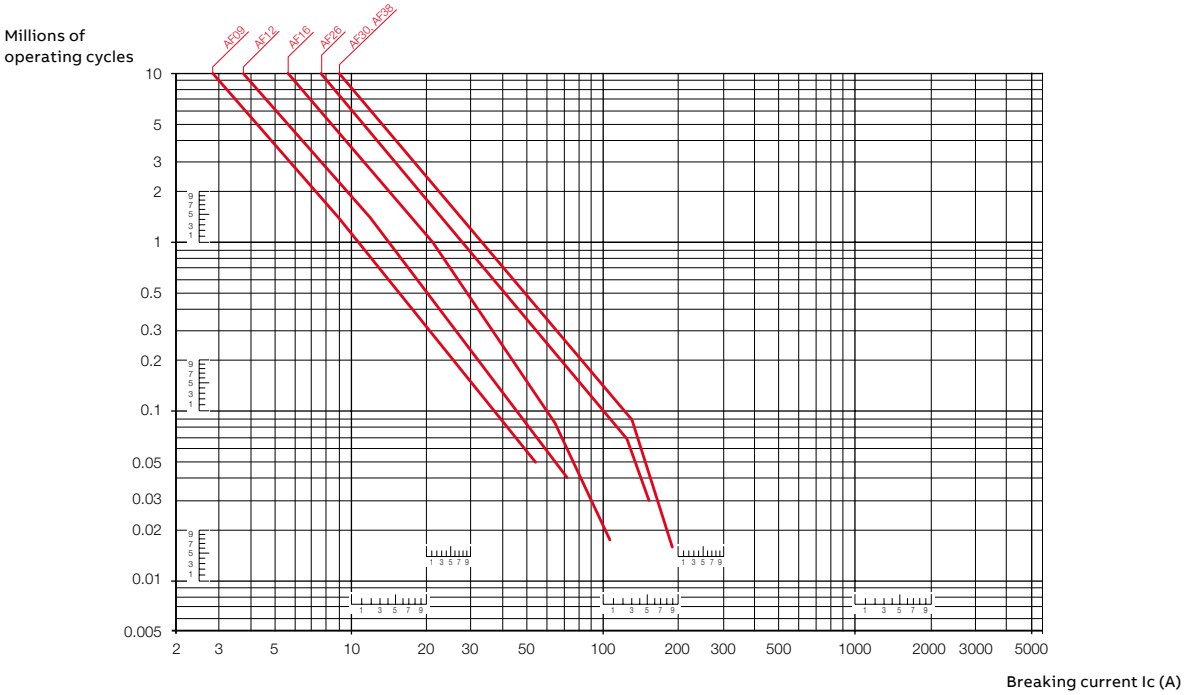
Electrical durability

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

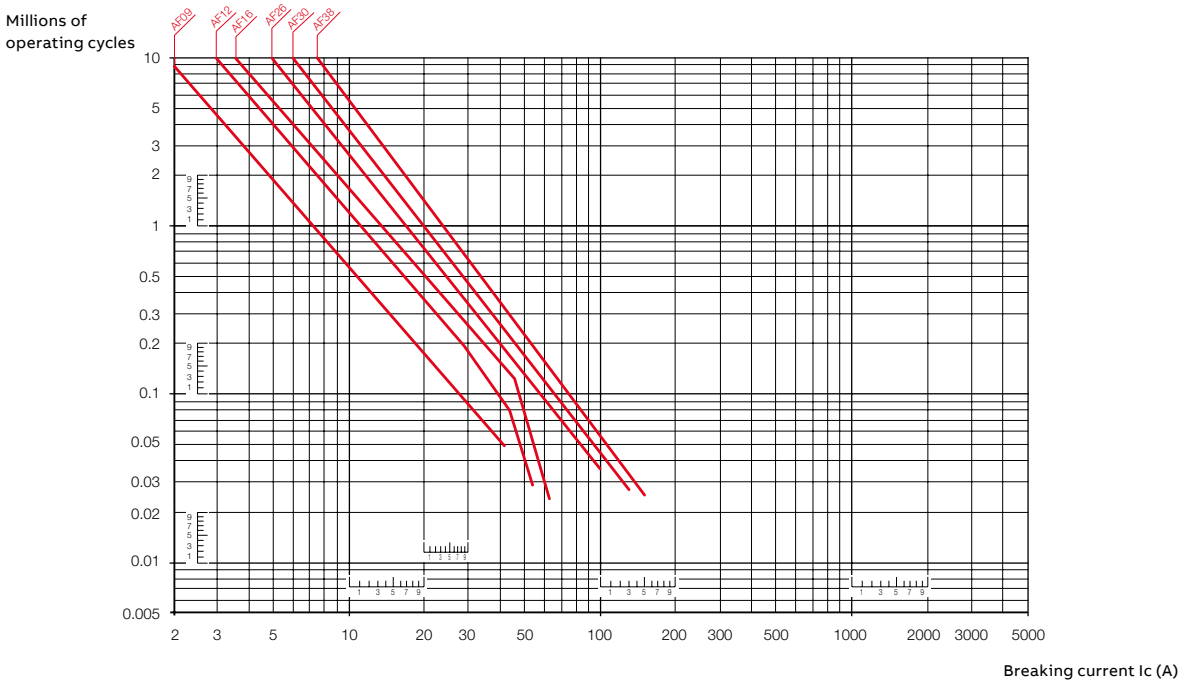
Switching cage motors: starting reverse operation and step-by-step operation. The breaking current Ic is equal to 2.5 x I_e for AC-2 and 6 x I_e for AC-4, keeping in mind that I_e is the motor rated operational current Ie (Ie = motor full load current).

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

AC-2 or AC-4 - Ue ≤ 440 V



AC-2 or AC-4 - 440 V < Ue ≤ 690 V



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Notes

AFS contactors for safety 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**

1SBC100321S0201

AFS 3-pole contactors with front-mounted auxiliary contacts

Dedicated for safety applications

ABB's complete range of safety components make protection systems easier to build. Designed for machine safety applications, AFS contactors come with fixed front or side mounted auxiliary contact blocks, making them ideal for monitoring and controlling circuits. Mechanically linked and mirror contacts help make your system safer.

Safety and protection

Safety in all things

ABB's AFS contactors can be easily integrated in machine manufacturer's systems complying with main standards EN ISO 13849 and EN 62061 - guaranteeing the safe use of your machinery and equipment.
The AFS contactor range is an integral part of ABB's comprehensive range of safety products.

Continuous operation

Secure uptime

The AFS contactor secures system uptime. It allows direct control by safety PLCs or safety relays to ensure the safety performance customers require, for contactors up to 38 A.
A low energy auxiliary contact guarantees PLC feedback.

Speed up your projects

Simplify design

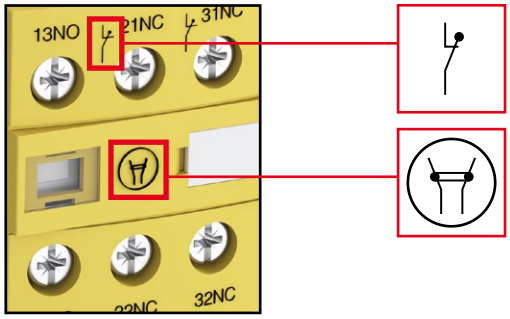
Perfect design makes integration easier. ABB's distinctive yellow auxiliary contact block makes identifying the right product quicker.
By reducing the contactor coil's power consumption, panels can also be made smaller and transformers more compact.
In addition, all the safety data for the contactors are readily available using safety design tools.

1SBC100321S0201

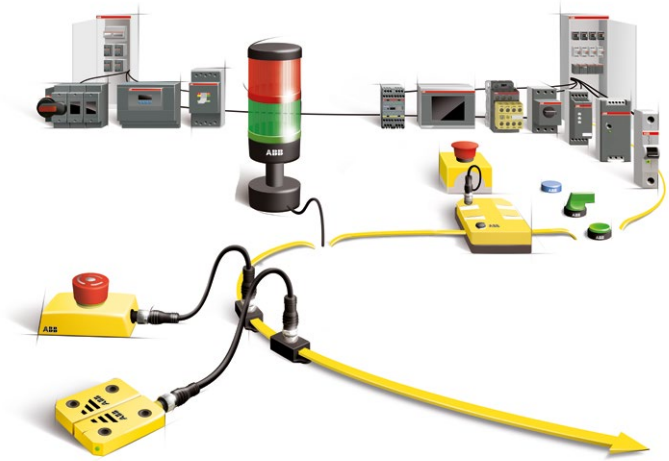
AFS contactors with front-mounted auxiliary contact blocks

Dedicated for safety applications

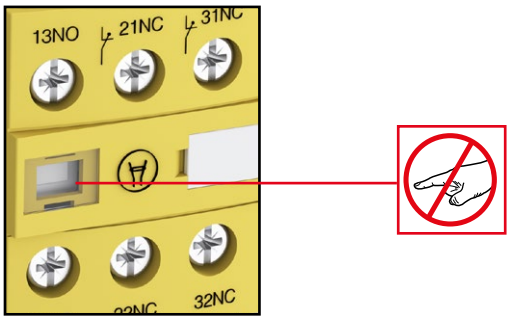
Contactors status guaranteed
ABB's permanently fixed front-mounted auxiliary contact blocks guarantee the correct contactor status at all times. Mechanically linked and mirror contacts get clearly marked symbols on the front and provide the performance required in feedback circuits. This prevents any unexpected state changes of auxiliary contact if main contacts become welded or stuck and ensures an accurate depiction of the safety system status displayed at all times.



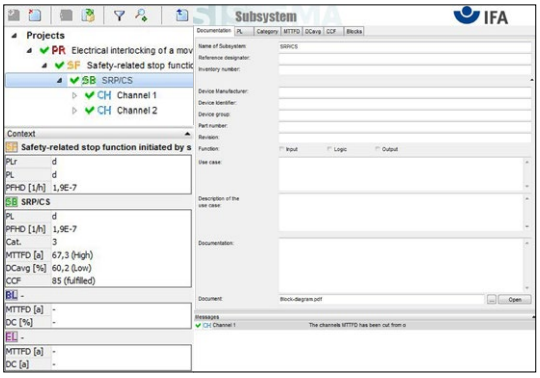
Easy safety chain identification
The yellow housing of ABB's AFS contactors makes identifying the safety product in your panel quicker. During routine maintenance work, ABB's intuitive design saves valuable time.



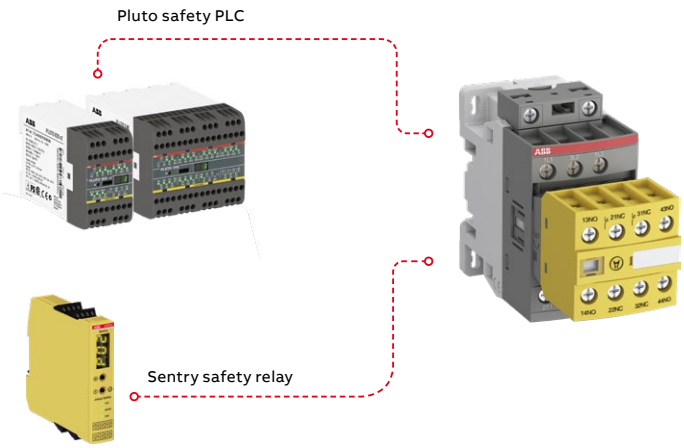
Prevent unexpected operations
Front-mounted contact blocks are permanently fixed to protect devices against accidental misuse and operation. A factory-fitted transparent cover shields the contactor status indicator, providing additional protection.



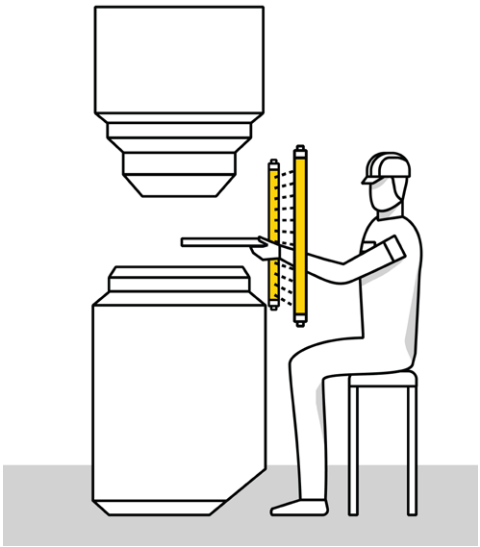
Simplify calculation of your installation safety level
All safety values are available in safety design tool such as Sistema and FSDT, dedicated software for determining the Performance Level (PL) and Safety Integrity Level (SIL) of safety functions and generating technical documentations.



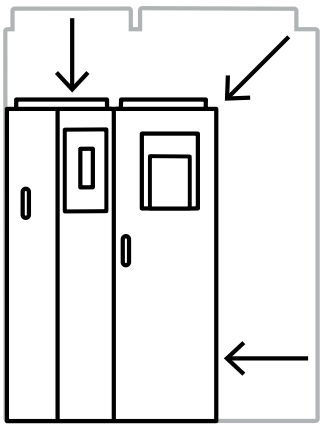
Control by safety PLCs or safety relays
ABB's AFS contactors can be controlled directly by safety PLCs or safety relays. The low energy auxiliary contacts feature a minimum switching capacity 12 V / 3 mA. They guarantee system status feedback, making the system safe and reliable.



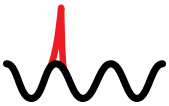
Fast response for increased safety
With fast opening times less than 30 ms for selected variants, AFS09 ... AFS38 respond quickly when a dangerous failure is detected. Safety is enhanced and the safety distances of installations can be significantly shorter.



Panel size reduction
By reducing coil energy consumption by up to 60%, panels can be built smaller and transformers can be downsized. With reduced power dissipation in the cabinet, installations also need fewer fans. Using AFS contactors saves money and precious space.



Built-in surge suppression
Unlike conventional contactors, ABB's AFS contactors have built-in surge suppression, preventing surges from ever reaching the control circuit. With no need for the usual external surge suppressor add-ons, ABB's solution means one less device to install and one less complication to manage.



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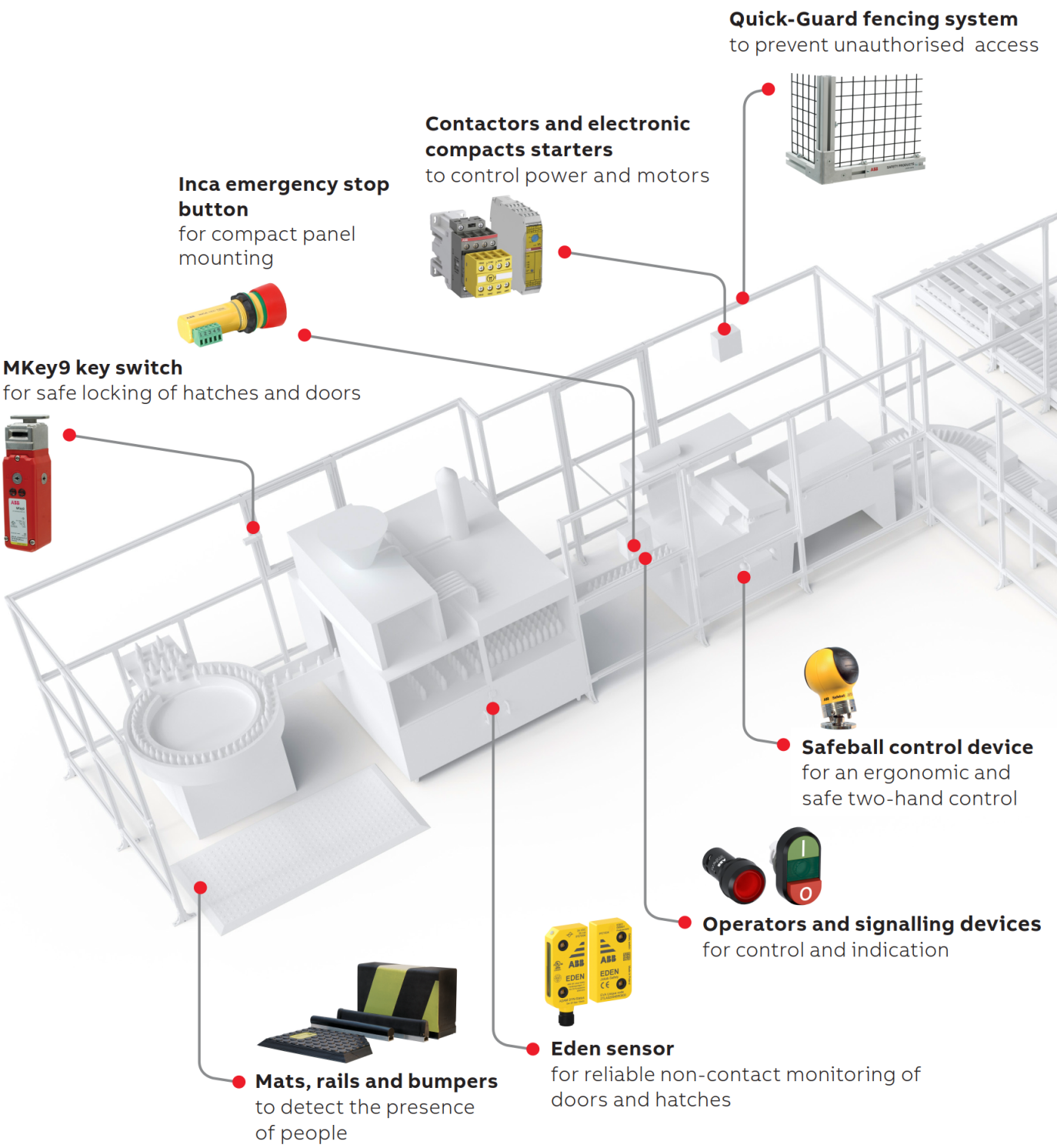
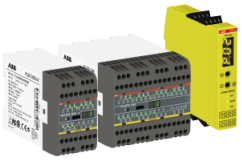
AFS contactors for safety applications



Magne magnetic lock
to keep doors and hatches locked during a process

Pluto programmable safety controller, Vital safety controller and Sentry safety relays
for flexible monitoring of safety devices



Smile emergency stop button
to safely stop machinery in hazardous situations

Orion light guards
for a production friendly safety detection

Knox safety lock
for safe locking of doors

JSDH4 three-position device
for safe and ergonomic inspection and troubleshooting

LineStrong pull wire emergency stop switch
for easy access of emergency stop function

1SBC100278S0201

AFS09 ... AFS38 3-pole contactors for safety applications

4 to 18.5 kW

AC / DC operated with 2 N.O. + 2 N.C. auxiliary contacts

AFS16-30-22

AFS38-30-22

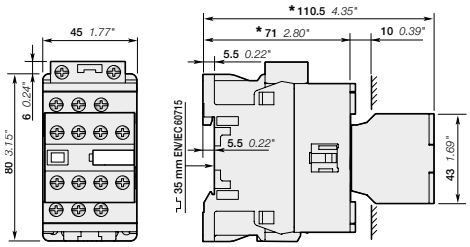
AFS09 ... AFS38 contactors are designed for machine safety applications. They are delivered with fixed front-mounted auxiliary contact blocks making them ideal for monitoring and controlling circuits.

Mechanically linked and mirror contacts make your system safer.

- control circuit with electronic coil interface:
  - dedicated 24 V DC for direct control by PLC-output ≥ 250 mA, low holding consumption up to 1.7 W
  - 24...60 V AC, 20...60 V DC and 100...250 V AC / DC operated accepting a wide control voltage range
  - reduced panel energy consumption
- mirror and mechanically linked contacts, with front marked symbol acc. to IEC60947-5-1, always guaranteeing the right contactor status
- front-mounted auxiliary contact block:
  - permanently fixed
  - protective cover to prevent manual operation
  - yellow housing for easy identification
  - minimum switching capacity 12 V / 3 mA, with a failure rate 10^{-7} acc. to IEC 60947-5-4
- built-in surge suppression

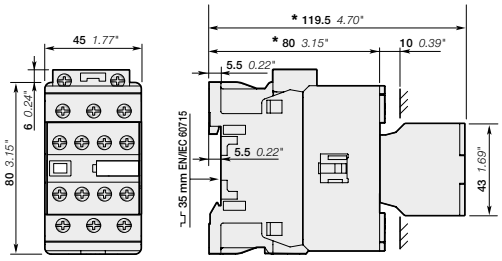
IEC		UL/CSA		Rated control circuit voltage Uc min. ... Uc max.		Auxiliary contacts fitted	Type (1)	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC				kg
4	25	5	25	-	24	2 2	AFS09Z-30-22-30	1SBL136082R3022	0.490
				24 ... 60	20 ... 60 (1)	2 2	AFS09-30-22-11	1SBL137082R1122	0.320
				100 ... 250	100 ... 250	2 2	AFS09-30-22-13	1SBL137082R1322	0.320
5.5	28	7-1/2	28	-	24	2 2	AFS12Z-30-22-30	1SBL156082R3022	0.490
				24 ... 60	20 ... 60 (1)	2 2	AFS12-30-22-11	1SBL157082R1122	0.320
				100 ... 250	100 ... 250	2 2	AFS12-30-22-13	1SBL157082R1322	0.320
7.5	30	10	30	-	24	2 2	AFS16Z-30-22-30	1SBL176082R3022	0.490
				24 ... 60	20 ... 60 (1)	2 2	AFS16-30-22-11	1SBL177082R1122	0.320
				100 ... 250	100 ... 250	2 2	AFS16-30-22-13	1SBL177082R1322	0.320
11	45	15	45	-	24	2 2	AFS26Z-30-22-30	1SBL236082R3022	0.540
				24 ... 60	20 ... 60 (1)	2 2	AFS26-30-22-11	1SBL237082R1122	0.360
				100 ... 250	100 ... 250	2 2	AFS26-30-22-13	1SBL237082R1322	0.360
15	50	20	50	-	24	2 2	AFS30Z-30-22-30	1SBL276082R3022	0.540
				24 ... 60	20 ... 60	2 2	AFS30-30-22-11	1SBL277082R1122	0.360
				100 ... 250	100 ... 250 (1)	2 2	AFS30-30-22-13	1SBL277082R1322	0.360
18.5	50	25	50	-	24	2 2	AFS38Z-30-22-30	1SBL296082R3022	0.540
				24 ... 60	20 ... 60 (1)	2 2	AFS38-30-22-11	1SBL297082R1122	0.360
				100 ... 250	100 ... 250	2 2	AFS38-30-22-13	1SBL297082R1322	0.360

(1) AFS..-30-..-11 for control by transistor outputs of safety PLCs and safety relays use interface relay RA4 1SBN060100R1000.



AFS09, AFS12, AFS16

* For AFS09Z, AFS12Z, AFS16Z-30-22-30: depth + 20 mm (+ 0.79")



AFS26, AFS30, AFS38

* For AFS26Z, AFS30Z, AFS38Z-30-22-30: depth + 20 mm (+ 0.79")

Main dimensions mm, inches

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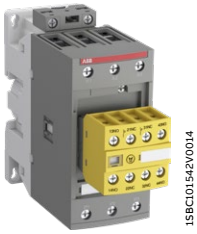
AFS40 ... AFS96 3-pole contactors for safety applications

18.5 to 45 kW

AC / DC operated with 2 N.O. + 2 N.C. auxiliary contacts



AFS65-30-22

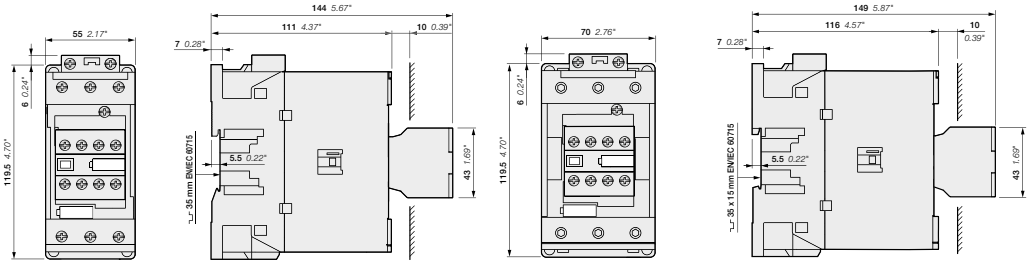
AFS96-30-22

AFS40 ... AFS96 contactors are designed for machine safety applications. They are delivered with fixed front-mounted auxiliary contact blocks making them ideal for monitoring and controlling circuits. Mechanically linked and mirror contacts make your system safer.

- control circuit with electronic coil interface:
  - 24...60 V AC, 20...60 V DC and 100...250 V AC / DC operated accepting a wide control voltage range
  - reduced panel energy consumption
- mirror and mechanically linked contacts, with front marked symbol acc. to IEC60947-5-1, always guaranteeing the right contactor status
- front-mounted auxiliary contact block:
  - permanently fixed
  - protective cover to prevent manual operation
  - yellow housing for easy identification
  - minimum switching capacity 12 V / 3 mA, with a failure rate 10^{-7} acc. to IEC 60947-5-4
- built-in surge suppression

IEC		UL/CSA		Rated control circuit voltage Uc min. ... Uc max.			Auxiliary contacts fitted	Type (1)	Order code	Weight
Rated operational power 400 V AC-3	current θ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC							Pkg (1 pce)
kW	A	hp	A	V 50/60 Hz	V DC					kg
18.5	70	30	60	24 ... 60	20 ... 60	(1)	2 2	AFS40-30-22-11	1SBL347082R1122	1.020
				100 ... 250	100 ... 250		2 2	AFS40-30-22-13	1SBL347082R1322	1.000
22	100	40	80	24 ... 60	20 ... 60	(1)	2 2	AFS52-30-22-11	1SBL367082R1122	1.020
				100 ... 250	100 ... 250		2 2	AFS52-30-22-13	1SBL367082R1322	1.000
30	105	50	90	24 ... 60	20 ... 60	(1)	2 2	AFS65-30-22-11	1SBL387082R1122	1.020
				100 ... 250	100 ... 250		2 2	AFS65-30-22-13	1SBL387082R1322	1.000
37	125	60	105	24 ... 60	20 ... 60	(1)	2 2	AFS80-30-22-11	1SBL397082R1122	1.270
				100 ... 250	100 ... 250		2 2	AFS80-30-22-13	1SBL397082R1322	1.220
45	130	60	115	24 ... 60	20 ... 60	(1)	2 2	AFS96-30-22-11	1SBL407082R1122	1.270
				100 ... 250	100 ... 250		2 2	AFS96-30-22-13	1SBL407082R1322	1.220

(1) AFS..-30-..-11 for control by transistor outputs of safety PLCs and safety relays use interface relay RA4 1SBN060100R1000.



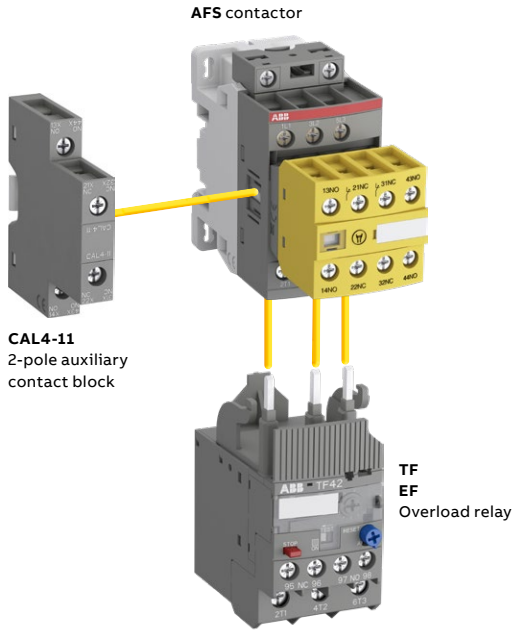
AFS40, AFS52, AFS65

AFS80, AFS96

Main dimensions mm, inches

AFS09 ... AFS96 3-pole contactors for safety applications

Contactors and main accessories



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

Contactor types	Main poles	Built-in auxiliary contacts	Front-mounted accessories Auxiliary contact blocks 1-pole CA4	2-pole CAT4-11	4-pole CA4	Electronic timer TEF4	Mechanical interlock unit (between 2 contactors) VM..		Side-mounted accessories Auxiliary contact blocks 2-pole CAL4-11 Left side	Right side
AFS09 ... AFS38	3 0	2 2	–	–	–	–	1	+	1	–
AFS09Z ... AFS38Z	3 0	2 2	–	–	–	–	1		–	–
AFS40 ... AFS96	3 0	2 2	–	–	–	–	–	+	1	+ 1
			–	–	–	–	–	+	1	or 1

Overload relays fitting details (1)

Contactor types	Thermal overload relays	Electronic overload relays
AFS09 ... AFS38	TF42 (0.10...38 A)	EF19 (0.10...19 A)
AFS26 ... AFS38	TF42 (0.10...38 A)	EF45 (9...45 A)
AFS40 ... AFS65	TF65 (22...67 A)	EF65 (20...70 A)
AFS80, AFS96	TF96 (40...96 A)	EF96 (36...100 A)

The addition of an overload relay on the contactor does not prevent fitting of many other accessories as shown above.
(1) Direct mounting - No kit required.

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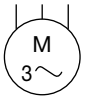
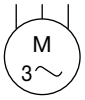
AFS09 ... AFS96 3-pole contactors for safety applications

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	AFS09	AFS12	AFS16	AFS26	AFS30	AFS38	AFS40	AFS52	AFS65	AFS80	AFS96
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1										
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	35 A	50 A	50 A	50 A	105 A	105 A	105 A	130 A	130 A
With conductor cross-sectional area		6 mm²	6 mm²	6 mm²	10 mm²	10 mm²	10 mm²	35 mm²	35 mm²	35 mm²	50 mm²	50 mm²
AC-1 Utilization category												
For air temperature close to contactor												
Ie / Rated operational current AC-1	θ ≤ 40 °C	25 A	28 A	30 A	45 A	50 A	50 A	70 A	100 A	105 A	125 A	130 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 60 °C	25 A	28 A	30 A	40 A	42 A	42 A	60 A	80 A	90 A	100 A	105 A
	θ ≤ 70 °C	22 A	24 A	26 A	32 A	37 A	37 A	50 A	70 A	80 A	85 A	90 A
With conductor cross-sectional area		4 mm²	6 mm²	6 mm²	10 mm²	10 mm²	10 mm²	25 mm²	35 mm²	35 mm²	50 mm²	50 mm²
AC-3 Utilization category												
For air temperature close to contactor θ ≤ 60 °C												
Ie / Max. rated operational current AC-3 (1)												
	220-230-240 V	9 A	12 A	18 A	26 A	33 A	40 A	40 A	53 A	65 A	80 A	96 A
	380-400 V	9 A	12 A	18 A	26 A	32 A	38 A	40 A	53 A	65 A	80 A	96 A
 3-phase motors	415 V	9 A	12 A	18 A	26 A	32 A	38 A	40 A	53 A	65 A	80 A	96 A
	440 V	9 A	12 A	18 A	26 A	32 A	38 A	40 A	53 A	65 A	80 A	96 A
	500 V	9.5 A	12.5 A	15 A	23 A	28 A	33 A	35 A	45 A	55 A	65 A	80 A
	690 V	7 A	9 A	10.5 A	17 A	21 A	24 A	25 A	35 A	39 A	49 A	57 A
	1000 V										25 A	30 A
Rated operational power AC-3 (1)												
	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW	11 kW	11 kW	15 kW	18.5 kW	22 kW	25 kW
	380-400 V	4 kW	5.5 kW	7.5 kW	11 kW	15 kW	18.5 kW	18.5 kW	22 kW	30 kW	37 kW	45 kW
 1500 r.p.m. 50 Hz	415 V	4 kW	5.5 kW	9 kW	11 kW	15 kW	18.5 kW	22 kW	30 kW	37 kW	45 kW	55 kW
1800 r.p.m. 60 Hz	440 V	4 kW	5.5 kW	9 kW	15 kW	18.5 kW	22 kW	22 kW	30 kW	37 kW	45 kW	55 kW
3-phase motors	500 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW	22 kW	22 kW	30 kW	37 kW	45 kW	55 kW
	690 V	5.5 kW	7.5 kW	9 kW	15 kW	18.5 kW	22 kW	22 kW	30 kW	37 kW	45 kW	55 kW
	1000 V										35 kW	40 kW
Rated making capacity AC-3		10 x Ie AC-3 acc. to IEC 60947-4-1										
Rated breaking capacity AC-3		8 x Ie AC-3 acc. to IEC 60947-4-1										
AC-8a Utilization category												
(without thermal overload relay												
Ue 400 V 50/60 Hz - θ ≤ 40 °C)												
Ie / Rated operational current AC-8a		12 A	16 A	22 A	30 A	40 A	50 A	53 A	70 A	85 A	105 A	120 A
Rated operational power AC-8a		5.5 kW	7.5 kW	11 kW	15 kW	20 kW	25 kW	25 kW	37 kW	45 kW	55 kW	65 kW
Short-circuit protection device for contactors												
without thermal overload relay												
Motor protection excluded (2)												
Ue ≤ 500 V AC - gG type fuse		25 A	32 A	32 A	50 A	63 A	63 A	100 A	125 A	160 A	160 A	200 A
Rated short-time withstand current Icw	1 s	300 A	300 A	300 A	700 A	700 A	700 A	1000 A	1000 A	1000 A	1200 A	1200 A
at 40 °C ambient temperature,	10 s	150 A	150 A	150 A	350 A	350 A	350 A	600 A	600 A	600 A	780 A	780 A
in free air from a cold state	30 s	80 A	80 A	80 A	225 A	225 A	225 A	350 A	350 A	350 A	450 A	450 A
	1 min	60 A	60 A	60 A	150 A	150 A	150 A	250 A	250 A	250 A	300 A	300 A
	15 min	35 A	35 A	35 A	50 A	50 A	50 A	110 A	110 A	110 A	140 A	140 A
Maximum breaking capacity												
cos ϕ = 0.45	at 440 V	250 A	250 A	250 A	500 A	500 A	500 A	950 A	950 A	950 A	1150 A	1150 A
	at 690 V	106 A	106 A	106 A	200 A	200 A	200 A	600 A	600 A	600 A	750 A	750 A
Power dissipation per pole	Ie / AC-1	0.8 W	1 W	1.2 W	1.8 W	2.4 W	2.4 W	3 W	6.3 W	7 W	7.6 W	8.2 W
	Ie / AC-3	0.1 W	0.2 W	0.35 W	0.6 W	0.9 W	1.3 W	1 W	1.7 W	2.7 W	3 W	4.5 W
Max. electrical switching frequency	AC-1	600 cycles/h										
	AC-3	1200 cycles/h										
	AC-2, AC-4	300 cycles/h			150 cycles/h							
B10d												
Calculated for 50% of the rated current value Ie		1.3 million operating cycles										
at AC-3 / 400 V												

(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".

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AFS09 ... AFS96 3-pole contactors for safety applications

Technical data

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

Contactor types	AC / DC operated	AFS09	AFS12	AFS16	AFS26	AFS30	AFS38	AFS40	AFS52	AFS65	AFS80	AFS96
Standards		UL 60947-4-1, CSA-C22.2 No. 60947-4-1										
Maximum operational voltage		600 V										
NEMA size		00	0	-	1	-	-	2	-	-	3	-
NEMA continuous amp rating	Thermal current	9 A	18 A	-	27 A	-	-	45 A	-	-	90 A	-
NEMA maximum horse power ratings 1-phase, 60 Hz	115 V AC	1/3 hp	1 hp	-	2 hp	-	-	3 hp	-	-	-	-
	230 V AC	1 hp	2 hp	-	3 hp	-	-	7.5 hp	-	-	-	-
NEMA maximum horse power ratings 3-phase, 60 Hz	200 V AC	1-1/2 hp	3 hp	-	7-1/2 hp	-	-	10 hp	-	-	25 hp	-
	230 V AC	1-1/2 hp	3 hp	-	7-1/2 hp	-	-	15 hp	-	-	30 hp	-
	460 V AC	2 hp	5 hp	-	10 hp	-	-	25 hp	-	-	50 hp	-
	575 V AC	2 hp	5 hp	-	10 hp	-	-	25 hp	-	-	50 hp	-
UL / CSA general use rating												
600 V AC		25 A	28 A	30 A	45 A	50 A	50 A	60 A	80 A	90 A	105 A	115 A
With conductor cross-sectional area		AWG 10	AWG 10	AWG 10	AWG 8	AWG 8	AWG 8	AWG 6	AWG 4	AWG 3	AWG 2	AWG 2
1 pole	80 V DC	25 A	28 A	30 A	45 A	50 A	50 A	60 A	80 A	90 A	105 A	115 A
2 poles in serie	160 V DC	25 A	28 A	30 A	45 A	50 A	50 A	60 A	80 A	90 A	105 A	115 A
3 poles in serie	240 V DC	25 A	28 A	30 A	45 A	50 A	50 A	60 A	80 A	90 A	105 A	115 A
With conductor cross-sectional area		AWG 10	AWG 10	AWG 10	AWG 8	AWG 8	AWG 8	AWG 6	AWG 4	AWG 3	AWG 2	AWG 2
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	34 A	34 A	56 A	80 A	80 A
	240 V AC	10 A	12 A	17 A	17 A	28 A	28 A	40 A	50 A	68 A	68 A	88 A
Horse power rating	120 V AC	3/4 hp	1 hp	1-1/2 hp	2 hp	2 hp	2 hp	3 hp	3 hp	5 hp	7-1/2 hp	7-1/2 hp
	240 V AC	1-1/2 hp	2 hp	3 hp	3 hp	5 hp	5 hp	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	7.8 A	11 A	17.5 A	25.3 A	32.2 A	32.2 A	32.2 A	48.3 A	62.1 A	78.2 A	92 A
	220-240 V AC	6.8 A	9.6 A	15.2 A	22 A	28 A	28 A	42 A	54 A	68 A	80 A	80 A
	440-480 V AC	7.6 A	11 A	14 A	21 A	27 A	34 A	40 A	52 A	65 A	77 A	77 A
	550-600 V AC	9 A	11 A	17 A	22 A	27 A	32 A	41 A	52 A	62 A	77 A	77 A
Horse power rating (1)	200-208 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp	10 hp	10 hp	15 hp	20 hp	25 hp	30 hp
	220-240 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp	10 hp	15 hp	20 hp	25 hp	30 hp	30 hp
	440-480 V AC	5 hp	7-1/2 hp	10 hp	15 hp	20 hp	25 hp	30 hp	40 hp	50 hp	60 hp	60 hp
	550-600 V AC	7-1/2 hp	10 hp	15 hp	20 hp	25 hp	30 hp	40 hp	50 hp	60 hp	75 hp	75 hp
UL / CSA - DC motor starting - 3 poles in series												
Full Load Amps	125 V DC	9.5 A	13.2 A	17 A	25 A	25 A	25 A	40 A	58 A	76 A	76 A	110 A
	250 V DC	8.5 A	12.2 A	12.2 A	20 A	29 A	29 A	38 A	55 A	72 A	89 A	106 A
Horse power rating	125 V DC	1 hp	1-1/2 hp	2 hp	3 hp	3 hp	3 hp	5 hp	7-1/2 hp	10 hp	10 hp	15 hp
	250 V DC	2 hp	3 hp	3 hp	5 hp	7-1/2 hp	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												
High fault current		100 kA										
Fuse rating		30 A		60 A		100 A		150 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".

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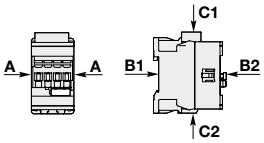
AFS09 ... AFS96 3-pole contactors for safety applications

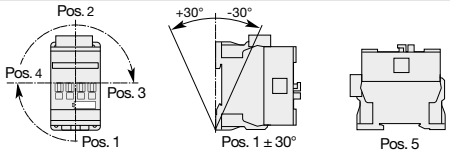
Technical data

General technical data

Contactor types	AC / DC operated	AFS09	AFS12	AFS16	AFS26	AFS30	AFS38
Rated insulation voltage Ui							
acc. to IEC 60947-4-1		690 V					
acc. to UL / CSA		600 V					
Rated impulse withstand voltage Uimp.		6 kV					
Electromagnetic compatibility		Devices complying with IEC 60947-1 / EN 60947-1 - Environments A and B					
Ambient air temperature close to contactor							
Operation Fitted with thermal overload relay		-40 ... +60 °C					
Without thermal overload relay		-40 ... +70 °C					
Storage		-60 ... +80 °C					
Climatic withstand		Category B according to IEC 60947-1 Annex Q					
Maximum operating altitude (without derating)		3000 m					
Mechanical durability							
Number of operating cycles		10 million operating cycles					
Maximum switching frequency		3600 cycles/h					
Shock withstand acc. to IEC 60068-2-27 and EN 60068-2-27 Mounting position 1	Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position					
	A	30 g					
	B1	25 g closed position / 5 g open position					
	B2	15 g					
	C1	25 g					
	C2	25 g					
Vibration withstand acc. to IEC 60068-2-6		5 ... 300 Hz 4 g Closed position / 2 g Open position					



Mounting characteristics and conditions for use

Contactor types	AC / DC operated	AFS09	AFS12	AFS16	AFS26	AFS30	AFS38
Mounting positions							
Mounting distances		The contactors can be assembled side by side					
Fixing							
On rail according to IEC 60715, EN 60715		35 x 7.5 mm or 35 x 15 mm					
By screws (not supplied)		2 x M4 screws placed diagonally					

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AFS09 ... AFS38 3-pole contactors for safety applications

Technical data

Magnet system characteristics for AFS09 ... AFS38 contactors - AC / DC operated

Contactor types	AC / DC operated	AFS09	AFS12	AFS16	AFS26	AFS30	AFS38
Coil operating limits acc. to IEC 60947-4-1	AC supply	At θ ≤ 60 °C 0.85 x Uc min...1.1 x Uc max. At θ ≤ 70 °C 0.85 x Uc min...Uc max.					
	DC supply	at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max at θ ≤ 70 °C 0.85 x Uc min ... Uc max					
AC control voltage 50/60 Hz							
Rated control circuit voltage Uc		24 ... 250 V AC					
Coil consumption	Average pull-in value	50 VA					
	Average holding value	2.2 VA / 2 W					
DC control voltage							
Rated control circuit voltage Uc		20 ... 250 V DC					
Coil consumption	Average pull-in value	50 W					
	Average holding value	2 W					
PLC-output control		AFS..-30-22-11 not suitable for direct control by PLC-output.					
Drop-out voltage		≤ 60 % 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 (1)					
	N.C. contact closing	13 ... 98 ms					

(1) AFS09 ... AFS38 ≤ 35 ms for 20 °C ≤ θ ≤ 70 °C

Magnet System Characteristics for AFS09Z ... AFS38Z contactors 24V DC operated - designed for PLC - coil 30

Contactor types	DC operated	AFS09Z	AFS12Z	AFS16Z	AFS26Z	AFS30Z	AFS38Z
Coil operating limits acc. to IEC 60947-4-1	DC supply	at θ ≤ 60 °C 0.85 ... 1.1 x Uc at θ ≤ 70 °C Uc					
DC control voltage							
Rated control circuit voltage Uc		24 V DC					
Coil consumption	Average pull-in value	6 W					
	Average holding value	1.7 W					
PLC-output control		≥ 250 mA 24 V DC for PLCs and safety PLCs using broken wire detection					
Drop-out voltage		≤ 60 % Uc min.					
Operating time							
Between coil energization and:	N.O. contact closing	27 ... 53 ms					
	N.C. contact opening	20 ... 35 ms					
Between coil de-energization and:	N.O. contact opening	17 ... 29 ms					
	N.C. contact closing	22 ... 57 ms					

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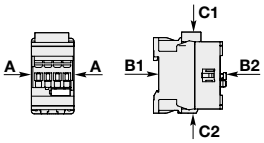
AFS40 ... AFS96 3-pole contactors for safety applications

Technical data

General technical data

Contactor types	AC / DC operated	AFS40	AFS52	AFS65	AFS80	AFS96
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 / EN 60947-1 - Environments A and B				
Ambient air temperature close to contactor						
Operation Fitted with thermal overload relay		-40...+70 °C				
Without thermal overload relay		-40...+70 °C				
Storage		-60...+80 °C				
Climatic withstand		Category B according to IEC 60947-1 Annex Q				
Maximum operating altitude (without derating)		3000 m				
Mechanical durability						
Number of operating cycles		10 million operating cycles				
Maximum switching frequency		3600 cycles/h				
Shock withstand acc. to IEC 60068-2-27 and EN 60068-2-27 Mounting position 1	Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position				
	A	25 g				
	B1	25 g closed position / 5 g open position				
	B2	15 g				
	C1	25 g				
	C2	25 g				
Vibration withstand acc. to IEC 60068-2-6		5 ... 300 Hz 3 g Closed position / 3 g Open position				

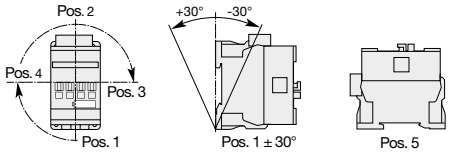


Magnet system characteristics for AFS40 ... AFS96 contactors - AC / DC operated

Contactor types	AC / DC operated	AFS40	AFS52	AFS65	AFS80	AFS96
Coil operating limits acc. to IEC 60947-4-1	AC supply	At θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max.				
	DC supply	at θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max				
AC control voltage 50/60 Hz						
Rated control circuit voltage Uc		24 ... 250 V AC				
Coil consumption	Average pull-in value	25 VA			40 VA	
	Average holding value	4 VA / 2 W				
DC control voltage						
Rated control circuit voltage Uc		20 ... 250 V DC				
Coil consumption	Average pull-in value	25 W			40 W	
	Average holding value	2 W				
PLC-output control		AFS..-30-22-11 not suitable for direct control by PLC-output.				
Drop-out voltage		≤ 60 % 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 for use

Contactor types	AC / DC operated	AFS40	AFS52	AFS65	AFS80	AFS96
Mounting positions						
Mounting distances		The contactors can be assembled side by side				
Fixing						
On rail according to IEC 60715, 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				



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AFS09 ... AFS96 3-pole contactors for safety applications

Technical data

Connecting characteristics

Contactor types	AC / DC operated	AFS09	AFS12	AFS16	AFS26	AFS30	AFS38	AFS40	AFS52	AFS65	AFS80	AFS96
Main terminals		 Screw terminals with cable clamp						 Screw terminals with double connector 2 x (9.3 width x 7.9/10.3 depth)			 Screw terminals with double connector 2 x (12.4 width x 9.3/11.1 depth)	
Connection capacity (min. ... max.)												
Main conductors (poles)												
Rigid Solid (≤ 4 mm²)	1 x	1 ... 6 mm²			2.5 ... 10 mm²			6 ... 35 mm²			6 ... 70 mm²	
Rigid Stranded (6 > 6 mm²)	2 x	1 ... 6 mm²			2.5 ... 10 mm²			6 ... 35 mm²			6 ... 50 mm²	
Flexible with non insulated ferrule	1 x	0.75 ... 6 mm²			1.5 ... 10 mm²			4 ... 35 mm²			6 ... 50 mm²	
	2 x	0.75 ... 6 mm²			1.5 ... 10 mm²			4 ... 35 mm²			6 ... 50 mm²	
Flexible with insulated ferrule	1 x	0.75 ... 4 mm²			1.5 ... 10 mm²			4 ... 35 mm²			6 ... 50 mm²	
	2 x	0.75 ... 2.5 mm²			1.5 ... 4 mm²			4 ... 35 mm²			6 ... 50 mm²	
Bars or lugs	L <	9.6 mm			12.5 mm			9.2 mm			12.2 mm	
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 16 ... 10			AWG 14 ... 8			AWG 10 ... 2			AWG 6 ... 1	
Stripping length		10 mm			14 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 (built-in auxiliary terminals + coil terminals)												
Rigid solid	1 x	1 ... 2.5 mm²										
	2 x	1 ... 2.5 mm²										
Flexible with non insulated ferrule	1 x	0.75 ... 2.5 mm²										
	2 x	0.75 ... 2.5 mm²										
Flexible with insulated ferrule	1 x	0.75 ... 2.5 mm²										
	2 x	0.75 ... 1.5 mm²										
Bars or 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 60947-1 / EN 60947-1 and IEC 60529 / EN 60529												
Main terminals		IP20						IP10				
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			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										
Built-in auxiliary terminals		M3.5										
	Screwdriver type	Flat Ø 5.5 / Pozidriv 2										

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AFS09 ... AFS96 3-pole contactors for safety applications

Technical data

Built-in auxiliary contacts according to IEC

Contactor types	AC / DC operated	AFS09	AFS12	AFS16	AFS26	AFS30	AFS38	AFS40	AFS52	AFS65	AFS80	AFS96
Rated operational voltage Ue max.		690 V										
Rated frequency (without derating)		50 / 60 Hz										
Conventional free air thermal current Ith - θ ≤ 40 °C		16 A										
Ie / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A										
	220-240 V 50/60 Hz	4 A										
	400-440 V 50/60 Hz	3 A										
	500 V 50/60 Hz	2 A										
	690 V 50/60 Hz	2 A										
Making capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1										
Breaking capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1										
Ie / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	6 A / 144 W										
	48 V DC	2.8 A / 134 W										
	72 V DC	1 A / 72 W										
	110 V DC	0.55 A / 60 W										
	125 V DC	0.55 A / 69 W										
	220 V DC	0.27 A / 60 W										
	250 V DC	0.27 A / 68 W										
	400 V DC	0.15 A / 60 W										
	500 V DC	0.13 A / 65 W										
	600 V DC	0.1 A / 60 W										
Short-circuit protection device gG type fuse		10 A										
Rated short-time withstand current Icw	for 1.0 s	100 A										
	for 0.1 s	140 A										
Minimum switching capacity 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 (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 (CAL4 aux. contact blocks) are mirror contacts.										

Built-in auxiliary contacts according to UL / CSA

Contactor types	AC / DC operated	AFS09	AFS12	AFS16	AFS26	AFS30	AFS38	AFS40	AFS52	AFS65	AFS80	AFS96
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										

1SBC100312502 01

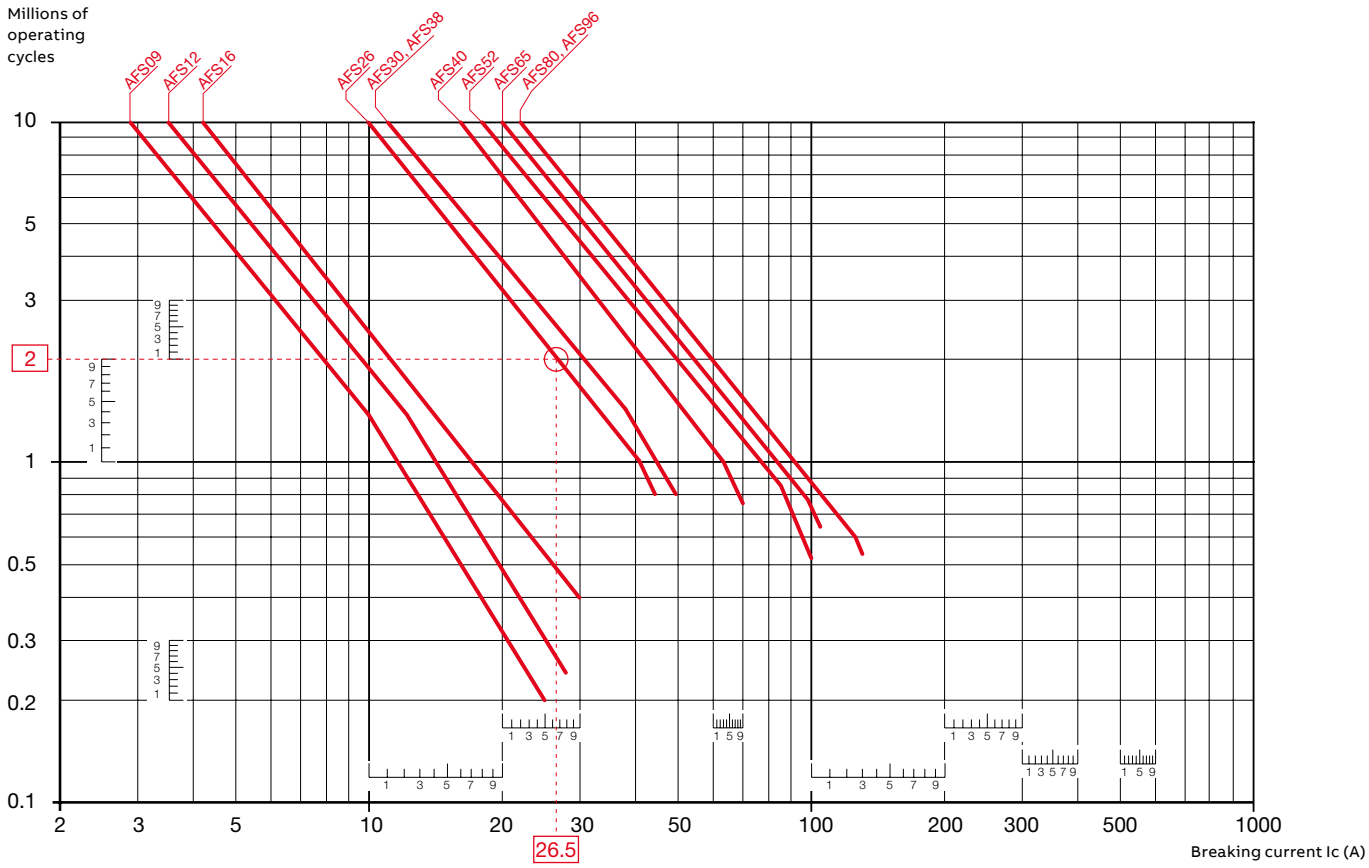
3-pole contactors for safety applications

Electrical durability

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

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

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



Example:

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

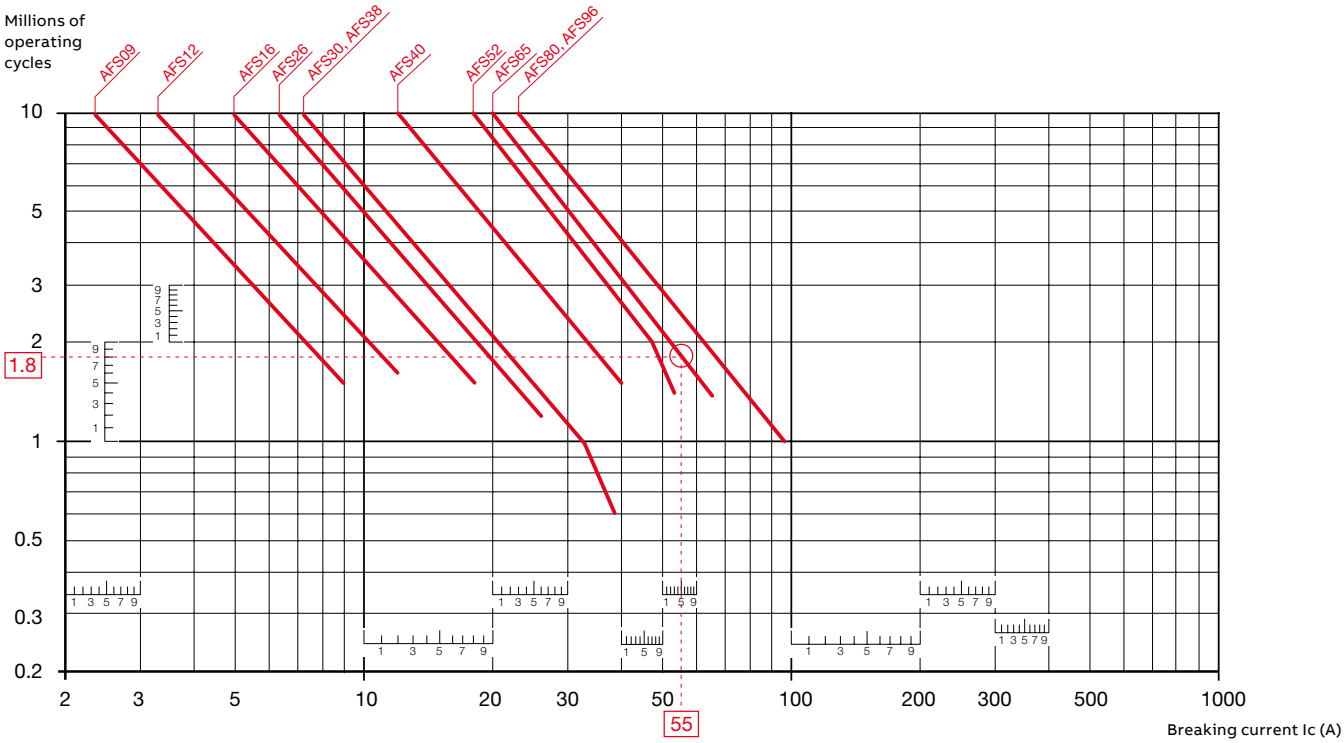
Using the AC-1 curves above select the AFS26 contactor at intersection "○" (26.5 A / 2 millions operating cycles).

1SBC100316S0201 - Rev. A

3-pole contactors for safety applications

Electrical durability

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



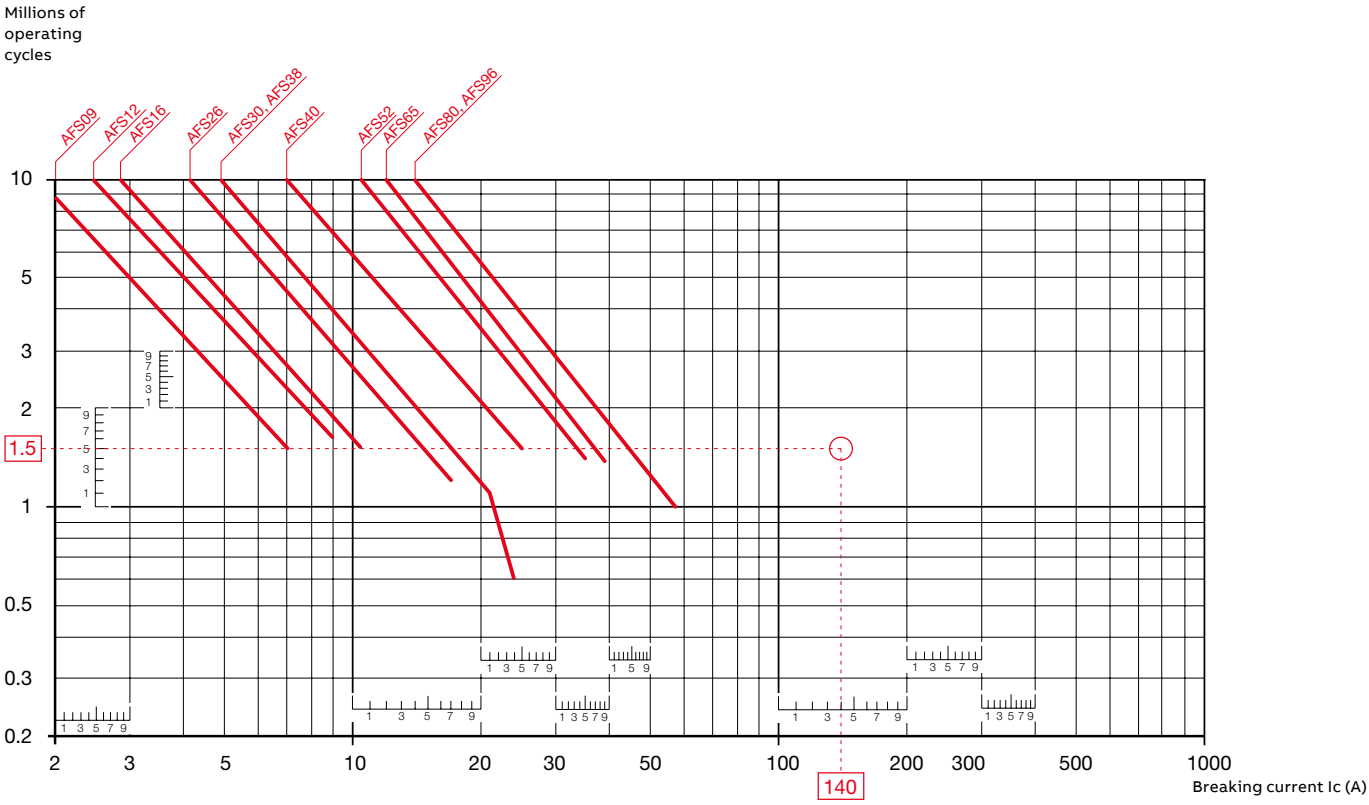
Example:
Motor power 30 kW for AC-3 - Ue = 400 V and Ie = 55 A utilization – Electrical durability required = 1.8 million operating cycles.
For AC-3: Ic = Ie. Select the AFS65 contactor at intersection "○" (55 A / 1.8 million operating cycles) on the curves (AC-3 - Ue ≤ 440 V).

1SBC100317S0201 - Rev. A

3-pole contactors for safety applications

Electrical durability

Electrical durability for AC-3 utilization category - 440 V < Ue ≤ 690 V.
Switching cage motors: starting and switching off running motors. The breaking current Ic for AC-3 is equal to the rated operational current Ie (Ie = motor full load current).
Ambient temperature and maximum electrical switching frequency: see "Technical data".

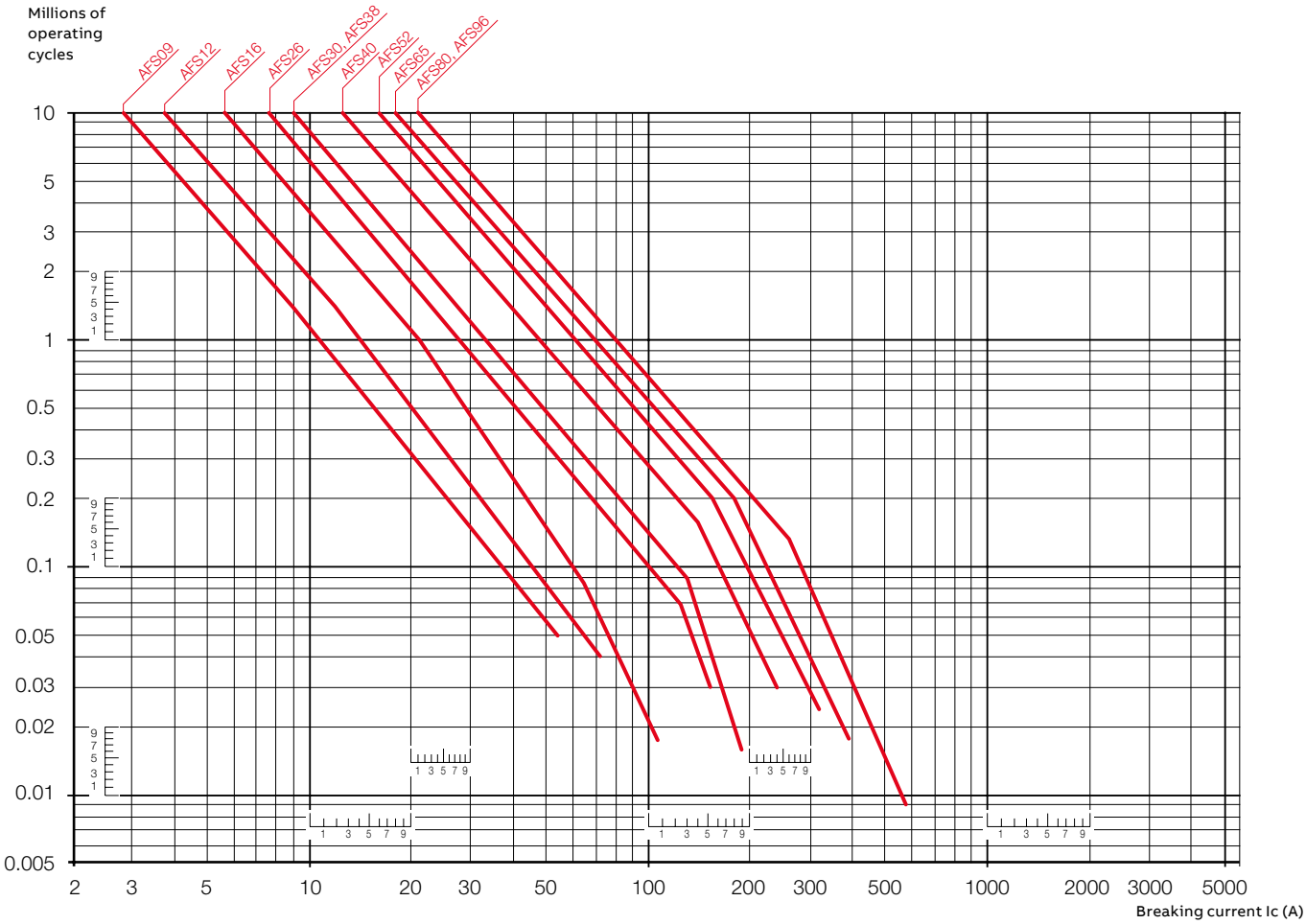


15BC100318502 01 - Rev. A

3-pole contactors for safety applications

Electrical durability

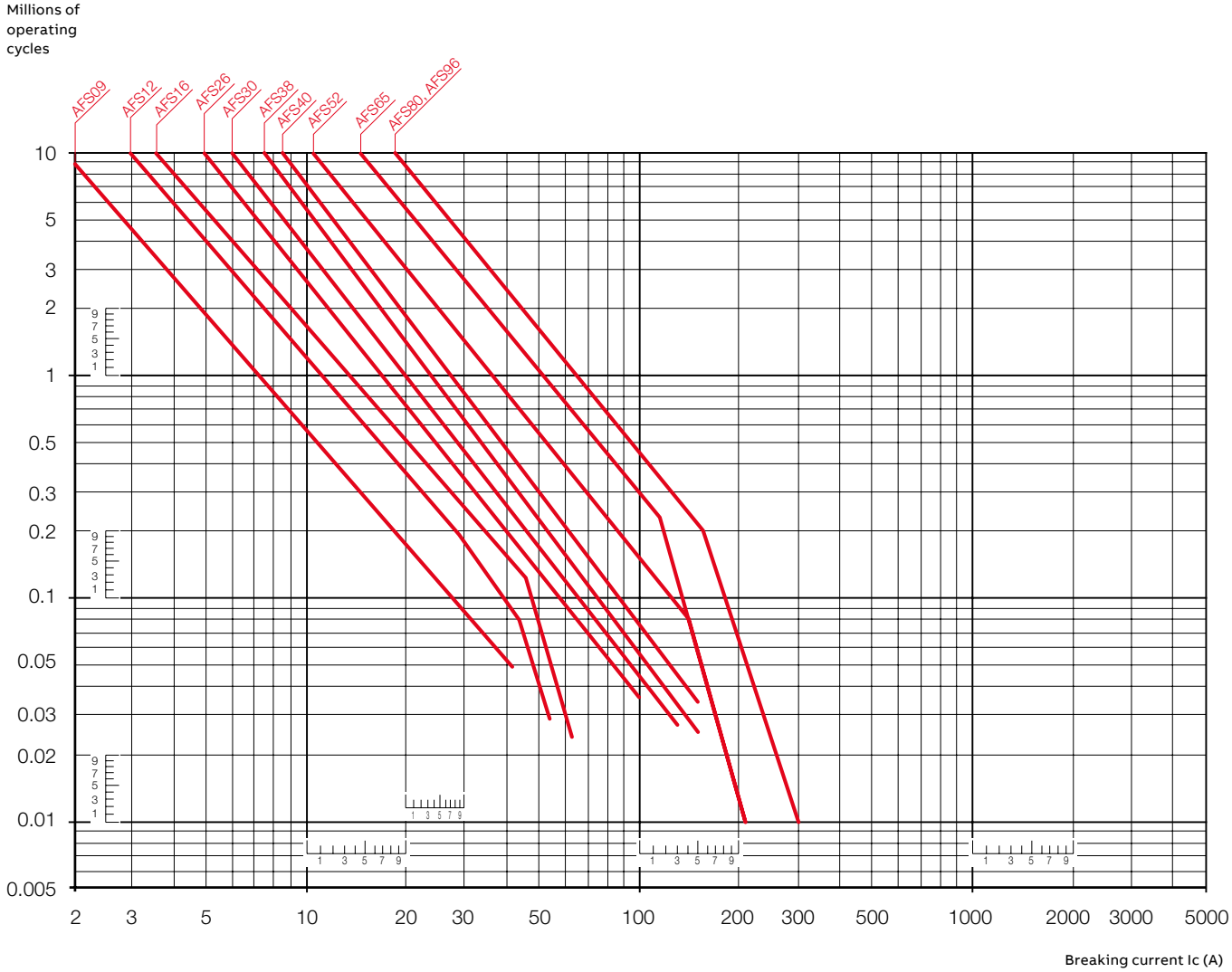
Electrical durability for AC-2 or AC-4 utilization category - Ue ≤ 440 V
Ambient temperature ≤ 60 °C for AFS09 ... AFS96
Switching cage motors: starting, reverse operation and step-by-step operation. The breaking current Ic is equal to 2.5 x Ie for AC-2 and 6 x Ie for AC-4, keeping in mind that Ie is the motor rated operational current (Ie = motor full-load current).
Maximum electrical switching frequency: see "Technical data".



3-pole contactors for safety applications

Electrical durability

Electrical durability for AC-2 or AC-4 utilization category - 440 V < Ue ≤ 690 V
Ambient temperature ≤ 60 °C for AFS09 ... AFS96
Switching cage motors: starting, reverse operation and step-by-step operation. The breaking current Ic is equal to 2.5 x Ie for AC-2 and 6 x Ie for AC-4, keaping in mind tha Ie is the motor rated operational current (Ie = motor full load current).
Maximum electrical switching frequency: see "Technical data".



1SBC100320S0201

Notes

AF and EK 4-pole contactors

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**

4-pole contactors

IEC	AC-1 Rated operational current	θ ≤ 40 °C, 690 V	A	25	30	45	55	70	100	125
UL/CSA	General use rating	600 V	A	25	30	45	55	60	80	105
AC / DC Control supply			Type	**AF09**	**AF16**	**AF26**	**AF38**	**AF40**	**AF52**	**AF80**
AC Control supply			Type	**AF09**	**AF16**	**AF26**	**AF38**	**AF40**	**AF52**	**AF80**
DC Control supply			Type	**AF09**	**AF16**	**AF26**	**AF38**	**AF40**	**AF52**	**AF80**
IEC	AC-1 Rated operational current 690 V	θ ≤ 40 °C	A	25	30	45	55	70	100	125
		θ ≤ 60 °C (1)	A	25	30	40	45	60	80	105
		θ ≤ 70 °C	A	22	26	32	37	50	70	90
	With conductor cross sectional area		mm²	4	6	10	16	35	35	50
	Rated operational voltage Ue max.		V	690	690	690	690	690	690	690

(1) θ ≤ 55 °C for EK550, EK1000 contactors

Main accessories

Auxiliary contact blocks	Front mounting	**CA4-10** (1 x N.O.), **CA4-01** (1 x N.C.)	
	Side mounting	**CAL4-11** (1 x N.O. + 1 x N.C.)	
Timers	Electronic	**TEF4-ON** **TEF4-OFF**	
Interlocking units	Mechanical	**VM4**	**VM96-4**
	Mechanical / Electrical	**VEM4**	
Surge suppressors	Varistor + RC (AC / DC)	Built-in surge protection	




160	200	275	350	400	500	525	800	1000
160	175	230	250	300	350	420	540	—
AF116	**AF140**	**AF190**	**AF205**	**AF265**	**AF305**	**AF370**	**—**	**—**
AF116	**AF140**	**AF190**	**AF205**	**AF265**	**AF305**	**AF370**	**EK550**	**EK1000**
AF116	**AF140**	**AF190**	**AF205**	**AF265**	**AF305**	**AF370**	**EK550**	**EK1000**
160	200	275	350	400	500	525	800	1000
145	175	250	300	350	400	425	650	800
130	160	200	240	290	325	350	575	720
70	95	150	240	240	300	2 x 185	2 x 240	2 x 300
690	690	1000	1000	1000	1000	1000	1000	1000

	CAL19-11 (1 x N.O. + 1 x N.C.)	**CAL16-11** (1 x N.O. + 1 x N.C.)
	VM19 (for same size contactors)	**VH800**
		RC-EH800

1SBC101569S0201 - Rev. E

AF09 ... AF38 4-pole contactors

25 to 55 A AC-1

AC / DC operated

AF09-40-00

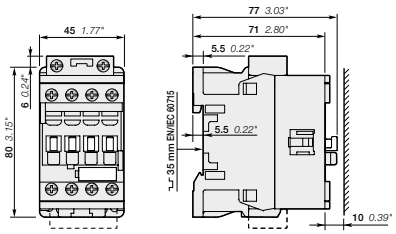
AF26-40-00

AF09 ... AF38 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) 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.

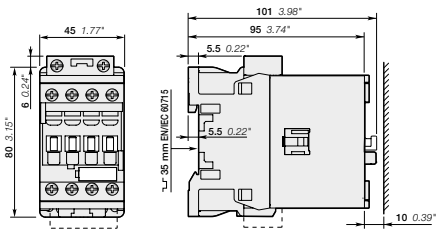
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening.
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC Rated operational current θ ≤ 40 °C AC-1 A	UL/CSA General use rating 600 V AC A	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	V DC		Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
4 N.O. main poles								
25	25	24...60	20...60	(1)	0 0	AF09-40-00-11	1SBL137201R1100	0.270
		48...130	48...130		0 0	AF09-40-00-12	1SBL137201R1200	0.270
		100...250	100...250		0 0	AF09-40-00-13	1SBL137201R1300	0.270
		250...500	250...500		0 0	AF09-40-00-14	1SBL137201R1400	0.310
30	30	24...60	20...60	(1)	0 0	AF16-40-00-11	1SBL177201R1100	0.270
		48...130	48...130		0 0	AF16-40-00-12	1SBL177201R1200	0.270
		100...250	100...250		0 0	AF16-40-00-13	1SBL177201R1300	0.270
		250...500	250...500		0 0	AF16-40-00-14	1SBL177201R1400	0.310
45	45	24...60	20...60	(1)	0 0	AF26-40-00-11	1SBL237201R1100	0.360
		48...130	48...130		0 0	AF26-40-00-12	1SBL237201R1200	0.360
		100...250	100...250		0 0	AF26-40-00-13	1SBL237201R1300	0.360
		250...500	250...500		0 0	AF26-40-00-14	1SBL237201R1400	0.400
55	55	24...60	20...60	(1)	0 0	AF38-40-00-11	1SBL297201R1100	0.360
		48...130	48...130		0 0	AF38-40-00-12	1SBL297201R1200	0.360
		100...250	100...250		0 0	AF38-40-00-13	1SBL297201R1300	0.360
		250...500	250...500		0 0	AF38-40-00-14	1SBL297201R1400	0.400
2 N.O. + 2 N.C. main poles								
25	25	24...60	20...60	(1)	0 0	AF09-22-00-11	1SBL137501R1100	0.270
		48...130	48...130		0 0	AF09-22-00-12	1SBL137501R1200	0.270
		100...250	100...250		0 0	AF09-22-00-13	1SBL137501R1300	0.270
		250...500	250...500		0 0	AF09-22-00-14	1SBL137501R1400	0.310
30	30	24...60	20...60	(1)	0 0	AF16-22-00-11	1SBL177501R1100	0.270
		48...130	48...130		0 0	AF16-22-00-12	1SBL177501R1200	0.270
		100...250	100...250		0 0	AF16-22-00-13	1SBL177501R1300	0.270
		250...500	250...500		0 0	AF16-22-00-14	1SBL177501R1400	0.310
45	45	24...60	20...60	(1)	0 0	AF26-22-00-11	1SBL237501R1100	0.360
		48...130	48...130		0 0	AF26-22-00-12	1SBL237501R1200	0.360
		100...250	100...250		0 0	AF26-22-00-13	1SBL237501R1300	0.360
		250...500	250...500		0 0	AF26-22-00-14	1SBL237501R1400	0.400
55	55	24...60	20...60	(1)	0 0	AF38-22-00-11	1SBL297501R1100	0.360
		48...130	48...130		0 0	AF38-22-00-12	1SBL297501R1200	0.360
		100...250	100...250		0 0	AF38-22-00-13	1SBL297501R1300	0.360
		250...500	250...500		0 0	AF38-22-00-14	1SBL297501R1400	0.400

(1) AF..-40-..-11 and AF..-22-..-11 not suitable for direct control by PLC-output.



AF09, AF16



AF26, AF38

Main dimensions mm, inches

1SBC101375S0201 - Rev. C

AF09Z ... AF16Z 4-pole contactors

25 to 30 A AC-1

24 V DC operated designed for PLC

1SBC101529V0014

AF09Z-40-00

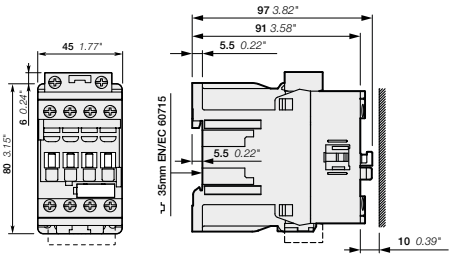
AF09Z ... AF16Z 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and generally for controlling power circuits up to 690 V AC and 440 V DC. These contactors are of the block type design with 4 main poles.

- control circuit: 24 V DC operated with electronic coil interface allowing low holding consumption up to 1.7 W and reduced panel energy consumption
  - allow direct control by PLC-output ≥ 250 mA 24 V DC
  - very distinct closing and opening
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC Rated operational current θ ≤ 40 °C AC-1 A	UL/CSA General use rating 600 V AC A	Rated control circuit voltage Uc V DC	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
4 N.O. main poles						
25	25	24	0 0	AF09Z-40-00-30	1SBL136201R3000	0.430
30	30	24	0 0	AF16Z-40-00-30	1SBL176201R3000	0.430
2 N.O. + 2 N.C. main poles						
25	25	24	0 0	AF09Z-22-00-30	1SBL136501R3000	0.430
30	30	24	0 0	AF16Z-22-00-30	1SBL176501R3000	0.430

Note: AF..Z contactors with 24 V DC control voltage need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.

Main dimensions mm, inches



AF09Z, AF16Z

1SBC100329S0201 - Rev. A

AF09Z ... AF38Z 4-pole contactors

25 to 55 A AC-1

AC / DC operated for specific applications

AF09Z-40-00

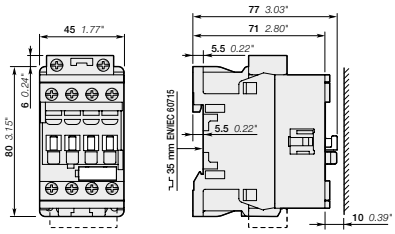
AF26Z-40-00

AF09Z ... AF38Z 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) 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.

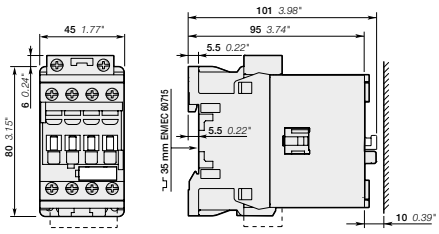
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...250 V 50/60 Hz and 12...250 V DC
  - can manage large control voltage variations
  - allow direct control by PLC-output ≥ 24 V DC 500 mA
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC Rated operational current θ ≤ 40 °C AC-1 A	UL/CSA General use rating 600 V AC A	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	V DC	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
4 N.O. main poles							
25	25	-	12...20	0 0	AF09Z-40-00-20	1SBL136201R2000	0.310
		24...60	20...60	0 0	AF09Z-40-00-21	1SBL136201R2100	0.310
		48...130	48...130	0 0	AF09Z-40-00-22	1SBL136201R2200	0.310
		100...250	100...250	0 0	AF09Z-40-00-23	1SBL136201R2300	0.310
30	30	-	12...20	0 0	AF16Z-40-00-20	1SBL176201R2000	0.310
		24...60	20...60	0 0	AF16Z-40-00-21	1SBL176201R2100	0.310
		48...130	48...130	0 0	AF16Z-40-00-22	1SBL176201R2200	0.310
		100...250	100...250	0 0	AF16Z-40-00-23	1SBL176201R2300	0.310
45	45	-	12...20	0 0	AF26Z-40-00-20	1SBL236201R2000	0.400
		24...60	20...60	0 0	AF26Z-40-00-21	1SBL236201R2100	0.400
		48...130	48...130	0 0	AF26Z-40-00-22	1SBL236201R2200	0.400
		100...250	100...250	0 0	AF26Z-40-00-23	1SBL236201R2300	0.400
55	55	-	12...20	0 0	AF38Z-40-00-20	1SBL296201R2000	0.400
		24...60	20...60	0 0	AF38Z-40-00-21	1SBL296201R2100	0.400
		48...130	48...130	0 0	AF38Z-40-00-22	1SBL296201R2200	0.400
		100...250	100...250	0 0	AF38Z-40-00-23	1SBL296201R2300	0.400
2 N.O. + 2 N.C. main poles							
25	25	-	12...20	0 0	AF09Z-22-00-20	1SBL136501R2000	0.310
		24...60	20...60	0 0	AF09Z-22-00-21	1SBL136501R2100	0.310
		48...130	48...130	0 0	AF09Z-22-00-22	1SBL136501R2200	0.310
		100...250	100...250	0 0	AF09Z-22-00-23	1SBL136501R2300	0.310
30	30	-	12...20	0 0	AF16Z-22-00-20	1SBL176501R2000	0.310
		24...60	20...60	0 0	AF16Z-22-00-21	1SBL176501R2100	0.310
		48...130	48...130	0 0	AF16Z-22-00-22	1SBL176501R2200	0.310
		100...250	100...250	0 0	AF16Z-22-00-23	1SBL176501R2300	0.310
45	45	-	12...20	0 0	AF26Z-22-00-20	1SBL236501R2000	0.400
		24...60	20...60	0 0	AF26Z-22-00-21	1SBL236501R2100	0.400
		48...130	48...130	0 0	AF26Z-22-00-22	1SBL236501R2200	0.400
		100...250	100...250	0 0	AF26Z-22-00-23	1SBL236501R2300	0.400
55	55	-	12...20	0 0	AF38Z-22-00-20	1SBL296501R2000	0.400
		24...60	20...60	0 0	AF38Z-22-00-21	1SBL296501R2100	0.400
		48...130	48...130	0 0	AF38Z-22-00-22	1SBL296501R2200	0.400
		100...250	100...250	0 0	AF38Z-22-00-23	1SBL296501R2300	0.400

Note: Only AF..Z contactors with DC control voltage 12...20 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.



AF09Z, AF16Z



AF26Z, AF38Z

Main dimensions mm, inches

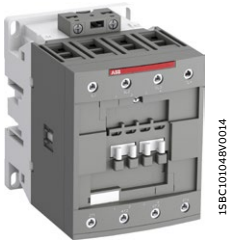
1SBC101376S0201 - Rev. B

AF40 ... AF80 4-pole contactors

70 to 125 A AC-1

AC / DC operated

AF40-40-00



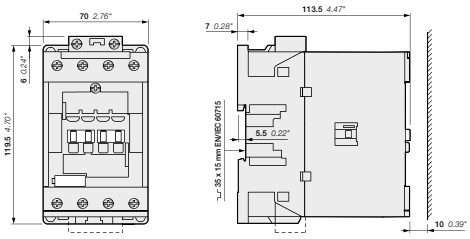
AF80-40-00

AF40 ... AF80 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) 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.

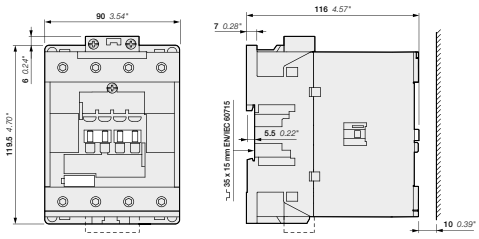
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltages ranges covering 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC Rated operational current θ ≤ 40 °C AC-1 A	UL/CSA General use rating 600 V AC A	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	V DC	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
4 N.O. main poles							
70	60	24...60	20...60	0 0	AF40-40-00-11	1SBL347201R1100	1.210
		48...130	48...130	0 0	AF40-40-00-12	1SBL347201R1200	1.210
		100...250	100...250	0 0	AF40-40-00-13	1SBL347201R1300	1.160
		250...500	250...500	0 0	AF40-40-00-14	1SBL347201R1400	1.160
100	80	24...60	20...60	0 0	AF52-40-00-11	1SBL367201R1100	1.210
		48...130	48...130	0 0	AF52-40-00-12	1SBL367201R1200	1.210
		100...250	100...250	0 0	AF52-40-00-13	1SBL367201R1300	1.160
		250...500	250...500	0 0	AF52-40-00-14	1SBL367201R1400	1.160
125	105	24...60	20...60	0 0	AF80-40-00-11	1SBL397201R1100	1.490
		48...130	48...130	0 0	AF80-40-00-12	1SBL397201R1200	1.490
		100...250	100...250	0 0	AF80-40-00-13	1SBL397201R1300	1.440
		250...500	250...500	0 0	AF80-40-00-14	1SBL397201R1400	1.440
2 N.O. + 2 N.C. main poles							
70	60	24...60	20...60	0 0	AF40-22-00-11	1SBL347501R1100	1.210
		48...130	48...130	0 0	AF40-22-00-12	1SBL347501R1200	1.210
		100...250	100...250	0 0	AF40-22-00-13	1SBL347501R1300	1.160
		250...500	250...500	0 0	AF40-22-00-14	1SBL347501R1400	1.160
125	105	24...60	20...60	0 0	AF80-22-00-11	1SBL397501R1100	1.490
		48...130	48...130	0 0	AF80-22-00-12	1SBL397501R1200	1.490
		100...250	100...250	0 0	AF80-22-00-13	1SBL397501R1300	1.440
		250...500	250...500	0 0	AF80-22-00-14	1SBL397501R1400	1.440

For control by PLC-output, use RA4 interface relay.



AF40, AF52



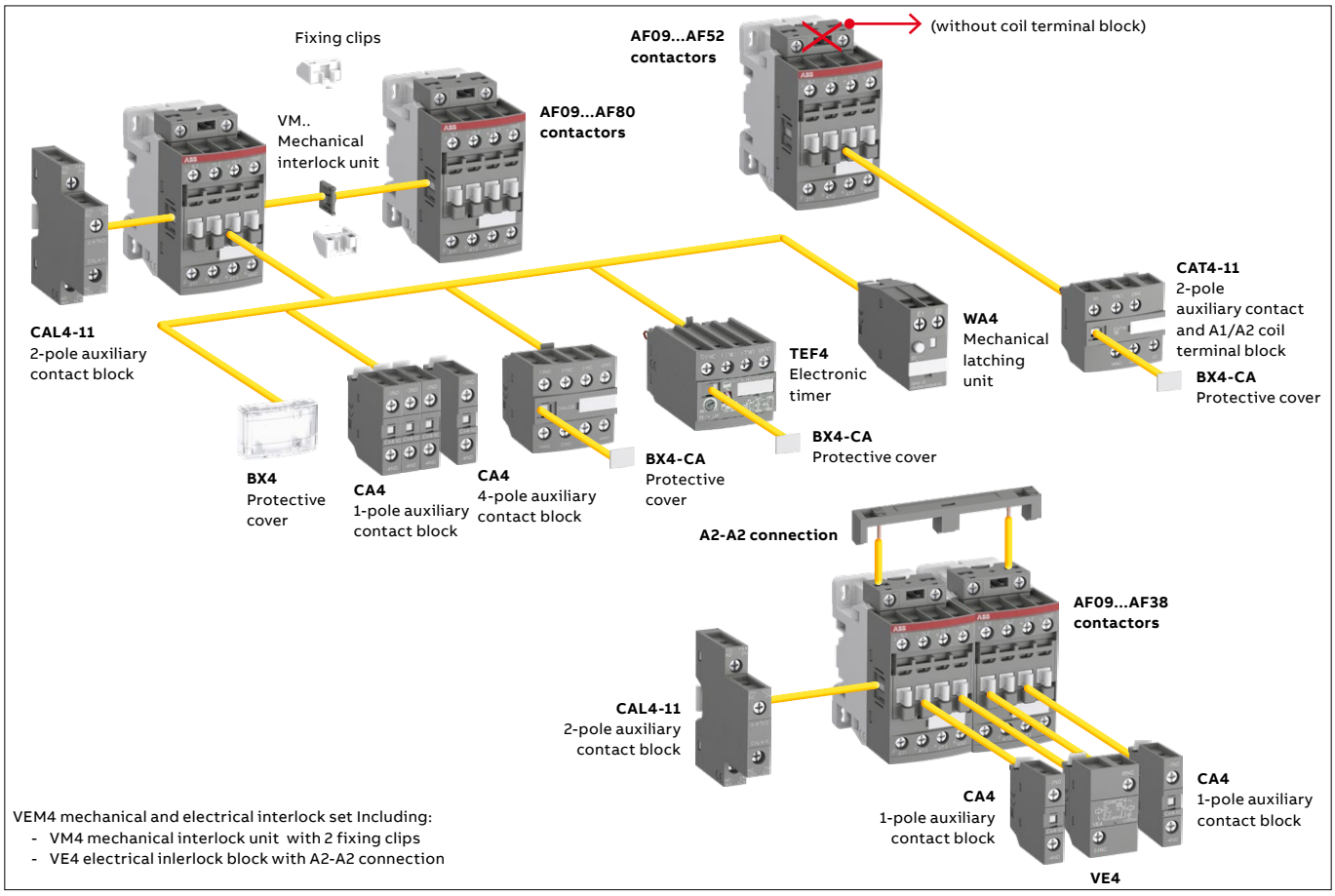
AF80

Main dimensions mm, inches

1SBC101987S0201 - Rev. C

AF09 ... AF80 4-pole contactors

Contactors and main accessories



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

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

Contactor types	Main poles	Built-in auxiliary contacts	Front-mounted accessories Auxiliary contact blocks			Electronic timer	Mechanical latching unit	Electrical and mechanical interlock set (between 2 contactors)	Side-mounted accessories Auxiliary contact blocks 2-pole CAL4-11	
			1-pole CA4	2-pole CAT4-11	4-pole CA4	TEF4	WA4 (4)	VEM4	Left side	Right side
AF09(Z) ... AF38(Z)										
AF09 ... AF16	4 0	0 0 (1)	4 max.	or 1	or 1	or 1	or 1	–	+ 1	–
AF26 ... AF38	4 0	0 0 (2)	2 max.	or 1	–	or 1	or 1	–	+ 1	+ 1
			3 max.	–	–	–	–	+ 1 (5)	+ 1	or 1
AF09 ... AF38	2 2	0 0 (2)	4 max.	or 1	or 1	or 1	or 1	–	+ 1	–
			2 max.	or 1	–	or 1	or 1	–	+ 1	+ 1
AF09Z ... AF16Z 24 V DC designed for PLC - coil 30										
AF09Z ... AF16Z	4 0	0 0 (1)	4 max.	–	or 1	or 1	–	– (5)	or 1	+ 1
			2 max.	–	–	or 1	–	– (5)	+ 1	or 1
			–	–	–	1	–	–	+ 1	+ 1
AF09Z ... AF16Z	2 2	0 0 (2)	4 max.	–	or 1	or 1	–	–	or 1	+ 1
			2 max.	–	–	or 1	–	–	+ 1	or 1
			–	–	–	1	–	–	+ 1	+ 1
AF40 ... AF80										
AF40 ... AF52	4 0	0 0	4 max.	or 1	or 1	or 1	or 1	–	+ 1	+ 1
AF80	4 0	0 0	4 max.	–	or 1	or 1	or 1	–	+ 1	+ 1
AF40	2 2	0 0 (3)	4 max.	or 1	or 1	or 1	or 1	–	+ 1	–
			4 max.	–	or 1	or 1	or 1	–	+ 1	+ 1
AF80	2 2	0 0 (3)	4 max.	–	or 1	or 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.
(4) Use WA4 for AF09...AF65 and WA4-96 for AF80.
Accept 1-pole CA4 auxiliary contacts (1 block on each side of the mechanical latch) in respect to the total number of built-in or additional N.C. auxiliary contacts.
For WA4 accessory use with contactors coil 30, please consult your ABB local sales organization.
(5) VEM4 not suitable for AF..Z contactors with DC control voltages 12...20 V DC (coil 20) and 24 V DC (coil 30). Use VM4 side-mounted mechanical interlock unit.

1SBC101392502 01 - Rev. C

AF116 ... AF140 4-pole contactors

160 to 200 A AC-1

AC / DC operated

1SFC101158V0001

AF140-40-00

1SFC101193V0001

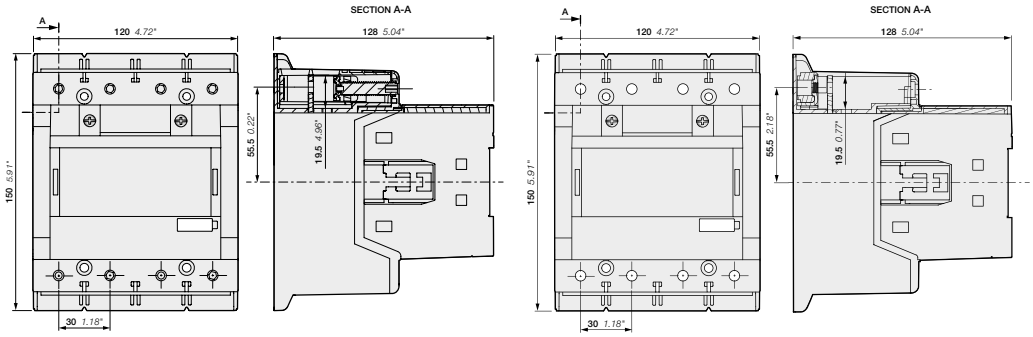
AF140-40-00B

AF116 ... AF140 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and generally for controlling power circuits up to 690 V AC and 350 V DC. These contactors are of the block type design with 4 main poles.

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC Rated operational current θ ≤ 40 °C AC-1 A	UL / CSA General use rating 600 V AC A	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	V DC	Auxiliary contacts fitted	Type (1)	Order code	Weight Pkg (1 pce) kg
4 N.O. main poles							
For connection with built-in cable clamps							
160	160	24...60	20...60	0 0	AF116-40-00-11	1SFL427101R1100	2.250
		48...130	48...130	0 0	AF116-40-00-12	1SFL427101R1200	2.250
		100...250	100...250	0 0	AF116-40-00-13	1SFL427101R1300	2.250
		250...500	250...500	0 0	AF116-40-00-14	1SFL427101R1400	2.250
200	175	24...60	20...60	0 0	AF140-40-00-11	1SFL447101R1100	2.250
		48...130	48...130	0 0	AF140-40-00-12	1SFL447101R1200	2.250
		100...250	100...250	0 0	AF140-40-00-13	1SFL447101R1300	2.250
		250...500	250...500	0 0	AF140-40-00-14	1SFL447101R1400	2.250
With bar connections							
160	160	24...60	20...60	0 0	AF116-40-00B-11	1SFL427102R1100	2.150
		48...130	48...130	0 0	AF116-40-00B-12	1SFL427102R1200	2.150
		100...250	100...250	0 0	AF116-40-00B-13	1SFL427102R1300	2.150
		250...500	250...500	0 0	AF116-40-00B-14	1SFL427102R1400	2.150
200	175	24...60	20...60	0 0	AF140-40-00B-11	1SFL447102R1100	2.150
		48...130	48...130	0 0	AF140-40-00B-12	1SFL447102R1200	2.150
		100...250	100...250	0 0	AF140-40-00B-13	1SFL447102R1300	2.150
		250...500	250...500	0 0	AF140-40-00B-14	1SFL447102R1400	2.150

(1) For other auxiliary contacts arrangements, please contact your ABB local organization.



AF116, AF140-40-00

AF116, AF140-40-00B

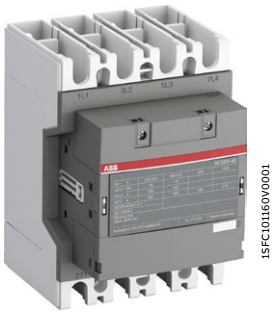
Main dimensions mm, inches

1SFC101197C0201 - Rev. B

AF190 ... AF370 4-pole contactors

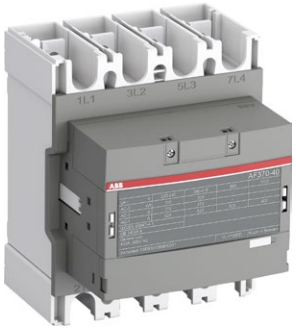
275 to 525 A AC-1

AC / DC operated



1SFC101160V0001

AF205-40-00



1SFC101197V0001

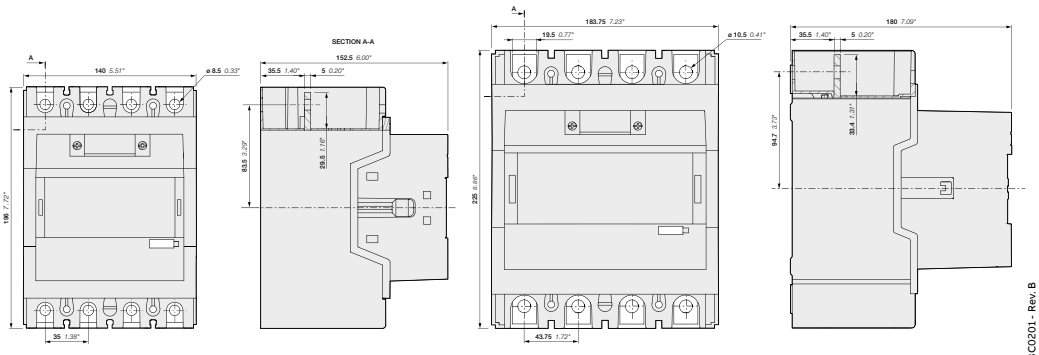
AF370-40-00

AF190 ... AF370 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and generally for controlling power circuits up to 1000 V AC and 440 V DC. These contactors are of the block type design with 4 main poles.

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC Rated operational current θ ≤ 40 °C AC-1 A	UL / CSA General use rating 600 V AC A	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	 V DC	Auxiliary contacts fitted		Type (1)	Order code	Weight Pkg (1 pce) kg
4 N.O. main poles								
275	230	24...60	20...60	0	0	AF190-40-00-11	1SFL487102R1100	3.900
		48...130	48...130	0	0	AF190-40-00-12	1SFL487102R1200	3.900
		100...250	100...250	0	0	AF190-40-00-13	1SFL487102R1300	3.900
		250...500	250...500	0	0	AF190-40-00-14	1SFL487102R1400	3.900
350	250	24...60	20...60	0	0	AF205-40-00-11	1SFL527102R1100	3.900
		48...130	48...130	0	0	AF205-40-00-12	1SFL527102R1200	3.900
		100...250	100...250	0	0	AF205-40-00-13	1SFL527102R1300	3.900
		250...500	250...500	0	0	AF205-40-00-14	1SFL527102R1400	3.900
400	300	24...60	20...60	0	0	AF265-40-00-11	1SFL547102R1100	6.360
		48...130	48...130	0	0	AF265-40-00-12	1SFL547102R1200	6.360
		100...250	100...250	0	0	AF265-40-00-13	1SFL547102R1300	6.360
		250...500	250...500	0	0	AF265-40-00-14	1SFL547102R1400	6.360
500	350	24...60	20...60	0	0	AF305-40-00-11	1SFL587102R1100	6.360
		48...130	48...130	0	0	AF305-40-00-12	1SFL587102R1200	6.360
		100...250	100...250	0	0	AF305-40-00-13	1SFL587102R1300	6.360
		250...500	250...500	0	0	AF305-40-00-14	1SFL587102R1400	6.360
525	420	24...60	20...60	0	0	AF370-40-00-11	1SFL607102R1100	6.360
		48...130	48...130	0	0	AF370-40-00-12	1SFL607102R1200	6.360
		100...250	100...250	0	0	AF370-40-00-13	1SFL607102R1300	6.360
		250...500	250...500	0	0	AF370-40-00-14	1SFL607102R1400	6.360

(1) For other auxiliary contacts arrangements, please contact your ABB local organization.



AF190, AF205

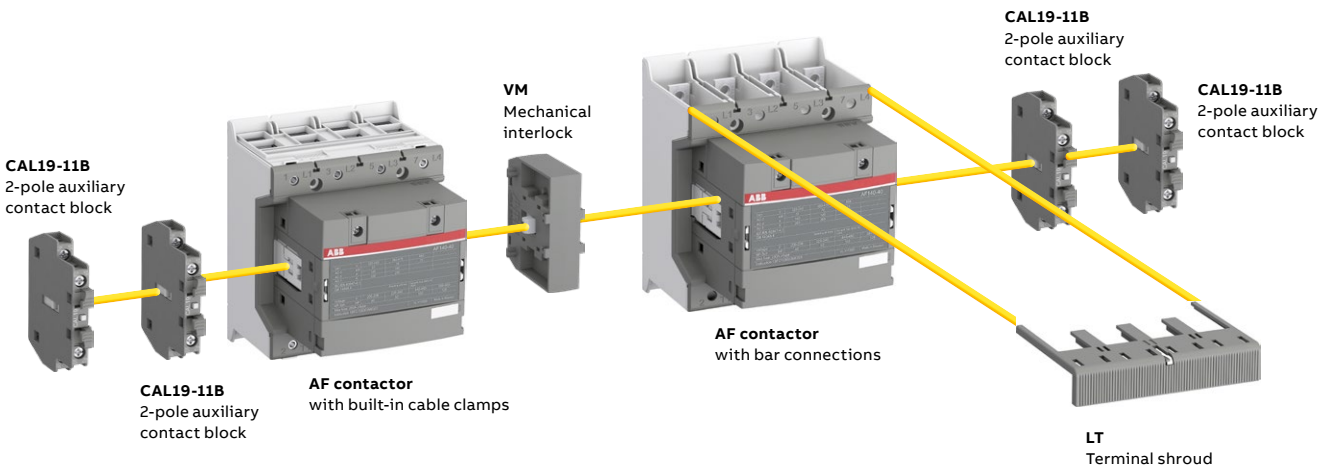
AF265, AF305, AF370

Main dimensions mm, inches

1SFC101198C0201 - Rev. B

AF116 ... AF370 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 (3)	**CAL19-11B (3)**	**Mechanical interlock units** (between two contactors)
AF116 ... AF370	4 0	0 0	2 x CAL19-11	+ 2 x CAL19-11B	–
AF116 ... AF370	4 0	0 0	2 x CAL19-11 (1)	+ 2 x CAL19-11B (1)	+ VM... (2)

(1) Total number of auxiliary contact blocks for the two contactors.
(2) Interlock type, according to the contactor ratings (see "Accessories").
(3) The CEL19 auxiliary contact blocks can replace the CAL19-11 and CAL19-11B. Though, no auxiliary contact block can be mounted outside the CEL19.

1SFC101203C0201 - Rev. A

AF116 ... AF140 4-pole contactors

160 to 200 A AC-1

AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

1SFC101154V0001

AF140-40-11

1SFC101192V0001

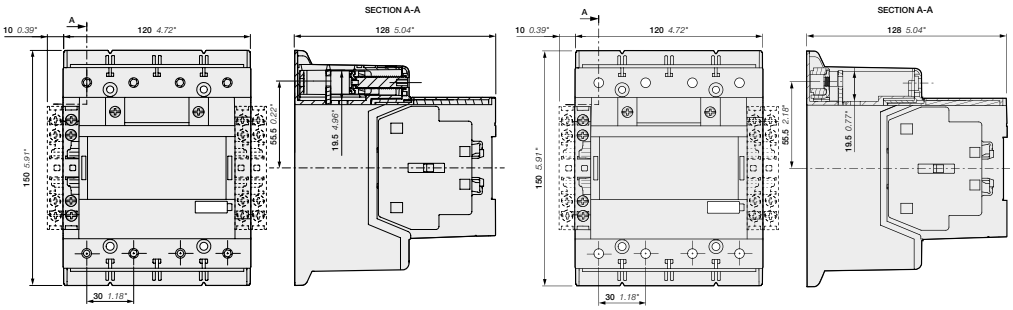
AF140-40-11B

AF116 ... AF140 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and generally for controlling power circuits up to 690 V AC and 350 V DC. These contactors are of the block type design with 4 main poles.

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC Rated operational current θ ≤ 40 °C AC-1 A	UL / CSA General use rating 600 V AC A	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	 V DC	Auxiliary contacts fitted	Type (1)	Order code	Weight Pkg (1 pce) kg
4 N.O. main poles							
For connection with built-in cable clamps							
160	160	24...60	20...60	1 1	AF116-40-11-11	1SFL427101R1111	2.270
		48...130	48...130	1 1	AF116-40-11-12	1SFL427101R1211	2.270
		100...250	100...250	1 1	AF116-40-11-13	1SFL427101R1311	2.270
		250...500	250...500	1 1	AF116-40-11-14	1SFL427101R1411	2.270
200	175	24...60	20...60	1 1	AF140-40-11-11	1SFL447101R1111	2.270
		48...130	48...130	1 1	AF140-40-11-12	1SFL447101R1211	2.270
		100...250	100...250	1 1	AF140-40-11-13	1SFL447101R1311	2.270
		250...500	250...500	1 1	AF140-40-11-14	1SFL447101R1411	2.270
With bar connections							
160	160	24...60	20...60	1 1	AF116-40-11B-11	1SFL427102R1111	2.170
		48...130	48...130	1 1	AF116-40-11B-12	1SFL427102R1211	2.170
		100...250	100...250	1 1	AF116-40-11B-13	1SFL427102R1311	2.170
		250...500	250...500	1 1	AF116-40-11B-14	1SFL427102R1411	2.170
200	175	24...60	20...60	1 1	AF140-40-11B-11	1SFL447102R1111	2.170
		48...130	48...130	1 1	AF140-40-11B-12	1SFL447102R1211	2.170
		100...250	100...250	1 1	AF140-40-11B-13	1SFL447102R1311	2.170
		250...500	250...500	1 1	AF140-40-11B-14	1SFL447102R1411	2.170

(1) For other auxiliary contacts arrangements, please contact your ABB local organization.



AF116, AF140-40-11

AF116, AF140-40-11B

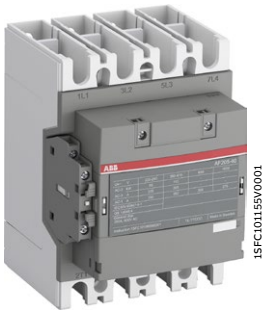
Main dimensions mm, inches

1SFC101199C0201 - Rev. B

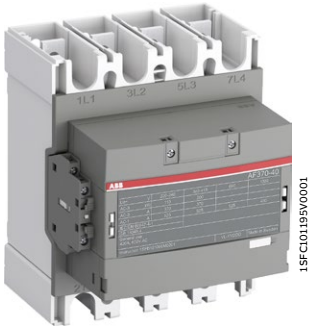
AF190 ... AF370 4-pole contactors

275 to 525 A AC-1

AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts



AF205-40-11



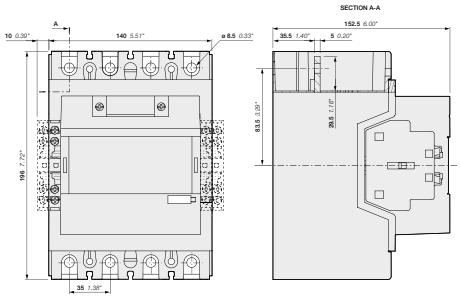
AF370-40-11

AF190 ... AF370 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and generally for controlling power circuits up to 1000 V AC and 440 V DC. These contactors are of the block type design with 4 main poles.

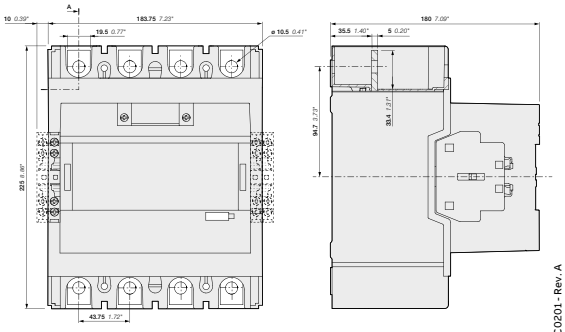
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC Rated operational current θ ≤ 40 °C AC-1 A	UL / CSA General use rating 600 V AC A	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	V DC	Auxiliary contacts fitted	Type (1)	Order code	Weight Pkg (1 pce) kg
4 N.O. main poles							
275	230	24...60	20...60	1 1	AF190-40-11-11	1SFL487102R1111	3.920
		48...130	48...130	1 1	AF190-40-11-12	1SFL487102R1211	3.920
		100...250	100...250	1 1	AF190-40-11-13	1SFL487102R1311	3.920
		250...500	250...500	1 1	AF190-40-11-14	1SFL487102R1411	3.920
350	250	24...60	20...60	1 1	AF205-40-11-11	1SFL527102R1111	3.920
		48...130	48...130	1 1	AF205-40-11-12	1SFL527102R1211	3.920
		100...250	100...250	1 1	AF205-40-11-13	1SFL527102R1311	3.920
		250...500	250...500	1 1	AF205-40-11-14	1SFL527102R1411	3.920
400	300	24...60	20...60	1 1	AF265-40-11-11	1SFL547102R1111	6.380
		48...130	48...130	1 1	AF265-40-11-12	1SFL547102R1211	6.380
		100...250	100...250	1 1	AF265-40-11-13	1SFL547102R1311	6.380
		250...500	250...500	1 1	AF265-40-11-14	1SFL547102R1411	6.380
500	350	24...60	20...60	1 1	AF305-40-11-11	1SFL587102R1111	6.380
		48...130	48...130	1 1	AF305-40-11-12	1SFL587102R1211	6.380
		100...250	100...250	1 1	AF305-40-11-13	1SFL587102R1311	6.380
		250...500	250...500	1 1	AF305-40-11-14	1SFL587102R1411	6.380
525	420	24...60	20...60	1 1	AF370-40-11-11	1SFL607102R1111	6.380
		48...130	48...130	1 1	AF370-40-11-12	1SFL607102R1211	6.380
		100...250	100...250	1 1	AF370-40-11-13	1SFL607102R1311	6.380
		250...500	250...500	1 1	AF370-40-11-14	1SFL607102R1411	6.380

(1) For other auxiliary contacts arrangements, please contact your ABB local organization.



AF190, AF205



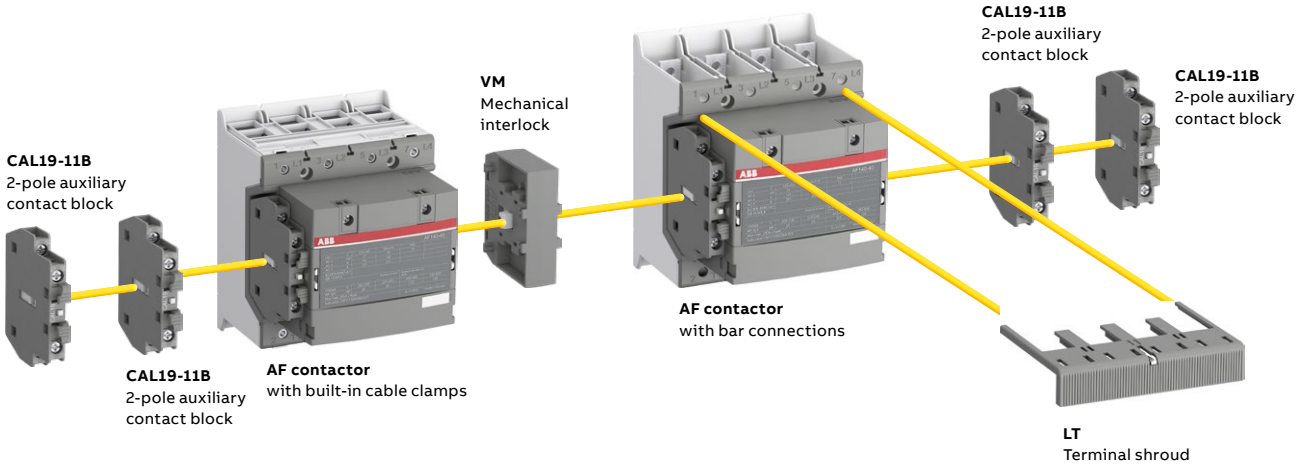
AF265, AF305, AF370

Main dimensions mm, inches

1SFC101200C0201 - Rev. A

AF116 ... AF370 4-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

Contactor types	Main poles	Available auxiliary contacts	Side-mounted accessories Auxiliary contact blocks		
			CAL19-11	CAL19-11B	Mechanical interlock units (between two contactors)
AF116 ... AF370	4 0	1 1	1 x CAL19-11	+ 2 x CAL19-11B	–
AF116 ... AF370	4 0	1 1	–	+ 2 x CAL19-11B (1)	+ VM... (2)

(1) Total number of auxiliary contact blocks for the two contactors.
(2) Interlock type, according to the contactor ratings (see "Accessories").

1SFC101205C0201

AF116 ... AF140 4-pole contactors

160 to 200 A AC-1

AC / DC operated with 2 N.O. + 2 N.C. auxiliary contacts

AF140-40-22

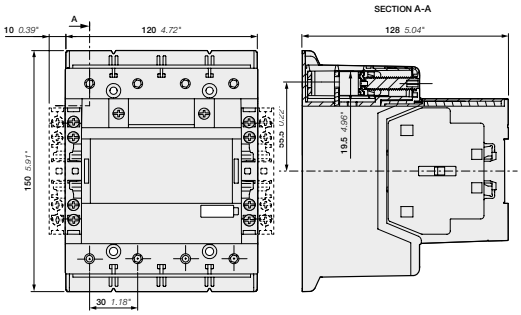
AF140-40-22B

AF116 ... AF140 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and generally for controlling power circuits up to 690 V AC and 350 V DC. These contactors are of the block type design with 4 main poles.

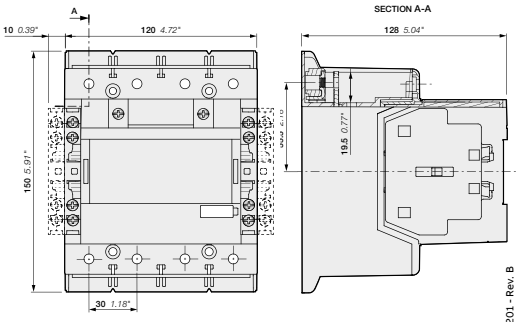
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC Rated operational current θ ≤ 40 °C AC-1 A	UL / CSA General use rating 600 V AC A	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	V DC	Auxiliary contacts fitted	Type (1)	Order code	Weight Pkg (1 pce) kg
4 N.O. main poles							
For connection with built-in cable clamps							
160	160	24...60	20...60	2 2	AF116-40-22-11	1SFL427101R1122	2.290
		48...130	48...130	2 2	AF116-40-22-12	1SFL427101R1222	2.290
		100...250	100...250	2 2	AF116-40-22-13	1SFL427101R1322	2.290
		250...500	250...500	2 2	AF116-40-22-14	1SFL427101R1422	2.290
200	175	24...60	20...60	2 2	AF140-40-22-11	1SFL447101R1122	2.290
		48...130	48...130	2 2	AF140-40-22-12	1SFL447101R1222	2.290
		100...250	100...250	2 2	AF140-40-22-13	1SFL447101R1322	2.290
		250...500	250...500	2 2	AF140-40-22-14	1SFL447101R1422	2.290
With bar connections							
160	160	24...60	20...60	2 2	AF116-40-22B-11	1SFL427102R1122	2.190
		48...130	48...130	2 2	AF116-40-22B-12	1SFL427102R1222	2.190
		100...250	100...250	2 2	AF116-40-22B-13	1SFL427102R1322	2.190
		250...500	250...500	2 2	AF116-40-22B-14	1SFL427102R1422	2.190
200	175	24...60	20...60	2 2	AF140-40-22B-11	1SFL447102R1122	2.190
		48...130	48...130	2 2	AF140-40-22B-12	1SFL447102R1222	2.190
		100...250	100...250	2 2	AF140-40-22B-13	1SFL447102R1322	2.190
		250...500	250...500	2 2	AF140-40-22B-14	1SFL447102R1422	2.190

(1) For other auxiliary contacts arrangements, please contact your ABB local organization.



AF116, AF140-40-11



AF116, AF140-40-11B

Main dimensions mm, inches

1SFC101201C0201 - Rev. B

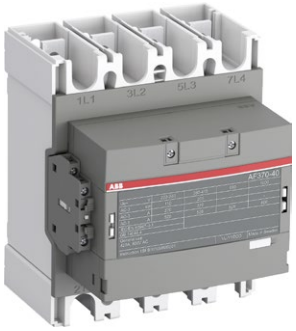
AF190 ... AF370 4-pole contactors

275 to 525 A AC-1

AC / DC operated with 2 N.O. + 2 N.C. auxiliary contacts

1SFC101161V0001

AF205-40-22



1SFC101196V0001

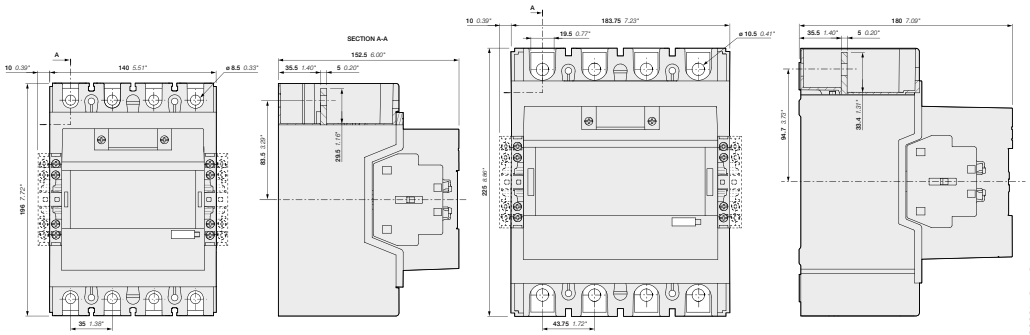
AF370-40-22

AF190 ... AF370 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and generally for controlling power circuits up to 1000 V AC and 440 V DC. These contactors are of the block type design with 4 main poles.

- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 24...500 V 50/60 Hz and 20...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC Rated operational current θ ≤ 40 °C AC-1 A	UL / CSA General use rating 600 V AC A	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	V DC	Auxiliary contacts fitted	Type (1)	Order code	Weight Pkg (1 pce) kg
4 N.O. main poles							
275	230	24...60	20...60	2 2	AF190-40-22-11	1SFL487102R1122	3.940
		48...130	48...130	2 2	AF190-40-22-12	1SFL487102R1222	3.940
		100...250	100...250	2 2	AF190-40-22-13	1SFL487102R1322	3.940
		250...500	250...500	2 2	AF190-40-22-14	1SFL487102R1422	3.940
350	250	24...60	20...60	2 2	AF205-40-22-11	1SFL527102R1122	3.940
		48...130	48...130	2 2	AF205-40-22-12	1SFL527102R1222	3.940
		100...250	100...250	2 2	AF205-40-22-13	1SFL527102R1322	3.940
		250...500	250...500	2 2	AF205-40-22-14	1SFL527102R1422	3.940
400	300	24...60	20...60	2 2	AF265-40-22-11	1SFL547102R1122	6.400
		48...130	48...130	2 2	AF265-40-22-12	1SFL547102R1222	6.400
		100...250	100...250	2 2	AF265-40-22-13	1SFL547102R1322	6.400
		250...500	250...500	2 2	AF265-40-22-14	1SFL547102R1422	6.400
500	350	24...60	20...60	2 2	AF305-40-22-11	1SFL587102R1122	6.400
		48...130	48...130	2 2	AF305-40-22-12	1SFL587102R1222	6.400
		100...250	100...250	2 2	AF305-40-22-13	1SFL587102R1322	6.400
		250...500	250...500	2 2	AF305-40-22-14	1SFL587102R1422	6.400
525	420	24...60	20...60	2 2	AF370-40-22-11	1SFL607102R1122	6.400
		48...130	48...130	2 2	AF370-40-22-12	1SFL607102R1222	6.400
		100...250	100...250	2 2	AF370-40-22-13	1SFL607102R1322	6.400
		250...500	250...500	2 2	AF370-40-22-14	1SFL607102R1422	6.400

(1) For other auxiliary contacts arrangements, please contact your ABB local organization.



AF190, AF205

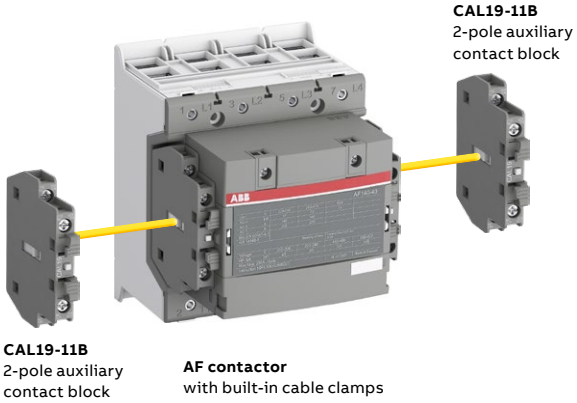
AF265, AF305, AF370

Main dimensions mm, inches

1SFC101202C0201 - Rev. B

AF116 ... AF370 4-pole contactors with 2 N.O. + 2 N.C. auxiliary contacts

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 (1)	**CAL19-11B (1)**	Mechanical interlock units (between two contactors)
AF116 ... AF370	4 0	2 2	2 x CAL19-11 included	+ 2 x CAL19-11B	–

(1) The CEL19 auxiliary contact blocks can replace the CAL19-11 and CAL19-11B. Though, no auxiliary contact block can be mounted outside the CEL19.

1SFC101207C0201 - Rev. B

EK550, EK1000 4-pole contactors

800 to 1000 A AC-1

AC operated with 1 N.O. + 1 N.C. auxiliary contacts

1SFC98099-069

EK1000-40-11

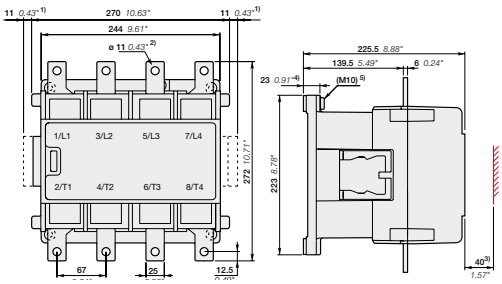
EK550 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and generally for controlling power circuits up to 1000 V AC and 600 V DC, EK1000 up to 1000 V AC.

These contactors are of the block type design with:

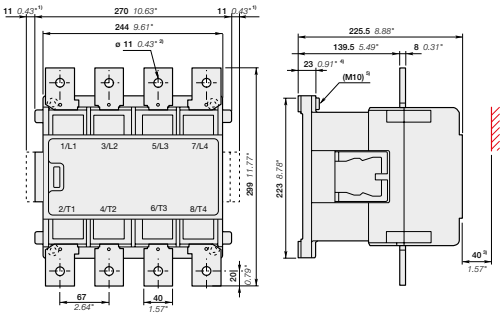
- 4 main poles
- control circuit: AC operated
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC Rated operational current θ ≤ 40 °C AC-1 A	UL/CSA General use rating 600 V AC A	Rated control circuit voltage Uc (1) V 50 Hz	 V 60 Hz	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
800	540	48	-	1 1	EK550-40-11	SK827041-AD	17.200
		110	110...120	1 1	EK550-40-11	SK827041-EF	17.200
		110...115	115...127	1 1	EK550-40-11	SK827041-EG	17.200
		220	220...240	1 1	EK550-40-11	SK827041-EL	17.200
		220...230	230...255	1 1	EK550-40-11	SK827041-EM	17.200
		400...415	-	1 1	EK550-40-11	SK827041-AR	17.200
1000	-	48	-	1 1	EK1000-40-11	SK827044-AD	17.500
		110	110...120	1 1	EK1000-40-11	SK827044-EF	17.500
		110...115	115...127	1 1	EK1000-40-11	SK827044-EG	17.500
		220	220...240	1 1	EK1000-40-11	SK827044-EL	17.500
		220...230	230...255	1 1	EK1000-40-11	SK827044-EM	17.500
		400...415	-	1 1	EK1000-40-11	SK827044-AR	17.500

(1) Other control voltages see voltage code table.



EK550



EK1000

1) Dimension for extra auxiliary contact block.
2) Screw, nut and washer by-packed.
3) Min. distance to uninsulated wall.
4) Damping elements are included.
5) Earthing screw.

Main dimensions mm, inches

1SFC101217C0201

EK550, EK1000 4-pole contactors

800 to 1000 A AC-1

DC operated with 2 N.O. + 1 N.C. auxiliary contacts

1SFC98099-069

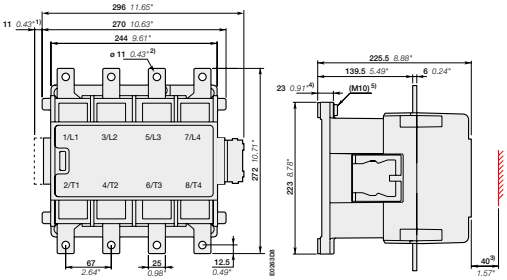
EK1000-40-21

EK550 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and generally for controlling power circuits up to 1000 V AC and 600 V DC, EK1000 up to 1000 V AC.

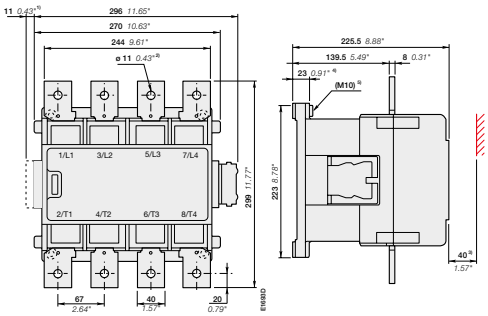
These contactors are of the block type design with:

- 4 main poles
- control circuit: DC operated
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC Rated operational current θ ≤ 40 °C AC-1 A	UL / CSA General use rating 600 V AC A	Rated control circuit voltage Uc V DC	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
800	540	24	2 1	EK550-40-21	SK827041-DB	17.200
		48	2 1	EK550-40-21	SK827041-DD	17.200
		75	2 1	EK550-40-21	SK827041-DG	17.200
		110	2 1	EK550-40-21	SK827041-DE	17.200
		125	2 1	EK550-40-21	SK827041-DU	17.200
		220	2 1	EK550-40-21	SK827041-DF	17.200
1000	-	24	2 1	EK1000-40-21	SK827044-DB	17.500
		36	2 1	EK1000-40-21	SK827044-DC	17.500
		48	2 1	EK1000-40-21	SK827044-DD	17.500
		60	2 1	EK1000-40-21	SK827044-DT	17.500
		75	2 1	EK1000-40-21	SK827044-DG	17.500
		110	2 1	EK1000-40-21	SK827044-DE	17.500
		125	2 1	EK1000-40-21	SK827044-DU	17.500
		220	2 1	EK1000-40-21	SK827044-DF	17.500



EK550



EK1000

1) Dimension for extra auxiliary contact block.
2) Screw, nut and washer by-packed.
3) Min. distance to uninsulated wall.
4) Damping elements are included.
5) Earthing screw.

1SFC101218C0201

EK550, EK1000 4-pole Contactors

800 to 1000 A AC-1

AC operated with 2 N.O. + 2 N.C. auxiliary contacts

1SFC98099-069

EK1000-40-22

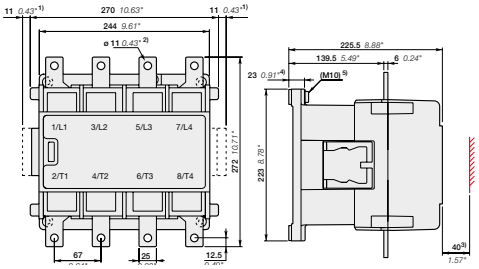
EK550 4-pole contactors are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...) and for controlling power circuits up to 1000 V AC and 600 V DC, EK1000 up to 1000 V AC.

These contactors are of the block type design with:

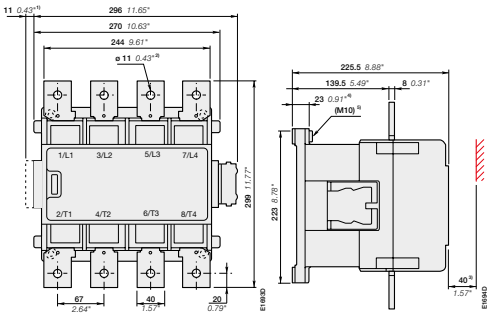
- 4 main poles
- control circuit: AC operated
- add-on auxiliary contact blocks for side mounting and a wide range of accessories

IEC Rated operational current θ ≤ 40 °C AC-1 A	UL/CSA General use rating 600 V AC A	Rated control circuit voltage Uc (1) V 50 Hz	 V 60 Hz	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
800	540	48	-	2 2	EK550-40-22	SK827043-AD	17.200
		110	110...120	2 2	EK550-40-22	SK827043-EF	17.200
		110...115	115...127	2 2	EK550-40-22	SK827043-EG	17.200
		220	220...240	2 2	EK550-40-22	SK827043-EL	17.200
		220...230	230...255	2 2	EK550-40-22	SK827043-EM	17.200
		400...415	-	2 2	EK550-40-22	SK827043-AR	17.200
1000	-	48	-	2 2	EK1000-40-22	SK827045-AD	17.500
		110	110...120	2 2	EK1000-40-22	SK827045-EF	17.500
		110...115	115...127	2 2	EK1000-40-22	SK827045-EG	17.500
		220	220...240	2 2	EK1000-40-22	SK827045-EL	17.500
		220...230	230...255	2 2	EK1000-40-22	SK827045-EM	17.500
		380	380...415	2 2	EK1000-40-22	SK827045-EP	17.500
		380...400	400...440	2 2	EK1000-40-22	SK827045-ER	17.500
		400...415	-	2 2	EK1000-40-22	SK827045-AR	17.500

(1) Other control voltages see voltage code table.



EK550



EK1000

1) Dimension for extra auxiliary contact block
2) Screw, nut and washer by-packed
3) Min. distance to uninsulated wall
4) Damping elements are included
5) Earthing screw

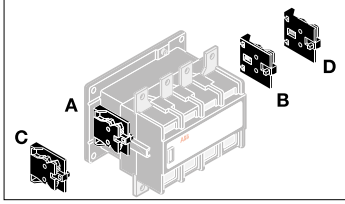
Main dimensions mm, inches

1SFC101219C0201

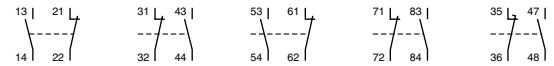
EK550, EK1000 4-pole contactors with 1 N.O. + 1 N.C. and 2 N.O. + 1 N.C. auxiliary contacts

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

Mounting positions of the auxiliary contact



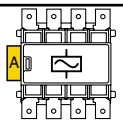
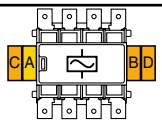
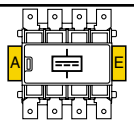
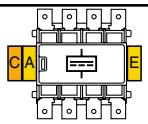
Auxiliary contact types and connecting diagrams



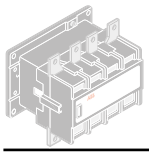
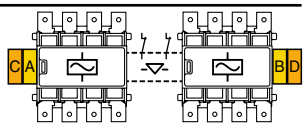
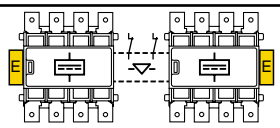
CAL16-11 A CAL16-11 B CAL16-11 C CAL16-11 D CCL16-11 E (1)

(1) Contact 35-36 used for some types of EK... contactors

EK 4-pole contactors

Contactor types	Main poles	Available auxiliary contacts			Add-on auxiliary contact blocks **2-pole CAL16-11 ...**		**Mounting and positioning** Factory mounted auxiliary contacts Add-on CAL16-11 auxiliary contacts
AC operated, 50 Hz, 60 Hz or 50/60 Hz							
EK550, EK1000	4 0	1 1		+	1 x CAL16-11B + 1 x CAL16-11C + 1 x CAL16-11D		
DC operated							
EK550, EK1000	4 0	2 1		+	1 x CAL16-11C		

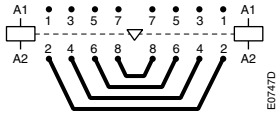
EK 4-pole reversing contactors with VH800 mechanical and electrical interlock units

"Left hand" contactors	**Interlocking**	**"Right hand" contactors**		**Add-on auxiliary contact blocks** **2-pole CAL16-11 ...**		**Mounting and positioning** Factory mounted auxiliary contacts Add-on CAL16-11 auxiliary contacts
						
AC operated, 50 Hz, 60 Hz or 50/60 Hz						
EK550, EK1000	VH800	EK550, EK1000	+	1 x CAL16-11C 1 x CAL16-11D		
DC operated						
EK550, EK1000	VH800	EK550, EK1000		–		

1SFC101220C0201

EK550, EK1000 4-pole contactors with 1 N.O. + 1 N.C. auxiliary contacts

and 2 N.O. + 1 N.C. auxiliary contacts



BSS550 ... BSS1000

RC-EH

For contactors	Auxiliary contacts		Type	Order code	Pkg qty	Weight (1 pce)
						kg
Side-mounted auxiliary contact blocks						
EK	1	1	CAL16-11B	SK829002-B	1	0.050
	1	1	CAL16-11C	SK829002-C	1	0.050
	1	1	CAL16-11D	SK829002-D	1	0.050
	1	1	CCL16-11E (2)	SK829002-E	1	0.050
Mechanical interlock unit for two horizontal mounted contactors						
EK550, EK1000			VH800	SK829070-F	1	6.000
Connecting sets						
EK550			BSS550	SK829090-E	1	3.300
EK1000			BSS1000	SK829090-H	1	5.500

Surge suppressors

For contactors	Rated control circuit voltage Uc			Type	Order code	Pkg qty	Weight (1 pce)
	V	AC	DC				kg
EK550, EK1000	48...110	●	–	RC-EH800/110	SK829007-C	1	0.015
EK550, EK1000	24...125	–	●	RC-EH800/110	SK829007-C	1	0.015
EK550, EK1000	220...600	●	–	RC-EH800/600	SK829007-D	1	0.015

See "Main accessory fitting details" table.
(2) Mounting of CCL16-11E blocks does not allow an additional second block to be added on top of it.
All DC operated EK contactors are equipped with one CCL16-11E on the right side.

1SFC101220C0201

AF09 ... AF80 4-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	AF09	AF16	AF26	AF38	AF40	AF52	AF80
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1						
Rated operational voltage Ue max.		690 V						
Rated frequency (without derating)		50 / 60 Hz						
Conventional free-air thermal current Ith								
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		35 A	35 A	55 A	55 A	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	35 mm²	35 mm²	50 mm²
AC-3 Utilization category								
For air temperature close to contactor θ ≤ 60 °C								
Ie / Max. rated operational current AC-3 (1)								
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
Rated operational power AC-3 (1)								
1500 r.p.m. 50 Hz	220-230-240 V	2.2 kW	4 kW	5.5 kW	5.5 kW	11 kW	15 kW	22 kW
1800 r.p.m. 60 Hz	380-400 V	4 kW	7.5 kW	11 kW (3)	11 kW (3)	18.5 kW	22 kW	37 kW
3-phase motors	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
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 N.O. main pole	at 440 V	250 A	250 A	-	-	950 A	950 A	1100 A
cos ϕ = 0.45	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 the corresponding kW/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) 400 V 3-phase motors only.

1SBC101989S0201 - Rev. B

AF116 ... EK1000 4-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	AF116	AF140	AF190	AF205	AF265	AF305	AF370	EK550	EK1000
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1								
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	800 A	1000 A
With conductor cross-sectional area		70 mm²	95 mm²	150 mm²	240 mm² (3)	240 mm²	300 mm² (4)	2x 185 mm² (4)	2x 240 mm²	2x 300 mm²
AC-1 Utilization category										
For air temperature close to contactor										
Ie / Rated operational current AC-1	θ ≤ 40 °C	160 A	200 A	275 A	350 A	400 A	500 A	525 A	800 A	1000 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 60 °C	145 A	175 A	250 A	300 A	350 A	400 A	425 A	650 A	800 A
	θ ≤ 70 °C	130 A	160 A	200 A	240 A	290 A	325 A	350 A	575 A	720 A
Ue max. ≤ 1000 V, 50/60 Hz	θ ≤ 40 °C	-	-	250 A	275 A	350 A	375 A	400 A	800 A	1000 A
	θ ≤ 60 °C (2)	-	-	225 A	250 A	300 A	325 A	350 A	650 A	800 A
	θ ≤ 70 °C	-	-	185 A	200 A	240 A	260 A	290 A	575 A	720 A
With conductor cross-sectional area		70 mm²	95 mm²	150 mm²	240 mm² (3)	240 mm²	300 mm² (4)	2x 185 mm² (4)	2x 240 mm²	2x 300 mm²
AC-3 Utilization category										
For air temperature close to contactor θ ≤ 60 °C (2)										
Ie / Max. rated operational current AC-3 (1)										
3-phase motors	220-230-240 V	116 A	140 A	190 A	205 A	265 A	305 A	370 A	550 A	-
	380-400 V	116 A	140 A	190 A	205 A	265 A	305 A	370 A	550 A	-
	415 V	116 A	140 A	190 A	205 A	265 A	305 A	370 A	550 A	-
	440 V	116 A	140 A	190 A	205 A	265 A	305 A	370 A	550 A	-
	500 V	-	-	-	-	-	-	-	550 A	-
	690 V	-	-	-	-	-	-	-	550 A	-
	1000 V	-	-	-	-	-	-	-	175 A	-
Rated operational power AC-3 (1)										
1500 r.p.m. 50 Hz	220-230-240 V	30 kW	37 kW	55 kW	55 kW	75 kW	90 kW	110 kW	160 kW	-
1800 r.p.m. 60 Hz	380-400 V	55 kW	75 kW	90 kW	110 kW	132 kW	160 kW	200 kW	280 kW	-
3-phase motors	415 V	55 kW	75 kW	90 kW	110 kW	132 kW	160 kW	200 kW	315 kW	-
	440 V	75 kW	90 kW	110 kW	132 kW	160 kW	160 kW	200 kW	315 kW	-
	500 V	-	-	-	-	-	-	-	400 kW	-
	690 V	-	-	-	-	-	-	-	500 kW	-
	1000 V	-	-	-	-	-	-	-	250 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		200 A	250 A	355 A	400 A	630 A	630 A	630 A	800 A	1000 A
Rated short-time withstand current Icw	1 s	1300 A	1460 A	1900 A	2050 A	2650 A	3050 A	3700 A	5500 A	6800 A
At 40 °C ambient temperature,	10 s	928 A	1168 A	1520 A	1640 A	2120 A	2440 A	2960 A	5300 A	6400 A
in free air from a cold state	30 s	536 A	674 A	878 A	947 A	1224 A	1409 A	1709 A	3700 A	4400 A
	1 min	379 A	477 A	621 A	670 A	865 A	996 A	1208 A	3000 A	3400 A
	15 min	160 A	200 A	275 A	350 A	400 A	500 A	525 A	1000 A	1200 A
Maximum breaking capacity	at 440 V	2000 A	3000 A	3300 A	3500 A	3800 A	4600 A	5000 A	5400 A	-
cos ϕ = 0.45	at 690 V	-	-	-	-	-	-	-	5400 A	-
Power dissipation per pole	Ie / AC-1	12 W	18 W	15 W	25 W	32 W	50 W	72 W	60 W	80 W
	Ie / AC-3	-	-	-	-	-	-	-	25 W	-
Max. electrical switching frequency	AC-1	300 cycles/h								
	AC-3	300 cycles/h								-
	AC-2, AC4	-							120 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) θ ≤ 55 °C for EK550, EK1000
(3) For currents above 275 A use terminal enlargements or terminal extensions.
(4) For currents above 450 A use terminal enlargements or terminal extensions.

1SFC101209C0201 - Rev. B

AF09 ... AF80 4-pole contactors

Technical data

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

Contactor types	AC / DC operated	AF09	AF16	AF26	AF38	AF40	AF52	AF80
Standards		UL 508, CSA C22.2 N°14				UL 60947-4-1, CSA-C22.2 No. 60947-4-1		
Max. 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
Max. electrical switching frequency								
For general use		600 cycles/h						

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

Main pole utilization characteristics - 4 N.O. non-reversing contactors

Contactor types	AC / DC operated	AF09	AF16	AF26	AF38	AF40	AF52	AF80
Lighting application - UL / CSA - breaking all lines								
Electrical discharge lamps (ballast)								
1-phase per pole	347 V AC	20 A	30 A	45 A	50 A	-	-	-
3-phase break all lines	600 V AC	20 A	30 A	45 A	50 A	-	-	-
Elevator control, load switching, 500 000 electrical operating cycles acc. to CSA B44.1 / ASME 17.5 paragraph 19.2.1								
1-phase								
Horse power rating	110-120 V AC	-	1/2 hp	-	-	-	-	-
	220-240 V AC	-	1-1/2 hp	-	-	-	-	-
3-phase								
Horse power rating	200-208 V AC	-	3 hp	-	-	-	-	-
	220-240 V AC	-	3 hp	-	-	-	-	-
	440-480 V AC	-	7-1/2 hp	-	-	-	-	-
	550-600 V AC	-	10 hp	-	-	-	-	-

Note: 4-pole contactors fitted with 2 N.O. + 2 N.C. main poles, see "General technical data".

1SBC100066S0201

AF116 ... EK1000 4-pole contactors

Technical data

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

Contactor types	AC / DC operated	AF116	AF140	AF190	AF205	AF265	AF305	AF370	EK550	EK1000
Standards		UL 60947-4-1							UL 508, CSA C22.2 N°14	
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	540 A	-
With conductor cross-sectional area		AWG 2/0	AWG 3/0	MCM 250	MCM 250	MCM 400	MCM 500	2//MCM 300	-	-
1 pole	90 V DC	200 A	200 A	-	-	-	-	-	-	-
	100 V DC	-	-	250 A	350 A	-	-	-	-	-
	110 V DC	-	-	-	-	400 A	500 A	520 A	-	-
2 poles in serie	175 V DC	200 A	200 A	-	-	-	-	-	-	-
	200 V DC	-	-	250 A	350 A	-	-	-	-	-
	225 V DC	-	-	-	-	400 A	500 A	520 A	-	-
3 poles in serie	260 V DC	200 A	200 A	-	-	-	-	-	-	-
	300 V DC	-	-	250 A	350 A	-	-	-	-	-
	340 V DC	-	-	-	-	400 A	500 A	520 A	-	-
4 poles in series	350 V DC	200 A	200 A	-	-	-	-	-	-	-
	400 V DC	-	-	250 A	350 A	-	-	-	-	-
	450 V DC	-	-	-	-	400 A	500 A	520 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								

Main pole utilization characteristics - 4 N.O. non-reversing contactors

Contactor types	AC / DC operated	AF116	AF140	AF190	AF205	AF265	AF305	AF370	EK550	EK1000
Lighting application - UL/CSA - breaking all lines										
Electrical discharge lamps (ballast)										
1-phase per pole	347 V AC	160 A	200 A	250 A	300 A	400 A	450 A	520 A	-	-
3-phase break all lines	600 V AC	160 A	200 A	250 A	300 A	400 A	450 A	520 A	-	-

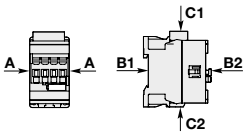
1SBC100067S0201

AF09 ... AF80 4-pole contactors

Technical data

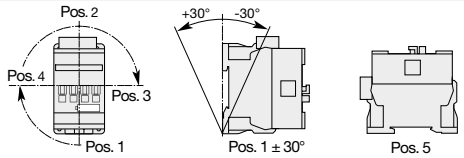
General technical data

Contactor types	AC / DC operated	AF09	AF16	AF26	AF38	AF40	AF52	AF80
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 / EN 60947-1 - Environment A and B (1)						
Ambient air temperature close to contactor								
Operation		-40...+70 °C						
Storage		-60...+80 °C						
Climatic withstand		Category B according to IEC 60947-1 Annex Q						
Maximum operating altitude (without derating)		3000 m						
Mechanical durability								
Number of operating cycles		10 millions operating cycles						
Max. switching frequency		3600 cycles/h						
Shock withstand acc. to IEC 60068-2-27 and EN 60068-2-27 Mounting position 1								
	Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position						
4 N.O. Main poles	A	30 g				20 g		
	B1	25 g Closed position / 5 g Open position				20 g Closed position / 5 g Open position		
	B2	15 g				10 g		
	C1	25 g				20 g		
	C2	25 g				20 g		
2 N.O. + 2 N.C. Main poles	A	30 g		30 g Closed position / 25 g Open position		20 g		
	B1	25 g Closed position / 5 g Open position		25 g Closed position / 5 g Open position		20 g Closed position / 5 g Open position		20 g Closed position / 4 g Open position
	B2	15 g		15 g Closed position / 10 g Open position		10 g		
	C1	25 g		25 g Closed position / 20 g Open position		20 g		
	C2	25 g		25 g Closed position / 20 g Open position		20 g		
Vibration withstand acc. to IEC 60068-2-6		5 ... 300 Hz 4 g Closed position / 2 g Open position				5 ... 300 Hz 3 g Closed position / 2 g Open position		

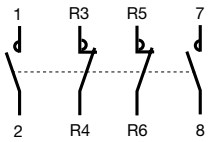


(1) Environment B: all AF09 ... AF38 contactors produced since week 08-2013.
AF09 ... AF38-..-..-12 (48...130 V 50/60 Hz-DC) compliant to environment A only: for environment B select AF09Z ... AF38Z-..-..-22.

Mounting characteristics and conditions for use

Contactor types	AF09	AF16	AF26	AF38	AF40	AF52	AF80
Mounting positions	 Max. add-on N.C. auxiliary contacts: see accessory fitting details for a 4-pole contactor AF09 ... AF80						
Mounting distances	The contactors can be assembled side by side						
Fixing							
On rail according to IEC 60715, 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		

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

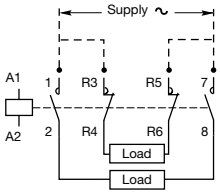


These contactors are suitable for controlling 2 separate circuits, i.e. 2 loads with 2 separate supplies, or 1 circuit comprising 2 separate loads with a single supply (see diagrams beside). When the contactor operates there is no mechanical overlapping between the N.O. poles and the N.C. poles: BREAK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

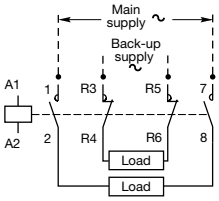
These contactors are not suitable for a reversing starter or for controlling a single load from 2 separate supplies.

Block diagrams

- Single supply and 2 separate loads



- 2 separate supplies and 2 separate loads



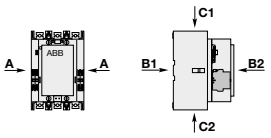
1SBC101990S0201 - Rev. B

AF116 ... EK1000 4-pole contactors

Technical data

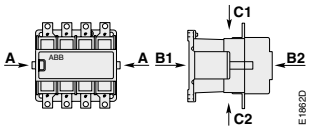
General technical data

Contactor types	AC / DC operated	AF116	AF140	AF190	AF205	AF265	AF305	AF370
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		AF contactors comply with IEC 60947-1 / EN 60947-1 - Environment A						
Ambient air temperature close to contactor								
Operation		-40 to +70 °C						
Storage		-40 to +70 °C						
Climatic withstand		Category B according to IEC 60947-1 Annex Q						
Maximum operating altitude (without derating)		3000 m						
Mechanical durability								
Number of operating cycles		5 million operating cycles						
Maximum switching frequency		300 cycles/h						
Shock withstand								
acc. to IEC 60068-2-27 and EN 60068-2-27								
Mounting position 1		No change in contact position, closed or open position						
	Shock direction	1/2 sinusoidal shock for 11 ms			1/2 sinusoidal shock for 30 ms			
	A	20 g			20 g			
	B1	15 g closed position / 3 g open position			15 g closed position / 3 g open position			
	B2	15 g closed position / 3 g open position			15 g closed position / 3 g open position			
	C1	20 g			20 g			
	C2	20 g			20 g			
Vibration withstand								
acc to IEC 60068-2-6		0.7 g closed position / 0.7 g open position 13.2...100 Hz						



General technical data

Contactor types	AC or DC operated	EK550	EK1000
Rated insulation voltage Ui			
acc. to IEC 60947-4-1		1000 V	
acc. to UL		600 V	
Rated impulse withstand voltage Uimp.		8 kV	
Electromagnetic compatibility		EK contactors complying with IEC 60947-1 / EN 60947-1 - Environment A	
Ambient air temperature close to contactor			
Operation	Fitted with thermal overload relay	-25 to +55 °C	-
	Without thermal overload relay	-40 to +70 °C	-
Storage		-50 to +70 °C	-
Climatic withstand		Category B acc. to IEC 60068-2-30	
Maximum operating altitude (without derating)		≤ 3000 m	
Mechanical durability			
Number of operating cycles		5 millions operating cycles	3 millions operating cycles
Max. switching frequency		60 cycles/h	
Shock withstand			
acc. to IEC 60068-2-27 and EN 60068-2-27			
Mounting position 1			
Closed or open position			
	Shock direction	1/2 sinusoidal shock for 15 ms: no change in contact position, closed or open position	
	A	10 g	
	B1	10 g	
	B2	10 g	
	C1	10 g	
	C2	10 g	



1SFC101212C0201

AF09 ... AF80 4-pole contactors

Technical data

Magnet system characteristics AF09 ... AF80 AC / DC operated

Contactor types	AC / DC operated	AF09	AF16	AF26	AF38	AF40	AF52	AF80
Coil operating limits acc. to IEC 60947-4-1	AC supply	At θ ≤ 60 °C 0.85 x Uc min...1.1 x Uc max. At θ ≤ 70 °C 0.85 x Uc min...Uc max.				at θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max		
	DC supply	at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max at θ ≤ 70 °C 0.85 x Uc min ... Uc max				at θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max		
AC control voltage 50/60 Hz								
Rated control circuit voltage Uc		24...500 V AC						
Coil consumption	Average pull-in value	50 VA				40 VA		
	Average holding value	2.2 VA / 2 W				4 VA / 2 W		
DC control voltage								
Rated control circuit voltage Uc		20...500 V DC				20...500 V DC		
Coil consumption	Average pull-in value	50 W				40 W		
	Average holding value	2 W				2 W		
PLC-output control		AF...-11 not suitable for direct control by PLC-output.				-		
Drop-out voltage		≤ 60 % of Uc min.				≤ 60 % of Uc min.		
Voltage sag immunity acc. to SEMI F47-0706		–				conditions of use on request		
Dips withstand -20 °C ≤ θ ≤ +60 °C		–				24 ms average		
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		

Magnet System Characteristics AF09Z...AF38Z 24V DC operated designed for PLC - coil 30

Contactor types	DC operated	AF09Z	AF16Z
Coil operating limits acc. to IEC 60947-4-1	DC supply	at θ ≤ 60 °C 0.85 ... 1.1x Uc at θ ≤ 70 °C Uc	
DC control voltage			
Rated control circuit voltage Uc		24 V DC	
Coil consumption	Average pull-in value	6 W	
	Average holding value	1.7 W	
PLC-output control		≥ 250 mA 24 V DC for PLCs and safety PLCs using broken wire detection	
Drop-out voltage		≤ 60 % of Uc min.	
Voltage sag immunity acc. to SEMI F47-0706		-	
Dips withstand -20 °C ≤ θ ≤ +60 °C		-	
Operating time			
Between coil energization and:	N.O. contact closing	27 ... 53 ms	
	N.C. contact opening	20 ... 35 ms	
Between coil de-energization and:	N.O. contact opening	17 ... 29 ms	
	N.C. contact closing	22 ... 57 ms	

Magnet System Characteristics AF09Z...AF38Z AC / DC operated for specific applications - coils 20, 21, 22, 23

Contactor types	AC / DC operated	AF09Z	AF16Z	AF26Z	AF38Z
Coil operating limits acc. to IEC 60947-4-1	AC supply	At θ ≤ 60 °C 0.85 x Uc min...1.1 x Uc max. At θ ≤ 70 °C 0.85 x Uc min...Uc max.			
	DC supply	at θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max			
AC control voltage 50/60 Hz					
Rated control circuit voltage Uc		24...250 V AC			
Coil consumption	Average pull-in value	16 VA			
	Average holding value	1.7 VA / 1.5 W			
DC control voltage					
Rated control circuit voltage Uc		12...250 V DC			
Coil consumption	Average pull-in value	12 ... 16 W			
	Average holding value	1.7 W			
PLC-output control		(AF..Z coil 21) ≥ 500 mA 24 V DC for PLCs - Not suitable for safety PLCs			
Drop-out voltage		≤ 60 % of Uc min.			
Voltage sag immunity acc. to SEMI F47-0706		(AF..Z coil 21, 22, 23) conditions of use on request			
Dips withstand -20 °C ≤ θ ≤ +60 °C		(AF..Z coil 21, 22, 23) 22 ms average for Uc ≥ 24 V 50/60 Hz or Uc ≥ 20 V DC			
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			

1SBC101991S0201 - Rev. A

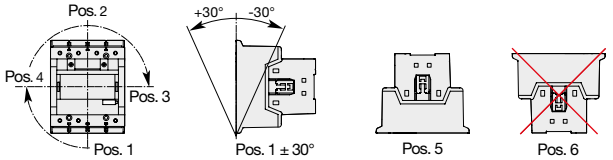
AF116 ... AF370 4-pole contactors

Technical data

Magnet system characteristics

Contactor types	AC / DC operated	AF116	AF140	AF190	AF205	AF265	AF305	AF370
Coil operating limits	AC supply	At θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max						
acc. to IEC 60947-4-1	DC supply	At θ ≤ 70 °C 0.80 x Uc min ... 1.1 x Uc max						
Rated control circuit voltage Uc		24...500 V AC, 20...500 V DC						
Coil consumption								
AC control voltage 50/60 Hz								
24...60 V AC	Average pull-in value	225 VA		165 VA		475 VA		
	Average holding value	5.5 VA		6 VA		8.5 VA		
48...130 V AC	Average pull-in value	170 VA		175 VA		340 VA		
	Average holding value	4 VA		4 VA		17 VA		
100...250 V AC	Average pull-in value	130 VA		220 VA		385 VA		
	Average holding value	6 VA		7 VA		17.5 VA		
250...500 V AC	Average pull-in value	205 VA		185 VA		420 VA		
	Average holding value	16 VA		16 VA		21 VA		
DC control voltage								
20...60 V DC	Average pull-in value	210 W		205 W		400 W		
	Average holding value	2.5 W		2.5 W		3.5 W		
48...130 V DC	Average pull-in value	130 W		130 W		360 W		
	Average holding value	2.5 W		2.5 W		2.5 W		
100...250 V DC	Average pull-in value	135 W		190 W		410 W		
	Average holding value	3 W		2.5 W		4.5 W		
250...500 V DC	Average pull-in value	205 W		190 W		600 W		
	Average holding value	4 W		4 W		4.7 W		
Drop-out voltage		55 % of Uc min						
Voltage sag immunity acc. to SEMI F47		Conditions of use on request						
Dips withstand		≥ 20 ms						
Operating time Coil supply between A1 - A2								
Between coil energization and:	N.O. contact closing	20...55 ms		25...60 ms		30...60 ms		
Between coil de-energization and:	N.O. contact opening	40..70 ms		45...80 ms		45...80 ms		

Mounting characteristics and conditions for use

Contactor types	AC / DC operated	AF116	AF140	AF190	AF205	AF265	AF305	AF370
Mounting positions		 Max. add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 4-pole contactor AF116 ... AF370						
Mounting distances		The contactors can be assembled side by side						
Fixing								
On rail acc. to IEC 60715, EN 60715		-						
By screws		4 x M4		4 x M5				

1SFC101210C0201 - Rev. A

EK550 ... EK1000 4-pole contactors

Technical data

Magnet system characteristics

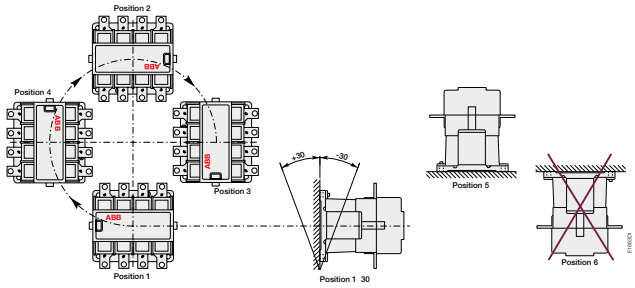
Contactor types			AC operated	**EK550**	**EK1000**
Coil operating limits			AC supply	At θ ≤ 70 °C 0.85 x Uc min...1.1 x Uc max.	
acc. to IEC 60947-4-1				Please also refer to "Mounting characteristics and conditions for use"	
AC control voltage					
Rated control circuit voltage			50 Hz	48...500 V	
			60 Hz	110...600 V	
Coil consumption	Average pull-in value		50 Hz	3500 VA	
			60 Hz	4000 VA	
	50/60 Hz (1)			3800 / 3400 VA	
	Average holding value		50 Hz	125 VA / 50 W	
			60 Hz	140 VA / 60 W	
	50/60 Hz (1)			140 VA /60 W	
Drop-out voltage in % of Uc min.				approx. 45...65 %	
Operating time					
Between coil energization and:			N.O. contact closing	30...60 ms	
			N.C. contact opening	25...55 ms	
Between coil de-energization and:			N.O. contact opening	10...20 ms	
			N.C. contact closing	13...23 ms	

(1) "A" coil voltage: see "Coil voltage code table".

Magnet system characteristics

Contactor types		DC operated	**EK550**	**EK1000**
Coil operating limits		DC supply	At θ ≤ 70 °C 0.85 x Uc min...1.1 x Uc max.	
acc. to IEC 60947-4-1			Please also refer to "Mounting characteristics and conditions for use"	
DC control voltage				
Rated control circuit voltage			24...220 V	
Coil consumption		Average pull-in value	1100 W	
		Average holding value	20 W	
Drop-out voltage			approx. 15...50 % of Uc min.	
Coil time constant				
Open		L/R	12 ms	
Closed		L/R	60 ms	
Operating time				
Between coil energization and:		N.O. contact closing	60...80 ms	
		N.C. contact opening	55...75 ms	
Between coil de-energization and:		N.O. contact opening	10...35 ms	
		N.C. contact closing	13...38 ms	

Mounting characteristics and conditions for use

Contactor types		AC / DC operated	**EK550**	**EK1000**
Mounting positions			 Max. N.O. or N.C. built-in and add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 4-pole contactor EK550, EK1000	
Control voltage / Ambient temperature				
Mounting positions	1, 1±30°, 2, 3, 4, 5	at θ ≤ 70 °C	0.85...1.1 x Uc	
	6	at θ ≤ 70 °C	Unauthorized	
Mounting distances			The contactors can be assembled side by side	
Fixing				
On rail according to IEC 60715, EN 60715			–	
By screws			4 x M6 (2)	

(2) Damping elements are supplied.

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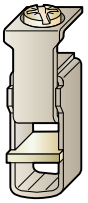
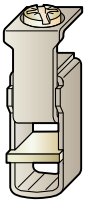
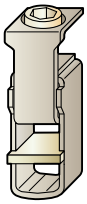
AF09 ... AF80 4-pole contactors

Technical data

Connecting characteristics

Contactor types			AF09	AF16	AF26	AF38	AF40	AF52	AF80
Main terminals			 Screw terminals with cable clamp		 Screw terminals with double connector 2 x (5.5 width x 6.8 depth)		 Screw terminals with double connector 2 x (9.3 width x 7.9/10.3 depth)		 Screw terminals with double connector 2 x (12.4 width x 9.3/11.1 depth)
Connection capacity (min. ... max.)									
Main conductors (poles)									
Rigid	Solid (≤ 4 mm²)	1 x	1...6 mm²		1.5...16 mm²		6...35 mm²		6...70 mm²
	Stranded (≥ 6 mm²)	2 x	1...6 mm²		1.5...16 mm²		6...35 mm²		6...50 mm²
Flexible with non insulated ferrule		1 x	0.75...6 mm²		1.5...16 mm²		4...35 mm²		6...50 mm²
		2 x	0.75...6 mm²		1.5...16 mm²		4...35 mm²		6...50 mm²
Flexible with insulated ferrule		1 x	0.75...4 mm²		1.5...16 mm²		4...35 mm²		6...50 mm²
		2 x	0.75...2.5 mm²		1.5...16 mm²		4...35 mm²		6...50 mm²
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		1 x	1...2.5 mm²						
		2 x	1...2.5 mm²						
Flexible with non insulated ferrule		1 x	0.75...2.5 mm²						
		2 x	0.75...2.5 mm²						
Flexible with insulated ferrule		1 x	0.75...2.5 mm²						
		2 x	0.75...1.5 mm²						
Lugs		L <	8 mm						
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18...14						
Stripping length			10 mm						
Tightening torque			1.2 Nm / 11 lb.in						
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / 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						

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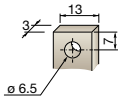
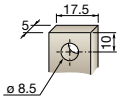
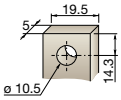
AF116 ... AF370 4-pole contactors

Technical data

Connecting characteristics

Contactor types	AC / DC operated	AF116	AF140	AF190	AF205	AF265	AF305	AF370
Main terminals Flat type								
Connection capacity (min. ... max.)								
Main conductors (poles)								
Cu cable - Stranded	1 x	10...95 mm²		6...150 mm²		16...300 mm²		
Clamp type		LD... included (1)		1SDA066917R1		1SDA055016R1		
Tightening torque		8 Nm		14 Nm		25 Nm		
Cu cable - Stranded	2 x	10...95 mm²		50...120 mm²		70...185 mm²		
Clamp type		LD... included (1)		1SFN074709R1000, LZ185-2C/120		1SCA022194R0890, OZXB4		
Tightening torque		8 Nm		16 Nm		22 Nm		
Al cable - Stranded	1 x	–		95...185 mm²		185...240 mm²		
Clamp type		–		1SDA054988R1		1SDA055020R1		
Tightening torque		–		31 Nm		43 Nm		
Cu cable - Flexible	1 x	10...70 mm²		6...120 mm²		16...240 mm²		
Clamp type		LD... included (1)		1SDA066917R1		1SDA055016R1		
Tightening torque		8 Nm		14 Nm		25 Nm		
Cu cable - Flexible	2 x	10...70 mm²		50...95 mm²		70...185 mm²		
Clamp type		LD... included (1)		1SFN074709R1000, LZ185-2C/120		1SCA022194R0890, OZXB4		
Tightening torque		8 Nm		16 Nm		22 Nm		
Lugs	L ≤	22 mm (.866 in)		24 mm (.945 in)		32 mm (1.260 in)		
	Ø >	6 mm (.236 in)		8 mm (.315 in)		10 mm (.394 in)		
Socket type		LL... included		LL... included		LL... included		
Tightening torque		9 Nm / 80 lb.in		18 Nm / 160 lb.in		28 Nm / 248 lb.in		
Connection capacity acc. to UL / CSA	1 x	AWG 6...3/0		6...300 MCM		4...400 MCM		
Clamp type		LD... included (1)		ATK185 (2)		ATK300 (2)		
Tightening torque		8 Nm / 71 lb.in		34 Nm / 301 lb.in		42 Nm / 372 lb.in		
Connection capacity acc. to UL / CSA	2 x	AWG 6...3/0		–		4...500 MCM		
Clamp type		LD... included (1)		–		ATK300/2 (2)		
Tightening torque		8 Nm / 71 lb.in		–		42 Nm / 372 lb.in		
Auxiliary conductors (coil terminals)								
Solid / stranded	1 x	1...4 mm²						
	2 x	1...4 mm²						
Flexible	1 x	0.75...2.5 mm²						
	2 x	0.75...2.5 mm²						
Flexible with non insulated ferrule	1 x	0.75...2.5 mm²						
	2 x	0.75...2.5 mm²						
Flexible with insulated ferrule	1 x	0.75...2.5 mm²						
	2 x	0.75...2.5 mm²						
Lugs	L <	8 mm						
	l >	3.5 mm						
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...14						
Stripping length		9 mm						
Tightening torque		1.00 Nm / 9 lb.in						
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / 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 AF116 ... AF146-30-..B.
(2) Available in North America only.

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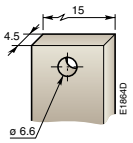
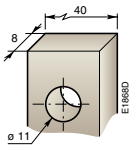
EK550 ... EK1000 4-pole contactors

Technical data

Connecting characteristics

Contactor types			AC or DC operated	EK550	EK1000
Main terminals Flat type					
Connection capacity (min. ... max.)					
Main conductors (poles)					
Rigid with connector	Cu cable		1 x	70...300 mm²	-
	Al/Cu cable		1 x	70...300 mm²	95...300 mm²
	Al/Cu cable		2 x	35...185 mm²	95...300 mm²
Bars or lugs			L ≤	55 mm	
			Ø >	10 mm	
Connection capacity acc. to UL/CSA			1 or 2 x	3 x 4 - 500 MCM	-
Tightening torque	Recommended			18 Nm / 160 lb.in	
	Max.			22 Nm	
Auxiliary conductors (coil terminals)					
Rigid solid			1 x	0.5...2.5 mm²	
			2 x	0.5...2.5 mm²	
Flexible with ferrule			1 x	0.5...2.5 mm²	
			2 x	0.5...2.5 mm²	
Bars or lugs			L ≤	8 mm	
			l >	3.7 mm	
Connection capacity acc. to UL/CSA			1 or 2 x	18...14 AWG	
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	
				Screws and bolts	
Coil terminals (delivered in open positions)				M3.5	
			Screwdriver type	Flat Ø 5.5 mm / Pozidriv 2	

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4-pole contactors

Electrical durability and utilization categories

General

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

Generally speaking Ic = m x Ie where m is a multiple of the load operational current.
On next pages, the curves corresponding to categorie AC-1 represent the electrical durability variation of standard contactors in relation to the breaking current Ic.

Electrical durability curves:
- categories AC-1: the curves represent the electrical durability variation of standard contactors in relation to the breaking current Ic.

Electrical durability is expressed in millions of operating cycles.

Curve utilization mode
Electrical durability forecast and contactor selection for categories AC-1
- Note the characteristics of the load to be controlled:
  - Operational voltage..... Ue
  - Current normally drawn..... Ie (Ue / Ie / kW relation for motors, see "Motor rated operational powers and currents").
  - Utilization category..... AC-1
  - Breaking current..... Ic = Ie for AC-1
- Define the number of operating cycles N required.
- On the diagram corresponding to the operational category, select the contactor with the curve immediately above the intersection point (Ic ; N).

Case of uninterrupted duty
For uninterrupted duty, some verifications of preventing maintenance are necessary to check the functionality of the concerned product (consult us).
The 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.

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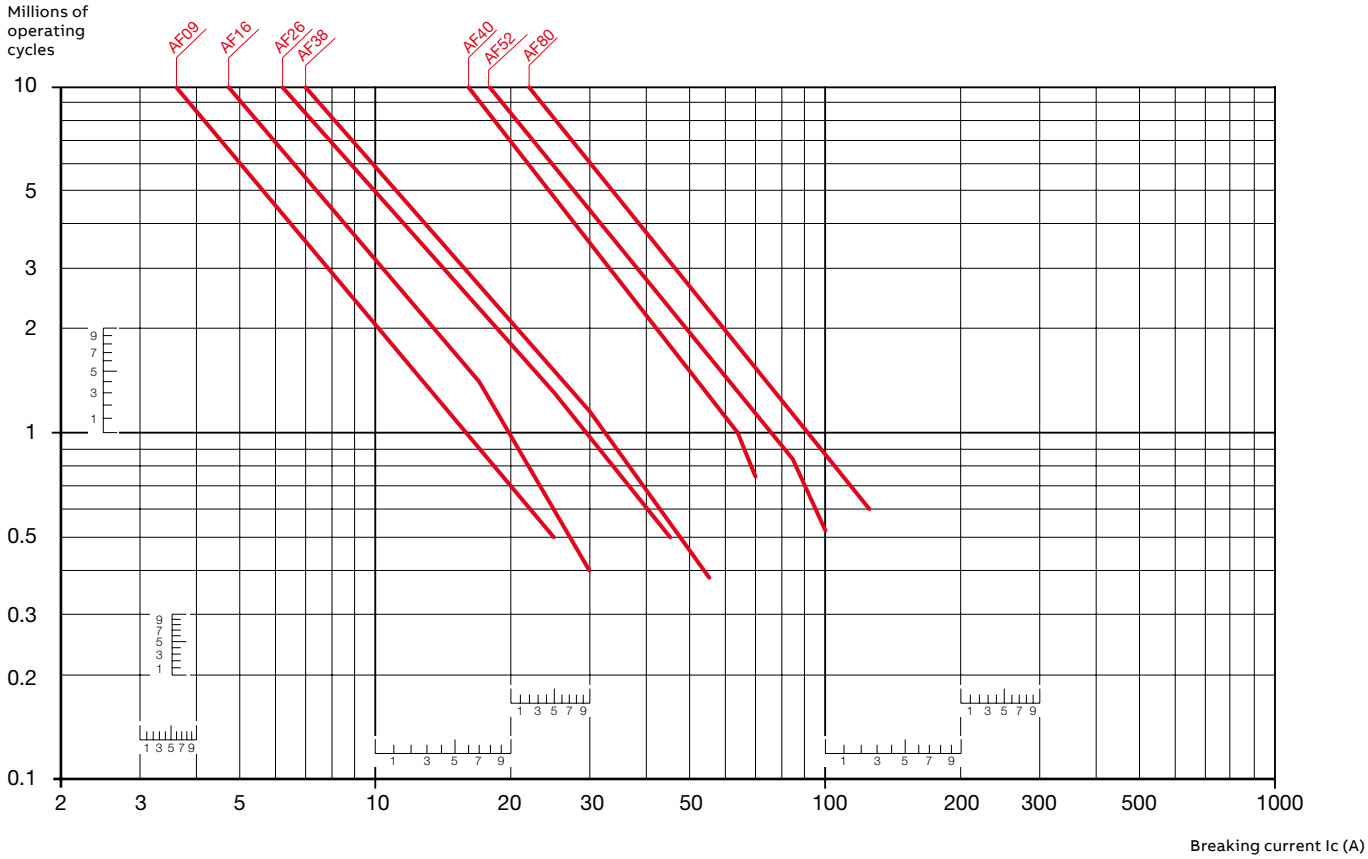
4-pole contactors

Electrical durability

Electrical durability for AC-1 utilization category - Ue ≤ 690 V
Switching non-inductive or slightly inductive loads. The breaking current Ic for AC-1 is equal to the rated operational current of the load.

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



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Notes

Courtesy of Steven Engineering, Inc - (800) 258-9200 - sales@steveneng.com - www.stevenengineering.com

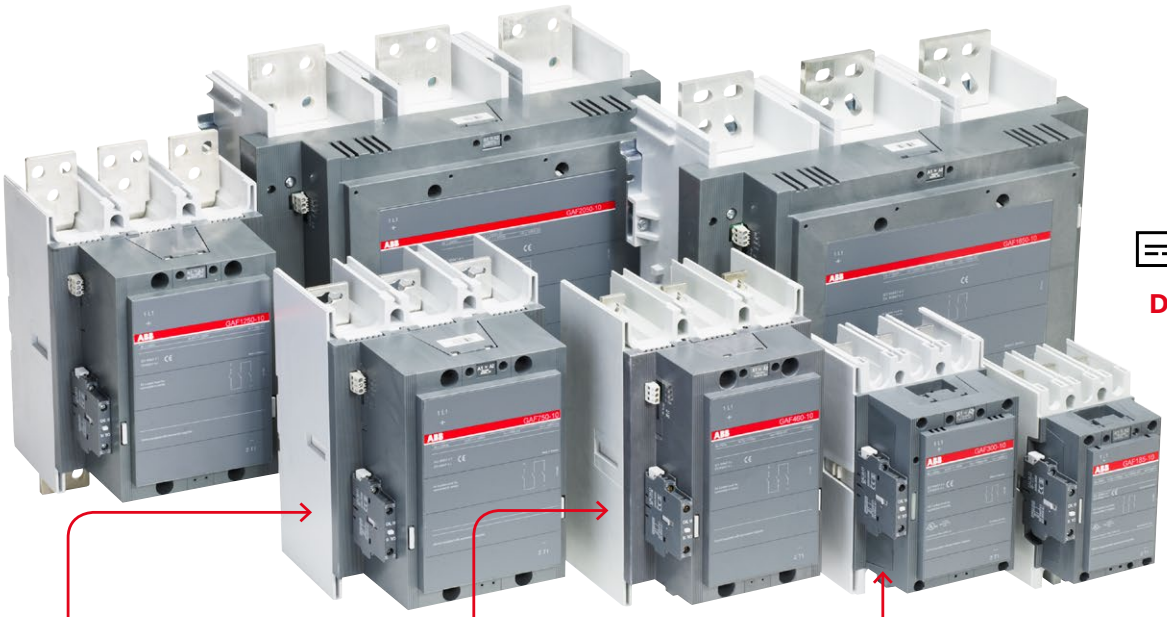
Contactors for DC switching

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**

GAF contactors

The compact efficient way to switch DC loads



DC

Up to 2050 A 1000 V DC-1

The GAF range of DC contactors extends from 250 A up to 2050 A for DC-1 and UL DC general use at 1000 V.

Proven technology

The GAF range of contactor is based on the tested and well proven AFcontactor range. The GAF share all accessories with the AF range, reducing the number of parts needed.

Easy selection

The GAF contactors feature ABBs AF technology and all of its features. With only four coils the entire voltage range of 20 V DC and 24 V AC to 500 V AC / DC is covered. The built in surge suppression takes away the need of a separate surge suppressor. All to enable easier selection of contactors.

PV plant applications for DC switching
Contactors are typically selected for applications that need remote control and switching of the central inverter's DC side at least once per day. Application examples include: disconnection of the inverter from PV strings; or changing the string configuration to increase plant capacity.

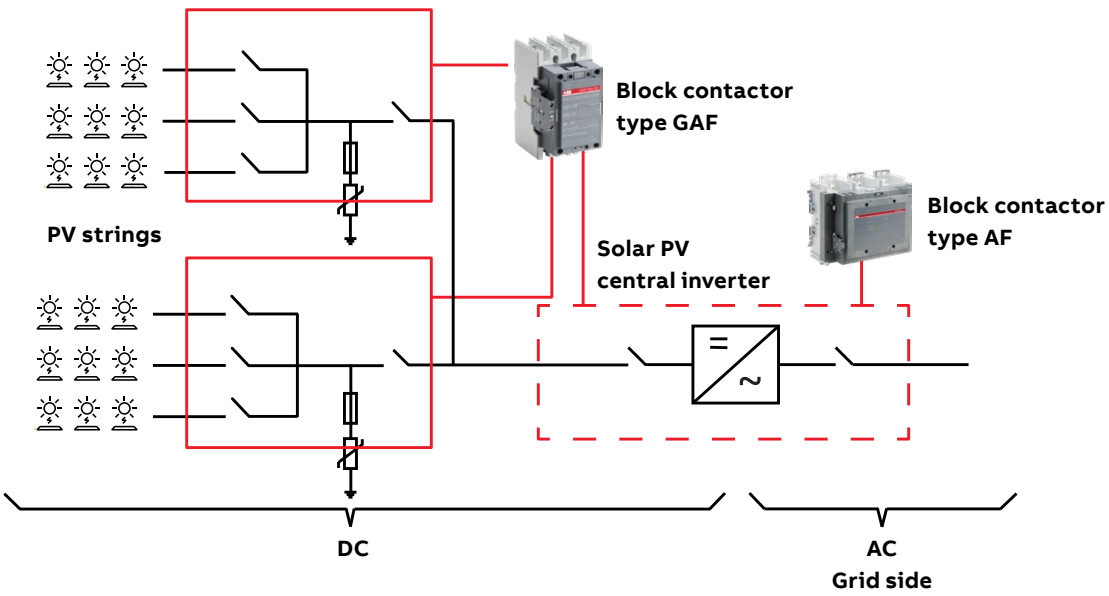
GAF contactors

The compact efficient way to switch DC loads

Optimised for central inverters

ABB offers the widest range of compact contactors for DC load switching in low voltage power distribution applications. Due to their breaking performance for DC circuits, GAF contactors can switch DC loads of up to 2050 A 1000 V DC-1.

PV solar plant



Contactors for DC switching applications

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

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

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

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

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

Operational voltage
- The higher the operational voltage value is, the more difficult it is to break the arc.
- The use of main poles connected in series will allow to increase the value of switched voltage.

However, the maximum switched voltage must be within the max operational voltage of the contactor.
All the poles required for breaking must be connected in series between the load and the source polarity not linked to earth (or chassis) (see recommended connection diagrams).

ABB offer a large choice of possibilities for DC switching applications (see selection tables):
- Standard 3-pole or 4-pole contactors with either 1- pole breaking or breaking with poles connected in series.
- Special contactors designed for DC breaking with permanent magnets fitted on the main poles for use with the 3 poles connected in series and considered as 1-pole devices:
  - GA75 and GAE75 contactors: the 3 poles are connected in series via two supplied and fitted insulated connections (25 mm²)
  - GAF145 … GAF2050 contactors: the 3 poles must be connected in series by the user according to conductor cross-sectional area (refer to main pole technical data) or by using LP connection bars to be ordered separately.

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 2050 A in ambient temperatures from -25 °C up to 40 °C.
For higher values of current or voltage or heavy DC switching applications see bar mounted R contactors.

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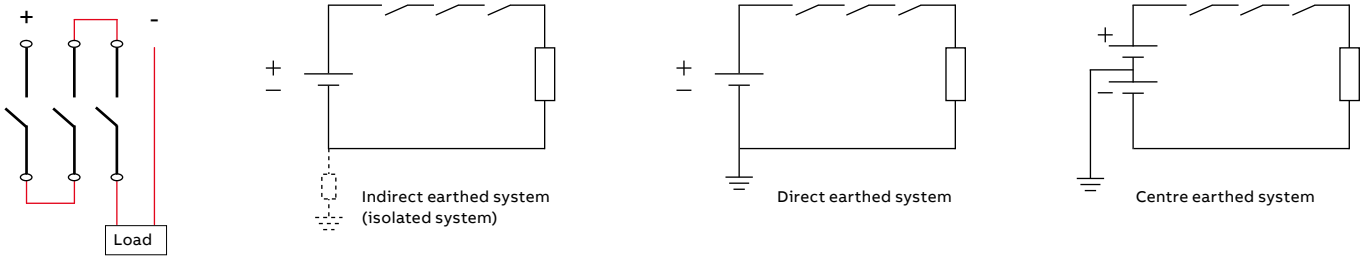
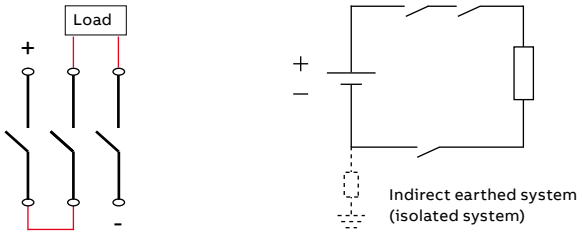
Connection diagrams

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.



Alternative connection (not possible for GA75, GAE75)
The load could be placed in between the contacts in a indirect earthed system. If not connected according to the configuration below, a fault to earth could result in one or two contacts breaking the full load which the contactor is not approved for.



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

Polarity:
For all GA, GAE, GAF types, connection polarities must be respected.
(See instruction leaflet and see markings on the main terminals or the contactor front)

1SBC101980S0201

AF09 ... AF96 contactors

DC circuit switching

General

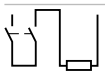
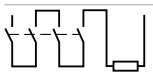
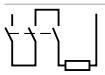
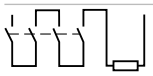
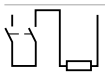
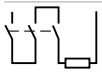
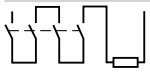
The arc switching on DC is more difficult than on AC.

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

Technical data

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

Selection table

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

For additional ratings ≥ 440 V, please consult us.
Note: For AFS09 ... AFS96 safety contactors, DC switching rating are the same as AF09 ... AF96 3-pole contactors.

1SBC101911S0201

AF116 ... AF2650 contactors

DC circuit switching

Selection table

Contactor types	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
	3 or 4-pole		3-pole	3 or 4-pole					3-pole								
Utilization category DC-1, L/R ≤ 1 ms																	
≤ 72 V	160	200	200	250	350	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
90 V	160	200	200	250	350	400	500	520	-	-	-	-	-	-	-	-	-
100 V	-	-	-	250	350	400	500	520	-	-	-	-	-	-	-	-	-
110 V	-	-	-	-	-	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
≤ 72 V	160	200	200	250	350	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
110 V	160	200	200	250	350	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
175 V	160	200	200	250	350	400	500	520	600 A	700 A	800 A	1050 A	-	-	-	-	-
200 V	-	-	-	250	350	400	500	520	600 A	700 A	800 A	1050 A	-	-	-	-	-
220 V	-	-	-	-	-	400	500	520	600 A	700 A	800 A	1050 A	-	-	-	-	-
(1) ≤ 72 V	160	200	200	250	350	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
110 V	160	200	200	250	350	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
220 V	160	200	200	250	350	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
260 V	160	200	200	250	350	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
300 V	-	-	-	250	350	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
340 V	-	-	-	-	-	400	500	520	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
440 V	-	-	-	-	-	-	-	-	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
600 V	-	-	-	-	-	-	-	-	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
780 V	-	-	-	-	-	-	-	-	600 A	700 A	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
850 V	-	-	-	-	-	-	-	-	-	-	800 A	1050 A	1250 A	1350 A	1650 A	2050 A	2650 A
< 350 V	200	200	-	250	350	400	500	520	-	-	-	-	-	-	-	-	-
400 V	-	-	-	250	350	400	500	520	-	-	-	-	-	-	-	-	-
440 V	-	-	-	-	-	400	500	520	-	-	-	-	-	-	-	-	-

(1) AF2650 at 780 V DC = 2650 A

Utilization category DC-3, L/R ≤ 2 ms

≤ 72 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	-	-	-	-	-
110 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	-	-	-	-	-
≤ 72 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	-	-	-	-	-
110 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	-	-	-	-	-
220 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	-	-	-	-	-
≤ 72 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	-	-	-	-	-
110 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	-	-	-	-	-
220 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	-	-	-	-	-
440 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	-	-	-	-	-
600 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	-	-	-	-	-
320 V	145 A	160 A	-	250 A	275 A	350 A	400 A	450 A	-	-	-	-	-	-	-	-	-

Utilization category DC-5, L/R ≤ 7.5 ms

≤ 72 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	-	-	-	-	-
110 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	-	-	-	-	-
≤ 72 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	-	-	-	-	-
110 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	-	-	-	-	-
220 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	-	-	-	-	-
≤ 72 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	-	-	-	-	-
110 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	-	-	-	-	-
220 V	145 A	160 A		250 A	275 A	350 A	400 A	450 A	600 A	700 A	800 A	1050 A	-	-	-	-	-
440 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	-	-	-	-	-
600 V	-	-		-	-	-	-	-	600 A	700 A	800 A	1050 A	-	-	-	-	-
320 V	145 A	160 A	-	250 A	275 A	350 A	400 A	450 A	-	-	-	-	-	-	-	-	-

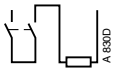
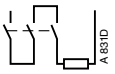
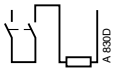
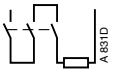
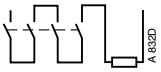
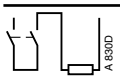
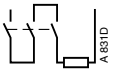
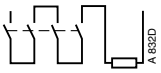
For additional ratings ≥ 440 V, please consult us.

1SBC101944S0201 - Rev. B

EK550, EK1000 contactors

DC circuit switching

Selection table

Contactor types			EK550	EK1000
Utilization category DC-1, L/R ≤ 1 ms				
 A 829D				
	≤ 72 V	A	550	–
	110 V	A	550	–
 A 830D	≤ 72 V	A	800	–
	110 V	A	800	–
	220 V	A	800	–
 A 831D	≤ 72 V	A	800	–
	110 V	A	800	–
	220 V	A	800	–
	440 V	A	650	–
	600 V	A	650	–
 A 832D	≤ 72 V	A	800	–
	110 V	A	800	–
	220 V	A	800	–
	440 V	A	650	–
	600 V	A	650	–
Utilization category DC-3, L/R ≤ 2 ms				
 A 829D				
	≤ 72 V	A	550	–
 A 830D	≤ 72 V	A	650	–
	110 V	A	650	–
	220 V	A	650	–
 A 831D	≤ 72 V	A	650	–
	110 V	A	650	–
	220 V	A	650	–
	440 V	A	650	–
	600 V	A	650	–
 A 832D	≤ 72 V	A	650	–
	110 V	A	650	–
	220 V	A	650	–
	440 V	A	650	–
	600 V	A	650	–
Utilization category DC-5, L/R ≤ 7.5 ms				
 A 830D	≤ 72 V	A	650	–
	110 V	A	650	–
	220 V	A	650	–
 A 831D	≤ 72 V	A	650	–
	110 V	A	650	–
	220 V	A	650	–
	440 V	A	650	–
	600 V	A	650	–
 A 832D	≤ 72 V	A	650	–
	110 V	A	650	–
	220 V	A	650	–
	440 V	A	650	–
	600 V	A	650	–

1SBC101986S0201

Notes

GA75 1-pole contactors
100 A DC-1
AC operated

GA75-10-11

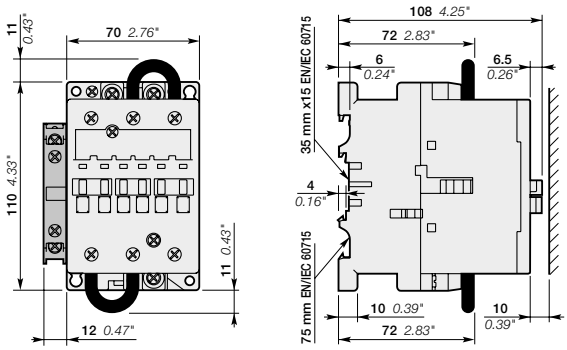
GA75 contactors are designed for controlling shunt or series motors and resistive or slightly inductive loads up to 1000 V DC.

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

- main poles arc chutes fitted with permanent magnets specially designed for DC breaking. The connection polarities must be respected.
- control circuit: AC operated
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC Rated operational current θ ≤ 55 °C 440 V DC-1 A	UL / CSA General use rating 440 V DC A	Rated control circuit voltage Uc (1) V 50 Hz	V 60 Hz	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
100	100	24	24	0 0	GA75-10-00	1SBL411025R8100	1.220
				1 1	GA75-10-11	1SBL411025R8111	1.260
		48	48	0 0	GA75-10-00	1SBL411025R8300	1.220
				1 1	GA75-10-11	1SBL411025R8311	1.260
		110	110...120	0 0	GA75-10-00	1SBL411025R8400	1.220
				1 1	GA75-10-11	1SBL411025R8411	1.260
		220...230	230...240	0 0	GA75-10-00	1SBL411025R8000	1.220
				1 1	GA75-10-11	1SBL411025R8011	1.260
		230...240	240...260	0 0	GA75-10-00	1SBL411025R8800	1.220
				1 1	GA75-10-11	1SBL411025R8811	1.260
		380...400	400...415	0 0	GA75-10-00	1SBL411025R8500	1.220
				1 1	GA75-10-11	1SBL411025R8511	1.260
		400...415	415...440	0 0	GA75-10-00	1SBL411025R8600	1.220
				1 1	GA75-10-11	1SBL411025R8611	1.260

(1) Other control voltages see voltage codes table.



GA75-10-11

Main dimensions mm, inches

1SBC101423502 01

GAE75 1-pole contactors
100 A DC-1
DC operated

GAE75-10-11

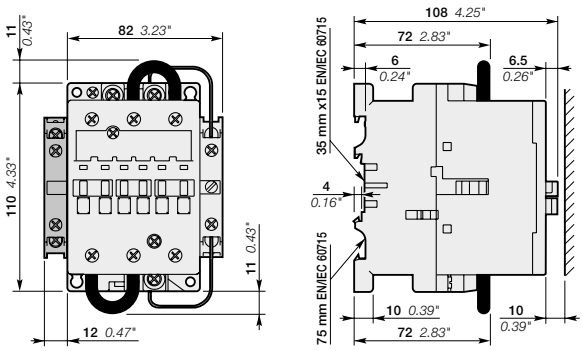
GAE75 contactors are designed for controlling shunt or series motors and resistive or slightly inductive loads up to 1000 V DC.

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

- main poles arc chutes fitted with permanent magnets specially designed for DC breaking. The connection polarities must be respected.
- control circuit: DC operated with double winding coil (and factory mounted lagging contact for "holding" winding insertion)
- add-on auxiliary contact blocks for side mounting and a wide range of accessories

IEC Rated operational current θ ≤ 55 °C 440 V DC-1 A	UL/CSA General use rating 440 V DC A	Rated control circuit voltage Uc (1) V DC	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
100	100	12	0 0	GAE75-10-00	1SBL419025R8000	1.260
			1 1	GAE75-10-11	1SBL419025R8011	1.300
		24	0 0	GAE75-10-00	1SBL419025R8100	1.260
			1 1	GAE75-10-11	1SBL419025R8111	1.300
		48	0 0	GAE75-10-00	1SBL419025R8300	1.260
			1 1	GAE75-10-11	1SBL419025R8311	1.300
		110	0 0	GAE75-10-00	1SBL419025R8600	1.260
			1 1	GAE75-10-11	1SBL419025R8611	1.300
		125	0 0	GAE75-10-00	1SBL419025R8700	1.260
			1 1	GAE75-10-11	1SBL419025R8711	1.300
		220	0 0	GAE75-10-00	1SBL419025R8800	1.260
			1 1	GAE75-10-11	1SBL419025R8811	1.300
		240	0 0	GAE75-10-00	1SBL419025R8900	1.260
			1 1	GAE75-10-11	1SBL419025R8911	1.300

(1) Other control voltages see voltage codes table.



GAE75-10-11

Main dimensions mm, inches

1SBC101424S0201 - Rev. A

GAF185 ... GAF300 3-pole contactors
250 to 400 A DC-1

AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

GAF185-10-11

GAF300-10-11

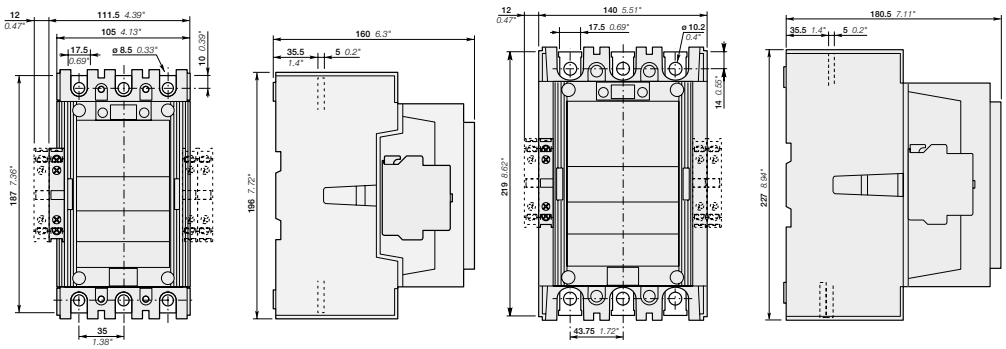
GAF185 ... GAF300 contactors are designed for controlling resistive or slightly inductive loads up to 1000 V DC.

These contactors are of the block type design with 3 main poles for connection in series by the user according to conductor cross-sectional area or by using LP connection bars to be ordered separately.

- main poles arc chutes fitted with permanent magnets specially designed for DC breaking. The connection polarities must be respected.
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 3 coils to cover control voltages between 48...250 V 50/60 Hz and 20...250 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC Rated operational current θ ≤ 55 °C 1000 V DC-1 A	UL / CSA General use rating θ ≤ 40 °C 1000 V DC A	Rated control circuit voltage Uc V 50/60 Hz	 V DC	Auxiliary contacts fitted NO NC	Type	Order code	Weight Pkg (1 pce) kg
250	250	-	20...60	1 1	GAF185-10-11 (1)	1SFL497025R7211	3.600
		48...130	48...130	1 1	GAF185-10-11	1SFL497025R6911	3.600
		100...250	100...250	1 1	GAF185-10-11	1SFL497025R7011	3.600
400	400	-	20...60	1 1	GAF300-10-11 (1)	1SFL557025R7211	6.200
		48...130	48...130	1 1	GAF300-10-11	1SFL557025R6911	6.200
		100...250	100...250	1 1	GAF300-10-11	1SFL557025R7011	6.200

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



GAF185 GAF300

Main dimensions mm, inches

1SFC101023C0201 - Rev. A

GAF460 ... GAF750 3-pole contactors
600 to 875 A DC-1

AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

1SFC101100F0001

GAF460-10-11

1SFC101102F0001

GAF750-10-11

GAF460 ... GAF750 contactors are designed for controlling resistive or slightly inductive loads up to 1000 V DC.

These contactors are of the block type design with 3 main poles for connection in series by the user according to conductor cross-sectional area or by using LP connection bars to be ordered separately.

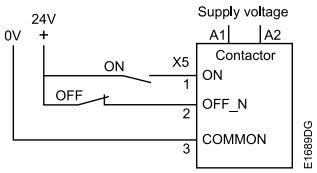
- main poles arc chutes fitted with permanent magnets specially designed for DC breaking. The connection polarities must be respected.
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 48...500 V 50/60 Hz and 24...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

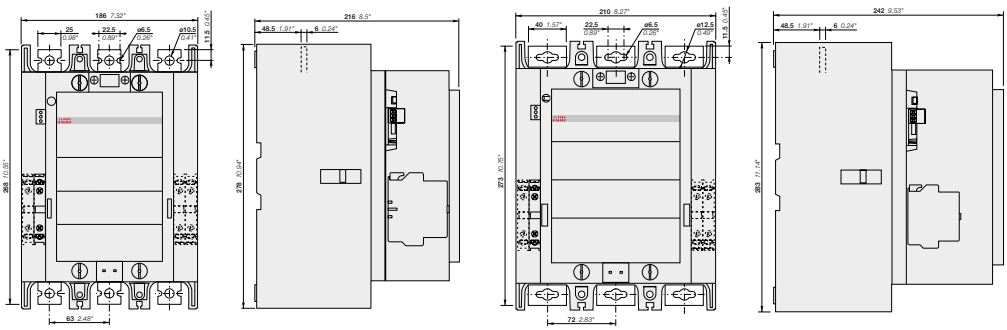
IEC Rated operational current θ ≤ 55 °C 1000 V DC-1 A	UL / CSA General use rating θ ≤ 40 °C 1000 V DC A	Rated control circuit voltage Uc V 50/60 Hz	 V DC	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
600	650	-	24...60	1 1	GAF460-10-11 (1)	1SFL597025R6811	12.000
		48...130	48...130	1 1	GAF460-10-11	1SFL597025R6911	12.000
		100...250	100...250	1 1	GAF460-10-11	1SFL597025R7011	12.000
		250...500	250...500	1 1	GAF460-10-11	1SFL597025R7111	12.000
875	900	-	24...60	1 1	GAF750-10-11 (1)	1SFL637025R6811	15.000
		48...130	48...130	1 1	GAF750-10-11	1SFL637025R6911	15.000
		100...250	100...250	1 1	GAF750-10-11	1SFL637025R7011	15.000
		250...500	250...500	1 1	GAF750-10-11	1SFL637025R7111	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.

GAF460 ... GAF750 are equipped with low voltage inputs for control, for example by a PLC.

Control inputs





GAF460

GAF750

Main dimensions mm, inches

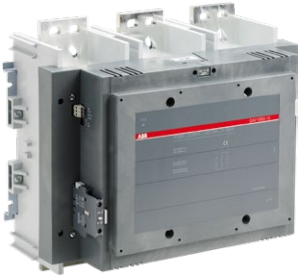
1SFC101024C0201 - Rev. A

GAF1250 ... GAF2050 3-pole contactors
1040 to 1750 A DC-1

AC / DC operated with 1 N.O. + 1 N.C. auxiliary contacts

1SFC101004F0201

GAF1250-10-11



1SFC101004F0201

GAF1650-10-11

GAF1250 ... GAF2050 contactors are designed for controlling resistive or slightly inductive loads up to 1000 V DC.

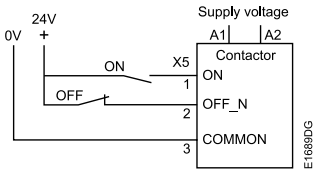
These contactors are of the block type design with 3 main poles for connection in series by the user according to conductor cross-sectional area or by using LP connection bars to be ordered separately.

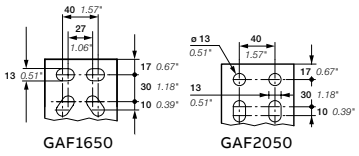
- main poles arc chutes fitted with permanent magnets specially designed for DC breaking. The connection polarities must be respected.
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 coils to cover control voltages between 48...500 V 50/60 Hz and 24...500 V DC
  - can manage large control voltage variations
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

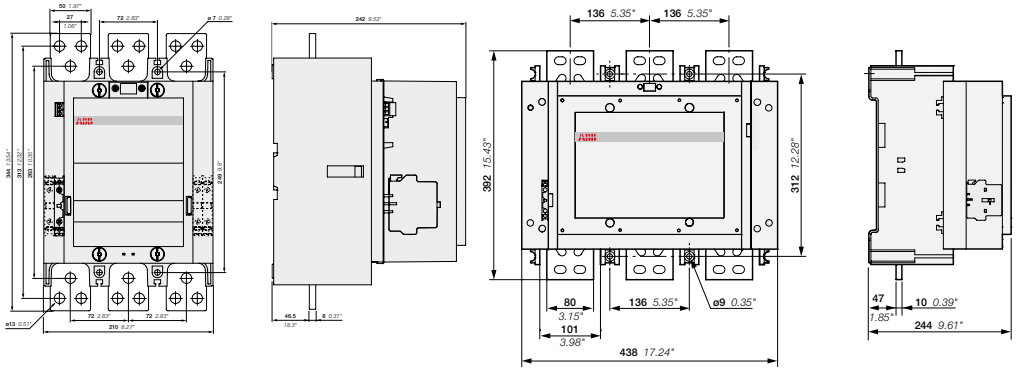
IEC Rated operational current θ ≤ 55 °C 1000 V DC-1 A	UL / CSA General use rating θ ≤ 40 °C 1000 V A	Rated control circuit voltage Uc V 50/60 Hz	 V DC	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
1040	1210	-	24...60	1 1	GAF1250-10-11	1SFL647025R6811	16.000
		48...130	48...130	1 1	GAF1250-10-11	1SFL647025R6911	16.000
		100...250	100...250	1 1	GAF1250-10-11	1SFL647025R7011	16.000
		250...500	250...500	1 1	GAF1250-10-11	1SFL647025R7111	16.000
1450	1650	100...250	100...250	1 1	GAF1650-10-11	1SFL677025R7011	35.000
1750	2050	100...250	100...250	1 1	GAF2050-10-11	1SFL707025R7011	35.000

GAF1250 ... AF2050 are equipped with low voltage inputs for control, for example by a PLC

Control inputs







GAF1250

GAF1650, GAF2050

Main dimensions mm, inches

1SFC101025C0201 - Rev. B

GA75 ... GAF2050 contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC operated	**GA75**							
	DC operated	**GAE75**							
	AC / DC operated		**GAF185**	**GAF300**	**GAF460**	**GAF750**	**GAF1250**	**GAF1650**	**GAF2050**
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1							
Rated operational voltage Ue max.		1000 V DC							
DC-1 Utilization category, L/R ≤ 1 ms For air temperature close to contactor Ie / Rated operational current DC-1									
θ ≤ 40 °C	220 V	120 A	275 A	500 A	700 A	1050 A	1250 A	1650 A	2050 A
	440 V	100 A	275 A	500 A	700 A	1050 A	1250 A	1650 A	2050 A
	600 V	75 A	275 A	500 A	700 A	1050 A	1250 A	1650 A	2050 A
	1000 V	35 A	275 A	500 A	700 A	1050 A	1250 A	1650 A	2050 A
θ ≤ 55 °C	220 V	100 A	250 A	400 A	600 A	875 A	1040 A	1450 A	1750 A
	440 V	100 A	250 A	400 A	600 A	875 A	1040 A	1450 A	1750 A
	600 V	75 A	250 A	400 A	600 A	875 A	1040 A	1450 A	1750 A
	1000 V	35 A	250 A	400 A	600 A	875 A	1040 A	1450 A	1750 A
θ ≤ 70 °C	220 V	85 A	180 A	325 A	480 A	720 A	875 A	1270 A	1500 A
	440 V	85 A	180 A	325 A	480 A	720 A	875 A	1270 A	1500 A
	600 V	75 A	180 A	325 A	480 A	720 A	875 A	1270 A	1500 A
	1000 V	35 A	180 A	325 A	480 A	720 A	875 A	1270 A	1500 A
With conductor cross-sectional area (3)		(1)	150 mm²	300 mm² (2)	2x 240 mm²	2x 50x8 mm²	2x 100x5 mm²	3x 100x5 mm²	4x 100x5 mm²
DC-3 Utilization category, L/R ≤ 2 ms Ie / Rated operational current DC-3									
θ ≤ 55 °C	220 V	100 A	-						
	440 V	85 A	-						
DC-5 Utilization category, L/R ≤ 7.5 ms Ie / Rated operational current DC-5									
θ ≤ 55 °C	220 V	85 A	-						
	440 V	35 A	-						
Maximum electrical switching frequency		300 cycles/h							

(1) Refer to IEC 60947-1, table 9.
(2) For currents up to 370 A, use 2 x LP300 kits.For higher currents, use 300 mm² conductors of minimum length 500 mm together with terminal extension/enlargement (LX300/LW300).
(3) To minimize terminal temperature for GAF185 ... GAF2050, length of connection should be at least 0.5 m per pole.

Main pole - Utilization characteristics according to UL / CSA

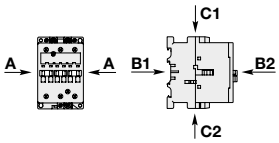
Contactor types	AC operated	**GA75**							
	DC operated	**GAE75**							
	AC / DC operated		**GAF185**	**GAF300**	**GAF460**	**GAF750**	**GAF1250**	**GAF1650**	**GAF2050**
Standards		UL 508, CSA C22.2 N°14		UL 60947-4-1, CSA C22.2 N°60947.4-1					
Maximum operational voltage		1000 V DC							
UL / CSA DC general use rating									
θ ≤ 40 °C	440 V	100 A	250 A	400 A	650 A	900 A	1210 A	1650 A	2050 A
	600 V	75 A	250 A	400 A	650 A	900 A	1210 A	1650 A	2050 A
	1000 V	35 A	250 A	400 A	650 A	900 A	1210 A	1650 A	2050 A
Maximum electrical switching frequency		300 cycles/h							

1SBC101982S0201 - Rev. B

GA75 and GAE75 contactors

Technical data

General technical data

Contactor types	AC operated	**GA75**
	DC operated	**GAE75**
Rated insulation voltage Ui		
acc. to IEC 60947-4-1		1000 V
acc. to UL		600 V
Rated impulse withstand voltage Uimp.		8 kV
Ambient air temperature close to contactor		
Operation		-40...+70 °C
Storage		-60...+80 °C
Climatic withstand		acc. to IEC 60068-2-30 and 60068-2-11 - UTE C 63-100 specification II
Maximum operating altitude (without derating)		3000 m
Mechanical durability		
Number of operating cycles		10 millions operating cycles (5 millions for GAE75)
Max. switching frequency		3600 cycles/h
Shock withstand acc. to IEC 60068-2-27 and EN 60068-2-27 Mounting position 1		
	Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position
	A	20 g
	B1	10 g closed position / 5 g open position
	B2	15 g
	C1	20 g
	C2	20 g

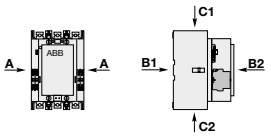
1SBC101983S0201 - Rev. A

GAF185 ... GAF2050 contactors

Technical data

General technical data

Contactor types	AC / DC operated	GAF185	GAF300	GAF460	GAF750	GAF1250	GAF1650	GAF2050
Rated insulation voltage Ui								
acc. to IEC 60947-4-1		1000 V						
acc. to UL		600 V						
Rated impulse withstand voltage Uimp.		8 kV						
Ambient air temperature close to contactor								
Operation		-40 to +70 °C						
Storage		-40 to +70 °C						
Climatic withstand		acc. to IEC 60068-2-30						
Maximum operating altitude (without derating)		3000 m						
Mechanical durability								
Number of operating cycles		5 millions operating cycles					0.5 millions operating cycles	
Max. switching frequency		300 cycles/h					60 cycles/h	
Shock withstand acc. to IEC 60068-2-27 and EN 60068-2-27 Mounting position 1								
	Shock direction	1/2 sinusoidal shock for 30 ms: no change in contact position, closed or open position						
	A	5 g					-	
	B1	5 g					-	
	B2	5 g					-	
	C1	5 g					-	
	C2	5 g					-	



1SFC101178C0201 - Rev. A

GA75 and GAE75 contactors

Technical data

Magnet system characteristics

Contactor types		AC operated	**GA75**
Coil operating limits		AC supply	At θ ≤ 55 °C 0.85...1.1 x Uc
acc. to IEC 60947-4-1			Please also refer to "Mounting characteristics and conditions for use"
AC control voltage			
Rated control circuit voltage Uc		at 50 Hz	24...690 V
		at 60 Hz	24...690 V
Coil consumption	Average pull-in value	50 Hz	180 VA
		60 Hz	210 VA
		50/60 Hz (1)	190 VA / 180 VA
	Average holding value	50 Hz	18 VA / 5.5 W
		60 Hz	18 VA / 5.5 W
		50/60 Hz (1)	18 VA / 5.5 W
Drop-out voltage			Approx. 40...65 % of Uc
Operating time			
Between coil energization and:		N.O. contact closing	8...27 ms
		N.C. contact opening	7...22 ms
Between coil de-energization and:		N.O. contact opening	4...11 ms
		N.C. contact closing	7...14 ms

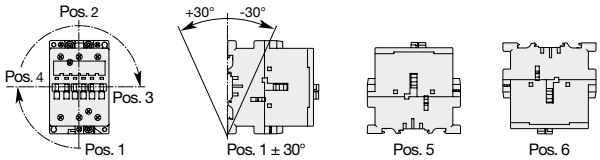
(1) 50/60 Hz coils: see "Voltage code table".

Magnet system characteristics

Contactor types		DC operated	**GAE75**
Coil operating limits		AC supply	At θ ≤ 55 °C 0.85...1.1 x Uc
acc. to IEC 60947-4-1			Please also refer to "Mounting characteristics and conditions for use"
DC control voltage			
Rated control circuit voltage Uc			12...250 V DC
Coil consumption		Average pull-in value	200 W
		Average holding value	4 W
Drop-out voltage			Approx. 15...40 % of Uc
Coil time constant			
Open		L/R	3 ms
Closed		L/R	15 ms
Operating time			
Between coil energization and:		N.O. contact closing	13...30 ms
		N.C. contact opening	10...27 ms
Between coil de-energization and:		N.O. contact opening (1)	5...15 ms
		N.C. contact closing (1)	8...18 ms

(1) The use of surge suppressors increases the opening time with a factor of 1.1 to 1.5 for a RV5 surge suppressor and a factor of 1.5 to 3 for RT5 surge suppressor.

Mounting characteristics and conditions for use

Contactor types		AC operated	**GA75**
		DC operated	**GAE75**
Mounting positions			
Control voltage / Ambient temperature			
Mounting positions	1, 1±30°, 2, 3, 4, 5	at θ ≤ 55 °C	0.85...1.1 x Uc
		at θ ≤ 70 °C	Uc
	6	at θ ≤ 55 °C	0.95...1.1 x Uc
		at θ ≤ 70 °C	Unauthorized
Mounting distances			The contactors can be assembled side by side
Fixing			
On rail according to IEC 60715, EN 60715			35 x 15 mm or 75 x 25 mm
By screws (not supplied)			2 x M6 screws placed diagonally

1SBC101981S0201 - Rev. A

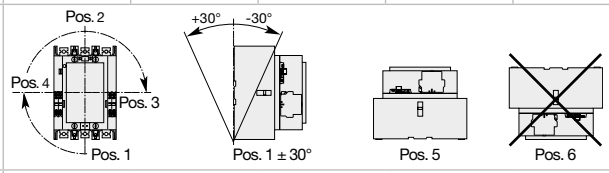
GAF185 ... GAF2050 contactors

Technical data

Magnet system characteristics

Contactor types	AC / DC operated	GAF185	GAF300	GAF460	GAF750	GAF1250	GAF1650	GAF2050
Coil operating limits acc. to IEC 60947-4-1	AC or DC supply	At θ ≤ 70 °C 0.85 x Uc min...1.1 x Uc max. Please also refer to "Mounting characteristics and conditions for use"						
AC control voltage 50/60 Hz								
Rated control circuit voltage Uc		48...250 V AC		48...500 V AC			100...250 V AC	
Coil consumption	Average pull-in value	430 VA	470 VA	890 VA	850 VA		1900 VA	
	Average holding value	12 VA / 3.5 W	10 VA / 2.5 W	12 VA / 4 W	12 VA / 4.5 W		48 VA / 17 W	
DC control voltage								
Rated control circuit voltage Uc		20...250 V DC		24...500 V DC			100...250 V DC	
Coil consumption	Average pull-in value	500 W	520 W	990 W	950 W		1700 W	
	Average holding value	2 W		4 W	4.5 W		16 W	
Drop-out voltage		55 % of Uc min.						
Dips withstand -20 °C ≤ θ ≤ +60 °C		≥ 20 ms						
Operating time								
Coil supply between A1 - A2								
Between coil energization and:	N.O. contact closing	30...115 ms		50...120 ms			50...80 ms	
	N.C. contact opening	30...115 ms		50...120 ms			50...80 ms	
Between coil de-energization and:	N.O. contact opening	25...80 ms		33...70 ms			35...55 ms	
	N.C. contact closing	25...80 ms		33...70 ms			35...55 ms	
Control input for PLC's								
Between coil energization and:	N.O. contact closing	-		40...60 ms	40...90 ms		40...65 ms	
	N.C. contact opening	-		40...60 ms	40...90 ms		40...65 ms	
Between coil de-energization and:	N.O. contact opening	-		10...30 ms			10...30 ms	
	N.C. contact closing	-		10...30 ms			10...30 ms	

Mounting characteristics and conditions for use

Contactor types	AC / DC operated	GAF185	GAF300	GAF460	GAF750	GAF1250	GAF1650	GAF2050
Mounting positions								
Control voltage / Ambient temperature								
Mounting positions 1, 1±30°, 2, 3, 4, 5	at θ ≤ 70 °C	0.85 x Uc min...1.1 x Uc max.						
Mounting positions 6		Unauthorized						
Mounting distances		The contactors can be assembled side by side						
Fixing								
On rail according to IEC 60715, EN 60715		–						
By screws (not supplied)		4 x M5			4 x M6		4 x M8	

1SFC101177C0201

GA75 and GAE75 contactors

Technical data

Connecting characteristics

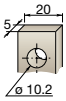
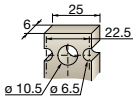
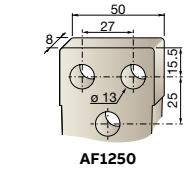
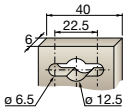
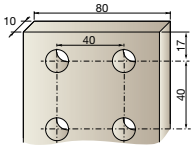
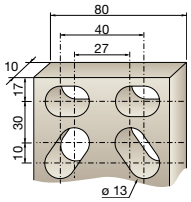
Contactor types			AC operated	**GA75**
			DC operated	**GAE75**
Main terminals				 Screw terminals with single connector (13 x 10 mm)
Connection capacity (min. ... max.)				
Main conductors (poles)				
Rigid	Solid (≤ 4 mm²)		1 x	6...50 mm²
	Stranded (≥ 6 mm²)		2 x	6...25 mm²
Flexible with ferrule			1 x	6...35 mm²
			2 x	6...16 mm²
Bars or lugs			L ≤	–
			l >	–
Connection capacity acc. to UL/CSA			1 or 2 x	AWG 8...1
Tightening torque	Recommended			4.00 Nm / 35 lb.in
	Max.			4.50 Nm
Auxiliary conductors (coil terminals)				
Rigid solid			1 x	1...4 mm²
			2 x	1...4 mm²
Flexible with ferrule			1 x	1...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	AWG 18...14
Tightening torque				
Coil terminals	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				IP10
Coil terminals				IP20
Screw terminals				Delivered in open position, screws of unused terminals must be tightened
Main terminals				M6
Screwdriver type				Flat Ø 6.5 / Pozidriv 2
Coil terminals				M3.5
Screwdriver type				Flat Ø 5.5 / Pozidriv 2

15BC1019845 0201

GAF185 ... GAF2050 contactors

Technical data

Connecting characteristics

Contactor types	AC / DC operated	GAF185	GAF300	GAF460	GAF750	GAF1250	GAF1650	GAF2050
Main terminals Flat type					 AF1250  AF750		 AF2050  AF1650	
Connection capacity (min. ... max.)								
Main conductors (poles)								
Rigid with connector	Single for Cu cable	6...185 mm²	16...240 mm²	240 mm²	300 mm²		–	
	Single for Al/Cu cable	25...150 mm²	120...240 mm²	240 mm²	300 mm²		–	
	Double for Al/Cu cable	–	2 x 95...120 mm²	2 x 240 mm²	3 x 185 mm²		–	
Bars or lugs	L ≤	24 mm	32 mm	47 mm	52 mm		100 mm	
	Ø >	8 mm	10 mm	10 mm	12 mm		12 mm	
Connection capacity acc. to UL/CSA	1 or 2 x	6 - 250 MCM	4 - 500 MCM	2//250 - 500 MCM	3// 2/0 - 500 MCM		1/0 - 750 MCM	
Tightening torque	Recommended	18 Nm / 160 lb.in	28 Nm / 247 lb.in	35 Nm / 310 lb.in	45 Nm / 398 lb.in		45 Nm / 398 lb.in	
	Max.	20 Nm	30 Nm	40 Nm	49 Nm		49 Nm	
Auxiliary conductors (coil terminals)								
Rigid solid	1 x	1...4 mm²						
	2 x	1...4 mm²						
Flexible with 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	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		M8	M10	M10	M12			
		Screws and bolts						
Coil terminals (delivered in open position)		M3.5						
	Screwdriver type	Flat Ø 5.5 mm / Pozidriv 2						

Contactors for capacitor switching

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**

Contactors for capacitor switching

AC-6b utilization category according to IEC 60947-4-1

Capacitor transient conditions

In Low Voltage industrial installations, capacitors are mainly used for reactive energy correction (raising the power factor). When these capacitors are energized, overcurrents of high amplitude and high frequencies (3 to 15 kHz) occur during the transient period (1 to 2 ms).

The amplitude of these current peaks, also known as "inrush current peaks", depends on the following factors:

- The network inductances.
- The transformer power and short-circuit voltage.
- The type of power factor correction.

There are 2 types of power factor correction: fixed or automatic.

Fixed power factor correction consists of inserting, in parallel on the network, a capacitor bank whose total power is provided by the assembly of capacitors of identical or different ratings.

The bank is energized by a contactor that simultaneously supplies all the capacitors (a single step).

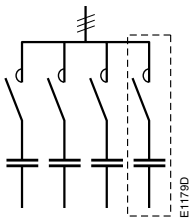
The inrush current peak, in the case of fixed correction, can reach 30 times the nominal current of the capacitor bank.

Single-step capacitor bank scheme
Use the AF... contactor ranges.

An automatic power factor correction system, on the other hand, consists of several capacitor banks of identical or different ratings (several steps), energized separately according to the value of the power factor to be corrected.

An electronic device automatically determines the power of the steps to be energized and activates the relevant contactors.

The inrush current peak, in the case of automatic correction, depends on the power of the steps already on duty, and can reach 100 times the nominal current of the step to be energized.



Multi-step capacitor bank scheme
Use the UA... or UA..RA contactor ranges.

Steady state condition data

The presence of harmonics and the network's voltage tolerance lead to a current, estimated to be 1.3 times the nominal current In of the capacitor, permanently circulating in the circuit.

Taking into account the manufacturing tolerances, the exact power of a capacitor can reach 1.15 times its nominal power.

Standard IEC 60831-1 Edition 2002 specifies that the capacitor must therefore have a maximum thermal current IT of:

$$IT = 1.3 \times 1.15 \times In = 1.5 \times In$$

Consequences for the contactors

To avoid malfunctions (welding of main poles, abnormal temperature rise, etc.), contactors for capacitor bank switching must be sized to withstand:

- **A permanent current that can reach 1.5 times the nominal current of the capacitor bank.**
- **The short but high peak current on pole closing** (maximum permissible peak current Î).

Contactor selection tool for capacitor switching

In a given application, if the user does not know the value of the inrush current peak, this value can be approximately calculated using the formulas given on the pages "Calculation and dimensioning".

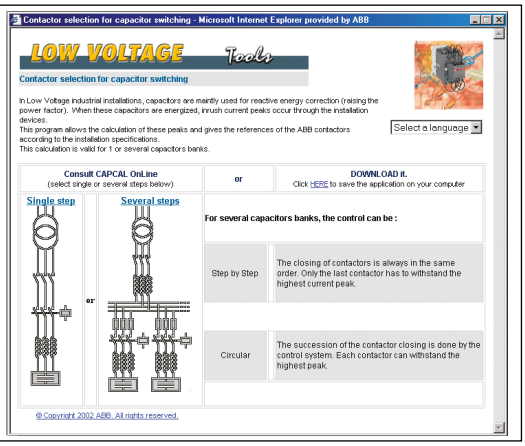
Alternatively by the **CAPCAL selection tool**, available on the ABB Website: **www.abb.com/lowvoltage**

right hand side menu

search: **"Online product selection tools"**

select: **"Contactors: AC-6b capacitor switching"**

This program allows the calculation of these peaks and gives the references of the ABB contactors according to the installation specifications. This calculation is valid for one or several capacitor banks.



1SBC101603S0201 - Rev. A

Contactors for capacitor switching

The ABB solutions

ABB offers 2 contactor versions according to the value of the inrush current peak and the power of the capacitor bank.

UA..RA contactors for capacitor switching (UA16..RA to UA110..RA) with insertion of damping resistors

The insertion of damping resistors protects the contactor and the capacitor from the highest inrush currents.


1SBC587794F0301


1SBC587774F0301


1SBC587764F0301


1SBC591444F0302

UA contactors for capacitor switching (UA16 to UA110)

Maximum permissible peak current Î ≤ 100 times the nominal rms current of the switched capacitor.


1SBC591694F0303


1SBC580093F0303


1SBC580783F0303


1SBC580105F0303

1SBC101604S0201 - Rev. A

UA16..RA ... UA30..RA 3-pole contactors for capacitor switching

12.5 to 30 kvar - Unlimited peak current Î

AC operated

UA16-30-10RA

UA30-30-10RA

UA..RA contactors for capacitor switching can be used for installations in which the peak current far exceeds 100 times nominal rms current. The contactors are delivered complete with their damping resistors and must be used without additional inductances.

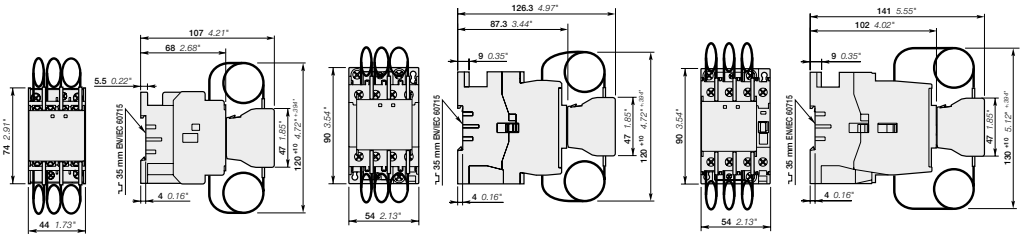
The capacitors must be discharged (maximum residual voltage at terminals ≤ 50 V) before being re-energized when the contactors are making.

These contactors are of the block type design with:

- 3 main poles and 1 built-in auxiliary contact
- the UA..RA contactors are fitted with a special front-mounted block, which ensures the serial insertion of 3 damping resistors into the circuit to limit the current peak on energization of the capacitor bank
  - their connection also ensures capacitor precharging in order to limit the second current peak occurring upon making of the main poles
  - the insertion of resistors allows to damp the highest current peak of the capacitor when switching on, whatever its level.
- control circuit: AC operated
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC Rated operational power θ ≤ 40 °C 400 V AC-6b kvar	UL/CSA Rated operational power θ ≤ 40 °C 480 V kvar	Rated control circuit voltage Uc (1) V 50 Hz	 V 60 Hz	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
12.5	16	24	24	1 0	UA16-30-10RA	1SBL181024R8110	0.460
		110	110...120	1 0	UA16-30-10RA	1SBL181024R8410	0.460
		220...230	230...240	1 0	UA16-30-10RA	1SBL181024R8010	0.460
		230...240	240...260	1 0	UA16-30-10RA	1SBL181024R8810	0.460
		380...400	400...415	1 0	UA16-30-10RA	1SBL181024R8510	0.460
		400...415	415...440	1 0	UA16-30-10RA	1SBL181024R8610	0.460
22	22	24	24	1 0	UA26-30-10RA	1SBL241024R8110	0.710
		110	110...120	1 0	UA26-30-10RA	1SBL241024R8410	0.710
		220...230	230...240	1 0	UA26-30-10RA	1SBL241024R8010	0.710
		230...240	240...260	1 0	UA26-30-10RA	1SBL241024R8810	0.710
		380...400	400...415	1 0	UA26-30-10RA	1SBL241024R8510	0.710
		400...415	415...440	1 0	UA26-30-10RA	1SBL241024R8610	0.710
30	28	24	24	1 0	UA30-30-10RA	1SBL281024R8110	0.810
		110	110...120	1 0	UA30-30-10RA	1SBL281024R8410	0.810
		220...230	230...240	1 0	UA30-30-10RA	1SBL281024R8010	0.810
		230...240	240...260	1 0	UA30-30-10RA	1SBL281024R8810	0.810
		380...400	400...415	1 0	UA30-30-10RA	1SBL281024R8510	0.810
		400...415	415...440	1 0	UA30-30-10RA	1SBL281024R8610	0.810

(1) Other control voltages see voltage code table.



Main dimensions mm, inches

UA50..RA ... UA75..RA 3-pole contactors for capacitor switching

40 to 60 kvar - Unlimited peak current Î

AC operated

UA75-30-00 RA

UA..RA contactors for capacitor switching can be used for installations in which the peak current far exceeds 100 times nominal rms current. The contactors are delivered complete with their damping resistors and must be used without additional inductances.

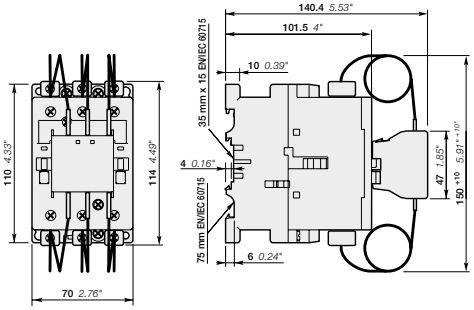
The capacitors must be discharged (maximum residual voltage at terminals ≤ 50 V) before being re-energized when the contactors are making.

These contactors are of the block type design with:

- 3 main poles
- the UA..RA contactors are fitted with a special front-mounted block, which ensures the serial insertion of 3 damping resistors into the circuit to limit the current peak on energization of the capacitor bank
  - their connection also ensures capacitor precharging in order to limit the second current peak occurring upon making of the main poles
  - the insertion of resistors allows to damp the highest current peak of the capacitor when switching on, whatever its level.
- control circuit: AC operated
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC	UL/CSA	Rated control circuit voltage Uc (1)		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power θ ≤ 40 °C 400 V AC-6b	Rated operational power θ ≤ 40 °C 480 V						Pkg (1 pce)
kvar	kvar	V 50 Hz	V 60 Hz				kg
40	50	24	24	0 0	UA50-30-00RA	1SBL351024R8100	1.350
		110	110...120	0 0	UA50-30-00RA	1SBL351024R8400	1.350
		220...230	230...240	0 0	UA50-30-00RA	1SBL351024R8000	1.350
		230...240	240...260	0 0	UA50-30-00RA	1SBL351024R8800	1.350
		380...400	400...415	0 0	UA50-30-00RA	1SBL351024R8500	1.350
		400...415	415...440	0 0	UA50-30-00RA	1SBL351024R8600	1.350
50	55	24	24	0 0	UA63-30-00RA	1SBL371024R8100	1.350
		110	110...120	0 0	UA63-30-00RA	1SBL371024R8400	1.350
		220...230	230...240	0 0	UA63-30-00RA	1SBL371024R8000	1.350
		230...240	240...260	0 0	UA63-30-00RA	1SBL371024R8800	1.350
		380...400	400...415	0 0	UA63-30-00RA	1SBL371024R8500	1.350
		400...415	415...440	0 0	UA63-30-00RA	1SBL371024R8600	1.350
60	64	24	24	0 0	UA75-30-00RA	1SBL411024R8100	1.350
		110	110...120	0 0	UA75-30-00RA	1SBL411024R8400	1.350
		220...230	230...240	0 0	UA75-30-00RA	1SBL411024R8000	1.350
		230...240	240...260	0 0	UA75-30-00RA	1SBL411024R8800	1.350
		380...400	400...415	0 0	UA75-30-00RA	1SBL411024R8500	1.350
		400...415	415...440	0 0	UA75-30-00RA	1SBL411024R8600	1.350

(1) Other control voltages see voltage code table.



UA50..RA, UA63..RA, UA75..RA

Main dimensions mm, inches

1SBC101508S0201 - Rev. A

UA95..RA ... UA110..RA 3-pole contactors for capacitor switching

70 to 80 kvar - Unlimited peak current Î

AC operated

UA110-30-00 RA

UA..RA contactors for capacitor switching can be used for installations in which the peak current far exceeds 100 times nominal rms current. The contactors are delivered complete with their damping resistors and must be used without additional inductances.

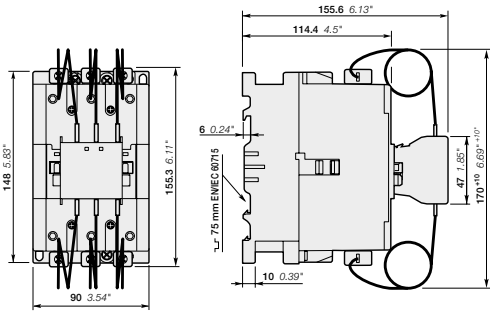
The capacitors must be discharged (maximum residual voltage at terminals ≤ 50 V) before being re-energized when the contactors are making.

These contactors are of the block type design with:

- 3 main poles
- the UA..RA contactors are fitted with a special front-mounted block, which ensures the serial insertion of 3 damping resistors into the circuit to limit the current peak on energization of the capacitor bank
  - their connection also ensures capacitor precharging in order to limit the second current peak occurring upon making of the main poles
  - the insertion of resistors allows to damp the highest current peak of the capacitor when switching on, whatever its level.
- control circuit: AC operated
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

IEC	UL/CSA	Rated control circuit voltage Uc (1)		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power θ ≤ 40 °C 400 V AC-6b	Rated operational power θ ≤ 40 °C 480 V	V 50 Hz	V 60 Hz				Pkg (1 pce) kg
70	80	24	24	0 0	UA95-30-00RA	1SFL431024R8100	2.000
		110	110...120	0 0	UA95-30-00RA	1SFL431024R8400	2.000
		220...230	230...240	0 0	UA95-30-00RA	1SFL431024R8000	2.000
		230...240	240...260	0 0	UA95-30-00RA	1SFL431024R8800	2.000
		380...400	400...415	0 0	UA95-30-00RA	1SFL431024R8500	2.000
		400...415	415...440	0 0	UA95-30-00RA	1SFL431024R8600	2.000
80	95	24	24	0 0	UA110-30-00RA	1SFL451024R8100	2.000
		110	110...120	0 0	UA110-30-00RA	1SFL451024R8400	2.000
		220...230	230...240	0 0	UA110-30-00RA	1SFL451024R8000	2.000
		230...240	240...260	0 0	UA110-30-00RA	1SFL451024R8800	2.000
		380...400	400...415	0 0	UA110-30-00RA	1SFL451024R8500	2.000
		400...415	415...440	0 0	UA110-30-00RA	1SFL451024R8600	2.000

(1) Other control voltages see voltage code table.



UA95..RA, UA100..RA

Main dimensions mm, inches

1SBC101553S0201 - Rev. A

UA..RA 3-pole contactors for capacitor switching

Unlimited peak current Î

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

Contactor types	Main poles	Available auxiliary contacts	Front-mounted accessories Auxiliary contact blocks 1-pole CA5-..	Side-mounted accessories Auxiliary contact blocks 2-pole CAL...
UA16-30-10RA	3 0	1 0	–	1 x CAL5-11
UA26-30-10RA	3 0	1 0	–	1 to 2 x CAL5-11
UA30-30-10RA	3 0	1 0	1 x CA5-...	+ 1 to 2 x CAL5-11
UA50-30-00RA	3 0	0 0	1 to 2 x CA5-...	+ 1 to 2 x CAL5-11
UA63-30-00RA	3 0	0 0		
UA75-30-00RA	3 0	0 0		
UA95-30-00RA	3 0	0 0	1 to 2 x CA5-...	+ 1 to 2 x CAL18-11
UA110-30-00RA	3 0	0 0		

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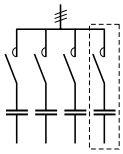
UA16..RA ... UA110..RA 3-pole contactors for capacitor switching

Unlimited peak current Î

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types		AC operated	UA16..RA	UA26..RA	UA30..RA	UA50..RA	UA63..RA	UA75..RA	UA95..RA	UA110..RA
Standards			IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1							
Rated operational voltage Ue max.			690 V							
Rated frequency (without derating)			50 / 60 Hz							
AC-6b Utilization category										
Rated operational power AC-6b (1)										
For air temperature close to contactor	θ ≤ 40 °C	230-240 V	8 kvar	12.5 kvar	16 kvar	25 kvar	30 kvar	35 kvar	40 kvar	45 kvar
		400-415 V	12.5 kvar	22 kvar	30 kvar	40 kvar	50 kvar	60 kvar	70 kvar	80 kvar
		440 V	15 kvar	24 kvar	32 kvar	50 kvar	55 kvar	65 kvar	75 kvar	85 kvar
		500-550 V	18 kvar	30 kvar	34 kvar	55 kvar	65 kvar	75 kvar	85 kvar	95 kvar
		690 V	22 kvar	35 kvar	45 kvar	72 kvar	80 kvar	100 kvar	120 kvar	130 kvar
	θ ≤ 55 °C	230-240 V	7.5 kvar	11.5 kvar	16 kvar	24 kvar	27 kvar	30 kvar	35 kvar	40 kvar
		400-415 V	12.5 kvar	20 kvar	27.5 kvar	40 kvar	45 kvar	50 kvar	60 kvar	70 kvar
		440 V	13 kvar	20 kvar	30 kvar	43 kvar	48 kvar	53 kvar	65 kvar	75 kvar
		500-550 V	16 kvar	25 kvar	34 kvar	50 kvar	60 kvar	65 kvar	75 kvar	82 kvar
		690 V	21 kvar	31 kvar	45 kvar	65 kvar	75 kvar	80 kvar	105 kvar	110 kvar
	θ ≤ 70 °C	230-240 V	6 kvar	9 kvar	11 kvar	20 kvar	23 kvar	25 kvar	30 kvar	35 kvar
		400-415 V	10 kvar	15.5 kvar	19.5 kvar	35 kvar	39 kvar	41 kvar	53 kvar	60 kvar
		440 V	11 kvar	17 kvar	20.5 kvar	37 kvar	42.5 kvar	45 kvar	58 kvar	70 kvar
		500-550 V	12.5 kvar	20 kvar	25 kvar	46 kvar	50 kvar	55 kvar	70 kvar	78 kvar
		690 V	17 kvar	26 kvar	32 kvar	60 kvar	65 kvar	70 kvar	85 kvar	100 kvar
Max. permissible peak current Î			Unlimited							
Short-circuit protection device for contactors gG type fuse (2)			80 A	125 A	200 A				250 A	
Max. electrical switching frequency			240 cycles/h							
Electrical durability AC-6b		Ue ≤ 440 V	250 000 operating cycles							
		500 V ≤ Ue ≤ 690 V	100 000 operating cycles							



Multi-step capacitor bank scheme

(1) For 220 V and 380 V, multiply by 0.9 the rated values at 230 V and 400 V respectively.
Example: 50 kvar / 400 V corresponding to 0.9 x 50 = 45 kvar/380 V.
(2) The fuse ratings given represent the maximum ratings ensuring type 1 coordination according to the definition of standard IEC 60947-4-1.

Main pole - Utilization characteristics according to UL / CSA

Contactor types		AC operated	UA16..RA	UA26..RA	UA30..RA	UA50..RA	UA63..RA	UA75..RA	UA95..RA	UA110..RA
Power - 60 Hz										
For air temperature close to contactor	θ ≤ 40 °C	240 V	8 kvar	11 kvar	14 kvar	25 kvar	27.5 kvar	32 kvar	40 kvar	45 kvar
		480 V	16 kvar	22 kvar	28 kvar	50 kvar	55 kvar	64 kvar	80 kvar	95 kvar
		600 V	20 kvar	27 kvar	35 kvar	62 kvar	70 kvar	80 kvar	100 kvar	120 kvar
Max. permissible peak Current Î			Unlimited							

Operating principle

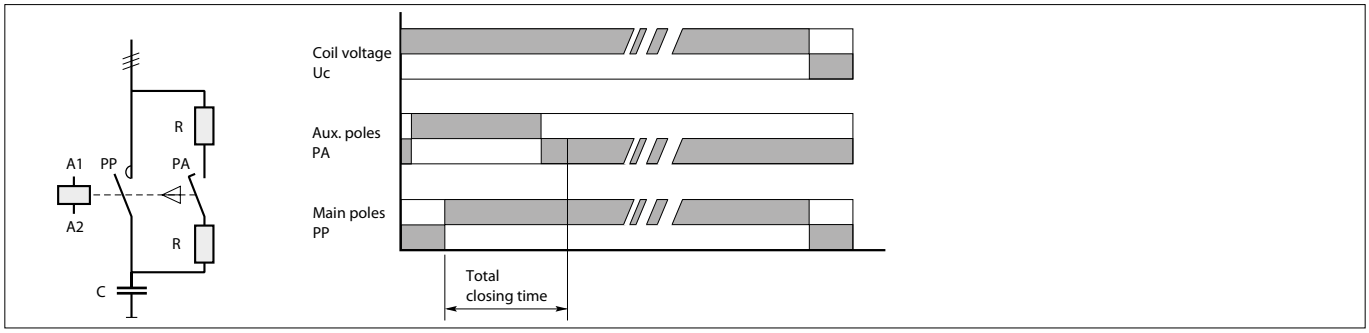
The front-mounted block mechanism of the UA..RA contactors ensures:

- early making of the auxiliary "PA" poles with respect to the main "PP" poles
- automatic return to the open position of the auxiliary "PA" poles after the main poles are closed.

When the coil is energized, the early making auxiliary poles connect the capacitor to the network via the set of 3 resistors. The damping resistors attenuate the first current peak and the second inrush current when the main contacts begin to make. Once the main poles are in the closed position, the auxiliary poles automatically break.

When the coil is de-energized, the main poles break ensuring the breaking of the capacitor bank.

The contactor can then begin a new cycle.



The insertion of resistors allows to damp the highest current peak of the capacitor when switching on, whatever its level.

1SBC101510S0201 - Rev. A

UA16..RA ... UA110..RA 3-pole contactors for capacitor switching

Unlimited peak current Î

Technical data

Connecting characteristics

Contactor types		AC operated	UA16..RA	UA26..RA	UA30..RA	UA50..RA UA63..RA UA75..RA	UA95..RA UA110..RA
Connection capacity (min. ... max.)							
Main conductors (poles)							
Rigid	Solid (≤ 4 mm²)	1 x	1...4 mm²	1.5...6 mm²	2.5...16 mm²	6...50 mm²	10...95 mm²
	Stranded (≥ 6 mm²)	2 x	-	-	2.5...16 + 2.5...6 mm²	6...25 + 6...16 mm²	6...35 mm²
Flexible with ferrule		1 x	0.75...2.5 mm²	1.5...4 mm²	2.5...10 mm²	6...35 mm²	10...70 mm²
		2 x	-	-	2.5...10 + 2.5...4 mm²	6...16 + 6...10 mm²	6...35 mm²
Bars or lugs		L ≤	7.7 mm	10 mm	-	-	-
		l >	3.7 mm	4.2 mm	-	-	-
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18...10	AWG 12...8	AWG 8...4	AWG 8...1	AWG 6...2/0
Tightening torque	Recommended		1 Nm / 9 lb.in	1.7 Nm / 15 lb.in	2.3 Nm / 20 lb.in	4 Nm / 35 lb.in	8 Nm / 53 lb.in
	Max.		1.2 Nm	2.2 Nm	2.6 Nm	4.5 Nm	9 Nm
Auxiliary conductors (built-in auxiliary terminals + coil terminals)							
Rigid solid		1 x	1...4 mm²				0.75...2.5 mm²
		2 x	1...4 mm²				0.75...2.5 mm²
Flexible with ferrule		1 x	0.75...2.5 mm²			1...2.5 mm²	0.75...2.5 mm²
		2 x	0.75...2.5 mm²				
Lugs	Coil terminals	L ≤	8 mm				
		l >	3.7 mm				
	Built-in auxiliary terminals	L ≤	7.7 mm	10 mm	8 mm	-	-
		l >	3.7 mm	4.2 mm	3.7 mm	-	-
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18...14				
Tightening torque							
Coil terminals	Recommended		1 Nm / 9 lb.in				
	Max.		1.2 Nm				
Built-in auxiliary terminals	Recommended		1 Nm / 9 lb.in				
	Max.		1.2 Nm				
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529							
Main terminals			IP20		IP10		
Coil terminals			IP20				
Built-in auxiliary terminals			IP20			-	-
Screw terminals			Delivered in open position, screws of unused terminals must be tightened				
Main terminals			M 3.5	M 4	M 5	M6	M8
		Screwdriver type	Flat Ø 5.5 / Pozidriv 2		Flat Ø 6.5 / Pozidriv 2		Hexagon socket (s = 4 mm)
Coil terminals			M 3.5				
		Screwdriver type	Flat Ø 5.5 / Pozidriv 2				
Built-in auxiliary terminals			M 3.5	M 4	M 3.5	-	-
		Screwdriver type	Flat Ø 5.5 / Pozidriv 2			-	-

Other technical characteristics are the same as those of standard A contactors.

1SBC101513S0201

UA16 ... UA30 3-pole contactors for capacitor switching

12.5 to 27.5 kvar - Peak current Î ≤ 100 times the rms current

AC operated

UA16-30-10

UA30-30-10

UA contactors can be used for the switching of capacitor banks whose inrush current peaks are less than or equal to 100 times nominal rms current.

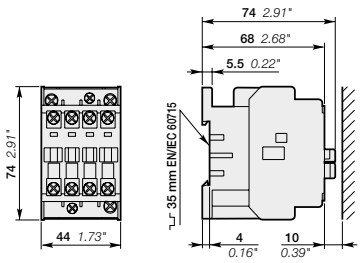
The capacitors must be discharged (maximum residual voltage at terminals ≤ 50 V) before being re-energized when the contactors are making.

These contactors are of the block type design with:

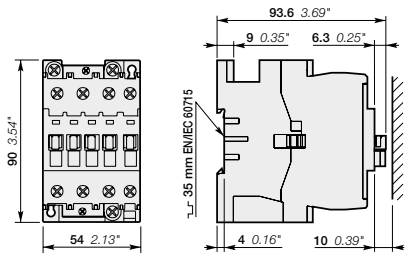
- 3 main poles and 1 built-in auxiliary contact
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC		UL/CSA	Rated control circuit voltage Uc (1)		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power θ ≤ 40 °C 400 V AC-6b	Max peak current Î	Rated operational power θ ≤ 40 °C 480 V						Pkg (1 pce)
kvar	kA	kvar	V 50 Hz	V 60 Hz				kg
12.5	1.8	-	24	24	1 0	UA16-30-10	1SBL181022R8110	0.340
			48	48	1 0	UA16-30-10	1SBL181022R8310	0.340
			110	110...120	1 0	UA16-30-10	1SBL181022R8410	0.340
			220...230	230...240	1 0	UA16-30-10	1SBL181022R8010	0.340
			230...240	240...260	1 0	UA16-30-10	1SBL181022R8810	0.340
			380...400	400...415	1 0	UA16-30-10	1SBL181022R8510	0.340
			400...415	415...440	1 0	UA16-30-10	1SBL181022R8610	0.340
20	3	25	24	24	1 0	UA26-30-10	1SBL241022R8110	0.600
			48	48	1 0	UA26-30-10	1SBL241022R8310	0.600
			110	110...120	1 0	UA26-30-10	1SBL241022R8410	0.600
			220...230	230...240	1 0	UA26-30-10	1SBL241022R8010	0.600
			230...240	240...260	1 0	UA26-30-10	1SBL241022R8810	0.600
			380...400	400...415	1 0	UA26-30-10	1SBL241022R8510	0.600
			400...415	415...440	1 0	UA26-30-10	1SBL241022R8610	0.600
27.5	3.5	32	24	24	1 0	UA30-30-10	1SBL281022R8110	0.710
			48	48	1 0	UA30-30-10	1SBL281022R8310	0.710
			110	110...120	1 0	UA30-30-10	1SBL281022R8410	0.710
			220...230	230...240	1 0	UA30-30-10	1SBL281022R8010	0.710
			230...240	240...260	1 0	UA30-30-10	1SBL281022R8810	0.710
			380...400	400...415	1 0	UA30-30-10	1SBL281022R8510	0.710
			400...415	415...440	1 0	UA30-30-10	1SBL281022R8610	0.710

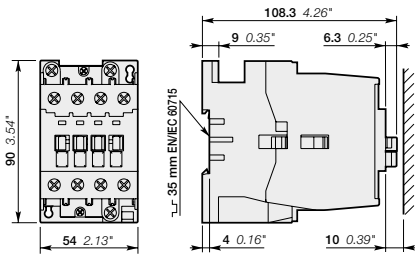
(1) Other control voltages see voltage code table.



UA16



UA26



UA30

Main dimensions mm, inches

1SBC101514S0201

UA50 ... UA75 3-pole contactors for capacitor switching

33 to 50 kvar - Peak current Î ≤ 100 times the rms current

AC operated

UA50-30-00

UA contactors can be used for the switching of capacitor banks whose inrush current peaks are less than or equal to 100 times nominal rms current.

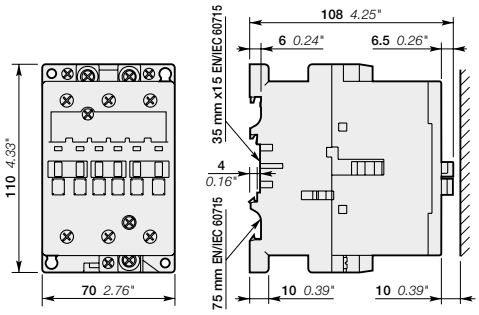
The capacitors must be discharged (maximum residual voltage at terminals ≤ 50 V) before being re-energized when the contactors are making.

These contactors are of the block type design with:

- 3 main poles
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC		UL/CSA	Rated control circuit voltage Uc (1)		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power θ ≤ 40 °C 400 V AC-6b	Max peak current Î	Rated operational power θ ≤ 40 °C 480 V						Pkg (1 pce)
kvar	kA	kvar	V 50 Hz	V 60 Hz				kg
33	5	40	24	24	0 0	UA50-30-00	1SBL351022R8100	1.160
			48	48	0 0	UA50-30-00	1SBL351022R8300	1.160
			110	110...120	0 0	UA50-30-00	1SBL351022R8400	1.160
			220...230	230...240	0 0	UA50-30-00	1SBL351022R8000	1.160
			230...240	240...260	0 0	UA50-30-00	1SBL351022R8800	1.160
			380...400	400...415	0 0	UA50-30-00	1SBL351022R8500	1.160
			400...415	415...440	0 0	UA50-30-00	1SBL351022R8600	1.160
45	6.5	-	24	24	0 0	UA63-30-00	1SBL371022R8100	1.160
			48	48	0 0	UA63-30-00	1SBL371022R8300	1.160
			110	110...120	0 0	UA63-30-00	1SBL371022R8400	1.160
			220...230	230...240	0 0	UA63-30-00	1SBL371022R8000	1.160
			230...240	240...260	0 0	UA63-30-00	1SBL371022R8800	1.160
			380...400	400...415	0 0	UA63-30-00	1SBL371022R8500	1.160
			400...415	415...440	0 0	UA63-30-00	1SBL371022R8600	1.160
50	7.5	55	24	24	0 0	UA75-30-00	1SBL411022R8100	1.160
			48	48	0 0	UA75-30-00	1SBL411022R8300	1.160
			110	110...120	0 0	UA75-30-00	1SBL411022R8400	1.160
			220...230	230...240	0 0	UA75-30-00	1SBL411022R8000	1.160
			230...240	240...260	0 0	UA75-30-00	1SBL411022R8800	1.160
			380...400	400...415	0 0	UA75-30-00	1SBL411022R8500	1.160
			400...415	415...440	0 0	UA75-30-00	1SBL411022R8600	1.160

(1) Other control voltages see voltage code table.



UA50, UA63, UA75

Main dimensions mm, inches

1SBC101521S0201

UA95 ... UA110 3-pole contactors for capacitor switching

65 to 75 kvar - Peak current Î ≤ 100 times the rms current

AC operated

UA110-30-00

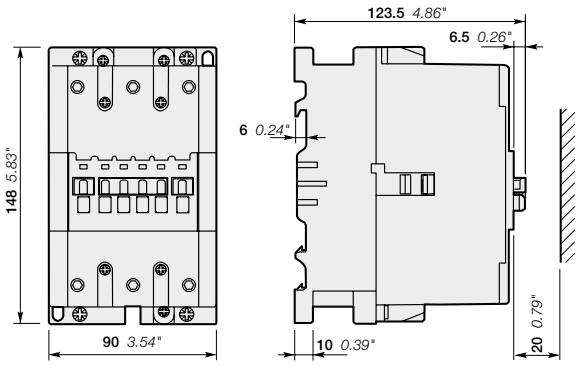
UA contactors can be used for the switching of capacitor banks whose inrush current peaks are less or equal to 100 times nominal rms current.
The capacitors must be discharges (maximum residual voltage at terminals ≤ 50 V) before being re-energized when the contactors are making.

These contactors are of the block type design with:

- 3 main poles
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

IEC		UL/CSA	Rated control circuit voltage Uc (1)		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power θ ≤ 40 °C 400 V AC-6b	Max peak current Î	Rated operational power θ ≤ 40 °C 480 V						Pkg (1 pce)
kvar	kA	kvar	V 50 Hz	V 60 Hz				kg
65	9.3	70	24	24	0 0	UA95-30-00	1SFL431022R8100	2.000
			48	48	0 0	UA95-30-00	1SFL431022R8300	2.000
			110	110...120	0 0	UA95-30-00	1SFL431022R8400	2.000
			220...230	230...240	0 0	UA95-30-00	1SFL431022R8000	2.000
			230...240	240...260	0 0	UA95-30-00	1SFL431022R8800	2.000
			380...400	400...415	0 0	UA95-30-00	1SFL431022R8500	2.000
			400...415	415...440	0 0	UA95-30-00	1SFL431022R8600	2.000
75	10.5	80	24	24	0 0	UA110-30-00	1SFL451022R8100	2.000
			48	48	0 0	UA110-30-00	1SFL451022R8300	2.000
			110	110...120	0 0	UA110-30-00	1SFL451022R8400	2.000
			220...230	230...240	0 0	UA110-30-00	1SFL451022R8000	2.000
			230...240	240...260	0 0	UA110-30-00	1SFL451022R8800	2.000
			380...400	400...415	0 0	UA110-30-00	1SFL451022R8500	2.000
			400...415	415...440	0 0	UA110-30-00	1SFL451022R8600	2.000

(1) Other control voltages see voltage code table.



UA95, UA110

Main dimensions mm, inches

1SFC101059C0201

UA... 3-pole contactors for capacitor switching

Peak current Î ≤ 100 times the rms current

Main accessory fitting details

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

Contactor types	Main poles	Available auxiliary contacts	Front-mounted accessories Auxiliary contact blocks 1-pole CA5-..		4-pole CA5-..		Pneumatic timer TP.. A		Side-mounted accessories Auxiliary contact blocks 2-pole CAL...
UA16-30-10	3 0	1 0	1 to 4 x CA5-..	**or**	1 x CA5-.. (4-pole)	**or**	1 x TP.. A	**+**	1 to 2 x CAL5-11
UA26-30-10	3 0	1 0	1 to 4 x CA5-..	**or**	1 x CA5-.. (4-pole)	**or**	1 x TP.. A	**+**	1 to 2 x CAL5-11
UA30-30-10	3 0	1 0	1 to 5 x CA5-..	**or**	1 x CA5-.. (4-pole) + 1 x 1-pole CA5-..	**or**	1 x TP.. A + 1 x CA5-.. (1-pole)	**+**	1 to 2 x CAL5-11
UA50-30-00	3 0	0 0	1 to 6 x CA5-..	**or**	1 x CA5-.. (4-pole)	**or**	1 x TP.. A	**+**	1 to 2 x CAL5-11
UA63-30-00	3 0	0 0			+ 2 x 1-pole CA5-..		+ 2 x CA5-.. (1-pole)		
UA75-30-00	3 0	0 0							
UA95-30-00	3 0	0 0	1 to 6 x CA5-..	**or**	1 x CA5-.. (4-pole)		–	**+**	1 to 2 x CAL18-11
UA110-30-00	3 0	0 0			+ 2 x 1-pole CA5-..				

1SBC101533S0201

UA16 ... UA110 3-pole contactors for capacitor switching

Peak current Î ≤ 100 times the rms current

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types		AC operated	UA16	UA26	UA30	UA50	UA63	UA75	UA95	UA110
Standards			IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1							
Rated operational voltage Ue max.			690 V							
Rated frequency (without derating)			50 / 60 Hz							
AC-6b Utilization category										
Rated operational power AC-6b (1)										
For air temperature close to contactor	θ ≤ 40 °C	230-240 V	7.5 kvar	12 kvar	16 kvar	20 kvar	25 kvar	30 kvar	35 kvar	40 kvar
		400-415 V	12.5 kvar	20 kvar	27.5 kvar	33 kvar	45 kvar	50 kvar	65 kvar	75 kvar
		440 V	13.7 kvar	22 kvar	30 kvar	36 kvar	50 kvar	55 kvar	65 kvar	75 kvar
		500-550 V	15.5 kvar	22 kvar	34 kvar	40 kvar	50 kvar	62 kvar	70 kvar	80 kvar
		690 V	21.5 kvar	30 kvar	45 kvar	55 kvar	70 kvar	75 kvar	80 kvar	90 kvar
	θ ≤ 55 °C	230-240 V	6.7 kvar	11 kvar	16 kvar	20 kvar	25 kvar	30 kvar	35 kvar	40 kvar
		400-415 V	11.7 kvar	18.5 kvar	27.5 kvar	33 kvar	43 kvar	50 kvar	65 kvar	70 kvar
		440 V	13 kvar	20 kvar	30 kvar	36 kvar	48 kvar	53 kvar	65 kvar	75 kvar
		500-550 V	14.7 kvar	22 kvar	34 kvar	40 kvar	50 kvar	62 kvar	70 kvar	80 kvar
Multi-step capacitor bank scheme		690 V	20 kvar	30 kvar	45 kvar	55 kvar	70 kvar	75 kvar	80 kvar	90 kvar
	θ ≤ 70 °C	230-240 V	6 kvar	8.5 kvar	11 kvar	19 kvar	21 kvar	22 kvar	30 kvar	35 kvar
		400-415 V	10 kvar	14.5 kvar	19 kvar	32 kvar	37 kvar	39 kvar	55 kvar	65 kvar
		440 V	11 kvar	16 kvar	20 kvar	35 kvar	41 kvar	43 kvar	55 kvar	70 kvar
		500-550 V	12.5 kvar	19.5 kvar	23.5 kvar	40 kvar	45 kvar	47.5 kvar	60 kvar	75 kvar
		690 V	17 kvar	25 kvar	32 kvar	52 kvar	60 kvar	65 kvar	70 kvar	85 kvar
Max. permissible peak current Î		Ue ≤ 500 V	1.8 kA	3 kA	3.5 kA	5 kA	6.5 kA	7.5 kA	9.3 kA	10.5 kA
		Ue > 500 V	1.6 kA	2.7 kA	3.1 kA	4.5 kA	5.8 kA	6.75 kA	8 kA	9 kA
Short-circuit protection device for contactors gG type fuse			sized 1.5...1.8 In of the capacitor							
Max. electrical switching frequency			240 cycles/h							
Electrical durability AC-6b		Ue ≤ 690 V	100 000 operating cycles							

(1) For 220 V and 380 V, multiply by 0.9 the rated values at 230 V and 400 V respectively.
Example: 50 kvar / 400 V corresponding to 0.9 x 50 = 45 kvar/380 V.
If, in an application, the current peak is greater than the maximum peak current Î specified in the tables above, select a higher rating, refer to the UA..RA contactors, or add inductances. (see application guide "Contactors for capacitor switching").

Main pole - Utilization characteristics according to UL / CSA

Contactor types		AC operated	UA16	UA26	UA30	UA50	UA63	UA75	UA95	UA110
Power - 60 Hz										
For air temperature close to contactor	θ ≤ 40 °C	240 V	-	12.5 kvar	16 kvar	20 kvar	-	27.5 kvar	35 kvar	40 kvar
		480 V	-	25 kvar	32 kvar	40 kvar	-	55 kvar	70 kvar	80 kvar
		600 V	-	30 kvar	40 kvar	50 kvar	-	70 kvar	75 kvar	85 kvar

If, in an application, the current peak is greater than the maximum peak current Î specified in the tables above, select a higher rating, refer to the UA..RA contactors, or add inductances. (see application guide "Contactors for capacitor switching").

UA16 ... UA110 3-pole contactors for capacitor switching

Peak current Î ≤ 100 times the rms current

Technical data

Connecting characteristics

Contactor types			AC operated	UA16	UA26	UA30	UA50 UA63 UA75	UA95 UA110
Connection capacity (min. ... max.)								
Main conductors (poles)								
Rigid	Solid (≤ 4 mm²)		1 x	1...4 mm²	1.5...6 mm²	2.5...16 mm²	6...50 mm²	10...95 mm²
	Stranded (≥ 6 mm²)		2 x	1...4 mm²	1.5...6 mm²	2.5...16 mm²	6...25 mm²	6...35 mm²
Flexible with ferrule			1 x	0.75...2.5 mm²	0.75...4 mm²	2.5...10 mm²	6...35 mm²	10...70 mm²
			2 x	0.75...2.5 mm²	0.75...4 mm²	2.5...10 mm²	6...16 mm²	6...35 mm²
Bars or lugs			L ≤	7.7 mm	10 mm	-	-	-
			l >	3.7 mm	4.2 mm	-	-	-
Connection capacity acc. to UL/CSA			1 or 2 x	AWG 18...10	AWG 12...8	AWG 8...4	AWG 8...1	AWG 6...2/0
Tightening torque	Recommended			1 Nm / 9 lb.in	1.7 Nm / 15 lb.in	2.3 Nm / 20 lb.in	4 Nm / 35 lb.in	8 Nm / 71 lb.in
	Max.			1.2 Nm	2.2 Nm	2.6 Nm	4.5 Nm	9 Nm
Auxiliary conductors (built-in auxiliary terminals + coil terminals)								
Rigid solid			1 x	1...4 mm²				0.75...2.5 mm²
			2 x	1...4 mm²				0.75...2.5 mm²
Flexible with ferrule			1 x	0.75...2.5 mm²			1...2.5 mm²	0.75...2.5 mm²
			2 x	0.75...2.5 mm²				
Lugs	Coil terminals		L ≤	8 mm				
			l >	3.7 mm				
	Built-in auxiliary terminals		L ≤	7.7 mm	10 mm	8 mm	-	-
			l >	3.7 mm	4.2 mm	3.7 mm	-	-
Connection capacity acc. to UL/CSA				AWG 18...14				
Tightening torque								
Coil terminals	Recommended			1 Nm / 9 lb.in				
	Max.			1.2 Nm				
Built-in auxiliary terminals	Recommended			1 Nm / 9 lb.in				
	Max.			1.2 Nm				
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529								
Main terminals				IP20			IP10	
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	M5	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				
Built-in auxiliary terminals				M3.5	M4	M3.5	-	-
			Screwdriver type	Flat Ø 5.5 / Pozidriv 2			-	-

Other technical characteristics are the same as those of standard A contactors.

1SBC101537S0201

NF 4-pole and 8-pole contactor relays

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**

NF 4-pole contactor relays

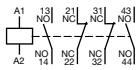
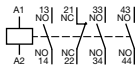
AC / DC operated

NF22E

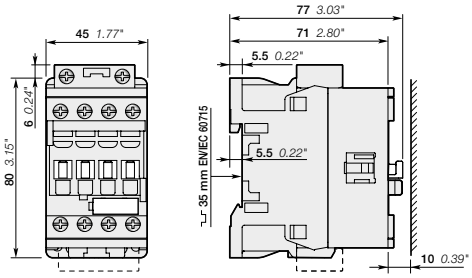
NF contactor relays are used for switching auxiliary and control circuits.

These contactor relays are of the block type design with:

- 4 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
  - can manage large control voltage variations
  - only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
  - reduced panel energy consumption
  - very distinct closing and opening.
- built-in surge suppression
- 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)
	V 50/60 Hz	V DC				kg
	24...60	20...60	(1)	NF22E-11	1SBH137001R1122	0.270
	48...130	48...130		NF22E-12	1SBH137001R1222	0.270
	100...250	100...250		NF22E-13	1SBH137001R1322	0.270
	250...500	250...500		NF22E-14	1SBH137001R1422	0.310
	24...60	20...60	(1)	NF31E-11	1SBH137001R1131	0.270
	48...130	48...130		NF31E-12	1SBH137001R1231	0.270
	100...250	100...250		NF31E-13	1SBH137001R1331	0.270
	250...500	250...500		NF31E-14	1SBH137001R1431	0.310
	24...60	20...60	(1)	NF40E-11	1SBH137001R1140	0.270
	48...130	48...130		NF40E-12	1SBH137001R1240	0.270
	100...250	100...250		NF40E-13	1SBH137001R1340	0.270
	250...500	250...500		NF40E-14	1SBH137001R1440	0.310

(1) NF..-11 not suitable for direct control by PLC-output.



NF22E, NF31E, NF40E

Main dimensions mm, inches

1SBC101558S0201 - Rev. C

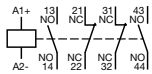
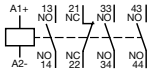
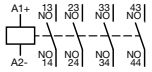
NFZ 4-pole contactor relays

24 V DC operated designed for PLC

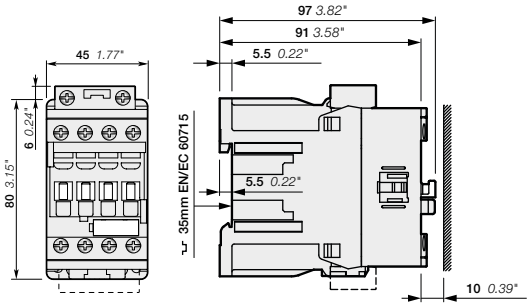
NFZ22E-30

NFZ contactor relays are used for switching auxiliary and control circuits. These contactor relays are of the block type design with:

- 4 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: 24 V DC operated with electronic coil interface allowing low holding consumption up to 1.7 W and reduced panel energy consumption
  - allow direct control by PLC-output ≥ 250 mA 24 V DC
  - very distinct closing and opening
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Number of contacts	Rated control circuit voltage Uc V DC	Type	Order code	Weight Pkg (1 pce) kg
4-pole contactor relays				
	24	NFZ22E-30	1SBH136001R3022	0.430
	24	NFZ31E-30	1SBH136001R3031	0.430
	24	NFZ40E-30	1SBH136001R3040	0.430

Note: NFZ contactor relays with DC control voltage 24 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.



NFZ22E, NFZ31E, NFZ40E

Main dimensions mm, inches

1SBC100330S0201

03

NFZ 4-pole contactor relays

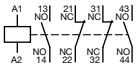
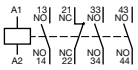
AC / DC operated for specific applications

NFZ22E

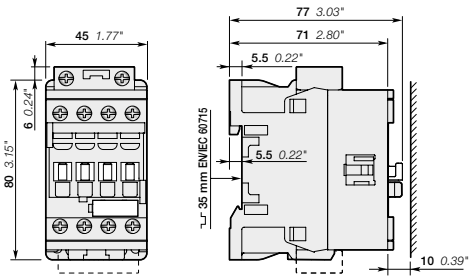
NFZ contactor relays are used for switching auxiliary and control circuits.

These contactor relays are of the block type design with:

- 4 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
  - can manage large control voltage variations
  - only 4 control voltage ranges covering 24...250 V 50/60 Hz and 12...250 V DC
  - allow direct control by PLC-output ≥ 24 V DC 500 mA
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- built-in surge suppression
- 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)
	V 50/60 Hz	V DC			kg
	–	12...20	NFZ22E-20	1SBH136001R2022	0.310
	24...60	20...60	NFZ22E-21	1SBH136001R2122	0.310
	48...130	48...130	NFZ22E-22	1SBH136001R2222	0.310
	100...250	100...250	NFZ22E-23	1SBH136001R2322	0.310
	–	12...20	NFZ31E-20	1SBH136001R2031	0.310
	24...60	20...60	NFZ31E-21	1SBH136001R2131	0.310
	48...130	48...130	NFZ31E-22	1SBH136001R2231	0.310
	100...250	100...250	NFZ31E-23	1SBH136001R2331	0.310
	–	12...20	NFZ40E-20	1SBH136001R2040	0.310
	24...60	20...60	NFZ40E-21	1SBH136001R2140	0.310
	48...130	48...130	NFZ40E-22	1SBH136001R2240	0.310
	100...250	100...250	NFZ40E-23	1SBH136001R2340	0.310

Note: Only NFZ contactor relays with DC control voltage 12...20 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.



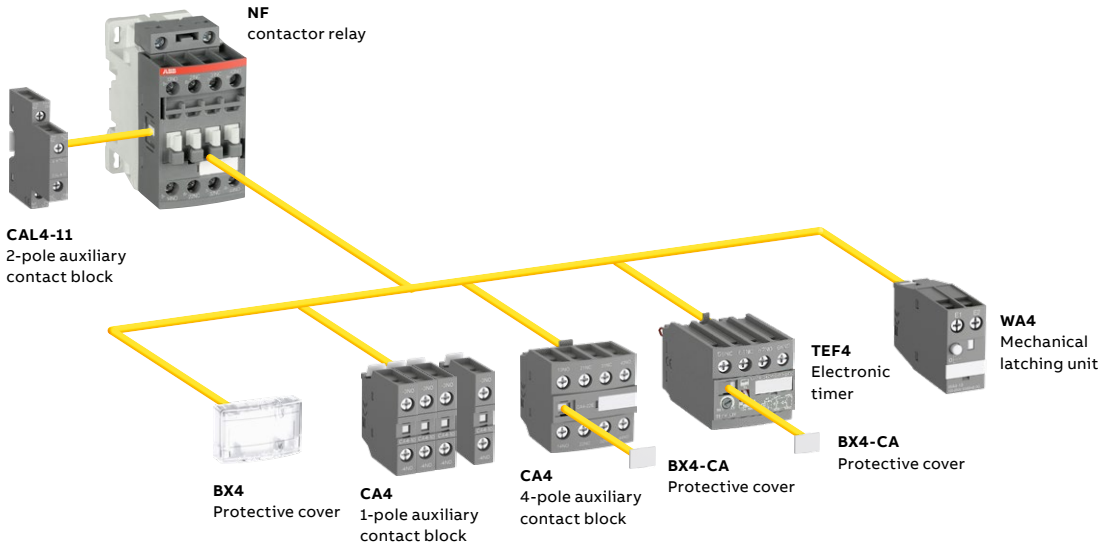
NFZ22E, NFZ31E, NFZ40E

Main dimensions mm, inches

1SBC101559S0201 - Rev. A

NF 4-pole contactor relays

Contactor relays and main accessories



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

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

Contactor relay types	Main poles			Front-mounted accessories: Auxiliary contact blocks 1-pole CA4	Front-mounted accessories: Auxiliary contact blocks 4-pole CA4	Front-mounted accessories: Electronic timer TEF4	Front-mounted accessories: Mechanical latching unit WA4 (3)		Side-mounted accessories: Auxiliary contact blocks 2-pole CAL4-11 Left side	Side-mounted accessories: Auxiliary contact blocks 2-pole CAL4-11 Right side
NF(Z)										
NF	2 2	E (1)		4 max.	**or** 1	**or** 1	**or** 1	+	1	–
	3 1	E (1)		2 max.	–	**or** 1	**or** 1	+	1	+ 1
	4 0	E (2)								
NFZ 24 V DC designed for PLC - coil 30										
NFZ	2 2	E (1)		4 max.	**or** 1	**or** 1	–	**or**	1	+ 1
	3 1	E (1)		2 max.	–	**or** 1	–	+	1	–
	4 0	E (2)		–	–	1	–	+	1	+ 1

(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.
(3) Accept 1-pole CA4 auxiliary contacts (1 block on each side of the mechanical latch) in respect to the total number of additional N.C. auxiliary contacts.
For WA4, accessory use with contactor relays coil 30, please consult your ABB local sales organization.

1SBC101518S0201 - Rev. B

NF 8-pole contactor relays

AC / DC operated

1SBC101029V0014

NF44E

1SBC101042V0014

NF33/11

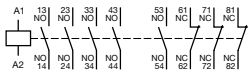
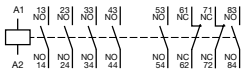
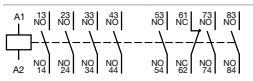
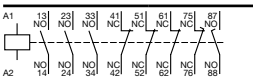
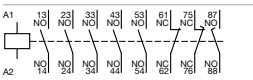
1SBC101043V0014

NF51/11

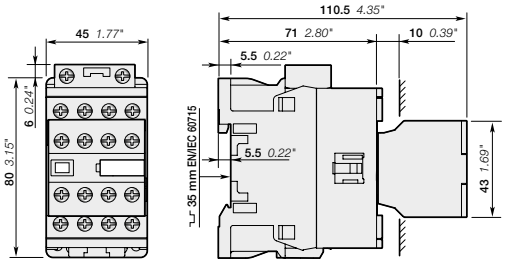
NF contactor relays are used for switching auxiliary and control circuits.

These contactor relays are of the block type design with:

- 8 poles with a permanently fixed 4-pole auxiliary contact block. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol) except for NF33/11 and NF51/11 variants
- overlapping of lagging / leading contacts for NF33/11 and NF51/11 variants
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
  - can manage large control voltage variations
  - only 4 coils to cover control voltages between 24...500 V 50/60 Hz and 20...500 V DC
  - reduced panel energy consumption
  - very distinct closing and opening
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Number of contacts 1st stack	2nd stack	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	V DC		Type	Order code	Weight Pkg (1 pce) kg
8-pole contactor relays							
		24...60	20...60	(1)	NF44E-11	1SBH137001R1144	0.320
		48...130	48...130		NF44E-12	1SBH137001R1244	0.320
		100...250	100...250		NF44E-13	1SBH137001R1344	0.320
		250...500	250...500		NF44E-14	1SBH137001R1444	0.360
		24...60	20...60	(1)	NF53E-11	1SBH137001R1153	0.320
		48...130	48...130		NF53E-12	1SBH137001R1253	0.320
		100...250	100...250		NF53E-13	1SBH137001R1353	0.320
		250...500	250...500		NF53E-14	1SBH137001R1453	0.360
		24...60	20...60	(1)	NF62E-11	1SBH137001R1162	0.320
		48...130	48...130		NF62E-12	1SBH137001R1262	0.320
		100...250	100...250		NF62E-13	1SBH137001R1362	0.320
		250...500	250...500		NF62E-14	1SBH137001R1462	0.360
		24...60	20...60	(1)	NF71E-11	1SBH137001R1171	0.320
		48...130	48...130		NF71E-12	1SBH137001R1271	0.320
		100...250	100...250		NF71E-13	1SBH137001R1371	0.320
		250...500	250...500		NF71E-14	1SBH137001R1471	0.360
		24...60	20...60	(1)	NF80E-11	1SBH137001R1180	0.320
		48...130	48...130		NF80E-12	1SBH137001R1280	0.320
		100...250	100...250		NF80E-13	1SBH137001R1380	0.320
		250...500	250...500		NF80E-14	1SBH137001R1480	0.360
8-pole contactor relays with overlapping of lagging / leading contacts							
		24...60	20...60	(1)	NF33/11-11	1SBH137001R1139	0.320
		48...130	48...130		NF33/11-12	1SBH137001R1239	0.320
		100...250	100...250		NF33/11-13	1SBH137001R1339	0.320
		250...500	250...500		NF33/11-14	1SBH137001R1439	0.320
		24...60	20...60	(1)	NF51/11-11	1SBH137001R1159	0.320
		48...130	48...130		NF51/11-12	1SBH137001R1259	0.320
		100...250	100...250		NF51/11-13	1SBH137001R1359	0.320
		250...500	250...500		NF51/11-14	1SBH137001R1459	0.320

(1) NF..-11 not suitable for direct control by PLC.



NF44E, NF53E, NF62E, NF71E, NF80E, NF33/11, NF51/11

Main dimensions mm, inches

1SBC101560S0201 - Rev. C

NFZ 8-pole contactor relays

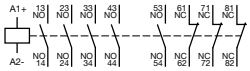
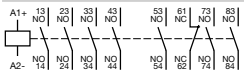
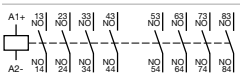
24 V DC operated designed for PLC

1SBC101535V0014

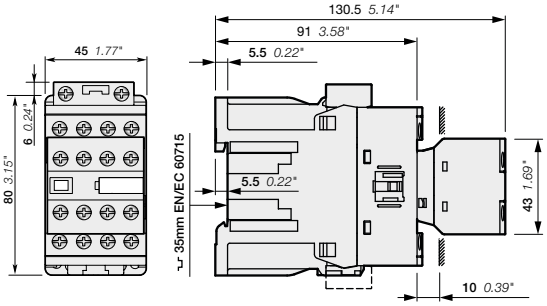
NFZ44E

NFZ contactor relays are used for switching auxiliary and control circuits. These contactor relays are of the block type design with:

- 8 poles with a permanently fixed 4-pole auxiliary contact block. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: 24 V DC operated with electronic coil interface allowing low holding consumption up to 1.7 W and reduced panel energy consumption
  - allow direct control by PLC-output ≥ 250 mA 24 V DC
  - very distinct closing and opening
- built-in surge suppression.

Number of contacts	Rated control circuit voltage Uc V DC	Type	Order code	Weight Pkg (1 pce) kg
8-pole contactor relays				
	24	NFZ44E-30	1SBH136001R3044	0.490
	24	NFZ53E-30	1SBH136001R3053	0.490
	24	NFZ62E-30	1SBH136001R3062	0.490
	24	NFZ71E-30	1SBH136001R3071	0.490
	24	NFZ80E-30	1SBH136001R3080	0.490

Note: NFZ contactor relays with DC control voltage 24 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.



NFZ44E, NFZ53E, NFZ62E, NFZ71E, NFZ80E

Main dimensions mm, inches

1SBC100431S0201

NFZ 8-pole contactor relays

AC / DC operated for specific applications

1SBC101029V0014

NFZ44E

1SBC101042V0014

NFZ33/11

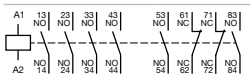
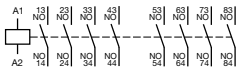
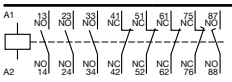
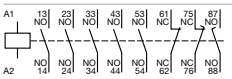
1SBC101043V0014

NFZ51/11

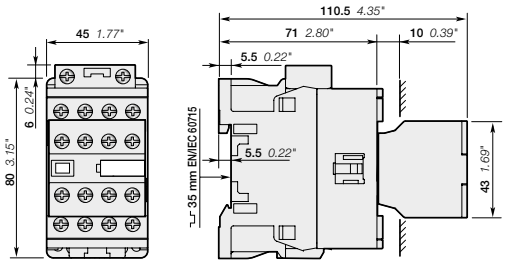
NFZ contactor relays are used for switching auxiliary and control circuits.

These contactor relays are of the block type design with:

- 8 poles with a permanently fixed 4-pole auxiliary contact block. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol) except for NFZ33/11 and NFZ51/11 variants
- overlapping of lagging / leading contacts for NFZ33/11 and NFZ51/11 variants
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
  - can manage large control voltage variations
  - only 4 coils to cover control voltages between 24 ... 250 V 50/60 Hz and 12 ... 250 V DC
  - allow direct control by PLC-output ≥ 24 V DC 500 mA
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Number of contacts 1st stack 2nd stack	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	V DC	Type	Order code	Weight Pkg (1 pce) kg
8-pole contactor relays					
	-	12...20	NFZ44E-20	1SBH136001R2044	0.360
	24...60	20...60	NFZ44E-21	1SBH136001R2144	0.360
	48...130	48...130	NFZ44E-22	1SBH136001R2244	0.360
	100...250	100...250	NFZ44E-23	1SBH136001R2344	0.360
	-	12...20	NFZ53E-20	1SBH136001R2053	0.360
	24...60	20...60	NFZ53E-21	1SBH136001R2153	0.360
	48...130	48...130	NFZ53E-22	1SBH136001R2253	0.360
	100...250	100...250	NFZ53E-23	1SBH136001R2353	0.360
	-	12...20	NFZ62E-20	1SBH136001R2062	0.360
	24...60	20...60	NFZ62E-21	1SBH136001R2162	0.360
	48...130	48...130	NFZ62E-22	1SBH136001R2262	0.360
	100...250	100...250	NFZ62E-23	1SBH136001R2362	0.360
	-	12...20	NFZ71E-20	1SBH136001R2071	0.360
	24...60	20...60	NFZ71E-21	1SBH136001R2171	0.360
	48...130	48...130	NFZ71E-22	1SBH136001R2271	0.360
	100...250	100...250	NFZ71E-23	1SBH136001R2371	0.360
	-	12...20	NFZ80E-20	1SBH136001R2080	0.360
	24...60	20...60	NFZ80E-21	1SBH136001R2180	0.360
	48...130	48...130	NFZ80E-22	1SBH136001R2280	0.360
	100...250	100...250	NFZ80E-23	1SBH136001R2380	0.360
8-pole contactor relays with overlapping of lagging / leading contacts					
	-	12...20	NFZ33/11-20	1SBH136001R2039	0.360
	24...60	20...60	NFZ33/11-21	1SBH136001R2139	0.360
	48...130	48...130	NFZ33/11-22	1SBH136001R2239	0.360
	100...250	100...250	NFZ33/11-23	1SBH136001R2339	0.360
	-	12...20	NFZ51/11-20	1SBH136001R2059	0.360
	24...60	20...60	NFZ51/11-21	1SBH136001R2159	0.360
	48...130	48...130	NFZ51/11-22	1SBH136001R2259	0.360
	100...250	100...250	NFZ51/11-23	1SBH136001R2359	0.360

Note: Only NFZ contactor relays with DC control voltage 12...20 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole



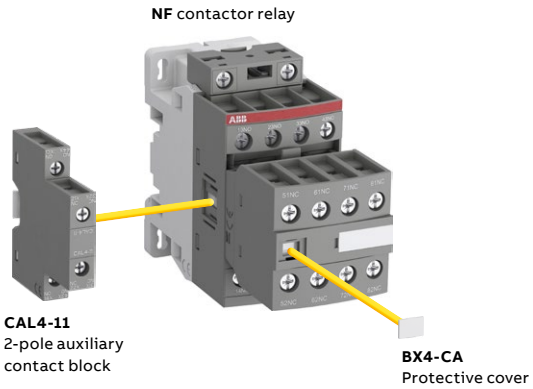
NFZ44E, NFZ53E, NFZ62E, NFZ71E, NFZ80E, NFZ33/11, NFZ51/11

Main dimensions mm, inches

1SBC101561S0201 - Rev. B

NF 8-pole contactor relays

Contactor relays and main accessories



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

Contactor relay types	Main poles	Side-mounted accessories Auxiliary contact blocks 2-pole CAL4-11 (1)	
		Left side	Right side
NF	4 4 E	1	–
	5 3 E		
	6 2 E		
	7 1 E		
	8 0 E		
	3 3 / 1 1		
	5 1 / 1 1		

(1) not allowed for 24 V DC operated contactor relay (coil 30).

NF contactor relays

Technical data

Contact utilization characteristics according to IEC

Contactor relay types	AC / DC operated	**NF**
Standards		IEC 60947-1 / 60947-5-1 and EN 60947-1 / 60947-5-1
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
Rated making capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1
Rated breaking capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1
Ie / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	6 A / 144 W
	48 V DC	2.8 A / 134 W
	72 V DC	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.27 A / 60 W
	250 V DC	0.27 A / 68 W
	400 V DC	0.15 A / 60 W
	500 V DC	0.13 A / 65 W
	600 V DC	0.1 A / 60 W
Short-circuit protection device gG type fuse		10 A
Rated short-time withstand current Icw	for 1.0 s	100 A
	for 0.1 s	140 A
Minimum switching capacity		12 V / 3 mA
with failure rate acc. to IEC 60947-5-4		10-7
Non-overlapping time between N.O. and N.C. contacts		≥ 2 ms
Power dissipation per pole at 6 A		0.1 W
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		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.

Contact utilization characteristics according to UL / CSA

Contactor relay types	AC / DC operated	**NF**
Standards		UL 508, CSA C22.2 N°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

1SBC101562S0201 - Rev. A

NF contactor relays

Technical data

Magnet System Characteristics - NF contactor relays AC / DC operated

Contactor relay types	AC / DC operated	**NF**
Coil operating limits acc. to IEC 60947-5-1	AC supply	At θ ≤ 60 °C 0.85 x Uc min...1.1 x Uc max. At θ ≤ 70 °C 0.85 x Uc min...Uc max.
	DC supply	at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max at θ ≤ 70 °C 0.85 x Uc min ... Uc max
AC control voltage 50/60 Hz		
Rated control circuit voltage Uc		24...500 V AC
Coil consumption	Average pull-in value	50 VA
	Average holding value	2.2 VA / 2 W
DC control voltage		
Rated control circuit voltage Uc		20...500 V DC
Coil consumption	Average pull-in value	50 W
	Average holding value	2 W
PLC-output control		Not suitable for direct control by PLC-output
Drop-out voltage		≤ 60 % of Uc min.
Voltage sag immunity acc. to SEMI F47-0706		–
Dips withstand -20 °C ≤ θ ≤ +60 °C		–
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

Magnet System Characteristics - NFZ contactor relays 24V DC operated - designed for PLC - coil 30

Contactor relay types	DC operated	**NFZ**
Coil operating limits acc. to IEC 60947-5-1	DC supply	at θ ≤ 60 °C 0.85 ... 1.1x Uc at θ ≤ 70 °C Uc
DC control voltage		
Rated control circuit voltage Uc		24 V DC
Coil consumption	Average pull-in value	6 W
	Average holding value	1.7 W
PLC-output control		≥ 250 mA 24 V DC for PLCs and safety PLCs using broken wire detection
Drop-out voltage		≤ 60 % of Uc min.
Operating time		
Between coil energization and:	N.O. contact closing	27 ... 53 ms
	N.C. contact opening	20 ... 35 ms
Between coil de-energization and:	N.O. contact opening	17 ... 29 ms
	N.C. contact closing	22 ... 57 ms

Magnet System Characteristics - NFZ... contactor relays - for specific applications - coils 20, 21, 22, 23

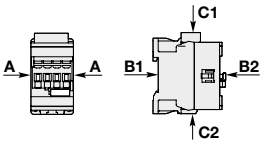
Contactor relay types	AC / DC operated	**NFZ**
Coil operating limits acc. to IEC 60947-5-1	AC supply	at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max at θ ≤ 70 °C 0.85 x Uc min ... Uc max
	DC supply	at θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max
AC control voltage 50/60 Hz		
Rated control circuit voltage Uc		24...250 V AC
Coil consumption	Average pull-in value	16 VA
	Average holding value	1.7 VA / 1.5 W
DC control voltage		
Rated control circuit voltage Uc		12...250 V DC
Coil consumption	Average pull-in value	12 ... 16 W
	Average holding value	1.7 W
PLC-output control		(NFZ coil 21) ≥ 500 mA 24 V DC for PLCs - Not suitable for safety PLCs
Drop-out voltage		≤ 60 % of Uc min.
Voltage sag immunity acc. to SEMI F47-0706		Conditions of use on request
Dips withstand -20 °C ≤ θ ≤ +60 °C		(NFZ coil 21, 22, 23) 22 ms average for Uc ≥ 24 V 50/60 Hz or Uc ≥ 20 V DC
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

1SBC101563S0201 - Rev. C

NF contactor relays

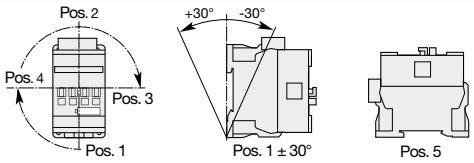
Technical data

General technical data

Contactor relay types	AC / DC operated	**NF**
Rated insulation voltage Ui		
acc. to IEC 60947-5-1		690 V
acc. to UL / CSA		600 V
Rated impulse withstand voltage Uimp.		6 kV
Electromagnetic compatibility		Devices complying with IEC 60947-1 / EN 60947-1 - Environment A and B (1)
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
Max. switching frequency		6000 cycles/h
Shock withstand acc. to IEC 60068-2-27 and EN 60068-2-27 Mounting position 1		
	Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position
	A	30 g
	B1	25 g closed position / 5 g open position
	B2	15 g
	C1	25 g
	C2	25 g
Vibration withstand acc. to IEC 60068-2-6		5...300 Hz 4 g closed position / 2 g open position

(1) Environment B: all NF contactor relays produced since week 08-2013.
NF..E-12 (48...130 V 50/60 Hz-DC) compliant to environment A only: for environment B, select NFZ..E-22.

Mounting characteristics

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

Connecting characteristics

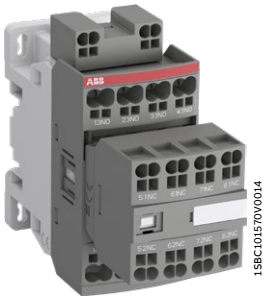
Contactor relay types	AC / DC operated	**NF**
Main terminals		 Screw terminals with cable clamp
Connection capacity (min. ... max.)		
Pole and coil terminals		
Rigid	1 x	1...2.5 mm²
	2 x	1...2.5 mm²
Flexible with non insulated ferrule	1 x	0.75...2.5 mm²
	2 x	0.75...2.5 mm²
Flexible with insulated ferrule	1 x	0.75...2.5 mm²
	2 x	0.75...1.5 mm²
L 6 Lugs	L <	8 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14
Stripping length		10 mm
Tightening torque		
Pole terminals		1.2 Nm / 11 lb.in
Coil terminals		1.2 Nm / 11 lb.in
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529		
All terminals		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

1SBC101564S0201 - Rev. B

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

AC / DC operated

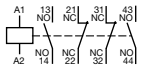
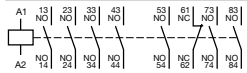
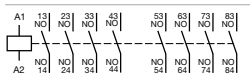
NF22EK



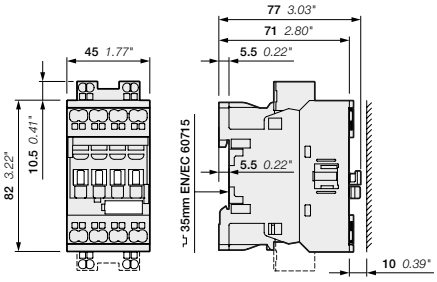
NF44EK

NF..K contactor relays are used for switching auxiliary and control circuits.
These contactor relays are of the block type design with:

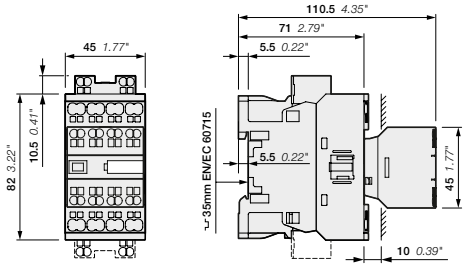
- 4 poles and 8 poles with a permanently fixed 4-pole auxiliary contact block.
  Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
  - can manage large control voltage variations
  - only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
  - reduced panel energy consumption
  - very distinct closing and opening
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Number of contacts	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	V DC	Type	Order code	Weight Pkg (1 pce) kg
4-pole contactor relays					
	24 ... 60	20 ... 60 (1)	NF22EK-11	1SBH137005R1122	0.285
	48 ... 130	48 ... 130	NF22EK-12	1SBH137005R1222	0.285
	100 ... 250	100 ... 250	NF22EK-13	1SBH137005R1322	0.285
	250 ... 500	250 ... 500	NF22EK-14	1SBH137005R1422	0.325
	24 ... 60	20 ... 60 (1)	NF31EK-11	1SBH137005R1131	0.285
	48 ... 130	48 ... 130	NF31EK-12	1SBH137005R1231	0.285
	100 ... 250	100 ... 250	NF31EK-13	1SBH137005R1331	0.285
	250 ... 500	250 ... 500	NF31EK-14	1SBH137005R1431	0.325
	24 ... 60	20 ... 60 (1)	NF40EK-11	1SBH137005R1140	0.285
	48 ... 130	48 ... 130	NF40EK-12	1SBH137005R1240	0.285
	100 ... 250	100 ... 250	NF40EK-13	1SBH137005R1340	0.285
	250 ... 500	250 ... 500	NF40EK-14	1SBH137005R1440	0.325
8-pole contactor relays					
	24 ... 60	20 ... 60 (1)	NF44EK-11	1SBH137005R1144	0.330
	48 ... 130	48 ... 130	NF44EK-12	1SBH137005R1244	0.330
	100 ... 250	100 ... 250	NF44EK-13	1SBH137005R1344	0.330
	250 ... 500	250 ... 500	NF44EK-14	1SBH137005R1444	0.370
	24 ... 60	20 ... 60 (1)	NF53EK-11	1SBH137005R1153	0.330
	48 ... 130	48 ... 130	NF53EK-12	1SBH137005R1253	0.330
	100 ... 250	100 ... 250	NF53EK-13	1SBH137005R1353	0.330
	250 ... 500	250 ... 500	NF53EK-14	1SBH137005R1453	0.370
	24 ... 60	20 ... 60 (1)	NF62EK-11	1SBH137005R1162	0.330
	48 ... 130	48 ... 130	NF62EK-12	1SBH137005R1262	0.330
	100 ... 250	100 ... 250	NF62EK-13	1SBH137005R1362	0.330
	250 ... 500	250 ... 500	NF62EK-14	1SBH137005R1462	0.370
	24 ... 60	20 ... 60 (1)	NF71EK-11	1SBH137005R1171	0.330
	48 ... 130	48 ... 130	NF71EK-12	1SBH137005R1271	0.330
	100 ... 250	100 ... 250	NF71EK-13	1SBH137005R1371	0.330
	250 ... 500	250 ... 500	NF71EK-14	1SBH137005R1471	0.370
	24 ... 60	20 ... 60 (1)	NF80EK-11	1SBH137005R1180	0.330
	48 ... 130	48 ... 130	NF80EK-12	1SBH137005R1280	0.330
	100 ... 250	100 ... 250	NF80EK-13	1SBH137005R1380	0.330
	250 ... 500	250 ... 500	NF80EK-14	1SBH137005R1480	0.370

(1) NF..K-11 not suitable for direct control by PLC-output.



NF22EK, NF31EK, NF40EK



NF44EK, NF53EK, NF62EK, NF71EK, NF80EK

Main dimensions mm, inches

1SBC100439S0201

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

24 V DC operated designed for PLC

1SBC101649V0014

NFZ22EK-30

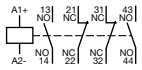
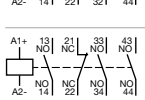
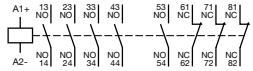
1SBC101651V0014

NFZ44EK-30

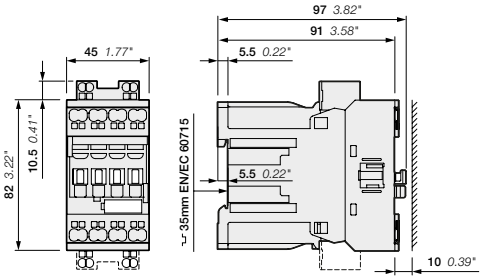
NFZ contactor relays are used for switching auxiliary and control circuits.

These contactor relays are of the block type design with 4 poles or 8 poles (with a permanently fixed 4-pole auxiliary contact block).

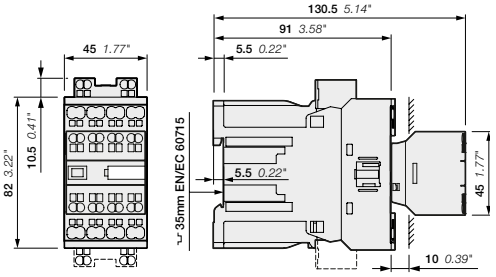
- contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: 24 V DC operated with electronic coil interface allowing low holding consumption up to 1.7 W and reduced panel energy consumption
  - allow direct control by PLC-output ≥ 250 mA 24 V DC
  - very distinct closing and opening
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Number of contacts	Rated control circuit voltage Uc min. ... Uc max. V DC	Type	Order code	Weight Pkg (1 pce) kg
4-pole contactor relays				
	24	NFZ22EK-30	1SBH136005R3022	0.435
	24	NFZ31EK-30	1SBH136005R3031	0.435
	24	NFZ40EK-30	1SBH136005R3040	0.435
8-pole contactor relays				
	24	NFZ44EK-30	1SBH136005R3044	0.490
	24	NFZ53EK-30	1SBH136005R3053	0.490
	24	NFZ62EK-30	1SBH136005R3062	0.490
	24	NFZ71EK-30	1SBH136005R3071	0.490
	24	NFZ80EK-30	1SBH136005R3080	0.490

Note: NFZ contactor relays with 24 V DC control voltage need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.
For product availability, please consult your ABB local sales organization.



NFZ22EK, NFZ31EK, NFZ40EK



NFZ44EK, NFZ53EK, NFZ62EK, NFZ71EK, NFZ80EK

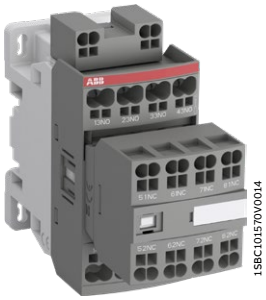
1SBC100500S0201

Main dimensions mm, inches

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

AC / DC operated for specific applications

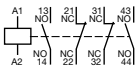
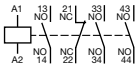
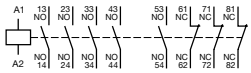
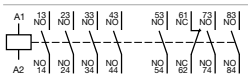
NFZ22EK



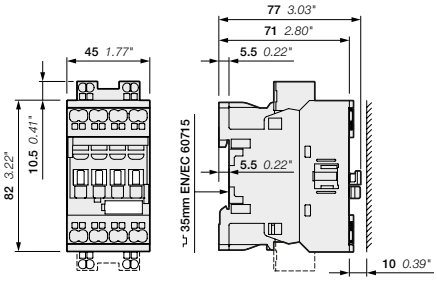
NFZ44EK

NFZ..K contactor relays are used for switching auxiliary and control circuits.
These contactor relays are of the block type design with:

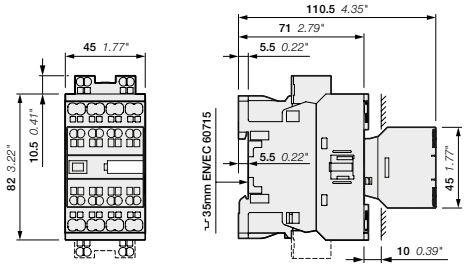
- 4 poles and 8 poles with a permanently fixed 4-pole auxiliary contact block.
  Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
  - can manage large control voltage variations
  - only 4 control voltage ranges covering 24...250 V 50/60 Hz and 12...250 V DC
  - allow direct control by PLC-output ≥ 24 V DC 500 mA
  - reduced panel energy consumption
  - very distinct closing and opening
  - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Number of contacts	Rated control circuit voltage Uc min. ... Uc max. V 50/60 Hz	V DC	Type	Order code	Weight Pkg (1 pce) kg
4-pole contactor relays					
	–	12 ... 20	NFZ22EK-20	1SBH136005R2022	0.315
	24 ... 60	20 ... 60	NFZ22EK-21	1SBH136005R2122	0.315
	48 ... 130	48 ... 130	NFZ22EK-22	1SBH136005R2222	0.315
	100 ... 250	100 ... 250	NFZ22EK-23	1SBH136005R2322	0.315
	–	12 ... 20	NFZ31EK-20	1SBH136005R2031	0.315
	24 ... 60	20 ... 60	NFZ31EK-21	1SBH136005R2131	0.315
	48 ... 130	48 ... 130	NFZ31EK-22	1SBH136005R2231	0.315
	100 ... 250	100 ... 250	NFZ31EK-23	1SBH136005R2331	0.315
	–	12 ... 20	NFZ40EK-20	1SBH136005R2040	0.315
	24 ... 60	20 ... 60	NFZ40EK-21	1SBH136005R2140	0.315
	48 ... 130	48 ... 130	NFZ40EK-22	1SBH136005R2240	0.315
	100 ... 250	100 ... 250	NFZ40EK-23	1SBH136005R2340	0.315
8-pole contactor relays					
	–	12 ... 20	NFZ44EK-20	1SBH136005R2044	0.360
	24 ... 60	20 ... 60	NFZ44EK-21	1SBH136005R2144	0.360
	48 ... 130	48 ... 130	NFZ44EK-22	1SBH136005R2244	0.360
	100 ... 250	100 ... 250	NFZ44EK-23	1SBH136005R2344	0.360
	–	12 ... 20	NFZ53EK-20	1SBH136005R2053	0.360
	24 ... 60	20 ... 60	NFZ53EK-21	1SBH136005R2153	0.360
	48 ... 130	48 ... 130	NFZ53EK-22	1SBH136005R2253	0.360
	100 ... 250	100 ... 250	NFZ53EK-23	1SBH136005R2353	0.360
	–	12 ... 20	NFZ62EK-20	1SBH136005R2062	0.360
	24 ... 60	20 ... 60	NFZ62EK-21	1SBH136005R2162	0.360
	48 ... 130	48 ... 130	NFZ62EK-22	1SBH136005R2262	0.360
	100 ... 250	100 ... 250	NFZ62EK-23	1SBH136005R2362	0.360
	–	12 ... 20	NFZ71EK-20	1SBH136005R2071	0.360
	24 ... 60	20 ... 60	NFZ71EK-21	1SBH136005R2171	0.360
	48 ... 130	48 ... 130	NFZ71EK-22	1SBH136005R2271	0.360
	100 ... 250	100 ... 250	NFZ71EK-23	1SBH136005R2371	0.360
	–	12 ... 20	NFZ80EK-20	1SBH136005R2080	0.360
	24 ... 60	20 ... 60	NFZ80EK-21	1SBH136005R2180	0.360
	48 ... 130	48 ... 130	NFZ80EK-22	1SBH136005R2280	0.360
	100 ... 250	100 ... 250	NFZ80EK-23	1SBH136005R2380	0.360

Note: NFZ contactor relays with 12...20 V DC control voltage need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.



NFZ22EK, NFZ31EK, NFZ40EK



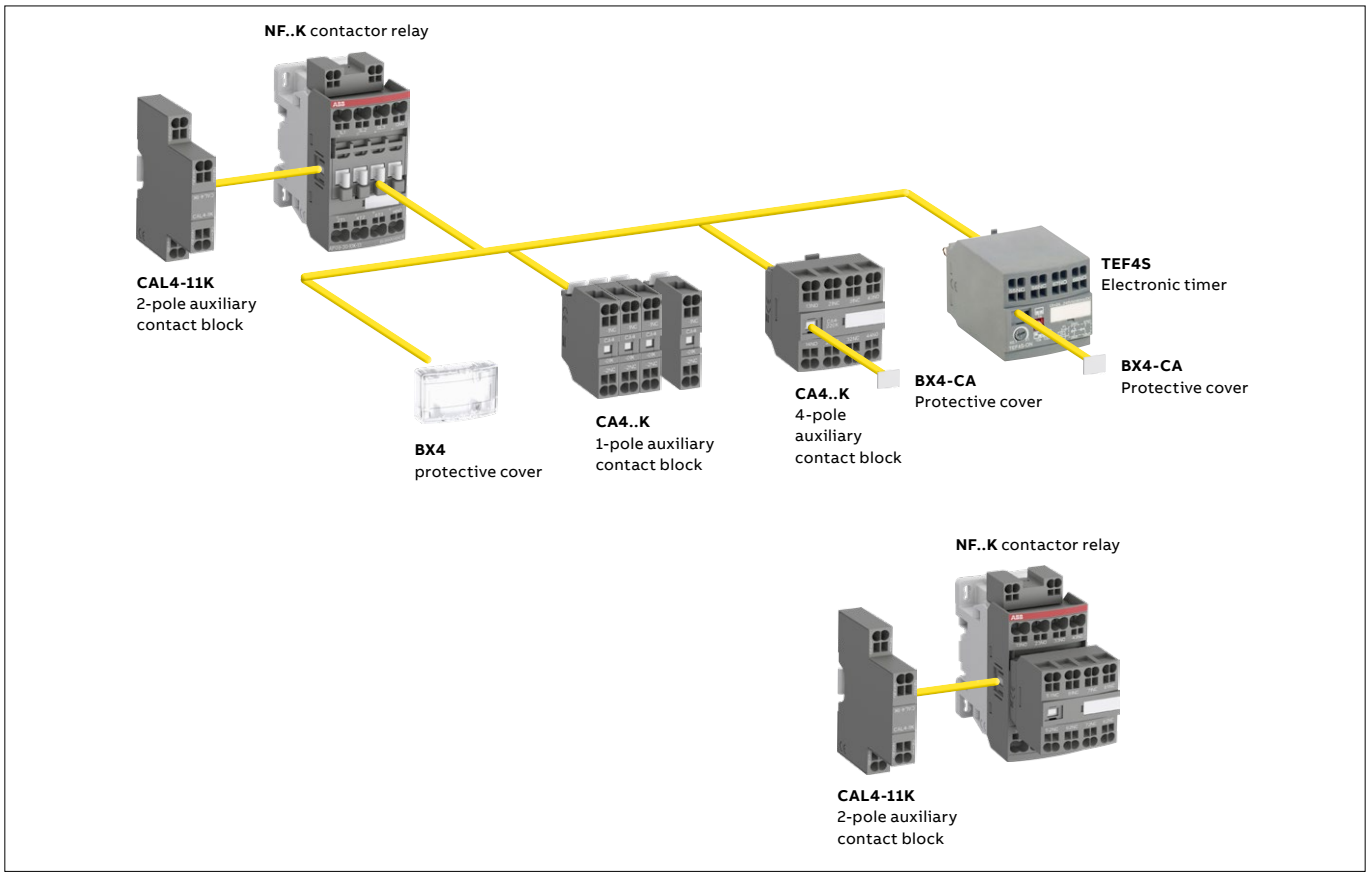
NFZ44EK, NFZ53EK, NFZ62EK, NFZ71EK, NFZ80EK

Main dimensions mm, inches

1SBC100440S0201

NF..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		Electronic timer		Auxiliary contact blocks 2-pole CAL4-11K	
			1-pole CA4..K	4-pole CA4..K	TEF4S		Left side	Right side
NF(Z)								
NF	2 2	EK (1)	4 max.	or 1	or 1	+	1	-
	3 1	EK (1)	2 max.	-	or 1	+	1	+ 1
	4 0	EK (2)						
NF	4 4	EK	-	-	- -	+	1	-
	5 3	EK						
	6 2	EK						
	7 1	EK						
	8 0	EK						
NFZ 24 V DC designed for PLC - coil 30								
NFZ	2 2	EK (1)	4 max.	**or** 1	**or** 1	**or**	1	**+** 1
	3 1	EK (1)	2 max.	-	**or** 1	**+**	1	
	4 0	EK (2)			1	**+**	1	**+** 1
NFZ	4 4	EK	-	-	-		-	-
	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

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

Technical data

Contact utilization characteristics according to IEC

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

Contact utilization characteristics according to UL / CSA

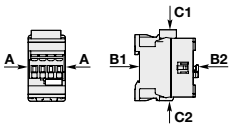
Contactor relay types	**NF..K**
Standards	UL 508, CSA C22.2 N°14
Maximum operational voltage	600 V AC, 600 V DC
Pilot duty	A600, Q600
AC thermal rated current	10 A
AC maximum volt-ampere making	7200 VA
AC maximum volt-ampere breaking	720 VA
DC thermal rated current	2.5 A
DC maximum volt-ampere making-breaking	69 VA

1SBC100441S0201

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

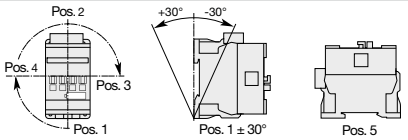
Technical data

General technical data

Contactor relay types	AC / DC operated	**NF..K**
Rated insulation voltage Ui		
acc. to IEC 60947-5-1		690 V
acc. to UL / CSA		600 V
Rated impulse withstand voltage Uimp.		6 kV
Electromagnetic compatibility		Devices complying with IEC 60947-1 / EN 60947-1 - Environment A and B (1)
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 withstand		
acc. to IEC 60068-2-27 and EN 60068-2-27		
Mounting position 1	Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position
	A	30 g
	B1	25 g closed position / 5 g open position
	B2	15 g
	C1	25 g
	C2	25 g
Vibration withstand		5 ... 300 Hz
acc. to IEC 60068-2-6		4 g closed position / 2 g open position

(1) NF..-12 (48...130 V 50/60 Hz-DC) compliant to environment A only. For environment B: select NFZ..-22.

Mounting characteristics

Contactor relay types	AC / DC operated	**NF..K**
Mounting positions		
		Max. add-on N.C. auxiliary contacts: see accessory fitting details for a NF contactor relay
Mounting distances		The contactor relays can be assembled side by side
Fixing		
On rail according to IEC 60715, 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..K**
Main terminals		
		Push-in Spring terminals
Connection capacity (min. ... max.)		
Pole and coil terminals		
Rigid	1 x	1 ... 2.5 mm²
	2 x	1 ... 2.5 mm²
Flexible with non insulated ferrule	1 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²
	2 x	1 (push-in) / 0.5 (spring) ... 2.5 mm²
Flexible with insulated ferrule	1 x	1 (push-in) / 0.5 (spring) ... 1.5 mm²
	2 x	1 (push-in) / 0.5 (spring) ... 1.5 mm²
Flexible without ferrule	1 x	(spring) 0.5 ... 2.5 mm²
	2 x	(spring) 0.5 ... 2.5 mm²
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18 ... 14
Stripping length		10 mm
Degree of protection		
acc. to IEC 60947-1 / EN 60947-1		
and IEC 60529 / EN 60529		IP20
Screwdriver type	All terminals	Flat Ø 3 mm x 0.5 mm

1SBC100442S0201 - Rev. A

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

Technical data

Magnet System Characteristics for NF..K contactor relays - AC / DC operated

Contactor relay types	AC / DC operated	**NF..K**
Coil operating limits acc. to IEC 60947-5-1	AC supply	at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max at θ ≤ 70 °C 0.85 x Uc min ... Uc max
	DC supply	At θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max At θ ≤ 70 °C 0.85 x Uc min ... Uc max
AC control voltage 50/60 Hz		
Rated control circuit voltage Uc		24 ... 500 V AC
Coil consumption	Average pull-in value	50 VA
	Average holding value	2.2 VA / 2 W
DC control voltage		
Rated control circuit voltage Uc		20 ... 500 V DC
Coil consumption	Average pull-in value	50 W
	Average holding value	2 W
PLC-output control		Not suitable for direct control by PLC-output
Drop-out voltage		≤ 60 % of Uc min.
Voltage sag immunity according to SEMI F47-0706		–
Dips withstand -20 °C ≤ θ ≤ +60°C		–
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

Magnet System Characteristics for NFZ..K contactor relays 24V DC operated - designed for PLC - coil 30

Contactor relay types	AC / DC operated	**NFZ..K**
Coil operating limits acc. to IEC 60947-5-1	DC supply	At θ ≤ 60 °C 0.85 ... 1.1 x Uc At θ ≤ 70 °C Uc
DC control voltage		
Rated control circuit voltage Uc		24 V DC
Coil consumption	Average pull-in value	6 W
	Average holding value	1.7 W
PLC-output control		≥ 250 mA 24 V DC for PLCs and safety PLCs using broken wire detection
Drop-out voltage		≤ 60 % of Uc min.
Operating time		
Between coil energization and:		
	N.O. contact closing	27 ... 53 ms
	N.C. contact opening	20 ... 35 ms
Between coil de-energization and:		
	N.O. contact opening	17 ... 29 ms
	N.C. contact closing	22 ... 57 ms

Magnet System Characteristics for NFZ..K contactor relays - for specific applications - coils 20, 21, 22, 23

Contactor relay types	AC / DC operated	**NFZ..K**
Coil operating limits acc. to IEC 60947-5-1	AC supply	At θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max At θ ≤ 70 °C 0.85 x Uc min ... Uc max
	DC supply	At θ ≤ 70 °C 0.85 x Uc min ... 1.1 x Uc max
AC control voltage 50/60 Hz		
Rated control circuit voltage Uc		24 ... 250 V AC
Coil consumption	Average pull-in value	16 VA
	Average holding value	1.7 VA / 1.5 W
DC control voltage		
Rated control circuit voltage Uc		12 ... 250 V DC
Coil consumption	Average pull-in value	12 ... 16 W
	Average holding value	1.7 W
PLC-output control		(AF..Z coil 21) ≥ 500 mA 24 V DC for PLCs
Drop-out voltage		≤ 60 % of Uc min.
Voltage sag immunity according to SEMI F47-0706		(NFZ coil 21, 22, 23) conditions of use on request
Dips withstand -20 °C ≤ θ ≤ +60°C		(NFZ coil 21, 22, 23) 20 ms average for Uc ≥ 24 V 50/60 Hz or Uc ≥ 20 V DC
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

1SBC100501S0201 - Rev. A

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**

Accessories


G 3/8"
www.piab.com

Accessories for AF09 ... AF2850 3-pole contactors, AF09 ... AF370 4-pole contactors and NF contactor relays

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**

Auxiliary contact blocks for AF09 ... AF96 contactors and NF contactor relays


1SBC100001V0014

CA4-10


1SBC100007V0014

CAL4-11


1SBC100006V0014

CA4-22E


1SBC100002V0014

CAT4-11E

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

Types of auxiliary contact blocks for front mounting:

- CA4 1 or 4-pole block, with instantaneous N.O., N.C. contacts
- CC4 1-pole block, with N.O. leading contact or N.C. lagging contact
- CAT4 2-pole block, with instantaneous N.O. + N.C. contacts and A1 / A2 coil terminal connection on front face.

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:

- CAL4 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 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 ... AF96	1 0	– –	CA4-10	1SBN010110R1010	1	0.014
4-pole NF	1 0	– –	CA4-10-T	1SBN010110T1010	10	0.014
	0 1	– –	CA4-01	1SBN010110R1001	1	0.014
	0 1	– –	CA4-01-T	1SBN010110T1001	10	0.014
AF09 ... AF16..-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 ... AF96..-30-00	2 2	– –	CA4-22E	1SBN010140R1022	1	0.055
AF09 ... AF80..-40-00	3 1	– –	CA4-31E	1SBN010140R1031	1	0.055
AF09 ... AF80..-22-00	4 0	– –	CA4-40E	1SBN010140R1040	1	0.055
AF26 ... AF96..-30-00 AF09 ... AF16..-40-00 AF40 ... AF80..-40-00	0 4	– –	CA4-04E	1SBN010140R1004	1	0.055
AF09 ... AF16..-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	2 2	– –	CA4-22N	1SBN010140R1222	1	0.055
	3 1	– –	CA4-31N	1SBN010140R1231	1	0.055
	4 0	– –	CA4-40N	1SBN010140R1240	1	0.055
	1 3	– –	CA4-13N	1SBN010140R1213	1	0.055
NF..40E	0 4	– –	CA4-04N	1SBN010140R1204	1	0.055
Front-mounted auxiliary contact blocks with N.O. leading contact and N.C. lagging contact						
AF09 ... AF96	– –	1 0	CC4-10	1SBN010111R1010	1	0.014
4-pole NF	– –	0 1	CC4-01	1SBN010111R1001	1	0.014

Note: 1 max CC4-10 and 1 max CC4-01.
CC4-01 use: on each "Accessory fitting details" table, the allowed number of N.C. add-on and built-in contacts including CC4-01, is decreased by one.

Side-mounted instantaneous auxiliary contact blocks						
AF09 ... AF96	1 1	– –	CAL4-11	1SBN010120R1011	1	0.040
NF	1 1	– –	CAL4-11-T	1SBN010120T1011	10	0.040
Front-mounted instantaneous auxiliary contact and A1/A2 coil terminal blocks						
AF09 ... AF16..-30-10	1 1	– –	CAT4-11M	1SBN010151R1111	1	0.040
AF26 ... AF65..-30-00 AF09 ... AF52..-40-00 AF09 ... AF40..-22-00	1 1	– –	CAT4-11E	1SBN010151R1011	1	0.040
AF09 ... AF16..-30-01	1 1	– –	CAT4-11U	1SBN010151R1311	1	0.040

For each contactor or contactor relay type, refer to "Accessory fitting details" table.
Note: CAT4 not suitable for AF..Z contactors with DC control voltage 12…20 V DC (coil 20) and 24 V DC (coil 30).

1SBC101573S0201 - Rev. A

Auxiliary contact blocks for AF09 ... AF96 contactors and NF contactor relays

Technical data

Contact utilization characteristics according to IEC

Types		**1-pole CA4, 1-pole CC4, 4-pole CA4, 2-pole CAT4, 2-pole CAL4**
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
Conventional thermal current Ith - θ ≤ 40 °C		16 A
Rated frequency (without derating)		50/60 Hz
Ie / Rated operational current AC-15		
acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A
	220-240 V 50/60 Hz	4 A
	400-440 V 50/60 Hz	3 A
	500 V 50/60 Hz	2 A
	690 V 50/60 Hz	2 A
Making capacity acc. to IEC 60947-5-1		10 x Ie AC-15
Breaking capacity acc. to IEC 60947-5-1		10 x Ie AC-15
Ie / Rated operational current DC-13		
acc. to IEC 60947-5-1	24 V DC	6 A / 144 W
	48 V DC	2.8 A / 134 W
	72 V DC	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.27 A / 60 W
	250 V DC	0.27 A / 68 W
	400 V DC	0.15 A / 60 W
	500 V DC	0.13 A / 65 W
	600 V DC	0.1 A / 60 W
Short-circuit protection device gG type fuse		10 A
Rated short-time withstand current Icw	for 1.0 s	100 A
θ = 40 °C	for 0.1 s	140 A
Minimum switching capacity		12 V / 3 mA
with failure rate acc. to IEC 60947-5-4		10^{-7}
Power dissipation per pole at 6 A		0.1 W
Mechanical durability Number of operating cycles		10 millions operating cycles
Max. switching frequency		3600 cycles/h
Max. electrical switching frequency	AC-15	1200 cycles/h
	DC-13	900 cycles/h
Mechanically linked contacts acc. to annex L of IEC 60947-5-1		Additional N.O. or N.C. auxiliary contacts (CA4, CAL4, CAT4) are mechanically linked contacts
Mirror contacts acc. to annex F of IEC 60947-4-1		Additional N.C. auxiliary contacts (CA4, CAL4, CAT4) are mirror contacts

Contact utilization characteristics according to UL / CSA

Types	**1-pole CA4, 1-pole CC4, 4-pole CA4, 2-pole CAT4, 2-pole CAL4**
Standards	UL 508, CSA C22.2 N°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, 1-pole CC4, 4-pole CA4, 2-pole CAT4, 2-pole CAL4**
Connection capacity (min. ... max.)			
	Rigid solid	1 x	1...2.5 mm²
		2 x	1...2.5 mm²
	Flexible with non insulated ferrule	1 x	0.75...2.5 mm²
		2 x	0.75...2.5 mm²
	Flexible with insulated ferrule	1 x	0.75...2.5 mm²
		2 x	0.75...1.5 mm²
	Lugs	L <	8 mm
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18...14
Stripping length			10 mm
Tightening torque			1.2 Nm / 11 lb.in
Degree of protection			
acc. to IEC 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

1SBC101593502 01 - Rev. A

Auxiliary contact blocks with Push-in Spring terminals


1SBC100080V0014

CA4-10K


1SBC100081V0014

CA4-22EK


1SBC100082V0014

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 ... AF96 NF	1 0	CA4-10K	1SBN010160R1010	1	0.012
	1 0	CA4-10K-T	1SBN010160T1010	10	0.012
	0 1	CA4-01K	1SBN010160R1001	1	0.012
	0 1	CA4-01K-T	1SBN010160T1001	10	0.012
AF09 ... AF16..-30-10	2 2	CA4-22MK	1SBN010146R1122	1	0.050
	3 1	CA4-31MK	1SBN010146R1131	1	0.050
	1 3	CA4-13MK	1SBN010146R1113	1	0.050
	0 4	CA4-04MK	1SBN010146R1104	1	0.050
AF26 ... AF96..-30-00 AF09 ... AF80..-40-00 AF09 ... AF80..-22-00	2 2	CA4-22EK	1SBN010146R1022	1	0.050
	3 1	CA4-31EK	1SBN010146R1031	1	0.050
	4 0	CA4-40EK	1SBN010146R1040	1	0.050
4-pole NF	1 3	CA4-13NK	1SBN010146R1213	1	0.050
	2 2	CA4-22NK	1SBN010146R1222	1	0.050
	3 1	CA4-31NK	1SBN010146R1231	1	0.050
	4 0	CA4-40NK	1SBN010146R1240	1	0.050
NF40E	0 4	CA4-04NK	1SBN010146R1204	1	0.050
Side-mounted instantaneous auxiliary contact blocks					
3-pole					
AF09 ... AF96 NF	1 1	CAL4-11K	1SBN010134R1011	1	0.030

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

1SBC100417S0201

Auxiliary contact blocks for AF09 ... AF96 contactors and NF 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 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1
Rated insulation voltage Ui acc. to IEC 60947-5-1		690 V
Rated impulse withstand voltage Uimp.		6 kV
Rated operational voltage Ue max.		690 V
Conventional thermal current Ith - θ ≤ 40 °C		16 A
Rated frequency (without derating)		50 / 60 Hz
Ie / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A
	220-240 V 50/60 Hz	4 A
	400-440 V 50/60 Hz	3 A
	500 V 50/60 Hz	2 A
	690 V 50/60 Hz	2 A
Making capacity acc. to IEC 60947-5-1		10 x Ie AC-15
Breaking capacity acc. to IEC 60947-5-1		10 x Ie AC-15
Ie / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	6 A / 144 W
	48 V DC	2.8 A / 134 W
	72 V DC	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.27 A / 60 W
	250 V DC	0.27 A / 68 W
	400 V DC	0.15 A / 60 W
	500 V DC	0.13 A / 65 W
	600 V DC	0.1 A / 60 W
Short-circuit protection device gG type fuse		10 A
Rated short-time withstand current Icw	for 1.0 s	100 A
θ = 40 °C	for 0.1 s	140 A
Minimum switching capacity		12 V / 3 mA
with failure rate acc. to IEC 60947-5-4		10^{-7}
Power dissipation per pole at 6 A		0.1 W
Mechanical durability	Number of operating cycles	10 million operating cycles
	Max. switching frequency	3600 cycles/h
Max. electrical switching frequency	AC-15	1200 cycles/h
	DC-13	900 cycles/h
Mechanically linked contacts acc. to annex L of IEC 60947-5-1		Additional N.O. or N.C. auxiliary contacts (CA4, CAL4) are mechanically linked contacts.
Mirror contacts acc. to annex F of IEC 60947-4-1		Additional N.C. auxiliary contacts (CA4, CAL4) are mirror contacts.

Contact utilization characteristics according to UL / CSA

Standards	UL 508, CSA C22 N°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

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

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Auxiliary contact blocks for severe industrial environments

for AF09 ... AF96 contactors and NF contactor relays

CE5-10W

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

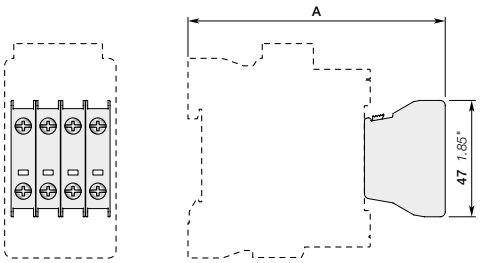
Types of auxiliary contact blocks for front mounting:

- CE5 1-pole block, instantaneous with N.O. contact or N.C. contact, available in 2 IP degrees
  - CE5 D with built-in microswitch IP40, degree of protection (IP20 on terminals)
  - CE5 W with built-in microswitch IP67, degree of protection (IP20 on terminals).

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
AF09 ... AF96	1 –	– –	CE5-10D0.1	1SBN010015R1010	1	0.020
NF	– 1	– –	CE5-01D0.1	1SBN010015R1001	1	0.020
	1 –	– –	CE5-10D2	1SBN010017R1010	1	0.020
	– 1	– –	CE5-01D2	1SBN010017R1001	1	0.020
	1 –	– –	CE5-10W0.1	1SBN010016R1010	1	0.020
	– 1	– –	CE5-01W0.1	1SBN010016R1001	1	0.020
	1 –	– –	CE5-10W2	1SBN010018R1010	1	0.020
	– 1	– –	CE5-01W2	1SBN010018R1001	1	0.020

(1) For each contactor type, refer to "Accessory fitting details" table.
Note: For use with 24 V DC operated AF..Z contactor and NFZ contactor relay (coil 30), please consult your ABB local sales organization.



Main dimensions mm, inches

1-pole CE5 on	A
AF09 ... AF16..-30-xx 1 stack AF09, AF16..-40/22-00 NF..E 1-stack	103.5 mm / 4.07"
AF26 ... AF38..-30-00	112.5 mm / 4.43"
AF26, AF38..-40/22-00	127.5 mm / 5.02"
AF40 ... AF65-30-00	137 mm / 5.39"
AF40 ... AF65-40/22-00	140 mm / 5.51"
AF80 ... AF96-30-00	142 mm / 5.59"
AF80-40/22-00	142 mm / 5.59"

1SBC101905S0201 - Rev. A

Auxiliary contact blocks for severe industrial environments

Technical data

Types		Front mounted 1-pole CE5-..0.1	1-pole CE5-..2
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		250 V	
Rated operational voltage Ue max.		125 V	250 V
Conventional thermal current Ith - θ ≤ 40 °C		0.1 A	2 A
Rated frequency (without derating)		50 / 60 Hz	
Ie / Rated operational current		AC-14	AC-15
acc. to IEC 60947-5-1	24-127 V 50/60 Hz	0.1 A	2 A
	220-240 V 50/60 Hz	–	2 A
Making capacity		6 x Ie AC-14 acc. to IEC 60947-5-1	10 x Ie AC-15 acc. to IEC 60947-5-1
Breaking capacity		6 x Ie AC-14 acc. to IEC 60947-5-1	10 x Ie AC-15 acc. to IEC 60947-5-1
Ie / Rated operational current DC-12 acc. to IEC 60947-5-1	24 V DC	0.1 A	2 A
	48 V DC	0.1 A	1 A
	72 V DC	0.1 A	0.3 A
	110 V DC	0.1 A	0.2 A
	125 V DC	–	0.2 A
	220 V DC	–	0.1 A
Short-circuit protection device FF type fuse (1)		0.1 A	10 A
Minimum switching capacity			
AF09 ... AF38 contactors		3 V / 1 mA	17 V / 1 mA
with failure rate acc. to IEC 60947-5-4		–	≤ 10^{-7}
Mechanical durability			
Number of operating cycles		5 millions for CE5-..D0.1	5 millions for CE5-..D2
		2.5 millions for CE5-..W0.1	2.5 millions for CE5-..W2
Max. switching frequency		3600 cycles/h	
Electrical durability			
Number of operating cycles		2.5 millions for CE5-..D0.1	1 million for CE5-..D2
		0.7 millions for CE5-..W0.1	0.3 millions for CE5-..W2
Max. electrical switching frequency			
	AC-14	1200 cycles/h	
	AC-15	1200 cycles/h	
	DC-12	900 cycles/h	
Contact utilization characteristics according to UL / CSA			
Standards		UL 508, CSA C22.2 N°14	
Max. operational voltage		125 V AC / 110 V DC	250 V AC / 220 V DC
Pilot duty			
AC thermal rated current		0.1 A	2 A
Connecting characteristics			
Connection capacity (min. ... max.)			
Rigid solid	1 x	1...4 mm²	
	2 x	1...4 mm²	
Flexible with ferrule	1 x	0.75...2.5 mm²	
	2 x	0.75...2.5 mm²	
Lugs	L ≤	7.7 mm	
	l >	3.7 mm	
Connecting capacity acc. to UL / CSA	1 or 2 x	AWG 18...14	
Tightening torque		1 Nm	
Degree of protection	Terminals	IP20	
acc. to IEC 60947-1 / EN 60947-1 and	Microswitches	IP40 for CE5-..D0.1	IP40 for CE5-..D2
IEC 60529 / EN 60529		IP67 for CE5-..W0.1	IP67 for CE5-..W2
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) HRC fuses for very fast action (6.3 x 32 mm size).

1SBC101906S0201

Auxiliary contact blocks for severe industrial environments

For AF09 ... AF96 3-pole contactors and AF09 ... AF80 4-pole contactors

For AF contactors

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

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

Contactor types	Main poles	Built-in auxiliary contacts	Front-mounted accessories: Auxiliary contact blocks 1-pole CE5	Front-mounted accessories: Auxiliary contact blocks 1-pole CA4	Front-mounted accessories: Electrical and mechanical interlock set (Between 2 contactors) VEM4		Side-mounted accessories: Auxiliary contact blocks Left side 2-pole CAL4-11	Side-mounted accessories: Auxiliary contact blocks Right side
3-pole contactors AF09 ... AF96								
			Max. N.C. built-in and add-on N.C. auxiliary contacts (CA4, CAL4, VEM4): 2 max. with 1 CE5, none with 2 CE5 on positions 1, 2, 3, 4					
AF09 ... AF16	3 0	0 1	1	+ 3 max.	–	+	1	–
AF09 ... AF16	3 0	1 0	2	+ 2 max.	–		–	–
AF26 ... AF38	3 0	0 0	1	+ 3 max.	–	+	1	–
			1	+ 1 max.	–	+	1	+ 1
			1	+ 2 max.	+ 1	+	1	–
			Max. N.C. built-in or add-on N.C. auxiliary contacts (CA4, CAL4, VEM4): 1 max. with 1 CE5 on positions 1 ±30°, 5					
AF09 ... AF16	3 0	0 1	1	+ 3 max.	–		–	–
AF09 ... AF16	3 0	1 0	1	+ 3 max.	–	+	1	–
AF26 ... AF38	3 0	0 0	1	+ 2 max.	+ 1		–	–
			Max. add-on N.C. auxiliary contacts (CA4, CAL4): 4 max. with 1 CE5, 2 max. with 2 CE5 on positions 1, 1 ±30°, 2, 3, 4, 5					
AF40 ... AF96	3 0	0 0	2	+ 2 max.	–	+	1	+ 1
			1	+ 3 max.	–	+	1	+ 1
4-pole contactors AF09 ... AF80								
			Max. add-on N.C. auxiliary contacts (CA4, CAL4, VEM4): 2 max. with 1 CE5, none with 2 CE5 on positions 1, 2, 3, 4					
AF09, AF16	4 0	0 0	2	+ 2 max.	–		–	–
			1	+ 3 max.	–	+	1	–
			1	+ 1 max.	–	+	1	+ 1
			1	+ 2 max.	+ 1	+	1	–
			Max. add-on N.C. auxiliary contacts (CA4, CAL4, VEM4): 1 max. with 1 CE5 on positions 1, 2, 3, 4					
AF26, AF38	4 0	0 0	1	+ 3 max.	–	+	1	–
			1	+ 2 max.	+ 1		–	–
AF09, AF16 AF26, AF38	2 2	0 0	1	+ 3 max.	–	+	1	–
			Max. add-on N.C. auxiliary contacts (CA4, CAL4, VEM4): 1 max. with 1 CE5 on positions 1 ±30°, 5					
AF09, AF16	4 0	0 0	1	+ 3 max.	–	+	1	–
			1	+ 2 max.	+ 1		–	–
			No add-on N.C. auxiliary contacts on positions 1 ±30°, 5					
AF26, AF38	4 0	0 0	1	+ 3 max.	–		–	–
AF09, AF16	2 2	0 0						
AF26, AF38	2 2	0 0						
			Max. add-on N.C. auxiliary contacts (CA4, CAL4): 4 max. with 1 CE5, 2 max. with 2 CE5 on positions 1, 1 ±30°, 2, 3, 4, 5					
AF40 ... AF80	4 0	0 0	2	+ 2 max.	–	+	1	+ 1
			1	+ 3 max.	–	+	1	+ 1
			No add-on N.C. auxiliary contacts on positions 1, 1 ±30°, 2, 3, 4, 5					
AF40, AF80	2 2	0 0	1	+ 3 max.	–		–	–

1SBC101907S0201 - Rev. A

Auxiliary contact blocks for severe industrial environments

For NF contactor relays

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

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

Contactor relay types	Main poles		**Front-mounted accessories** Auxiliary contact blocks 1-pole CE5	1-pole CA4			**Side-mounted accessories** Auxiliary contact blocks Left side 2-pole CAL4-11	Right side
			Max. add-on N.C. auxiliary contacts (CA4, CAL4): 1 max. with 1 CE5 on positions 1, 2, 3, 4					
NF	2 2 3 1	E E	1	+ 3 max.	–	+	1	–
			Max. add-on N.C. auxiliary contacts (CA4, CAL4): 2 max. with 1 CE5, none with 2 CE5 on positions 1, 2, 3, 4					
NF	4 0	E	2	+ 2 max.	–		–	–
			1	+ 3 max.	–	+	1	–
			1	+ 1 max.	–	+	1	+ 1
			Max. add-on N.C. auxiliary contacts (CA4): none with 1 CE5 on positions 1 ±30°, 5					
NF	2 2 3 1	E E	1	+ 3 max.	–		–	–
			Max. add-on N.C. auxiliary contacts (CA4, CAL4): 1 max. with 1 CE5 on positions 1 ±30°, 5					
NF	4 0	E	1	+ 3 max.	–	+	1	–

Auxiliary contact blocks for AF116 ... AF2850 contactors

1SFC101071V0001

CAL19-11

1SFC101082V0001

CAL18-11

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 side mounting:

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

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 AF116 ... AF2850 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-mounted instantaneous auxiliary contact blocks					
AF116 ... AF370	1 1	CAL19-11	1SFN010820R1011	1	0.040
	1 1	CAL19-11B	1SFN010820R3311	1	0.040
AF400 ... AF2850	1 1	CAL18-11	1SFN010720R1011	2	0.050
	1 1	CAL18-11B	1SFN010720R3311	2	0.050

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

Auxiliary contact blocks for AF116 ... AF2850 contactors

Technical data

Types		CAL18	CAL19
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	6 A / 144 W	3 A / 72 W
	48 V DC	2.8 A / 134 W	1.5 A / 72 W
	72 V DC	1 A / 72 W	1 A / 72 W
	110 V DC	0.55 A / 60 W	0.55 A / 60 W
	125 V DC	0.55 A / 69 W	0.55 A / 69 W
	220 V DC	0.3 A / 66 W	0.3 A / 69 W
	250 V DC	0.3 A / 75 W	0.3 A / 75 W
Short-circuit protection device gG type fuse		10 A	
Rated short-time withstand current Icw	for 1.0 s	100 A	
θ = 40 °C	for 0.1 s	140 A	
Minimum switching capacity		24 V / 50 mA (0.5 million of operating cycles)	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 (A/AF400 ... AF750)	
		0.5 million (AF1250 ... AF2050)	5 millions operating cycles
Max. switching frequency		3600 cycles/h	300 cycles/h
Max. electrical switching frequency	AC-15	1200 cycles/h	300 cycles/h
	DC-13	900 cycles/h	300 cycles/h
Mirror contacts acc. to annex F of IEC 60947-4-1		N.C. auxiliary contacts are mirror contacts (1)	

(1) CAL19: for 3-pole contactors only.

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 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.)		
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

1SFC101116C0201 - Rev. B

Auxiliary contact blocks for AF116 ... AF2850 contactors for severe industrial environments

1SFC101214V0001

CEL19

1SFC101083V0001

CEL18

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					
AF116 ... AF370	1 0	CEL19-10	1SFN010832R1010	1	0.040
	0 1	CEL19-01	1SFN010832R1001	1	0.040
AF400 ... AF2850	1 0	CEL18-10	1SFN010716R1010	1	0.050
	0 1	CEL18-01	1SFN010716R1001	1	0.050

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

Auxiliary contact blocks for AF116 ... AF2850 contactors for severe industrial environments

Technical data

Types			CEL18, CEL19
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			250 V
Rated operational voltage Ue max.			125 V
Conventional thermal current Ith - θ ≤ 40 °C			0.1 A
Ie / Rated operational current AC-14 acc. to IEC 60947-5-1		24-127 V 50/60 Hz	0.1 A
Making capacity acc. to IEC 60947-5-1			6 x Ie AC-14
Breaking capacity acc. to IEC 60947-5-1			6 x Ie AC-14
Ie / Rated operational current DC-12 acc. to IEC 60947-5-1		24 V DC	0.1 A
		48 V DC	0.1 A
		72 V DC	0.1 A
		110 V DC	0.1 A
		220 V DC	–
Short-circuit protection device			0.1 A (FF type fuses) (1)
Minimum switching capacity with failure rate acc. to IEC 60947-5-4			3 V / 1 mA
Mechanical durability	Number of operating cycles		1 million (2)
	Max. switching frequency		1200 cycles/h (2)
Electrical durability	Number of operating cycles		0.7 millions (2)
	Max. switching frequency	AC-14, AC15	1200 cycles/h (2)
		DC-12	900 cycles/h (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 N°14
Max. operational voltage			125 V
Pilot duty AC thermal rated current			0.1 A
Connecting characteristics			
Connection capacity (min. ... max.)			
	Rigid solid	1 x	1...4 mm²
		2 x	1...4 mm²
	Flexible with ferrule	1 x	0.75...2.5 mm²
		2 x	0.75...2.5 mm²
	Lugs	L ≤	7.7 mm
		l >	3.7 mm
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18...14
Tightening torque			1 Nm
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529		Terminals	IP20
		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) For CEL19, please consult us.

1SFC101129C0201 - Rev. A

Auxiliary contact blocks for AF09 ... AF96 contactors and NF contactor relays

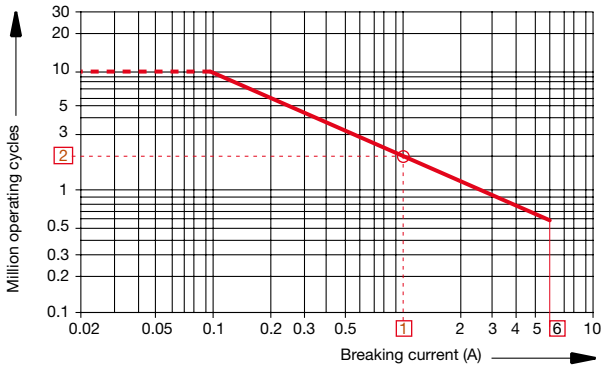
Electrical durability

Electrical durability for AC-15 utilization category

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

These curves represent the electrical durability of the built-in or add-on auxiliary contacts in relation to the breaking current.

The curves have been drawn for resistive and inductive loads up to 690 V, 40...60 Hz.

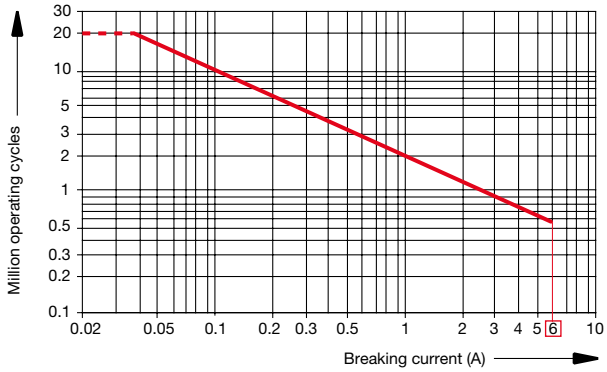


- AF09 ... AF96 contactor built-in auxiliary contacts
- 1-pole and 4-pole CA4, 2-pole CAT4,
  1-pole CC4,
  2-pole CAL4 add-on auxiliary contacts.

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.

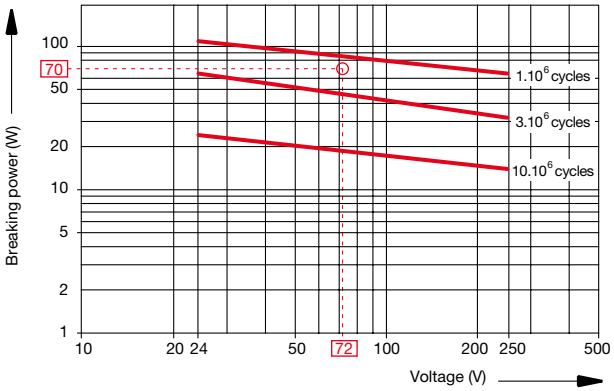


NF contactor relays.

(For add on auxiliary contacts see curve above).

Electrical durability for DC-13 utilization category

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



- AF09 ... AF96 contactor built-in auxiliary contacts
  1-pole and 4-pole CA4, 2-pole CAT4, 1-pole CC4,
- 2-pole CAL4 add-on auxiliary contacts,
- NF contactor relays.

Example:

Control of DC electro-magnet:
Ue voltage = 72 V DC and breaking power = 70 W.

On the opposite curve at intersection "O" 72 V / 70 W the corresponding value for the electrical durability is approximately 2 millions operating cycles.

1SBC101641S0201 - Rev. A

Auxiliary contact blocks for AF116 ... AF2850 contactors

Electrical durability

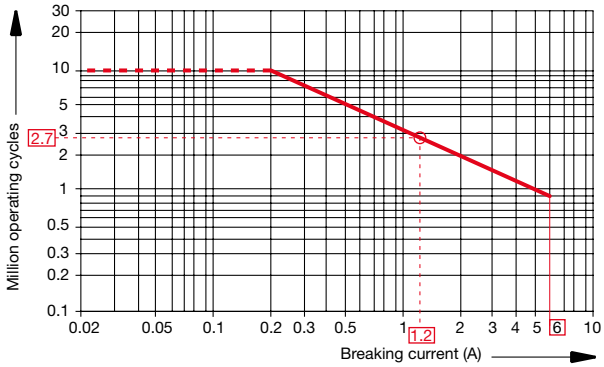
Electrical durability for AC-15 utilization category

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

- making current: 10 x Ie with cos ϕ = 0.7 and Ue
- breaking current: Ie with cos ϕ = 0.4 and Ue.

This curves represent the electrical durability of the add-on auxiliary contacts, in relation to the breaking current.

The curves have been drawn for resistive and inductive loads up to 690 V, 40...60 Hz.



- AF116 ... AF2850 contactors auxiliary contacts
- 2-pole CAL18 and CAL19 add-on auxiliary contacts

Example:

Breaking current = 1.2 A

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

1SFC101117C0201 - Rev. A

Add-on auxiliary contacts

Terminal marking and positioning

1-pole auxiliary contacts

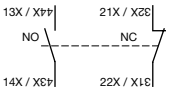
CA4-01 (1)

CA4-10 (1)

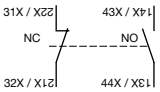
CC4-01

CC4-10

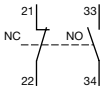
2-pole auxiliary contacts



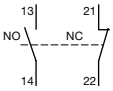
CAL4-11 (1)
(Left-side mounted)



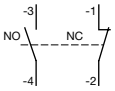
CAL4-11 (1)
(Right-side mounted)



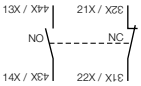
CAT4-11M



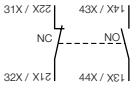
CAT4-11E



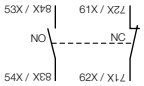
CAT4-11U



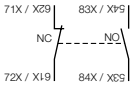
CAL18-11, CAL19-11
(Left-side mounted)



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

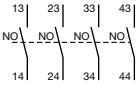


CAL18-11B, CAL19-11B
(Left-side mounted)

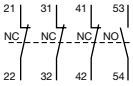


CAL18-11B, CAL19-11B
(Right-side mounted)

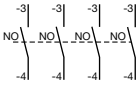
4-pole auxiliary contacts



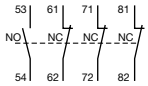
CA4-40E (1)



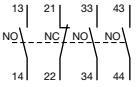
CA4-13M (1)



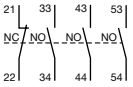
CA4-40U



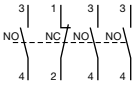
CA4-13N (1)



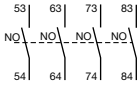
CA4-31E (1)



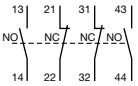
CA4-31M (1)



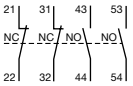
CA4-31U



CA4-40N (1)



CA4-22E (1)



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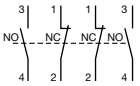
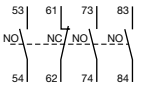
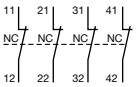


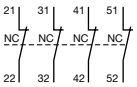
CA4-22U



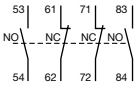
CA4-31N (1)



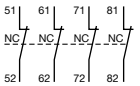
CA4-04E



CA4-04M (1)



CA4-22N (1)



CA4-04N (1)

(1) available with Push-in Spring terminals

1SBC101660S0201 - Rev. A

Electronic timers


1SBC100004V0014

TEF4-ON


1SBC100012V0014

TEF4-OFF


1SBC101394F0014

TEF4S-ON


1SBC101394F0014

TEF4S-OFF

TEF4 frontal electronic timers are used for realizing timing function and are available in ON-delay and OFF-delay versions.

Compact solution in cabinet compared to separate timers

TEF4 electronic timers are front-mounted and locked on AF contactors or NF contactor relays. A mechanical indicator allows to show the state of the contactor.

Safe and cost-reduced wiring

TEF4 electronic timers are supplied by a direct plug-in parallel connection to the coil terminals A1 - A2 of the contactor or contactor relay. A varistor is integrated on the timer to offer a built-in protection against surges in the contactor coil.

Available for a wide control voltage range 24...240 V AC/DC

TEF4-ON or TEF4-OFF allow time-delayed functions up to 100 s in 3 distinct time ranges, independently of the control system. The time delay ranges are selected by a switch and the time delay can be adjusted by means of a rotary switch. The timing function is activated by closing or opening the device on which the timer is mounted. The OFF-delay version operates without additional control supply.

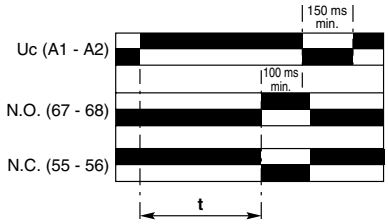
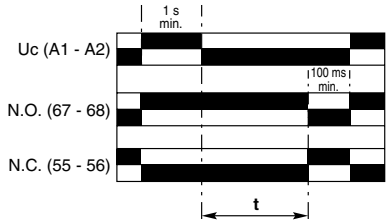
For contactors, contactor relays	Time delay range selected by switch	Delay type	Rated control circuit voltage Uc V 50/60 Hz or DC	Auxiliary contacts	Type	Order code		Weight Pkg (1 pce) kg
With screw terminals								
AF09 ... AF96 NF	0.1...1 s 1...10 s 10...100 s	ON-delay	24...240	1 1	TEF4-ON	1SBN020112R1000		0.065
		OFF-delay	24...240	1 1	TEF4-OFF	1SBN020114R1000		0.065
With spring terminals								
AF09 ... AF96 NF	0.1...1 s 1...10 s 10...100 s	ON-delay	24...240	1 1	TEF4S-ON	1SBN020113R1000		0.065
		OFF-delay	24...240	1 1	TEF4S-OFF	1SBN020115R1000		0.065

1SBC101669S0201 - Rev. A

Electronic timers

Technical data

Contact utilization characteristics according to IEC

Types		TEF4-ON	TEF4-OFF
Standards		IEC 60947-5-1 and EN 60947-5-1	
Rated insulation voltage Ui acc. to IEC 60947-5-1		400 V	
Rated impulse withstand voltage Uimp		4 kV	
Rated operational voltage Ue max.		240 V	
Rated frequency (without derating)		50 / 60 Hz	
Conventional thermal current Ith - θ ≤ 40 °C		5 A	
Ie / Rated operational current AC-15			
acc. to IEC 60947-5-1	24-127 V 50/60 Hz	3 A	
	220-240 V 50/60 Hz	1.5 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	1 A / 24 W	
Short-circuit protection device gG type fuse		6 A	
Rated short-time withstand current Icw	for 1.0 s	8 A	
θ = 40 °C	for 0.1 s	8 A	
Minimum switching capacity		12 V / 3 mA	
with failure rate acc. to IEC 60947-5-4	24 V DC	10-7	
Power dissipation per pole at 3 A		0.1 W	
Function diagram		ON-delay	OFF-delay
			
		Bistable relay inside. Before use, once apply Uc then switch it off in order to initialize position of the contacts.	
Control circuit voltage			
AC control voltage	Rated control circuit voltage Uc	24...240 V AC	
50/60 Hz	Average consumption	1.5 mA RMS	1 mA RMS
DC control voltage	Rated control circuit voltage Uc	24...240 V DC	
	Average consumption	1.5 mA	1 mA
Rated frequency limits		50 / 60 Hz	
Supply voltage range		0.85...1.1 x Uc (at θ ≤ 70 °C)	
Overvoltage protection		Varistor included	
Time delay range (t) selected by switch	0.1...1 s	■■	
	1...10 s	■■	
	10...100 s	■■	
On-load reiteration accuracy under constant conditions		≤ 1 %	
Minimum ON period		0.1 s	1 s
Recovery time		0.15 s	0.1 s
Ambient air temperature	Operation	-25 °C ... +70 °C	
	Storage	-40 °C ... +80 °C	
Climatic withstand		Category B according to IEC 60947-1 Annex Q	
Maximum operating altitude		2000 m	
Mounting positions		Mounting positions 1, 1 +/- 30°, 2, 3, 4, 5	
Shock withstand acc. to IEC 60068-2-27 and EN 60068-2-27 (Mounting position 1)		1/2 sinusoidal shock for 11 ms: no change in contact position Same as contactor or contactor relay	
Vibration withstand acc. to IEC 60068-2-6		5...300 Hz 3 g closed position / 2 g open position	
Mechanical durability			
	Number of operating cycles	5 millions operating cycles	
	Max. switching frequency	3600 cycles/h	1800 cycles/h
Max. electrical switching frequency			
	AC-15	1200 cycles/h	
	DC-13	900 cycles/h	

1SBC101670S0201 - Rev. B

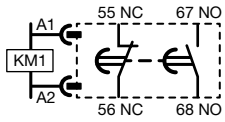
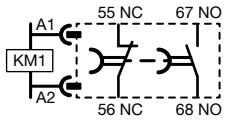
Electronic timers

Technical data

Contact utilization characteristics according to UL / CSA

Types		TEF4-ON	TEF4-OFF
Standards		UL 508, CSA C22.2 N°14	
Rated insulation voltage Ui acc. to UL / CSA		300 V	
Max. operational voltage		240 V	
Pilot duty		B300, R300	
AC thermal rated current		5 A	
AC maximum volt-ampere making		3600 VA	
AC maximum volt-ampere breaking		360 VA	
DC thermal rated current		1 A	
DC maximum volt-ampere making-breaking		28 VA	

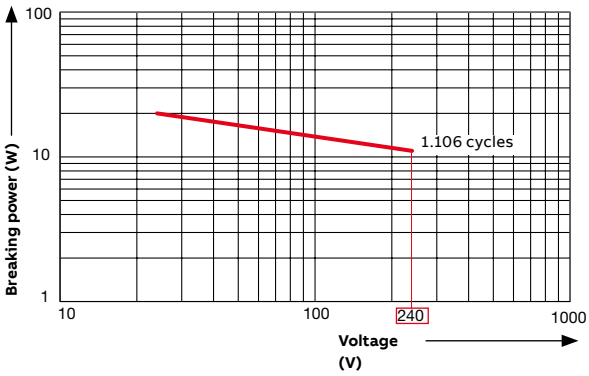
Connecting characteristics

Connection capacity (min. ... max.)			
Rigid solid	1 x	1...2.5 mm²	
	2 x	1...2.5 mm²	
Flexible with non insulated ferrule	1 x	0.75...2.5 mm²	
	2 x	0.75...2.5 mm²	
Flexible with insulated ferrule	1 x	0.75...2.5 mm² (0.75 ... 1.5 mm² with spring terminals)	
	2 x	0.75...1.5 mm² (0.75 ... 1.5 mm² with spring terminals)	
Lugs	L ≤	8 mm (1)	
	l >	3.7 mm (1)	
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...14	
Stripping length		10 mm	
Tightening torque		1.2 N.m / 11 lb.in (1)	
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 should be tightened	
All terminals		M3.5	
Screwdriver type		Flat Ø 5.5 / Pozidriv 2	
Spring terminals			
Screwdriver type		Ø 3.5	
Terminal Marking			

(1) Not applicable for TEFAS-ON and TEF4S-OFF with spring terminal Spring terminals)

Electrical durability for DC-13 utilization category

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



Interlocks


1SBC100010V0014

VM4

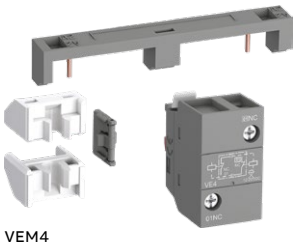

1SFC101035V0014

VM19

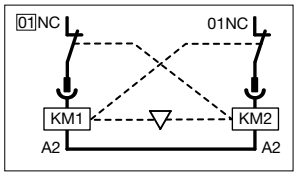
Mechanical interlock units

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 mechanical interlock units VM4 and VM96-4 include 2 fixing clips (BB4).

For contactors	Mounting	Type	Order code	Pkg qty	Weight (1 pce) kg
Mechanical interlock units for two contactors mounted side by side					
AF09 ... AF38..-30-.. AF09 ... AF38..-40-00		VM4	1SBN030105T1000	10	0.005
AF40 ... AF96-30-.. AF40 ... AF80-40-00		VM96-4	1SBN033405T1000	10	0.006
For same size contactors: AF116 ... AF146 AF190, AF205 AF265 ... AF370		VM19	1SFN030300R1000	1	0.054
AF116 ... AF146 and AF190, AF205		VM140/190	1SFN034403R1000	1	0.088
AF190, AF205 and AF265 ... AF370		VM205/265	1SFN035203R1000	1	0.090
AF265 ... AF370 and AF400 ... AF460		VM370/400	1SFN035403R1000	1	0.100
AF400 ... AF1250	PN.. mounting plate to be ordered separately	VM750H	1SFN035700R1000	1	0.200
AF1350 ... AF2650	Plate included	VM1650H	1SFN036503R1001	1	6.000
Mechanical interlock units for two contactors mounted one above the other					
AF400 ... AF1250	Additional plate (not supplied)	VM750V	1SFN035701R1000	1	0.200


1SBC100011V0014

VEM4



Mechanical and electrical interlock sets

VEM4 mechanical and electrical interlock set for the interlocking of two AF contactors.
VEM4 set includes a mechanical interlock unit VM4 with 2 fixing clips (BB4) and a VE4 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 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 same size contactors: AF09 ... AF16..-30-.. AF26 ... AF38..-30-00 AF09, AF16..-40-00 AF26, AF38..-40-00	0 2	VEM4	1SBN030111R1000	1	0.035
Fixing clips					
AF09 ... AF96		BB4	1SBN110120W1000	50	0.002

Note: VEM4 not suitable for AF..Z contactors with DC control voltage 12...20 V DC (coil 20) and 24 V DC (coil 30).


1SBC100013V0014

BB4

1SBC101595S0201 - Rev. B

Interlocks

Technical data

Mechanical interlock unit

Types		VM4, VM96	VM19 ... VM750	VM1650H
Mechanical durability	Number of operating cycles	5 millions operating cycles	1 million operating cycles	500 000 operating cycles
	Max. mechanical switching frequency	1800 cycles/h	300 cycles/h	

Mechanical and electrical interlock set

Contact utilization characteristics according to IEC

Types		VEM4
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 control circuit voltage Uc		
	AC 50/60 Hz control voltage	24...500 V AC
	DC control voltage	20...500 V DC
Conventional thermal current Ith - θ ≤ 40 °C		16 A
Mechanical durability	Number of operating cycles	5 millions operating cycles
	Max. mechanical switching frequency	1800 cycles/h
Electrical durability	Max. electrical switching frequency	1200 cycles/h

Contact utilization characteristics according to UL / CSA

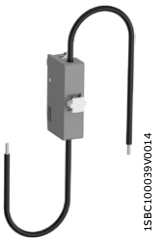
Types	VEM4
Standards	UL 508, CSA C22.2 N°14
Max. operational voltage	500 V AC, 500 V DC

Connecting characteristics

Types			VEM4
Connection capacity (min. ... max.)			
	Rigid solid	1 x	1...2.5 mm²
		2 x	1...2.5 mm²
	Flexible with ferrule	1 x	0.75...2.5 mm²
		2 x	0.75...2.5 mm²
	Flexible with insulated ferrule	1 x	0.75...2.5 mm²
		2 x	0.75...1.5 mm²
	Lugs	L <	8 mm
Connection capacity acc. to UL / CSA		1 or 2 x	AWG 18...14
Stripping length			10 mm
Tightening torque			1.2 Nm / 11 lb.in
Degree of protection acc. to IEC 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

1SBC101594502 01 - Rev. A

Impulse contact blocks



CB5

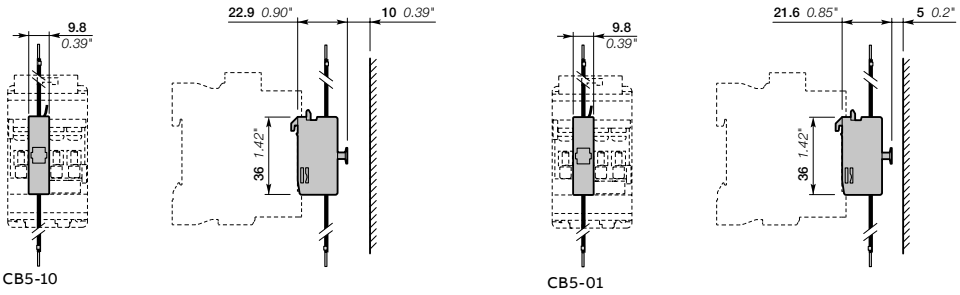
Impulse contact blocks are designed for use in enclosures, in association with an adjustable mechanical pushbutton. Two types are available:

- CB5-10: N.O. contact with a black actuator ("ON" function)
- CB5-01: N.C. contact with a light grey actuator ("OFF" function).

These blocks are equipped with 2 connecting leads 0.5 mm² with end, approximately 18 cm long.

Mounting: Clipped onto the front face of the contactors.

For contactors	Contacts	Type	Order code	Pkg qty	Weight (1 pce)
					kg
AF09 ... AF96	1 –	CB5-10	1SBN010013R1010	1	0.012
	– 1	CB5-01	1SBN010013R1001	1	0.012



Main dimensions mm, inches

Notes

RA4 interface relays

1SBC101065V0014

RA4

RA4 interface relay is designed to receive 24 V DC signals delivered by PLC's or other sources with a low output power and to restore them with sufficient power to operate the coils of the relevant AF09 ... AF96 contactors or the NF contactor relays. RA4 interface relay is made up of a miniature electromechanical relay equipped with a N.O. contact and with a low consumption 24 V DC coil.

The interface relay coil is controlled by the PLC while the N.O. contact ensures switching of the power contactor.

Coil switching gives rise to overvoltages which have adverse effects on the electronic devices, insulators and, more generally, on component lifetime. The RA4 is protected from surge thanks to the built-in surge protection of AF09 ... AF96. Furthermore, the RA4 is protected against relay pole reversal by a diode inserted between the E1 and E2 input terminals.

Connection

The "E1+" and "E2–" input terminals must be connected, according to their polarity, to the PLC-output.

The RA4 is equipped with two terminal pads for connection to the A1 and A2 terminals of the contactor coil.

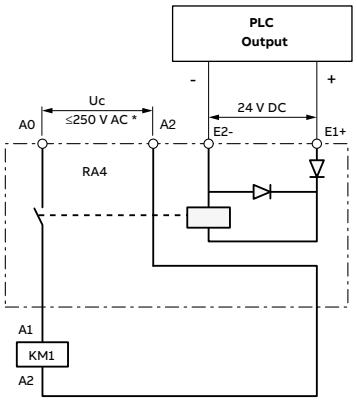
This coil is supplied between the A0 and A2 terminals of the RA4.

Mounting

Remove the coil terminal block from the contactor and clip the interface relay without any screwing operation.

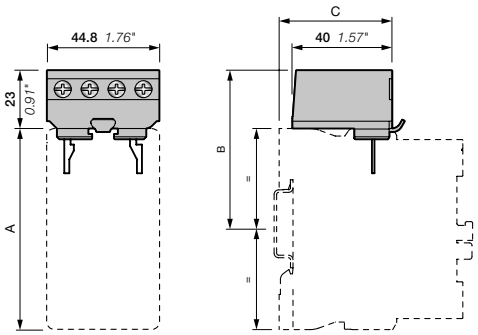
For contactors (1)	Coil voltages (2)	Rated control circuit voltage Uc	Type	Order code	Pkg qty	Weight (1 pce)
	V AC 50/60 Hz (4)	V DC				kg
AF09 ... AF96	24 ... 250	24	RA4	1SBN060100R1000	1	0.040
NF			RA4-T (3)	1SBN060100T1000	10	0.040

(1) LDC4 additional terminal blocks and CAT4 auxiliary contact blocks not suitable with RA4.
(2) Main use with contactor coils 41, 11, 12, 13.
(3) On request. Please contact your ABB local sales organization.
(4) 24 V DC on request.



* 24 V DC on request.

Wiring diagram



RA4 mounted on	AF09 ... AF38	AF40 ... AF96
A	80 mm / 3.15"	119.5 mm / 4.70"
B	63 mm / 2.48"	83 mm / 3.27"
C	45 mm / 1.77"	40 mm / 1.57"

Main dimensions mm, inches

1SBC101060S0201

RA4 interface relays

Technical data

Utilization characteristics according to IEC

Type		**RA4**
Standards		IEC 60947 5-1
Rated insulation voltage Ui acc. to IEC 60947 5-1		250 V AC 50/60 Hz
Ambient air temperature		
In free air operation	at Uc = 24 V DC (between E1 and E2)	-25 ... +70 °C
	from 0.85 to 1.1 x Uc	-25 ... +60 °C
Storage		-40 ... +70 °C
Climatic withstand		Category B according to IEC 60947-1 Annex Q
Maximum operating altitude		≤3000 m
Mounting positions		Mounting positions 1, 1 ±30°, 2, 3, 4, 5

Connecting characteristics

Connection capacity (min. ... max.)			
	Rigid solid	1 x	1 ... 2.5 mm²
		2 x	1 ... 2.5 mm²
	Flexible with non insulated ferrule	1 x	0.75 ... 2.5 mm²
		2 x	0.75 ... 2.5 mm²
	Flexible with insulated ferrule	1 x	0.75 ... 2.5 mm²
		2 x	0.75 ... 1.5 mm²
	Lugs	L <	8 mm
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18 ... 14
Stripping length			10 mm
Tightening torque			1.2 Nm / 11 lb.in
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529			IP20 protection against direct contact in acc. with EN 50274 RA4 wired and mounted on the associated contactor
Screw terminals			Delivered in open position
All terminals			M3.5
Screwdriver type			Flat Ø 5.5 / Pozidriv 2

Working data

Surge suppression		
For interface relay coil		Included inside AF built-in surge protection
Protection against polarity reversal between terminals E1 and E2		Diode
Interface relay operating time		Closing and drop-out ≤10 ms
Total operating time interface relay + contactor (1)		
Between energization and:	N.O. contact closing	42 ... 95 ms (AF09 ... AF38, NF) 44 ... 105 ms (AF40 ... AF96)
	N.C. contact opening	40 ... 90 ms (AF09 ... AF38, NF) 40 ... 100 ms (AF40 ... AF96)
Between de-energization and:	N.O. contact opening	15 ... 57 ms (AF09 ... AF38, NF) 21 ... 107 ms (AF40 ... AF96)
	N.C. contact closing	17 ... 60 ms (AF09 ... AF38, NF) 23 ... 112 ms (AF40 ... AF96)

(1) For contactor coils 41, 11, 12, 13.

Electrical input data

Control voltage (E1 and E2 terminals) Uc		
Rated value		24 V DC
Max. range at ambient temperature 20 °C		19 ... 30 V DC
Max. consumption for Uc = 24 V DC, θ = 20 °C		0.3 W
"0" status (relay open)	for Uc	≤2.4 V DC
	for Ic	<1 mA
"1" status (relay closed)	for Uc	≥19 V DC
Max. short supply interruption immunity time		2 ms

Electrical output data

Switching voltage (A0 and A2 terminals)	≤250 V AC
Electrical durability	
Switching frequency	600 cycles/h
Number of operating cycles	2 million operating cycles

Mechanical latching unit

WA4

The WA4 mechanical latching unit for AF09 ... AF96 contactors and NF contactor relays ensures that the contactor or contactor relay remains switched on even if there is a lack or a failure of voltage. Standard contactors can be easily converted into compact latched contactors.

The WA4 block contains a mechanical latching device with electromagnetic impulse unlatching (AC or DC) or manual unlatching.

Operation

After closing, the contactor continues to be held in the closed position by the latching mechanism should the supply voltage fail at the contactor coil terminals.

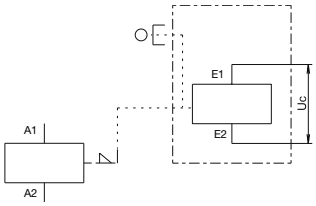
Contactor opening can be controlled:

- electrically by an impulse (AC or DC) on the WA4 block coil (the coil is not designed to be permanently energized)
- manually by pressing the pushbutton on the front face of the WA4 block.

Mounting

The WA4 block is clipped onto the front face of the 1-stack contactor where it takes up two slots in central position (see fig. below).
The two other slots may accept CA4 single pole auxiliary contacts (1 block on each side of the mechanical latch).

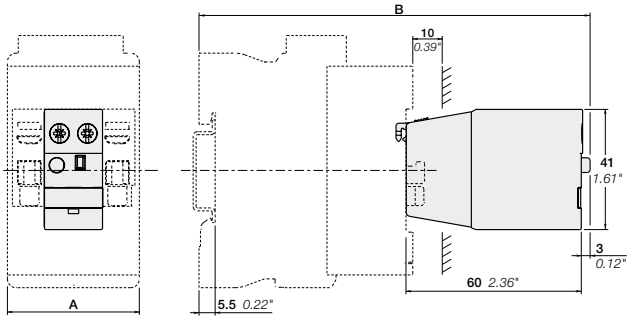
Additional CAL4 can be fitted on the side of the contactor in respect to the total number of built-in or additional N.O. and N.C. auxiliary contacts as described in the accessory fitting details part of each contactor type.



Wiring diagram

For contactors and contactor relays	Rated control circuit voltage Uc		Type	Order code	Pkg qty	Weight (1 pce)
	V AC 50/60 Hz	V DC				kg
AF09 ... AF65, NF 1-stack	24...60	24...60	WA4-11	1SBN040100R1011	1	0.080
	48...130	48...130	WA4-12	1SBN040100R1012	1	0.080
	100...250	100...250	WA4-13	1SBN040100R1013	1	0.080
	250...500	250...500	WA4-14	1SBN040100R1014	1	0.080
AF80, AF96	24...60	24...60	WA4-96-11	1SBN040200R1011	1	0.080
	48...130	48...130	WA4-96-12	1SBN040200R1012	1	0.080
	100...250	100...250	WA4-96-13	1SBN040200R1013	1	0.080
	250...500	250...500	WA4-96-14	1SBN040200R1014	1	0.080
Mechanical latching unit for 24 V DC - 500 mA PLC control						
AF09 ... AF38, NF 1-stack	–	24	WA4-10	1SBN040100R1010	1	0.080

Note: For WA4 accessory use with contactor or contactor relay coil 30, please consult your ABB local sales organization.



For contactors and contactor relays	A mm in.	B mm in.
AF09 ... 16(Z)-30-.. AF09 ... 16(Z)-40/22-00 NF(Z)	45 1.77"	133.5 5.25"
AF26 ... 38(Z)-30-00	45 1.77"	142.5 5.61"
AF26 ... 38(Z)-40/22-00	45 1.77"	157.5 1.77"
AF40 ... 65-30-00	55 2.16"	167 6.57"
AF40-40/22-00	70 2.75"	170 6.70"
AF52-40-00	70 2.75"	170 6.70"
AF80, 96-30-00	70 2.75"	172 6.77"
AF80-40/22-00	90 3.54"	172 6.77"

WA4 + AF09 ... AF96, NF 1-stack

Main dimensions mm, inches

1SBC100204S0201

Mechanical latching unit

Technical data

Types		WA4, WA4-96	WA4
Coil voltage code		11, 12, 13, 14	10
Standards		IEC 60947-4-1	
Rated insulation voltage Ui			
acc. to IEC 60947-1		690 V AC	
Coil operating limits	AC supply	At θ ≤ 70 °C 0.85 x Uc min … 1.1 x Uc max	–
acc. to IEC 60947-4-1	DC supply	At θ ≤ 70 °C 0.85 x Uc min … 1.1 x Uc max	At θ ≤ 70 °C 0.85 x Uc … 1.1 x Uc
Control circuit voltage			
AC control voltage 50/60 Hz			
Rated control circuit voltage Uc		24 … 500 V AC 50/60 Hz	–
Coil consumption	Average pull-in value	15 … 100 VA	–
DC control voltage 50/60 Hz			
Rated control circuit voltage Uc		24 … 500 V DC	24 V DC
Coil consumption	Average pull-in value	15 … 100 W	12 W
Max. electrical impulse time			
On AC control supply (with load factor 1.6%)		4 s	–
On DC control supply (with load factor 1.6%)		4 s	
Min. electrical impulse time			
For latching, energizing of the contactor coil		120 ms	
For unlatching, energizing of the mechanical latching unit coil		50 ms	
Operating time			
On contactor closing (latching) between coil energization and:			
N.O. contact closing		No difference with the operation of a contactor without mechanical latching unit	
N.C. contact opening		No difference with the operation of a contactor without mechanical latching unit	
On contactor opening (unlatching) between mechanical latching unit coil energization and:			
N.O. contact opening		8 … 15 ms	
N.C. contact closing		10 … 17 ms	
Ambient air temperature			
Operation		-25 … +70 °C	
Storage		-60 … +80 °C	
Climatic withstand		Category B according to IEC 60947-1 Annex Q	
Max. operating altitude		≤ 3000 m	
Mounting positions		Mounting positions 1, 1+/- 30°, 2, 3, 4, 5	
Mechanical durability		AF09 … AF38, NF: 1 million operating cycles	
		AF40 … AF65: 0.5 million operating cycles	
		AF80, AF96: 0.2 million operating cycles	
Max. switching frequency			
with on-load factor of 1.6%	cycles/h	600	

Connecting characteristics

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

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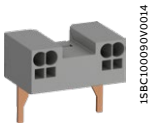
Other accessories

LDC4



LDC4K

BX4

BX4-CA

BA4

BA5-50

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

Additional coil terminal blocks with screw terminal

Additional coil terminal blocks for a bottom access to the coil terminals of contactors or contactor relays.

AF09 ... AF96, NF	LDC4	1SBN070156T1000	10	0.010

Additional coil terminal blocks with Push-in Spring terminal

AF09 ... AF96, NF	LDC4K	1SBN070159T1000	10	0.010

Protective covers

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

AF09 ... AF96 1-stack contactors and NF contactor relays	BX4	1SBN110108T1000	10	0.006
4-pole CA4, 2-pole CAT4 auxiliary contact blocks and TEF4 electronic timer	BX4-CA	1SBN110109W1000	50	0.001

Note: BX4 produced since 13045 (day 045 - year 2013) are suitable for AF40 ... AF96.

Function markers AF09 ... AF370

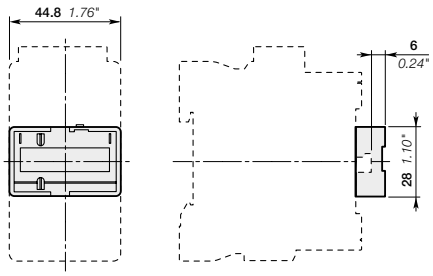
Box of 16 blank cards (16 markers by card) printable on HTP500 thermal transfer printer and AMS 500 marking table to identify your contactors, overload relays or manual motor starters.
Marker dimensions: 7 x 20 mm (.276" x .787").

AF09 ... AF370 contactors, TF thermal overload relays, EF electronic overload relays and MS116, MS132 manual motor starters	BA4	1SNA235156R2700	16	0.011
AMS 500 support plate for 8 BA4	SPRC 1	1SNA360010R1500	1	0.220
HTP500 support plate	HTP500-BA4	1SNA235712R2400	1	0.290

Function markers AF400 ... AF2850

Set of 50 function markers designed to be clipped onto the front face of devices. Details can be added to these markers using a ball point pen, indelible felt-tip pen or pentel white.
Self-adhesive labels (not supplied) can also be added to them.
Marker dimensions: 7 x 19 mm (.276" x .748").

AF400 ... AF2850 and accessories	BA5-50	1SBN110000R1000	1	0.017



BX4

Main dimensions mm, inches

1SBC101733S0201

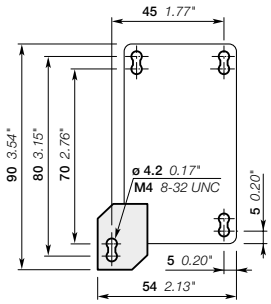
Other accessories

BP38-4

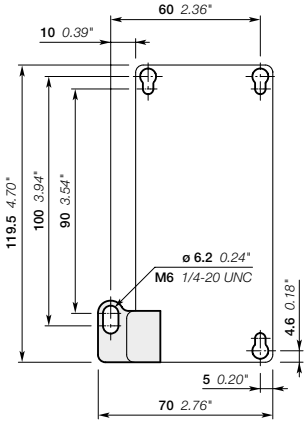
BDT4
For AF09 ... AF65, NF

BDT4
For AF80 ... AF96

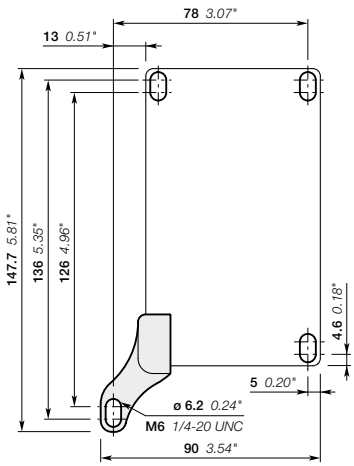
For contactors		Type	Order code	Pkg qty	Weight (1 pce) kg
Mounting pieces					
Mounting piece for replacing installed contactors fixed by screws by AF contactors.					
From contactor	**To contactor**				
A26 ... A40, AL26 ... AL40	AF09 ... AF38	BP38-4	1SBN112303T1000	10	0.003
A50 ... A75, AE50 ... AE75, AF50 ... AF75	AF40 ... AF65	BP65-4	1SBN113403T1000	10	0.004
A95, A110, AE95, AE110, AF95, AF110	AF80 ... AF96	BP96-4	1SBN113903T1000	10	0.005
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...AF96 3-pole, NF		BDT4	1SBN110122T1000	10	0.007



BP38-4



BP65-4



BP96-4

Main dimensions mm, inches

1SBC101752S0201 - Rev. A

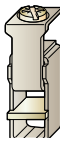
Additional terminal blocks

LD38-4

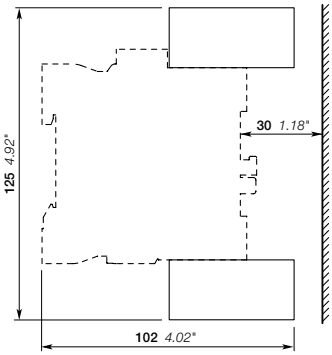
The LD terminal block is designed to increase the connecting capacity of 3-pole AF26 ... AF38 contactors on which it is fitted and for preparation of the wiring before final connection to the contactor. LD38-4 blocks are 3-pole terminal blocks with tunnel terminals.

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AF26 ... AF38	LD38-4	1SBN072308R1000	2	0.070

Technical data

Types	LD38-4
Rated insulation voltage Ui	
acc. to IEC 60947-4-1	690 V
acc. to UL / CSA	600 V
Main terminals	
	Screw terminals with double connector 2 x (7 width x 5.8/9.2 depth)
Connection capacity (min. ... max.)	
Rigid Solid (≤ 4 mm²)	1x 2.5...25 mm²
Rigid Stranded (≥ 6 mm²)	1x 2.5...25 mm² + 1x 2.5...16mm²
Flexible with non insulated ferrule	1x 2.5...16 mm²
	1x 2.5...16mm² + 1x 2.5...10mm²
Flexible with insulated ferrule	1x 2.5...16mm²
	1x 2.5...16mm² + 1x 2.5...10mm²
Connection capacity acc. to UL / CSA	1x AWG 8-4
	2x AWG 8-6
Stripping length	14 mm
Tightening torque	2.5 Nm / 22 lb.in
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529	IP20
Screw terminals	Delivered in closed position, screws of unused terminals must be tightened
Main terminals	M5
Screwdriver type	Flat Ø 6.5 / Pozidriv 2

Note: The utilization of LD38-4 additional terminal blocks does not allow the use of BER and BEY connection sets.



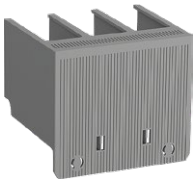
Main dimensions mm, inches

1SBC101734S0201

Terminal shrouds


1SBC100073V0014

LT65-30


1SFC101038V0001

LT140-30L


1SFC101041V0001

LT370-30C


1SFC101089V0001

LT460-AC


1SBC100075V0014

LT80-40


1SFC101199V0001

LT205-40

Main terminal protection for AF40 ... AF1250 contactors.

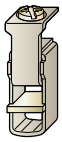
The auxiliary contact blocks and coils are designed to provide an IP 20 degree of protection.

The main terminals, equipped with compression lugs or cable clamps, can be protected against accidental direct contact after wiring (EN 50274) by the addition of terminal shrouds (see table below).

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
3-pole contactors				
AF40 ... AF65	LT65-30	1SBN123401R1000	1	0.015
AF80, AF96	LT96-30	1SBN123901R1000	1	0.020
AF116 ... AF146, with compression lugs	LT140-30L	1SFN124203R1000	2	0.070
AF190, AF205, with cable clamps	LT205-30C	1SFN124801R1000	2	0.050
AF190, AF205, with compression lugs	LT205-30L	1SFN124803R1000	2	0.220
AF190, AF205, with shorting bar or between contactor and TOL/EOL in DOL starters	LT205-30Y	1SFN124804R1000	1	0.050
AF265 ... AF370, with cable clamps	LT370-30C	1SFN125401R1000	2	0.035
AF265 ... AF370, with compression lugs	LT370-30L	1SFN125403R1000	2	0.280
AF265 ... AF370, with shorting bar or between contactor and TOL/EOL in DOL starters	LT370-30Y	1SFN125404R1000	1	0.075
AF265 ... AF370, for use with extending cable clamps, ATK300/2 and OZXB4	LT370-30D	1SFN125406R1000	1	0.15
AF400, AF460 with cable clamps	LT460-AC	1SFN125701R1000	2	0.100
AF400, AF460 with compression lugs	LT460-AL	1SFN125703R1000	2	0.800
AF580, AF750 with cable clamps	LT750-AC	1SFN126101R1000	2	0.120
AF580, AF1250 with compression lugs	LT750-AL	1SFN126103R1000	2	0.825
4-pole contactors				
AF40, AF52	LT52-40	1SBN123402R1000	1	0.020
AF80	LT80-40	1SBN123902R1000	1	0.025
AF116 ... AF140, with compression lugs	LT140-40L	1SFN124203R2000	2	0.090
AF190 ... AF205, with cable clamps	LT205-40C	1SFN124801R2000	2	0.035
AF190 ... AF205, with compression lugs	LT205-40L	1SFN124803R2000	2	0.140
AF265 ... AF370, with cable clamps	LT370-40C	1SFN125401R2000	2	0.040
AF265 ... AF370, with compression lugs	LT370-40L	1SFN125403R2000	2	0.165

Note: With LT65-30, LT96-30, LT52-40, LT80-40, use rigid cables or flexible cables with insulated ferrules including a stripping length ≥ 18 mm.

Connecting characteristics with LT ... terminal shrouds

Contactor types	AC / DC operated	AF40 ... 65 + LT65 ...	AF80 ... 96 + LT ...
			
		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 contactor (poles)			
Rigid solid	1 x	6...16 mm² or 25 ...35 mm²	6...16 mm² or 25 ...70 mm²
	2 x	6...16 mm² or 25 ...35 mm²	6...16 mm² or 35 ... 50 mm²
Flexible with insulated ferrule	1 x	4...16 mm² or 25 ...35 mm²	6...16 mm² or 25 ...50 mm²
	2 x	4...16 mm² or 25 ...35 mm²	6...16 mm² or 35 ...50 mm²
Bars or Lugs	L <	9.2 mm	12.2 mm
Connection capacity acc. to UL / CSA	1 x	AWG 10...6 or AWG 4..2	AWG 6 or AWG 4..1
	2 x	AWG 10...6 or AWG 4..2	AWG 6 or AWG 2..1
Stripping length		18 mm	18 mm
Tightening torque Recommended		4 Nm / 35 lb.in	6 Nm / 53 lb.in
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529 Main terminals equipped with LT		IP20	
Screw terminals Main terminals		M6	M8
	Screwdriver type	Flat Ø 6.5 / Pozidriv 2	hexagon socket (s = 4 mm)

1SFC101099C0201 - Rev. C

Connections


1SFC101050V0001

LW140


LW205-40

LW205-40


1SFC101049V0001

LX140


1SFC101073V0001

LL146-30


1SFC101046V0001

LD146-30

Terminal enlargements

Enlargement pieces designed to increase the width of the contactor terminal pads in order to allow larger connections to be mounted.

For contactors	Dimensions		Type	Order code	Pkg qty	Weight (1 pce)
	hole Ø mm	bar mm				kg
3-pole contactors						
AF116 ... AF146	6.5	13 x 3	LW140	1SFN074207R1000	1	0.115
AF190, AF205	10.5	17.5 x 5	LW205	1SFN074807R1000	1	0.260
AF265 ... AF370	10.5	25 x 5	LW370	1SFN075407R1000	1	0.340
AF400, AF460	10.5	25 x 5	LW460	1SFN075707R1000	1	0.730
AF580, AF750	13	40 x 6	LW750	1SFN076107R1000	1	1.230
AF1250	13	50 x 10	LW1250	1SFN076407R1000	1	2.000
4-pole contactors						
AF190 ... AF205	10.5	20 x 5	LW205-40	1SFN074807R2000	1	0.306
AF265 ... AF370	10.5	25 x 5	LW370-40	1SFN075407R2000	1	0.540

Terminal extension

Extension pieces designed to extend the main terminals of contactors for combined mounting of contactors and connection sets.

For 3-pole contactors	Dimensions		Type	Order code	Pkg qty	Weight (1 pce)
	hole Ø mm	bar mm				kg
AF116 ... AF146	6.5	13 x3	LX140	1SFN074210R1000	1	0.072
AF190, AF205	8.5	17.5 x 5	LX205	1SFN074810R1000	1	0.180
AF265 ... AF370	10.5	20 x 5	LX370	1SFN075410R1000	1	0.234
AF400, AF460	10.5	25 x 5	LX460	1SFN075710R1000	1	0.500
AF580, AF750	13	40 x 6	LX750	1SFN076110R1000	1	0.850

Connection sockets

Connection socket can be used to replace built-in cable clamps in AF116 ... AF146.

For contactor	Type	Order code	Pkg qty	Weight (1 pce)
				kg
3-pole contactors				
AF116 ... AF146	LL146-30	1SFN074211R1000	6	0.102
AF190 ... AF205	LL205-30	1SFN074811R1000	1	0.166
AF265 ... AF370	LL370-30	1SFN075411R1000	1	0.173
AF400 ... AF460	LE460	1SFN075716R1000	6	0.600
AF580 ... AF750	LE750	1SFN076116R1000	6	0.750
4-pole contactors				
AF116 ... AF140	LL146-40	1SFN074211R2000	8	0.132
AF190 ... AF205	LL205-40	1SFN074811R2000	2	0.216
AF265 ... AF370	LL370-40	1SFN075411R2000	2	0.224

Connection module

Connection module can be fixed on AF116 ... AF146 delivered with bar terminals.

For contactor	Type	Order code	Pkg qty	Weight (1 pce)
				kg
3-pole contactors				
AF116 ... AF146	LD146-30	1SFN074208R1000	2	0.165
4-pole contactors				
AF116 ... AF140	LD146-40	1SFN074208R2000	2	0.225

1SFC101100C0201 - Rev. C

Terminal connecting strips and shorting bars


1SBC100024V0014

LY16-4

Parallel and series connection of 3-pole contactors:

- To obtain a star point (3 parallel-connected poles)
- To connect poles in parallel and thus increase the AC load passing through the flow path made up of the parallel-connected poles: LP, LY, LH, LF, LG.
  The relevant cable cross-sectional area may limit the maximum permissible current. Consult information in table below
- To connect poles in series and thus increase the DC voltage controlled by the poles: LP, LY (only LY16-4 and LY38-4 secable strips).


1SFC101088V0001

LY185

Types	for connection of "n" poles	with terminal	insulated
LP	n = 2	no	no (1)
LY	n = 2 (secable LY16-4, LY38-4 connecting strips)	no	yes
	n = 3	no	yes (1)
LH	n = 2	yes	no
LF	n = 3	yes	yes
LG	n = 4	yes	yes

(1) LP460 ... LP750, LY185 ... LY750 not insulated. Use terminal shrouds.


1SBC100035V0014

LH38-4

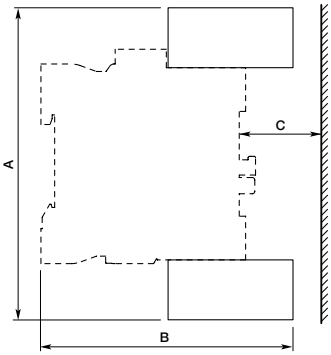

1SBC100037V0014

LF16-4


1SBC100036V0014

LG16-4

For contactors	max. nominal continuous current with "n" poles				Cable cross-sectional area	Type	Order code	Pkg qty	Weight (1 pce)
	in parallel			in series					
	2 poles	3 poles	4 poles	2 poles					
	A				mm²				kg
AF09	30	33	–	25	6	LY16-4	1SBN071303T1000	10	0.006
AF12	32	36	–	27					
AF16	34	40	–	30					
AF26	50	60	–	45	10	LY38-4	1SBN072303T1000	10	0.012
AF116 ... AF146	–	240	–		–	LY140	1SFN074203R1000	1	0.055
AF190, AF205	–	400	–		–	LY185	1SFN074703R1000	1	0.200
AF265 ... AF370	–	670	–		–	LY300	1SFN075103R1000	1	0.300
AF400, AF460	–	1000	–		–	LY460	1SFN075703R1000	1	0.450
AF580, AF750	–	1650	–		–	LY750	1SFN076103R1000	1	0.800
AF190, AF205	300	–	–		–	LP185	1SFN074712R1000	2	0.300
AF265 ... AF370	475	–	–		–	LP300	1SFN075112R1000	2	0.400
AF400, AF460	725	–	–		–	LP460	1SFN075712R1000	2	0.550
AF580, AF750	1200	–	–		–	LP750	1SFN076112R1000	2	0.950
AF09	45		–	–	10	LH38-4	1SBN072304R1000	2	0.012
AF12	50		–	–	10				
AF16	54		–	–	16				
AF26	81		–	–	25				
AF30, AF38	90		–	–	25				
AF09		62	–		16	LF16-4	1SBN071305R1000	2	0.020
AF12		70	–		25				
AF16		75	–		25				
AF26		112	–		35	LF38-4	1SBN072305R1000	2	0.040
AF30, AF38		125	–		50				
AF09	–	–	70	–	25	LG16-4	1SBN071306R1000	2	0.025
AF12	–	–	78	–	25				
AF16	–	–	84	–	25				

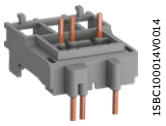


Main dimensions

Type	For contactors	Dimensions					
		A		B		C	
		mm	inch	mm	inch	mm	inch
LH38-4	AF09 ... AF16	111.20	4.38"	83	3.27"	22	0.87"
	AF26 ... AF38	114	4.49"	86	3.39"	16	0.63"
LF16-4	AF09 ... AF16	121	4.76"	87	3.43"	23	0.91"
LF38-4	AF26 ... AF38	135.20	5.32"	103	4.06"	31	1.22"
LG16-4	AF09 ... AF16	124.20	4.89"	87	3.43"	23	0.91"

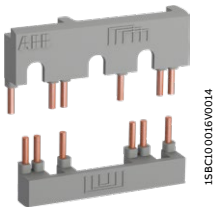
1SBC101735S0201 - Rev. A

Connection accessories for starting solutions

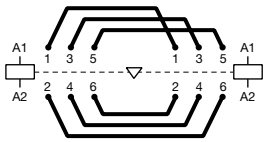


BEA16-4

BPR65-4

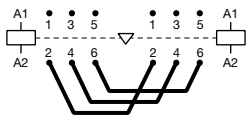


BER16-4

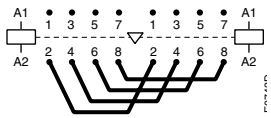


BER, BEM
Reversing connections

BEP140-30



BEP, BES
3-pole phase to phase connections



BEP
4-pole changeover connections

Connecting links with manual motor starters

The BEA insulated 3-pole connecting links are used to connect AF09 ... AF65 contactors with the MS116 or MS132 or MS165 manual motor starters. The BEA insulated 3-pole connecting links ensure the electrical and mechanical connection between the contactor and the associated manual motor starter. BPR65-4 35 mm rail hooks used with BEA65-4 connecting link, allow direct mounting on 2 rails 35 mm of MS165 manual motor starters with AF40 ... AF65 contactors.

For 3-pole contactors	Manual motor starter	Type	Order code	Pkg qty	Weight (1 pce) kg
AF09 ... AF16	MS116-0.16 ... MS116-25, MS132-0.16... MS132-25	BEA16-4	1SBN081306T1000	10	0.025
AF26 ... AF38	MS116-0.16 ... MS116-16, MS132-0.16 ... MS132-10	BEA26-4	1SBN082306T1000	10	0.025
	MS116-20 ... MS116-32, MS132-12 ... MS132-32	BEA38-4	1SBN082306T2000	10	0.030
AF40 ... AF65	MS165-16 ... MS165-65	BEA65-4	1SBN083406R1000	1	0.090
	MS165-16 ... MS165-65 (1)	BPR65-4 (2)	1SBN113405R1000	1	0.014

Note : BEA not suitable for AF..Z contactors with DC control voltage 24 V DC (coil 30).
(1) Applicable for MS165 manufactured after week 31, 2016 (date code > 16214).
(2) Use one BPR65-4 for each contactor AF40 ... AF65.

Connection sets for reversing contactors

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

For 3-pole contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AF09 ... AF16	BER16-4	1SBN081311R1000	1	0.045
AF26 ... AF38	BER38-4	1SBN082311R1000	1	0.100
AF40 ... AF65	BER65-4	1SBN083411R1000	1	0.175
AF80, AF96	BER96-4	1SBN083911R1000	1	0.250
AF116 ... AF146	BER140-4	1SFN084211R1000	1	0.615
AF190, AF205	BER205-4	1SFN084811R1000	1	1.237
AF265 ... AF370	BER370-4	1SFN085411R1000	1	2.140
AF400, AF460	BEM460-30	1SFN085701R1000	1	4.400
AF580, AF750	BEM750-30	1SFN086101R1000	1	7.300

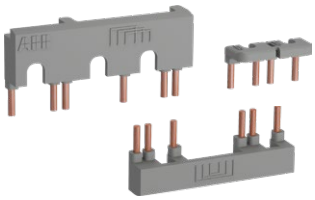
Phase to phase connections

The BEP and BES connection sets are used to connect phase to phase the main poles of two contactors mounted side by side. 4-pole contactors will then operate as source reversing contactors. The BEP connection sets are made up of 1 upstream or downstream connections. The BES connection sets are made up of 3 upstream or downstream connections. BEP and BES connection sets are insulated and made of solid copper bars.

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
3-pole contactors				
AF116 ... AF146	BEP140-30	1SFN084214R1000	1	0.320
AF190, AF205	BEP205-30	1SFN084814R1000	1	0.534
AF265 ... AF370	BEP370-30	1SFN085414R1000	1	0.926
AF400, AF460	BES460	1SFN085704R1000	1	2.200
AF580, AF750	BES750	1SFN086104R1000	1	3.700
4-pole contactors				
AF116 ... AF140	BEP140-40	1SFN084214R2000	1	0.420
AF190 ... AF205	BEP205-40	1SFN084814R2000	1	0.710
AF265 ... AF370	BEP370-40	1SFN085414R2000	1	1.230

1SBC101736S0201 - Rev. D

Connection sets for star-delta starter



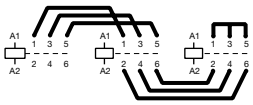
1SBC100018V0014

BEY16-4

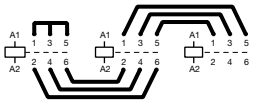
The BEY and BED connection sets are used to connect the main poles of the Line, Delta and Star contactors of a star-delta starter.

The connection sets are made up of:

- Line contactor / delta contactor:
  - BEY: upstream phase-to-phase connection
  - BED: upstream connection in parallel
- Delta contactor / star contactor: downstream connection in parallel
- Star contactor: star point upstream
- Insulated, solid copper bar.



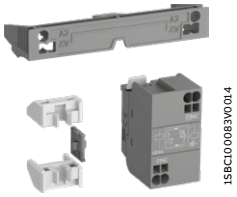
AF09 ... AF370
Line-delta-star connection



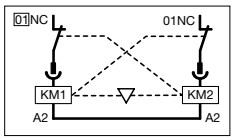
AF400 ... AF750
Star-delta-line connection

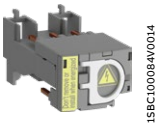
For 3-pole line, delta & star contactors	Interlock unit between delta & star contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AF09 ... AF16	With or without VM4 or VEM4	BEY16-4	1SBN081313R2000	1	0.050
AF26 ... AF38	With or without VM4 or VEM4	BEY38-4	1SBN082713R2000	1	0.110
AF40 ... AF65	With or without VM96-4	BEY65-4	1SBN083413R2000	1	0.200
AF80, AF96	With or without VM96-4	BEY96-4	1SBN083913R2000	1	0.250
AF116 ... AF146	With or without VM19	BEY140-4	1SFN084413R1000	1	1.040
AF190 ... AF205 (line and delta) AF116 ... AF146 (star)	With or without VM140/190	BEY190-4	1SFN084813R1000	1	1.154
AF190, AF205	With or without VM19	BEY205-4	1SFN085213R1000	1	1.205
AF265 ... AF370 (line and delta) AF190 ... AF205 (star)	With or without VM205/265	BEY265-4	1SFN085413R1000	1	2.020
AF265 ... AF370	With or without VM19	BEY370-4	1SFN085813R1000	1	2.110
AF400 ... AF460	With or without VM750H	BED460	1SFN085703R1000	1	4.700
AF580 ... AF750 (line and delta) AF400 ... AF460 (star)	With or without VM750H	BED580	1SFN085903R1000	1	6.300
AF580 ... AF750	With or without VM750H	BED750	1SFN086103R1000	1	7.700

Connection accessories for starting solutions- with Push-in Spring terminals



VEM4K





BEA16-4K

For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce) kg
Mechanical and electrical interlock set (1)					
AF09..K ... AF16..K AF26..K ... AF38..K	0 2	VEM4K	1SBN030113R1000	1	0.034

Note: - VEM4K includes a VM4 mechanical interlock unit with 2 fixing clips (BB4), a VE4K electrical interlock block with A2 - A2 connection.
- VE4K block must be used with A2-A2 connection to respect the electrical connection diagram.
- VEM4K not suitable for AF..Z contactors with DC control voltage 12 ... 20 V DC (coil 20 and 24 V DC (coil 30).
For product availability, please consult your ABB local sales organization.

Connecting links with manual motor starters (1)					
AF09..K ... AF16..K	with MS132-0.16K... MS132-25K	BEA16-4K	1SBN081321T1000	10	0.051
AF26..K ... AF38..K	with MS132-0.16K... MS132-32K	BEA38-4K	1SBN082321T2000	10	0.053

(1)For product availability, please consult your ABB local sales organization.
Note: BEA not suitable for AF..Z contactors with DC control voltage 24 V DC (coil 30).

Connection bars

1SFC101061V0001

BEA140/XT2

1SFC101064V0001

BEA205/T4

1SFC101065V0001

BEA370/T5

Connection between contactors/starters and moulded case circuit breakers.
These connection sets are solid copper bars.

For 3-pole contactors	MCCB	Type	Order code	Pkg qty	Weight (1 pce) kg
Vertical assembly					
AF116 ... AF146	XT2	BEA140/XT2	1SFN084206R1000	1	0.058
AF116 ... AF146	XT3	BEA140/XT3	1SFN084206R1002	1	0.070
AF116 ... AF146	XT4	BEA140/XT4	1SFN084206R1001	1	0.068
AF190, AF205	XT4	BEA205/XT4	1SFN084806R1000	1	0.200
AF190, AF205	T4	BEA205/T4	1SFN084806R1001	1	0.190
AF265 ... AF370	T5	BEA370/T5	1SFN085406R1000	1	0.350
AF400 ... AF750	T6	BEA750/T6	1SFN086106R1000	1	0.410
AF400 ... AF750	T5	BEA750/T5	1SFN086106R1001	1	0.410
Vertical assembly with control wire terminals (also suitable when using busbar kits for starter combinations)					
AF400 ... AF750	T5	BEA750D/T5	1SFN086106R1003	1	0.720
AF400 ... AF750	T6	BEA750D/T6	1SFN086106R1002	1	0.720
Horizontal assembly (also suitable when using busbar kits for starter combinations)					
AF400, AF460	T4	BEA460H/T4	1SFN085907R1000	1	2.450

Connection bars between contactors and switch fuse

Connection between contactors/starters and moulded case circuit breakers.
These connection sets are solid copper bars.

For 3-pole contactors	Switch fuse	Type	Order code	Pkg qty	Weight (1 pce) kg
Vertical assembly					
AF400, AF460	OESA400	BEF460/OESA400	1SFN085708R1000	1	0.340
AF460 ... AF750	OESA630 to OESA800	BEF750/OESA800	1SFN086108R1000	1	0.740
Horizontal assembly					
AF400, AF460	OESA400...LR	OESA460H/OESA400	1SFN085709R1000	1	1.250

Note: The BEF connection bars provided for the A145 ... A300 contactors can be used for the AF145 ... AF300 contactors.

Mounting plates

1SFC101087V0001

PN460

Mounting plates with fixing holes for the specified 3-pole contactors and overload relays.

For 3-pole contactors		For overload relays	Type	Order code	Pkg qty	Weight (1 pce) kg
Mounting plates for Direct on line starters						
AF400, AF460		E500DU	PN460-11	1SFN095705R1000	1	2.120
AF580, AF750		E800DU	PN750-11	1SFN096105R1000	1	2.500

For two contactors side by side with space for mechanical interlock		For one or two overload relays	Type	Order code	Pkg qty	Weight (1 pce) kg
Mounting plates for mechanical interlocked contactors, reversing starters and two speed starters for double windings						
AF400, AF460		E500DU	PN460-21	1SFN095701R1000	1	3.490
AF580, AF750		E800DU	PN750-21	1SFN096101R1000	1	4.230

For main and delta contactors	For star contactor (1)	For overload relays	Type	Order code	Pkg qty	Weight (1 pce) kg
Mounting plates for star-delta starters and two speed starters for single windings						
AF400, AF460	A300, AF400	E500DU	PN460-41	1SFN095703R1000	1	5.310
AF580, AF750	AF400 ... AF580	E800DU	PN750-41	1SFN096103R1000	1	6.320

(1) Space for mechanical interlock included.

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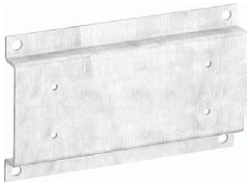
Adapter plates

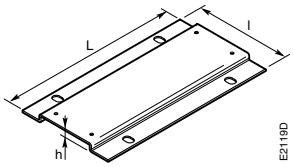


1SFC101048V0001

PR146-1

Adapter plates with fixing holes for replacing installed contactors.

From contactors	To contactor	Type	Order code	Pkg qty	Weight (1 pce) kg
A95, AF95, A110, AF110	AF116, AF140, AF146	PR146-1	1SFN094200R1000	1	0.300
EH150, EH160, EH175, EH210, EG160	AF190, AF205	PR210-1	1SFN094900R1000	1	0.440
EH250, EH260, EH300	AF265, AF305, AF370	PR300-1	1SFN095300R1000	1	0.560
EH370, EH550, EG315	AF400, AF460, AF580	PR460-1	1SFN095700R1000	1	0.900
EH700, EH800	AF750	PR750-1	1SFN096100R1000	1	0.500
OKYM150, OKYM175	AF190	PR185-2	1SFN095100R1001	1	0.500
OKYM200, OKYM250	AF265, AF305, AF370	PR300-2	1SFN095300R1001	1	0.500
OKYM315	AF400, AF460	PR400-2	1SFN095700R1002	1	0.820
OKYM400	AF400, AF460	PR460-2	1SFN095700R1001	1	0.800
OKYM500	AF580	PR580-2	1SFN096100R1002	1	0.700
EH550, EG630, OKYM630	AF580, AF750	PR750-2	1SFN096100R1001	1	1.100



E2119D

Dimensions (mm)

Type of the plate	Dimensions			Fixing holes
	L	l	h	mm
PR146-1	150	90	15	4 x ø 6.5
PR210-1	200	132	11.5	4 x ø 7
PR300-1	200	172	11.5	4 x ø 7
PR460-1	278	198	11.5	4 x ø 7
PR750-1	283	244	11.5	4 x ø 7
PR185-2	202	152	11.2	4 x ø 11
PR300-2	202	152	11.2	4 x ø 11
PR400-2	278	151	11.5	4 x ø 11
PR460-2	278	176	11.5	4 x ø 11
PR580-2	283	176	11.5	4 x ø 11
PR750-2	283	255	11.5	4 x ø 14

Fixing holes according to the plate types

1SFC101107C0201

Low Voltage Ride Through (LVRT) modules

1SFC101223V0001

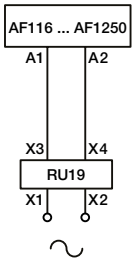
RU19/120

RU19 is designed to meet the Low Voltage Ride Through (LVRT) requirements for grid connections by staying operational during voltage dips preventing disturbances on the grid it self.

The RU19 is a separate module connected to the contactors coil connection A1-A2 creating a delay function of the opening of the contactor. When controlled by PLC, the contactor is operated directly whitout delay functionality. The RU19 can be screw or DIN rail mounted.

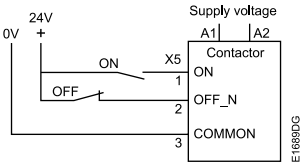
For contactor	Rated control circuit voltage Uc V 50/60 Hz	Type	Order code	Weight Pkg (1 pce) kg
AF116 ... AF370 use coil 33	110...120	RU19/120	1SFN170801R1001	0.400
AF400 ... AF1250 use coil 69				
AF116 ... AF370 use coil 33	230...240	RU19/240	1SFN170801R1002	0.400
AF400 ... AF1250 use coil 70				

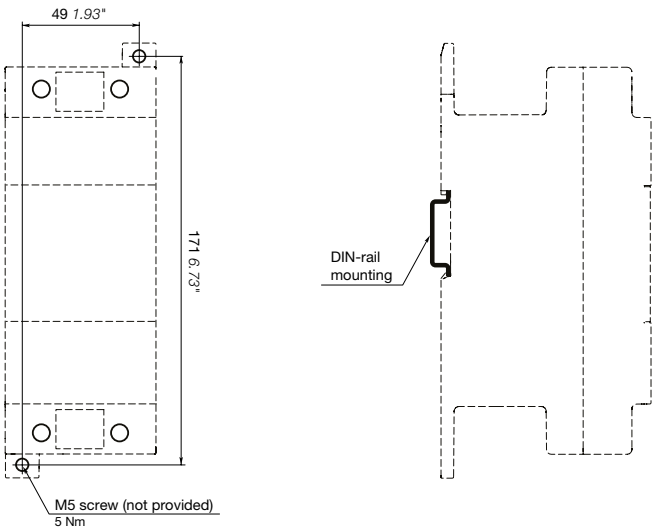
AF116 ... AF1250



For direct opening of AF400 ... AF1250 contactors, connect through built in PLC interface.

Control inputs





RU19/240

Main dimensions mm, inches

1SFC101077D0201

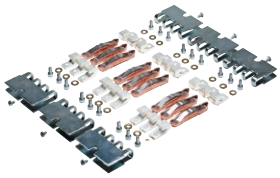
Contactor coils, main contact sets and arc chutes

ZAF1650

Contactor coils

For contactors	Rated control circuit voltage Uc min. ... Uc max.		Type	Order code	Pkg qty	Weight (1 pce)
	V 50/60 Hz	V DC				kg
AF400, AF460	-	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
AF580 ... AF1250	-	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
AF1350 ... AF2050	100...250	100...250	ZAF1650 (1)	1SFN156570R7026	1 set	0.900
			ZP1650 (2)	1SFN166521R1070	1	0.300
AF2650	100...250	100...250	ZAF2650 (1)	1SFN156670R7026	1 set	0.900
			ZP2650 (2)	1SFN166621R1070	1	0.300

ZAF460, ZAF750 : printed circuit board included.
(1) One set of two coil.
(2) Printed circuit board.



ZL1650

Main contact sets

The contact sets for 3-pole contactors consists of six fixed contacts, three moving contacts, springs and the required screws.

For 3-pole contactors		Type	Order code	Pkg qty	Weight (1 pce) kg
AF400		ZL400	1SFN165703R1000	1	1.320
AF460		ZL460	1SFN165903R1000	1	1.320
AF580		ZL580	1SFN166103R1000	1	1.840
AF750		ZL750	1SFN166303R1000	1	1.840
AF1250		ZL1250	1SFN166403R1000	1	1.840
AF1350	For contactors produced before 2014-01-13, with serial number before 1S16010051403xxxx	ZL1350	1SFN166503R1000	1	2 500
	For contactors produced since 2014-01-13, with serial number above 1S16010051403xxxx	ZL1350-1	1SFN166503R1001	1	4 500
AF1650	For contactors produced before 2014-01-13, with serial number before 1S16010051403xxxx	ZL1650	1SFN166703R1000	1	3 500
	For contactors produced since 2014-01-13, with serial number above 1S16010051403xxxx	ZL1650-1	1SFN166703R1001	1	4 500
AF2050	For contactors produced before 2014-01-13, with serial number before 1S16010051403xxxx	ZL2050	1SFN167003R1000	1	3 500
	For contactors produced since 2014-01-13, with serial number above 1S16010051403xxxx	ZL2050-1	1SFN167003R1001	1	4 500
AF2650 (3)		ZL2650	1SFN166603R1000	1	1.200

(3) Does not include fixed contacts and screws.

Arc chutes

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AF400, AF460	ZW460	1SFN165710R1000	1	1.380
AF580, AF750, AF1250	ZW750	1SFN166110R1000	1	1.500
AF1350, AF1650, AF2050	ZW1650	1SFN166510R1001	1	4.560
AF2650	ZW2650	1SFN166610R1000	1	4.000

Accessories for UA, UA..RA contactors and GA75, GAE75, GAF contactors

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**

Auxiliary contact blocks


1SBC580992F0301

CA5-10


1SBC573794F0302

CA5-40E


1SBC573752F0301

CAL5-11


1SFC101033F0201

CAL18-11

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:

- CA5 1 or 4-pole block, instantaneous with N.O., N.C. contacts
- CC5 1-pole block, with N.O. leading contact or N.C. lagging contact.

Select the 4-pole auxiliary contact blocks CA5 type, according to the contactor type for compliance with the standard requirements (see "Terminal Marking and Positioning").

Types of auxiliary contact blocks for side mounting:

- CAL 2-pole block 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 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, 1-pole						
UA16 ... UA110	1 0	– –	CA5-10	1SBN010010R1010	10	0.014
	0 1	– –	CA5-01	1SBN010010R1001	10	0.014
	– –	1 0	CC5-10	1SBN010011R1010	10	0.014
	– –	0 1	CC5-01	1SBN010011R1001	10	0.014
Front-mounted instantaneous auxiliary contact blocks, 4-pole						
UA16 ... UA30	2 2	– –	CA5-22M	1SBN010040R1122	2	0.060
	3 1	– –	CA5-31M	1SBN010040R1131	2	0.060
	1 3	– –	CA5-13M	1SBN010040R1113	2	0.060
	0 4	– –	CA5-04M	1SBN010040R1104	2	0.060
	1 1	1 1	CA5-11/11M	1SBN010040R1118	2	0.060
UA50 ... UA110	2 2	– –	CA5-22E	1SBN010040R1022	2	0.060
	3 1	– –	CA5-31E	1SBN010040R1031	2	0.060
	4 0	– –	CA5-40E	1SBN010040R1040	2	0.060
	0 4	– –	CA5-04E	1SBN010040R1004	2	0.060
	1 1	1 1	CA5-11/11E	1SBN010040R1018	2	0.060
Side-mounted instantaneous auxiliary contact blocks, 2-pole						
UA16 ... UA75	1 1	– –	CAL5-11	1SBN010020R1011	2	0.050
UA95, UA110, GAF185...GAF2050	1 1	– –	CAL18-11	1SFN010720R1011	2	0.050

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

Note:

- The front-mounted auxiliary contact blocks provided for the UA75 contactors can be used with the GA and GAE types
- The CAL auxiliary contact blocks can be used with GA contactors:
  - GA75-10-00: 2 x CAL5-11 blocks
  - GA75-10-11: 1 x CAL5-11 block
  - GAE75-10-00: 1 x CAL5-11 block
  - GAE75-10-11: no add-on block.
- The CAL auxiliary contact blocks can be used with UA..RA contactors. See "Accessory fitting details" for this contactor type.

Auxiliary contact blocks

Technical data

			Front mounted	Side mounted	
Types			1-pole CA5, 1-pole CC5, 4-pole CA5	CAL5-11	CAL18-11, CAL18-11B
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 operational voltage Ue max.			24...690 V AC		
Conventional thermal current Ith - θ ≤ 40 °C			16 A		
Ie / Rated operational current AC-15 acc. to IEC 60947-5-1		24-127 V 50/60 Hz	6 A		
		220-240 V 50/60 Hz	4 A		
		380-440 V 50/60 Hz	3 A		
		500-690 V 50/60 Hz	2 A		
Making capacity acc. to IEC 60947-5-1			10 x Ie AC-15		
Breaking capacity acc. to IEC 60947-5-1			10 x Ie AC-15		
Ie / Rated operational current DC-13 acc. to IEC 60947-5-1		24 V DC	6 A / 144 W		
		48 V DC	2.8 A / 134 W		
		72 V DC	1 A / 72 W		
		110 V DC	0.55 A / 60 W		
		125 V DC	0.55 A / 69 W		
		220 V DC	0.3 A / 66 W		
		250 V DC	0.3 A / 75 W		
Short-circuit protection device gG type fuse			10 A		
Rated short-time withstand current Icw		for 1.0 s	100 A		
θ = 40 °C		for 0.1 s	140 A		
Minimum switching capacity					
A40 ... A75 contactors			17 V / 1 mA		–
with failure rate acc. to IEC 60947-5-4			≤ 10-7		–
A95 ... A110 contactors			24 V / 50 mA	–	24 V / 50 mA (0.5 million of operating cycles)
with failure rate acc. to IEC 60947-5-4			–	–	≤ 10-6
Power dissipation per pole at 6 A			0.1 W		0.15 W
Mechanical durability	Number of operating cycles		10 millions (UA16 ... UA75)	10 millions	5 millions (UA95 ... UA110)
			3 millions (UA95 ... UA110)		3 millions (GAF185 ... GAF750)
					0.5 million (GAF1250 ... GAF2050)
	Max. switching frequency		3600 cycles/h		
Electrical durability	Number of operating cycles		see "Electrical durability" curves		
	Max. switching frequency	AC-15	1200 cycles/h		
		DC-13	900 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

Connecting characteristics

Connection capacity (min. ... max.)				
	Rigid solid	1 x	1...4 mm²	
		2 x	1...4 mm²	
	Flexible with ferrule	1 x	0.75...2.5 mm²	
		2 x	0.75...2.5 mm²	
	Lugs	L ≤	7.7 mm	8 mm
		l >	3.7 mm	3.7 mm
Tightening torque			1 Nm	
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529		Terminals	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	

1SBC101522S0201 - Rev. B

Auxiliary contact blocks for severe industrial environments

CE5-01W

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

Types of auxiliary contact blocks for front mounting:

- CE5 1-pole block, instantaneous with N.O. contact or N.C. contact, designed in 2 protection versions:
  - CE5-.. D with built-in microswitch IP40, degree of protection (IP20 on terminals)
  - CE5-.. W with built-in microswitch IP67, degree of protection (IP20 on terminals).

Types of auxiliary contact blocks for side mounting:

- CEL18 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
Front-mounting instantaneous auxiliary contact blocks, 1-pole						
UA16 ... UA75	1 –	– –	CE5-10D0.1	1SBN010015R1010	1	0.020
	– 1	– –	CE5-01D0.1	1SBN010015R1001	1	0.020
	1 –	– –	CE5-10D2	1SBN010017R1010	1	0.020
	– 1	– –	CE5-01D2	1SBN010017R1001	1	0.020
	1 –	– –	CE5-10W0.1	1SBN010016R1010	1	0.020
	– 1	– –	CE5-01W0.1	1SBN010016R1001	1	0.020
	1 –	– –	CE5-10W2	1SBN010018R1010	1	0.020
	– 1	– –	CE5-01W2	1SBN010018R1001	1	0.020
Side-mounting instantaneous auxiliary contact blocks, 1-pole microswitch auxiliary contact N.O. or N.C.						
UA95, UA110 GAF185 ... GAF2050	1 0	– –	CEL18-10	1SFN010716R1010	1	0.050
UA95, UA110 GAF185 ... GAF2050	0 1	– –	CEL18-01	1SFN010716R1001	1	0.050

For each contactor type, refer to "Accessory fitting details" table.
Note: The front-mounted auxiliary contact blocks provided for the UA contactors can be used with the GA and GAE types.
The side-mounted auxiliary contact blocks provided for the UA95, UA110 contactors can be used with the GAF types.

1SBC101577S0201 - Rev. C

Auxiliary contact blocks

Technical data

			Front-mounted		Side-mounted
Types			**1-pole CE5-..0.1**	**1-pole CE5-..2**	**CEL18-10, CEL18-01**
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			250 V		
Rated operational voltage Ue max.			125 V	250 V	125 V
Conventional thermal current Ith - θ ≤ 40 °C			0.1 A	2 A	0.1 A
Ie / Rated operational current			**AC-14**	**AC-15**	**AC-14**
acc. to IEC 60947-5-1		24-127 V 50/60 Hz	0.1 A	2 A	0.1 A
		220-240 V 50/60 Hz	–	2 A	–
Making capacity acc. to IEC 60947-5-1			6 x Ie AC-14	10 x Ie AC-15	6 x Ie AC-14
Breaking capacity acc. to IEC 60947-5-1			6 x Ie AC-14	10 x Ie AC-15	6 x Ie AC-14
Ie / Rated operational current			**DC-12**		
acc. to IEC 60947-5-1		24 V DC	0.1 A	2 A	0.1 A
		48 V DC	0.1 A	1 A	0.1 A
		72 V DC	0.1 A	0.3 A	0.1 A
		110 V DC	0.1 A	0.2 A	0.1 A
		125 V DC	–	0.2 A	–
		220 V DC	–	0.1 A	–
Short-circuit protection device			0.1 A (FF type fuses) (1)	10 A (FF type fuses) (1)	0.1 A (FF type fuses) (1)
Minimum switching capacity					
A40 ... A75 contactors			3 V / 1 mA	17 V / 1 mA	3 V / 1 mA
With failure rate acc. to IEC 60947-5-4			–	≤ 10-7	–
A95 ... A110 contactors			3 V / 1 mA	17 V / 1 mA	–
With failure rate acc. to IEC 60947-5-4			–	≤ 10-7	–
Mechanical durability	Number of operating cycles		5 millions for CE5-..D0.1	5 millions for CE5-..D2	1 million
			2.5 millions for CE5-..W0.1	2.5 millions for CE5-..W2	–
	Max. switching frequency		3600 cycles/h		1200 cycles/h
Electrical durability	Number of operating cycles		2.5 millions for CE5-..D0.1	1 million for CE5-..D2	0.7 millions
			0.7 millions for CE5-..W0.1	0.3 millions for CE5-..W2	
	Max. switching frequency	AC-14, AC-15	1200 cycles/h		
		DC-12	900 cycles/h		

Contact utilization characteristics according to UL / CSA

Standards		UL 508, CSA C22.2 N°14		
Max. operational voltage		125 V AC / 110 V DC	250 V AC / 220 V DC	125 V
Pilot duty				
AC thermal rated current		0.1 A	2 A	0.1 A

Connecting characteristics

Connection capacity (min. ... max.)					
	Rigid solid	1 x	1...4 mm²		
		2 x	1...4 mm²		
	Flexible with ferrule	1 x	0.75...2.5 mm²		
		2 x	0.75...2.5 mm²		
	Bars or lugs	L ≤	7.7 mm		
		l >	3.7 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 60947-1 / EN 60947-1		Microswitches	IP40 for CE5-..D0.1	IP40 for CE5-..D2	IP67
and IEC 60529 / EN 60529			IP67 for CE5-..W0.1	IP67 for CE5-..W2	
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).

1SBC101584S0201

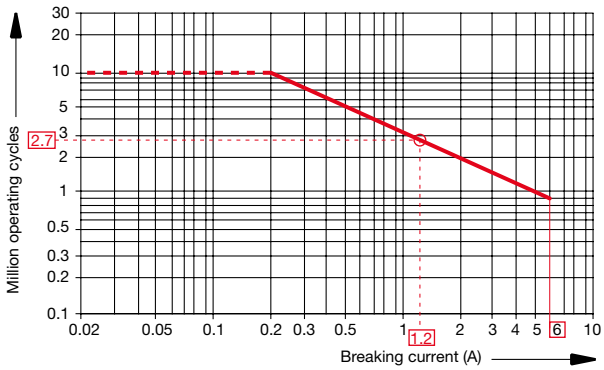
Auxiliary contacts

Electrical durability

Electrical durability for AC-15 utilization category

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

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

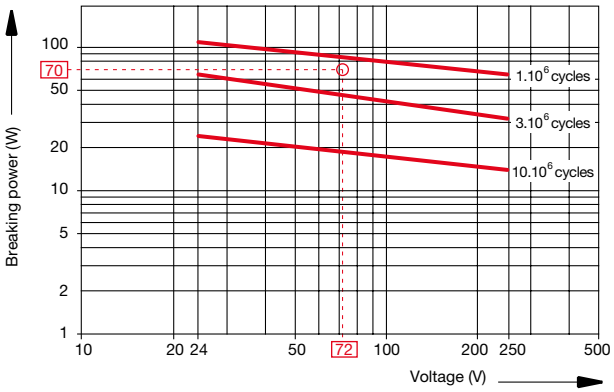


- 1-pole and 4-pole CA5,
  1-pole CC5,
  2-pole CAL5 and CAL18 add-on auxiliary contacts.

Example:
Breaking current = 1.2 A
On the opposite curve at intersection "O" 1.2 A
the corresponding value for the electrical durability is approximately 2.7.106 operating cycles.

Electrical durability for DC-13 utilization category

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



- 1-pole and 4-pole CA5,
  1-pole CC5,
  2-pole CAL5 and CAL18 add-on auxiliary contacts.

Example:
Control of DC electro-magnet: Ue voltage = 72 V DC and breaking power = 70 W.
On the opposite curve at intersection "O" 72 V / 70 W
the corresponding value for the electrical durability is approximately 2.106 operating cycles.

1SBC100238S0201 - Rev. A

Add-on auxiliary contacts

Terminal marking and positioning

1-pole auxiliary contacts

CA5-01

CA5-10

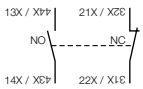
CE5-01, CEL18-01

CE5-10, CEL18-10

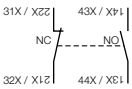
CC5-01

CC5-10

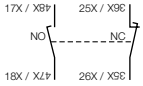
2-pole auxiliary contacts



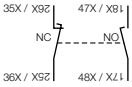
CAL5-11, CAL18-11
(Left-side
mounted)



CAL5-11, CAL18-11
(Right-side mounted)

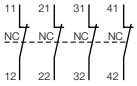


CCL5-11
(Left-side
mounted)

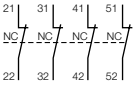


CCL5-11
(Right-side mounted)

4-pole auxiliary contacts



CA5-04E



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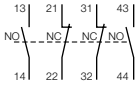

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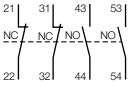

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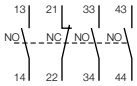
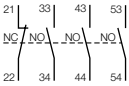
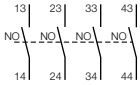


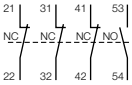
CA5-31E



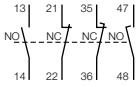
CA5-31M



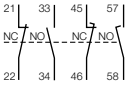
CA5-40E



CA5-13M



CA5-11/11E



CA5-11/11M

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Electronic timers

TEF5-OFF

TEF5 frontal electronic timers are used for realizing timing function and are available in ON-delay and OFF-delay versions.

Compact solution in cabinet compared to separate timers

TEF5 electronic timers are front-mounted and locked on contactors.
A mechanical indicator allows to show the state of the contactor.

TEF5 electronic timers are supplied by direct wiring to the coil terminals A1 - A2 of the contactor or contactor relay. A varistor is integrated on the timer to offer a built-in protection against surges in the contactor coil.

Available for a wide control voltage range 24...240 V AC/DC

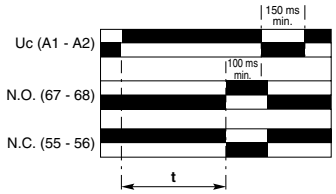
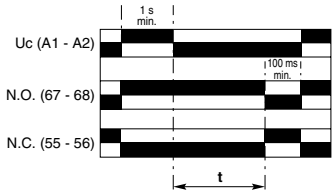
TEF5-ON or TEF5-OFF allow time-delayed functions up to 100 s in 3 distinct time ranges, independently of the control system. The time delay ranges are selected by a switch and the time delay can be adjusted by means of a rotary switch. The timing function is activated by closing or opening the device on which the timer is mounted. The OFF-delay version operates without additional control supply.

For contactors, contactor relays	Time delay range selected by switch	Delay type	Rated control circuit voltage Uc V 50/60 Hz or DC	Auxiliary contacts	Type	Order code	Weight Pkg (1 pce) kg
UA16 ... UA75 GA75, GAE75	0.1...1 s 1...10 s 10...100 s	ON-delay	24...240	1 1	TEF5-ON	1SBN020312R1000	0.065
		OFF-delay	24...240	1 1	TEF5-OFF	1SBN020314R1000	0.065

Electronic timers

Technical data

Contact utilization characteristics according to IEC

Types		**TEF5-ON**	**TEF5-OFF**
Standards		IEC 60947-5-1 and EN 60947-5-1	
Rated insulation voltage Ui acc. to IEC 60947-5-1		400 V	
Rated impulse withstand voltage Uimp		4 kV	
Rated operational voltage Ue max.		240 V	
Rated frequency (without derating)		50 / 60 Hz	
Conventional thermal current Ith - θ ≤ 40 °C		5 A	
Ie / Rated operational current AC-15			
acc. to IEC 60947-5-1	24-127 V 50/60 Hz	3 A	
	220-240 V 50/60 Hz	1.5 A	
Making capacity		10 x Ie AC-15 acc. to IEC 60947-5-1	
Breaking capacity		10 x Ie AC-15 acc. to IEC 60947-5-1	
Ie / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	1 A / 24 W	
Short-circuit protection device gG type fuse		6 A	
Rated short-time withstand current Icw	for 1.0 s	8 A	
θ = 40 °C	for 0.1 s	8 A	
Minimum switching capacity		12 V / 3 mA	
with failure rate acc. to IEC 60947-5-4	24 V DC	10-7	
Power dissipation per pole at 3 A		0.1 W	
Function diagram		ON-delay	OFF-delay
			
		Bistable relay inside. Before use, once apply Uc then switch it off in order to initialize position of the contacts.	
Control circuit voltage			
AC control voltage	Rated control circuit voltage Uc	24...240 V AC	
50/60 Hz	Average consumption	1.5 mA RMS	1 mA RMS
DC control voltage	Rated control circuit voltage Uc	24...240 V DC	
	Average consumption	1.5 mA	1 mA
Rated frequency limits		50 / 60 Hz	
Supply voltage range		0.85...1.1 x Uc (at θ ≤ 70 °C)	
Overvoltage protection		Varistor included	
Time delay range (t) selected by switch	0.1...1 s	■■	
	1...10 s	■■	
	10...100 s	■■	
On-load reiteration accuracy under constant conditions		≤ 1 %	
Minimum ON period		0.1 s	1 s
Recovery time		0.15 s	0.1 s
Ambient air temperature	Operation	-25 °C ... +70 °C	
	Storage	-40 °C ... +80 °C	
Climatic withstand		Category B according to IEC 60947-1 Annex Q	
Maximum operating altitude		2000 m	
Mounting positions		Acc. to mounting positions permitted on contactors or contactor relays	
Shock withstand acc. to IEC 60068-2-27 and EN 60068-2-27 (Mounting position 1)		1/2 sinusoidal shock for 11 ms: no change in contact position Same as contactor or contactor relay	
Mechanical durability			
	Number of operating cycles	5 millions operating cycles	
	Max. switching frequency	3600 cycles/h	1800 cycles/h
Max. electrical switching frequency			
	AC-15	1200 cycles/h	
	DC-13	900 cycles/h	

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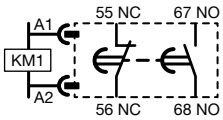
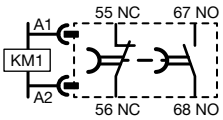
Electronic timers

Technical data

Connecting characteristics

Connection capacity (min. ... max.)			
	Rigid solid	1 x	1...2.5 mm²
		2 x	1...2.5 mm²
	Flexible with non insulated ferrule	1 x	0.75...2.5 mm²
		2 x	0.75...2.5 mm²
	Flexible with insulated ferrule	1 x	0.75...2.5 mm²
		2 x	0.75...1.5 mm²
	Lugs	L ≤	8 mm
		l >	3.7 mm
Stripping length			10 mm
Tightening torque			1 N.m / 9 lb.in
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 should be tightened
All terminals			M3.5
Screwdriver type			Flat Ø 5.5 / Pozidriv 2
Terminal Marking			 

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Notes

Mechanical and electrical interlock units

VE5-2

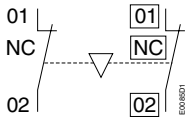
When mounted between two contactors, the mechanical interlock unit prevents one of the contactors from closing as long as the other contactor is closed.

VE interlock units are used for mechanical and electrical interlocking of two AC or DC operated contactors mounted side by side.

For contactors	Mounting	Type	Order code	Pkg qty	Weight (1 pce) kg
Mechanical and electrical interlock units for two horizontal mounted contactors					
GA75, GAE75	Rail mounting	VE5-2	1SBN030210R1000	1	0.146

Mechanical and electrical interlock units

Technical data

Types		VE5-2
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 operational voltage Ue max.		24...690 V
Conventional thermal current Ith - θ ≤ 40 °C		16 A
Ie / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A
	220-240 V 50/60 Hz	4 A
	380-440 V 50/60 Hz	3 A
	500-690 V 50/60 Hz	2 A
Making capacity acc. to IEC 60947-5-1		10 x Ie AC-15
Breaking capacity acc. to IEC 60947-5-1		10 x Ie AC-15
Ie / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	6 A
	48 V DC	2.8 A
	72 V DC	1 A
	125 V DC	0.55 A
	250 V DC	0.3 A
Short-circuit protection device - gG type fuse		10 A
Rated short-time withstand current Icw	for 1.0 s	100 A
θ = 40 °C	for 0.1 s	140 A
Power dissipation per pole at 6 A		0.15 W
Mechanical durability		
Number of operating cycles		5 millions operating cycles
Max. switching frequency		600 cycles/h
Utilization characteristics according to UL/CSA		
Standards		UL 508, CSA C22.2 N°14
Max. operational voltage		600 V
Connecting characteristics		
Connection capacity (min. ... max.)		
Rigid solid	1 x	1...4 mm²
	2 x	1...4 mm²
Flexible with ferrule	1 x	0.75...2.5 mm²
	2 x	0.75...2.5 mm²
Lugs	L <	8 mm
	l >	3.5 mm
Tightening torque		
Recommended		1 Nm
Max.		1.2 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
Terminal marking		

Technical note: when, during switching, the arc time is estimated to more than 40 ms, the closing signal of one of the two contactors must be delayed with respect to the opening signal of the other contactor in order to prevent a short-circuit.
Use a TEF5 electronic timer according to application use with time lapse for GA75, GAE75 contators.

CA5, CE5, CAL, CEL18 and TEF5 fitting details

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

Contactor types	Main poles	Built-in auxiliary contacts	Front-mounted accessories Auxiliary contact blocks 1-pole CA5 1-pole CE5	4-pole CA5	Electronic timer TEF5	Side-mounted accessories Auxiliary contact blocks 2-pole CAL 1-pole CEL18	Interlock unit VE5
UA contactors							
UA16 ... UA26	3 0	1 0	1 to 4 x CA5	**or** 1 x 4-pole CA5	**or** 1 x TEF5	**+** 1 to 2 x CAL5-11	–
			1 to 2 x CE5 max. (1)	**+** 1 x 1-pole CA5 or CE5 (1)	**+** 1 x 1-pole CA5	–	–
UA30	3 0	1 0	1 to 5 x CA5	**or** 1 x 4-pole CA5	**or** 1 x TEF5	**+** 1 to 2 x CAL5-11	–
			1 to 3 x CE5 max. (1)	**+** 1 x 1-pole CA5 or CE5 (1)	**+** 1 x 1-pole CA5	–	–
UA50 ... UA75	3 0	0 0	1 to 6 x CA5	**or** 1 x 4-pole CA5	**or** 1 x TEF5	**+** 1 to 2 x CAL5-11	–
			1 to 5 x CE5 max. (2)	+ 2 x 1-pole CA5 or CE5 (1)	**+** 2 x 1-pole CA5	–	–
	3 0	1 1	1 to 6 x CA5	**or** 1 x 4-pole CA5	**or** 1 x TEF5	**+** 1 x CAL5-11	–
			1 to 5 x CE5 max. (2)	**+** 2 x 1-pole CA5 or CE5 (1)	**+** 2 x 1-pole CA5	–	–
UA95, UA110	3 0	0 0	1 to 6 x CA5	**or** 1 x 4-pole CA5	–	**+** 1 to 2 x CAL18-11	–
			1 to 5 x CE5 max. (2)	**+** 2 x 1-pole CA5 or CE5 (1)	–	**or** 1 to 2 x CEL18	–
	3 0	1 1	1 to 6 x CA5	**or** 1 x 4-pole CA5	–	**+** 1 x CAL18-11	–
			1 to 5 x CE5 max. (2)	**+** 2 x 1-pole CA5 or CE5 (1)	–	**or** 1 x CEL18	–
UA..RA contactors							
UA16-30-10RA	3 0	1 0	–	–	–	**+** 1 x CAL5-11	–
UA26-30-10RA	3 0	1 0					
UA30-30-10RA	3 0	1 0	1 x CA5 1 x CE5	–	–	**+** 1 to 2 x CAL5-11	–
UA50-30-00RA	3 0	0 0	1 to 2 x CA5 1 to 2 x CE5	–	–	**+** 1 to 2 x CAL5-11	–
UA63-30-00RA	3 0	0 0					
UA75-30-00RA	3 0	0 0					
UA95-30-00RA	3 0	0 0	1 to 2 x CA5	–	–	**+** 1 to 2 x CAL18-11	–
UA110-30-00RA	3 0	0 0	1 to 2 x CE5	–	–	**or** 1 to 2 x CEL18	–
GA75, GAE75 contactors							
GA75	1 0	0 0	1 to 6 x CA5	**or** 1 x 4-pole CA5	**or** 1 x TEF5	**+** 1 to 2 x CAL5-11	**or** 1 x VE5-2
			1 to 5 x CE5 max. (2)	**+** 2 x 1-pole CA5 or CE5 (2)	**+** 2 x 1-pole CA5	–	**+** 1 x CAL5-11
	1 0	1 1	1 to 6 x CA5	**or** 1 x 4-pole CA5	**or** 1 x TEF5	**+** 1 x CAL5-11	**or** 1 x VE5-2
			1 to 5 x CE5 max. (2)	**+** 2 x 1-pole CA5 or CE5 (2)	**+** 2 x 1-pole CA5	–	–
GAE75	1 0	0 0	1 to 6 x CA5	**or** 1 x 4-pole CA5	**or** 1 x TEF5	**+** 1 x CAL5-11	**or** 1 x VE5-2
			1 to 5 x CE5 max. (2)	**+** 2 x 1-pole CA5 or CE5 (2)	**+** 2 x 1-pole CA5	–	–
	1 0	1 1	1 to 6 x CA5	**or** 1 x 4-pole CA5	**or** 1 x TEF5	–	–
			1 to 5 x CE5 max. (2)	**+** 2 x 1-pole CA5 or CE5 (2)	**+** 2 x 1-pole CA5	–	–

Notes regarding combination of CE5 with other accessories:
(1) The total number of N.O. or N.C. CE5 and other additional N.C. CA5 auxiliary contacts is limited to 3. CES auxiliary contacts not allowed in mounting position 5.
(2) The total number of N.O. or N.C. CE5 and other additional N.C. CA5 auxiliary contacts is limited to 5.

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Function markers

Mounting piece

BA5-50

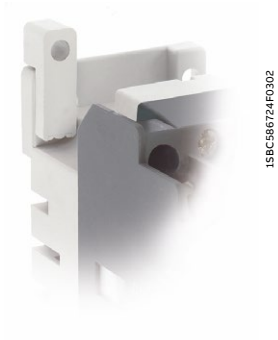
BA5-50 Function markers

Set of 50 function markers designed to be clipped onto the front face of devices. Details can be added to these markers using a ball point pen, indelible felt-tip pen or pentel white.

Self-adhesive labels (not supplied) can also be added to them.

Marker dimensions: 7 x 19 mm (0.276" x 0.748").

For contactors	Type	Order code		Pkg qty	Weight (1 pce) kg
UA, UA..RA and accessories GA75, GAE75	BA5-50	1SBN110000R1000		1	0.017



BP16

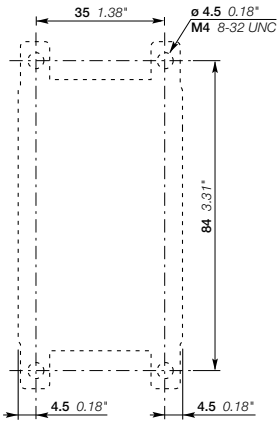
BP16 Mounting piece

Mounting piece for screw fixing (M4, not supplied) of UA, UA..RA series contactors indicated in the table below.

Easy handling of screwdrivers and screw driving.

Add-on mounting piece on contactor's rear face, offering a wide fixing facility.

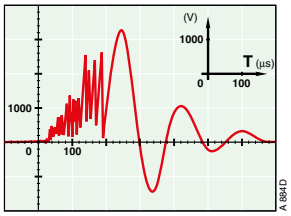
For contactors	Type	Order code		Pkg qty	Weight (1 pce) kg
UA16, UA16..RA	BP16	1SBN111403R1000		100	0.141



Drilling plan for UA16, UA16..RA contactors with BP16

1SBC101531S0201 - Rev. B

Surge suppressors for contactor coils



The operation of inductive circuits causes overvoltages, in particular on opening of the contactor coil.

The electromagnetic energy stored in the coil during contactor closing is restored on opening in the form of surges, the slope and amplitude of which may rise to several kilovolts. A number of drawbacks are observed ranging from interference on the electronic devices to breakdown of insulators and even destruction of certain sensitive components.
The graph opposite reproduces the oscillogram showing voltage discharges at the terminals of a 42 V / 50 Hz coil without peak clipping. The coil was switched by 8 series-connected poles of a contactor relay.

Following a burst of discharges with a very steep slope a damped oscillation emerges with a peak value of 3500 V.

Overvoltage Factor
The overvoltage factor k is defined as the ratio of the maximum overvoltage peak value Ûs to the peak value Ûc of the coil rated control voltage Uc:

$$k = \frac{\hat{U}s\ max.}{\hat{U}c} \qquad \text{in DC: } k = \frac{\hat{U}s\ max.}{Uc} \qquad \text{or in AC: } k = \frac{\hat{U}s\ max.}{Uc\sqrt{2}}$$


1SBC574001F0301

RV5/50

For example the following is obtained for the above graph: $k = \frac{3500}{42\sqrt{2}} \approx 60$

To reduce the harmful effects of these overvoltages, ABB has developed a range of surge suppressors designed to reduce the k factor defined above and to limit or even completely eliminate the high pre-damping voltage frequencies.

Each case is different, but the technical data tolerances and the generous sizing of parts have enabled us to reduce the number of variants.

We have chosen the following solutions: transil diodes, varistors and RC blocks.

Note: A varistor is a resistor whose value decreases to a very large extent when a certain voltage is applied at its terminals.


1SBC573891F0301

RC5-1/50

For contactors	Rated control circuit voltage Uc			Type	Order code	Pkg qty	Weight (1 pce)
	V	AC	DC				kg
UA, UA..RA	24...50	●	●	RV5/50	1SBN050010R1000	2	0.015
GA75, GAE75	50...133	●	●	RV5/133	1SBN050010R1001	2	0.015
	110...250	●	●	RV5/250	1SBN050010R1002	2	0.015
	250...440	●	●	RV5/440	1SBN050010R1003	2	0.015
UA, UA..RA	24...50	●	–	RC5-2/50	1SBN050200R1000	2	0.015
GA75	50...133	●	–	RC5-2/133	1SBN050200R1001	2	0.015
	110...250	●	–	RC5-2/250	1SBN050200R1002	2	0.015
	250...440	●	–	RC5-2/440	1SBN050200R1003	2	0.015
GAE75	12...32	–	●	RT5/32	1SBN050020R1000	2	0.015
	25...65	–	●	RT5/65	1SBN050020R1001	2	0.015
	50...90	–	●	RT5/90	1SBN050020R1002	2	0.015
	77...150	–	●	RT5/150	1SBN050020R1003	2	0.015
	150...264	–	●	RT5/264	1SBN050020R1004	2	0.015

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Surge suppressors for contactor coils

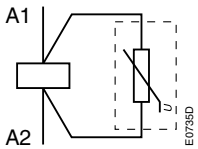
Technical data

Varistor	**RV5/50**	**RV5/133**	**RV5/250**	**RV5/440**
Rated control circuit voltage Uc	24...50 V AC	50...133 V AC	110...250 V AC	250...440 V AC
	24...50 V DC	50...133 V DC	110...250 V DC	250...440 V DC
Residual overvoltage (clipping voltage)	132 V AC	270 V AC	480 V AC	825 V AC
	132 V DC	270 V DC	480 V DC	825 V DC
Opening time growth factor	1.1...1.5			
Operating temperature	-20...+70 °C			
Connection to the coil terminals (parallel mounting)	Clip-on for both fixing and connection.			
Fixing	Clipped onto the top part of the contactor base without change in contactor overall dimensions.			
Advantages	High energy absorption: good damping - Unpolarized system.			
Drawback	Clipping as from Uvdr*, thus voltage front up to this point.			
	*Uvdr = Varistor operating voltage (voltage dependent resistor), tolerance ± 10 %.			

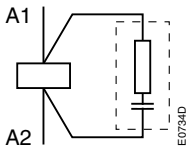
RC type	**RC5-2/50**	**RC5-2/133**	**RC5-2/250**	**RC5-2/440**
Rated control circuit voltage Uc	24...50 V AC	50...133 V AC	110...250 V AC	250...440 V AC
Residual overvoltage (clipping voltage)	2 to 3 x Uc max.			
Opening time growth factor	1.2...1.3			
Operating temperature	-20...+70 °C			
Connection to the coil terminals (parallel mounting)	Clip-on for both fixing and connection.			
Fixing	Clipped onto the top part of the contactor base without change in contactor overall dimensions.			
Advantages	Very fast clipping - Attenuation of steep fronts and thus of high frequencies. No operating delays.			

Transil diode	**RT5/32**	**RT5/65**	**RT5/90**	**RT5/150**	**RT5/264**
Rated control circuit voltage Uc	12...32 V DC	25...65 V DC	50...90 V DC	77...150 V DC	150...264 V DC
Residual overvoltage (clipping voltage)	50 V DC	100 V DC	150 V DC	210 V DC	390 V DC
Opening time growth factor	1.5...3				
Operating temperature	-20...+70 °C				
Connection to the coil terminals (parallel mounting)	Clip-on for both fixing and connection.				
Fixing	Clipped onto the top part of the contactor base without change in contactor overall dimensions.				
Advantages	Good energy absorption - Unpolarized system - Simple, reliable system.				
Drawback	A certain delay on drop out which does not however reduce contactor breaking capacity.				

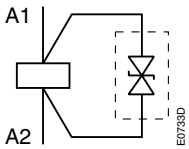
Wiring diagrams



Varistor

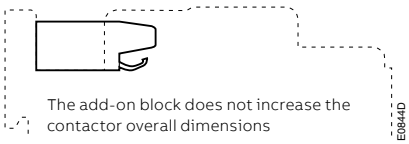


RC type



Transil diode

Dimensions



RV5, RC5, RT5

1SBC101335S0201 - Rev. A

Interface relays

RA5-1

RA5-1 interface relay is designed to receive 24 V DC signals delivered by PLC's or other sources with a low output power and to restore them with sufficient power to operate the coils of the relevant contactors.

RA5-1 interface relay is made up of a miniature electromechanical relay equipped with a N.O. contact and with a low consumption 24 V DC coil.

The interface relay coil is controlled by the PLC while the N.O. contact ensures switching of the power contactor.

Coil switching gives rise to overvoltages which have adverse effects on the electronic devices, insulators and, more generally, on component lifetime. The RA5-1 is equipped with surge suppressors:

- on the 24 V DC relay coil via a diode,
- on the power contactor coil via a varistor.

Furthermore, the RA5-1 is protected against relay pole reversal by a diode inserted between the E1 and E2 input terminals.

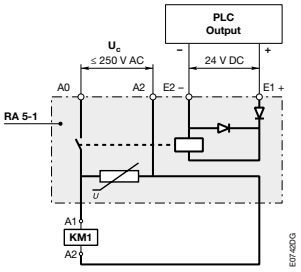
For contactors	Coil voltages V 50/60 Hz	Rated control circuit voltage Uc V DC	Type	Order code	Pkg qty	Weight (1 pce) kg
UA, UA..RA	24...250	24	RA5-1	1SBN060300R1000	1	0.050
GA75			RA5-1	1SBN060300T1000	10	0.050

Interface relays

Technical data

Type		**RA5-1**
Utilization characteristics according to IEC		
Standards		IEC 60255-5
Rated insulation voltage Ui acc. to IEC 60947-4-1		250 V AC
Ambient air temperature		
In free air operation	at Uc = 24 V DC (between E1 and E2)	-25...+70 °C
	from 0.85 to 1.1 x Uc	-25...+55 °C
Storage		-40...+70 °C
Climatic withstand		Complies with that of associated contactors
Maximum operating altitude		3000 m
Mounting positions		No limitation
Fixing		Using the contactor A1 and A2 teminal connecting parts
Connecting characteristics		
Connection capacity (min. ... max.)		
Rigid solid	1 x	1...4 mm²
	2 x	1...4 mm²
Flexible with ferrule	1 x	0.75...2.5 mm²
	2 x	0.75...2.5 mm²
Lugs	L <	8 mm
	l >	3.5 mm
Tightening torque		
Recommended		1 Nm
Max.		1.2 Nm
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529		Protection against direct contact in acc. with EN 50274 RA5-1 wired and mounted on the associated contactor
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
Working data		
Surge suppression		
For contactor coil		Varistor
For interface relay coil		Diode
Protection against polarity reversal between terminals E1 and E2		Diode
Interface relay operating time		Closing and drop-out ≤ 10 ms
Total operating time, interface relay + contactor		
Between energization and:	N.O. contact closing	20...37 ms
	N.C. contact opening	17...32 ms
Between de-energization and:	N.O. contact opening	17...25 ms
	N.C. contact closing	20...28 ms
Electrical input data		
Control voltage (E1 and E2 terminals) Uc		
Rated value		24 V DC
Max. range at ambient temperature 20 °C		19...30 V DC
Max. consumption for Uc = 24 V DC, θ = 20 °C		0.3 W
"0" status (relay open)	for Uc	≤ 2.4 V DC
	for Ic	< 1 mA
"1" status (relay closed)	for Uc	≥ 19 V DC
Max. short supply interruption immunity time		2 ms
Electrical output data		
Switching voltage (A0 and A2 terminals)		≤ 250 V AC
Electrical durability		
Number of operating cycles		2 millions (600 cycles/h) on UA16(RA) ... UA75(RA), GA75, GAE75 contactors
		0.5 million (600 cycles/h) on UA95(RA) and UA110(RA) contactors

Connection

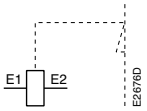


The "E1+" and "E2-" input terminals must be connected, according to their polarity, to the PLC output.
The RA5-1 is equipped with two terminal pads for connection to the A1 and the A2 terminals of the contactor coil.
This coil is supplied between the A0 and the A2 terminals of the RA 5-1.
Mounting: terminals pads clamped inside the contactor coil terminals.

1SBC101337S0201 Rev. A

Mechanical latching units

WB75-A



Terminal marking

For converting standard contactors into latched contactors.

The WB75-A block contains a mechanical latching device with electromagnetic impulse unlatching (AC or DC) or manual unlatching.

Captive screw type connecting terminals, built-in cable clamps, M3.5 (+,-) pozidriv 2 screw with screwdriver guidance; delivered untightened and protected against accidental direct contact.

Operation
After closing, the contactor continues to be held in the closed position by the latching mechanism should the supply voltage fail at the contactor coil terminals.

Contactor opening can be controlled:

- electrically by an impulse (AC or DC) on the WB75-A block coil.
  (the coil is not designed to be permanently energized)
- manually by pressing the pushbutton on the front face of the WB75-A block.

Mounting
The WB75-A block is clipped onto the front face of the 1-stack contactor where it takes up two slots. The two other slots may accept CA5... single pole auxiliary contacts (1 block on each side of the mechanical latch).

For contactors	Rated control circuit voltage Uc		Type	Order code	Pkg qty	Weight (1 pce)
	V 50 Hz or DC	V 60 Hz				kg
UA16 ... UA75, GA75, GAE75	24	24...28	WB75-A	FPTN372726R1001	1	0.120
	42	42...48	WB75-A	FPTN372726R1002	1	0.120
	48	48...55	WB75-A	FPTN372726R1003	1	0.120
	110	110...127	WB75-A	FPTN372726R1004	1	0.120
	220...230	220...255	WB75-A	FPTN372726R1006	1	0.120
	230...240	230...277	WB75-A	FPTN372726R1005	1	0.120
	380...415	380...440	WB75-A	FPTN372726R1007	1	0.120
	415...440	440...480	WB75-A	FPTN372726R1008	1	0.120

1SBC101526S0201 - Rev. B

Mechanical latching units

Technical data

Type			WB75-A
Utilization characteristics according to IEC			
Rated insulation voltage Ui acc. to IEC 60947-1			690 V
Max. electrical impulse time			
On AC coil (with load factor 5 %)			20 s
On DC coil (with load factor 3 %)			8 s
Min. electrical impulse time			
For latching (energizing of the contactor coil)		AC	50 ms (UA, GA contactors)
		DC	50 ms (GAE contactors)
For pull-out (energizing of the WB block coil)		AC	30 ms (UA, GA contactors)
		DC	50 ms (GAE contactors)
Coil operating limits		AC or DC supply	0.85...1.1 x Uc
AC control voltage 50/60 Hz			
Rated control circuit voltage Uc			24...480 V AC
Coil consumption		Average pull-in value	90 VA
		Average holding value	60 VA
DC control voltage			
Rated control circuit voltage Uc			24...440 V DC
Coil consumption		Average pull-in value	110 W
		Average holding value	110 W
On contactor closing (latching) Between coil energization and:		N.O. contact closing	No difference with the operation of a contactor without mechanical latching unit
		N.C. contact opening	No difference with the operation of a contactor without mechanical latching unit
On contactor opening (unlatching) Between WB coil energization and:		N.O. contact opening	5...25 ms
		N.C. contact closing	7...28 ms
Mechanical durability			
		Number of operating cycles	1 million operating cycles
Max. switching frequency			3600 cycles/h with on-load factor of 8 %

Connecting characteristics

Connection capacity (min. ... max.)			
	Rigid solid	1 x	1...4 mm²
		2 x	1...4 mm²
	Flexible with ferrule	1 x	0.75...2.5 mm²
		2 x	0.75...2.5 mm²
	Lugs	L <	8 mm
		l >	3.5 mm
Tightening torque		Recommended	1 Nm
		Max.	1.2 Nm
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

15BC101333502 01

Additional terminal blocks and other accessories

LD75

Terminal blocks

The LD terminal blocks are designed to increase the connecting capacity of the contactor on which they are fitted and for preparation of the wiring before final connection on the contactor.

The LD blocks are 3-pole terminal blocks with tunnel terminals.

The LD75 terminal blocks are fixed in the 3 independent slots located above the built-in connectors.

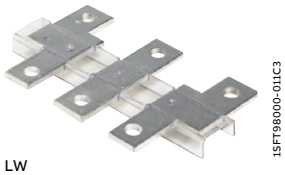
For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
UA50(RA) ... UA75(RA)	LD75	1SBN073508R1000	1	0.115

Technical data

Types				LD75
Rated insulation voltage Ui				
acc. to IEC 60947-4-1				690 V
acc. to UL / CSA				600 V
Main terminals				
				Screw terminals with single connector 10x11 mm
Connection capacity (min. ... max.)				
	Rigid	Solid (≤ 4 mm²)	1 x	6...50 mm²
		Stranded (≥ 6 mm²)	2 x	6...25 mm²
	Flexible with ferrule		1 x	6...35 mm²
			2 x	6...16 mm²
	Bars			10 mm
Tightening torque				4 Nm
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529				IP10
Screw terminals				Delivered in closed position M6
			Screwdriver type	pozidriv 2

Note: The utilization of LD additional terminal blocks leaves the possibility to connect the following cables directly into the contactor main terminals.

	LD75
Possible cross section of rigid cable in the contactor terminals	50 mm²



LW

Terminal enlargements

Enlargement pieces designed to increase the width of the contactor terminal pads in order to allow larger connections to be mounted.

Sets containing 3 tin plated copper bars fixed by an isolating spacer.

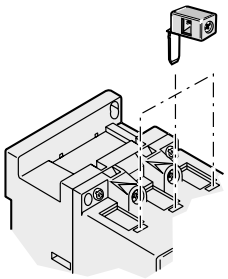
For contactors	Dimensions		Type	Order code	Pkg qty	Weight (1 pce) kg
	hole Ø mm	bar mm				
UA95, UA110	6.5	15 x 3	LW110	1SFN074307R1000	1	0.100

1SBC101534502 01 - Rev. B

Terminals for control lead connections

LK75-L

LK75-F



LK positioning

Terminals designed to connect the control conductors to the main poles of the UA and GA contactors and derivative versions.

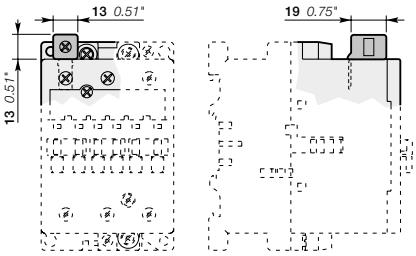
Accessories clipped into the slots placed above each power terminal connector.

The LK75 are fitted with a pin designed to hold them in place until the connector has been fully clamped with its power cable.

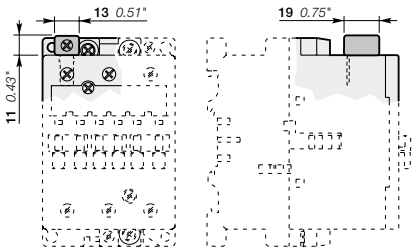
- Degree of protection IP20
- Connecting terminal delivered in open position: cable clamp and M3.5 (+,-) pozidriv 2 screw.
- Cable cross-sectional area:
  - 1 or 2 rigid conductors.....1...4 mm²
  - 1 or 2 flexible conductors with cable end .....0.75...2.5 mm²
- Tightening torque for the LK screw:
  - recommended .....1.00 Nm
  - maxi. .....1.20 Nm

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
Right and left on: UA50(RA) ... UA75(RA) GA75, GAE75	LK75-L	1SBN073552R1003	2	0.006
Opposite on: UA50(RA) ... UA75(RA) GA75, GAE75	LK75-F	1SBN073552R1002	2	0.006

Note: The LK terminals provided for the UA contactors can be used with the AM types.



LK75-L

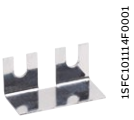


LK75-F

Main dimensions mm, inches

1SBC101535S0201 - Rev. B

Connection bar for contactor



LP185

LP2050

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
Connection bar for contactor				
GAF185	LP185	1SFN074712R1000	2	0.300
GAF300	LP300	1SFN075112R1000	2	0.400
GAF460	LP460	1SFN075712R1000	4	0.550
GAF750	LP750	1SFN076112R1000	4	0.950
GAF1250	LP1250	1SFN076412R1000	4	1.900
GAF1650, GAF2050	LP2050	1SFN076512R1000	4	2.900

Maximum continuous current with two parrallel connection strips per pole

Connexion kit (includes 4 pcs of connection strips)	Ie max
2 x LP185	220 A
2 x LP300	370 A
1 x LP460	600 A
1 x LP750	800 A
1 x LP1250	900 A
1 x LP2050	1650 A

1SFC101185C0201 - Rev. A

Contactor coils and main contact sets

1SBC573802F0302

ZA16

Contactor coils

For contactors	Rated control circuit voltage Uc V 50 Hz	V 60 Hz	Type	Order code	Pkg qty	Weight (1 pce) kg
UA16,	24	24	ZA16	1SBN151410R8106	1	0.093
	110	110...120	ZA16	1SBN151410R8406	1	0.093
	220...230	230...240	ZA16	1SBN151410R8006	1	0.093
	230...240	240...260	ZA16	1SBN151410R8806	1	0.093
	380...400	400...415	ZA16	1SBN151410R8506	1	0.093
	400...415	415...440	ZA16	1SBN151410R8606	1	0.093
UA26, UA30,	24	24	ZA40	1SBN152410R8106	1	0.148
	110	110...120	ZA40	1SBN152410R8406	1	0.148
	220...230	230...240	ZA40	1SBN152410R8006	1	0.148
	230...240	240...260	ZA40	1SBN152410R8806	1	0.148
	380...400	400...415	ZA40	1SBN152410R8506	1	0.148
	400...415	415...440	ZA40	1SBN152410R8606	1	0.148
UA50 ... UA75	24	24	ZA75	1SBN153510R8106	1	0.166
GA75	110	110...120	ZA75	1SBN153510R8406	1	0.166
	220...230	230...240	ZA75	1SBN153510R8006	1	0.166
	230...240	240...260	ZA75	1SBN153510R8806	1	0.166
	380...400	400...415	ZA75	1SBN153510R8506	1	0.166
	400...415	415...440	ZA75	1SBN153510R8606	1	0.166
UA95, UA110	24	24	ZA110	1SFN154310R8106	1	0.170
	110	110...120	ZA110	1SFN154310R8406	1	0.170
	220...230	230...240	ZA110	1SFN154310R8006	1	0.170
	230...240	240...260	ZA110	1SFN154310R8806	1	0.170
	380...400	400...415	ZA110	1SFN154310R8506	1	0.170
	400...415	415...440	ZA110	1SFN154310R8606	1	0.170
GAF460	-	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
GAF750 ... AF1250	-	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
GAF1650 ... GAF2050	100...250	100...250	ZAF1650 (1)	1SFN156570R7026	1 set	0.900
			ZP1650 (2)	1SFN166521R1070	1	0.300

ZAF460, ZAF750 : printed circuit board included.
(1) One set of two coil.
(2) Printed circuit board.

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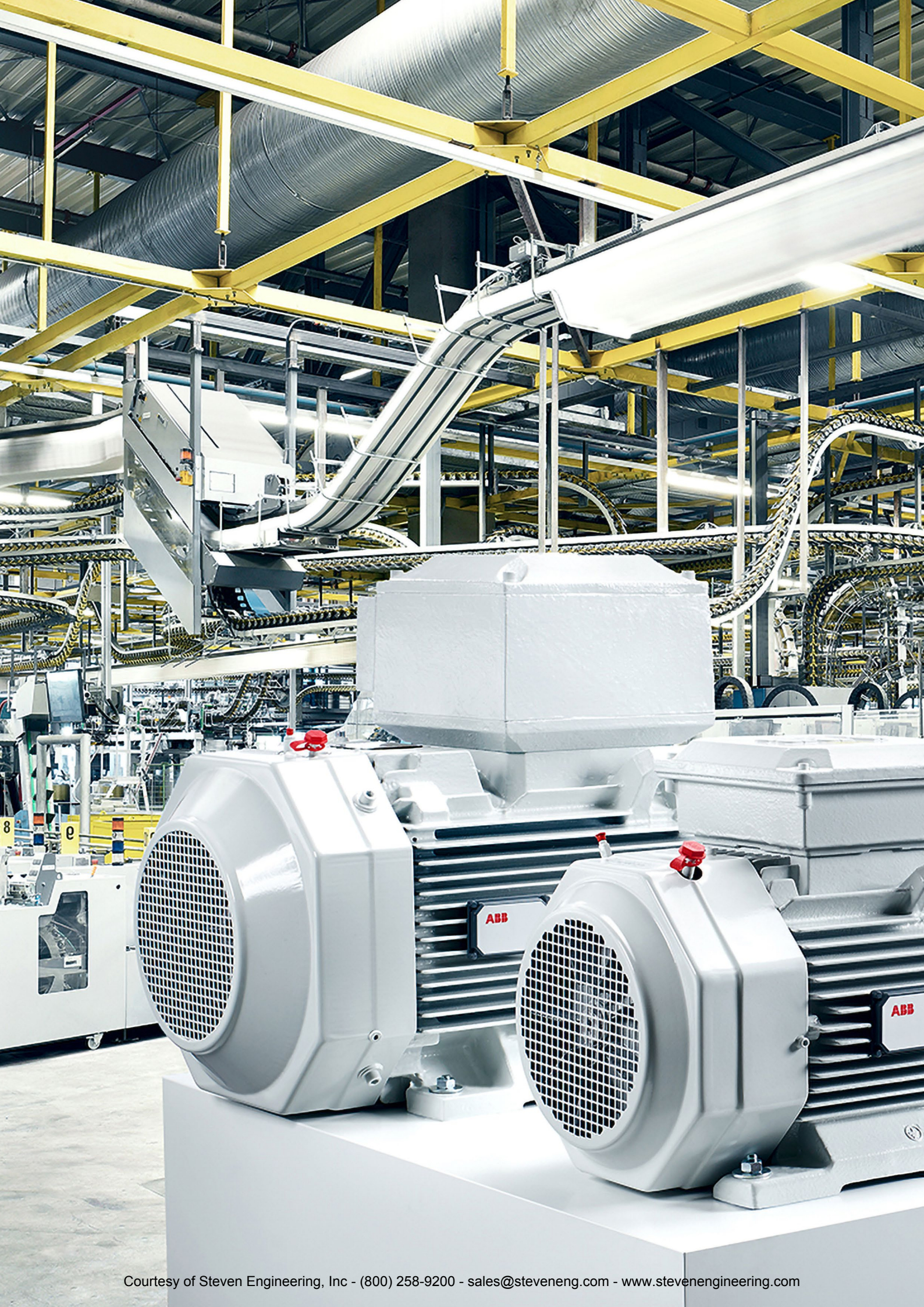
ZAF1650

Main contact sets

The contact sets for 3-pole contactors consists of six fixed contacts, three moving contacts, springs and the required screws.

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
UA50	ZLU50	1SBN163502R1000	1	0.115
UA63	ZLU63	1SBN163702R1000	1	0.145
UA75	ZLU75	1SBN164102R1000	1	0.145
UA95	ZLU95	1SFN164302R1000	1	0.190
UA110	ZLU110	1SFN164502R1000	1	0.190

1SFC101143C0201 - Rev B

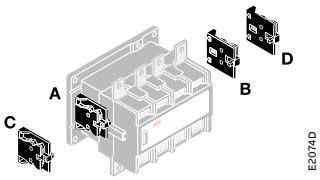


Accessories for EK550, EK1000 4-pole contactors

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**

Auxiliary contact blocks



Mounting positions of the CAL16-11

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

Types of auxiliary contact blocks for standard industrial environments:

- CAL instantaneous with N.O. + N.C. contacts
- CCL N.O. leading contact + N.C. lagging contact.

The auxiliary contact blocks are equipped with screw type connecting terminals delivered open, protected against accidental direct contact, and bear the corresponding function marking.
Mounting: Screwed onto the right and / or lefthand side of the EK550, EK1000 contactors.

For contactors	Number of blocks	Auxiliary contacts				Type	Order code	Pkg qty	Weight (1 pce) kg
2-pole auxiliary contacts N.O. + N.C.									
EK	1	1	1	–	–	CAL16-11A	SK829002-A	1	0.050
	1	1	1	–	–	CAL16-11B	SK829002-B	1	0.050
	1	1	1	–	–	CAL16-11C	SK829002-C	1	0.050
	1	1	1	–	–	CAL16-11D	SK829002-D	1	0.050
	1	1	–	–	1	CCL16-11E (1)	SK829002-E	1	0.050

(1) Mounting of CCL16-11E blocks does not allow an additional second block to be added on top of it.
All DC operated EK contactors are equipped with one CCL16-11E on the right side.

1SFC101221C0201

Auxiliary contact blocks

Technical data

Types			**2-pole CAL 16-11, 2-pole CCL 16-11**
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 operational voltage Ue max.			24...690 V
Conventional thermal current Ith - θ ≤ 40 °C			10 A
Rated frequency (without derating)			50/60 Hz
Ie / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V		6 A
	220-240 V		6 A
	380-440 V		4 A
	500-690 V		1 A
Making capacity acc. to IEC 60947-5-1			10 x Ie AC-15
Breaking capacity acc. to IEC 60947-5-1			10 x Ie AC-15
Ie / Rated operational current DC-13 acc. to IEC 60947-5-1		24 V DC	6 A
		48 V DC	6 A
		72 V DC	4 A
		125 V DC	1.8 A
		250 V DC	0.6 A
Short-circuit protection device gG type fuse			10 A
Rated short-time withstand current Icw θ = 40 °C		for 1.0 s	50 A
		for 0.1 s	100 A
Minimum switching capacity with failure rate acc. to IEC 60947-5-4			0.25 VA / 12 V or 0.25 VA / 5 mA
Power dissipation per pole at 6 A			0.2 W
Mechanical durability	Number of operating cycles		10 millions operating cycles
	Max. switching frequency		3600 cycles/h
Electrical durability	Number of operating cycles		see "Electrical durability" curves
	Max. switching frequency		1200 cycles/h

Contact utilization characteristics according to UL / CSA

Max. operational voltage	600 V
Pilot duty	A600

Connecting characteristics

Connection capacity (min. ... max.)			
	Rigid solid	1 x	0.5...2.5 mm²
		2 x	0.5...2.5 mm²
	Flexible with ferrule	1 x	0.5...2.5 mm²
		2 x	0.5...2.5 mm²
	Flexible with insulated ferrule	1 x	0.5...1.5 mm²
		2 x	0.5...1.5 mm²
	Lugs	L ≤	8 mm
		l >	3.7 mm
Tightening torque	Recommended		1.00 Nm
	Max.		1.20 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			Pozidriv 2

1SBC101656S0201

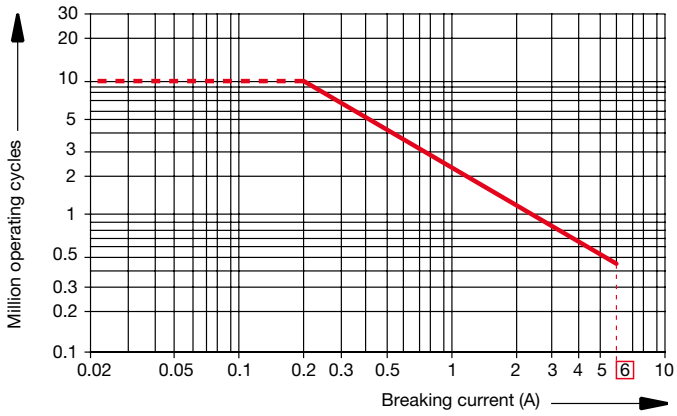
Auxiliary contacts

Electrical durability

Electrical Durability for AC-15 Utilization Category

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

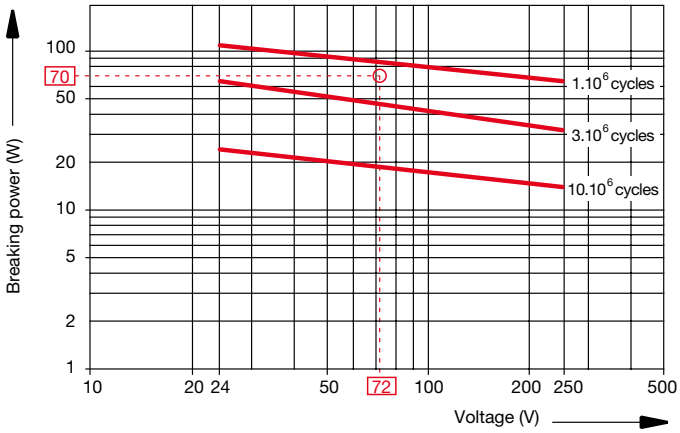
This curve represents the electrical durability of the auxiliary contacts in relation to the breaking current.
The curve has been drawn for resistive and inductive loads up to 690 V, 40...60 Hz.



2-pole CAL16... and CCL16... auxiliary contact blocks

Electrical Durability for DC-13 Utilization Category

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



2-pole CAL16... and CCL16... auxiliary contact blocks

Example:
Control of d.c. electro-magnet: Ue voltage = 72 V d.c. and breaking power = 70 W.
On the opposite curve at intersection "O" 72 V / 70 W the correspon-ding value for the electrical durability is approx-imately 2.106 cycles.

1SBC101657S0201

Add-on auxiliary contacts

Terminal marking and positioning

2-pole auxiliary contacts

CAL16-11A

CAL16-11B

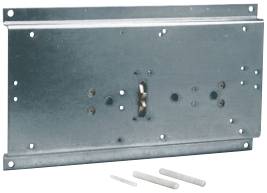
CAL16-11C

CAL16-11 D

CAL16-11E

1SBC101687S0201

Mechanical interlock units, terminal shrouds and connection sets



A090C4

Mechanical interlock units

The mechanical interlock unit prevents one of the contactors from closing as long as the other contactor is closed.

VH800 interlock unit is used for the mechanical interlocking of two horizontal mounted EK550, EK1000 contactors. Mounting plate is included.

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
Mechanical interlock unit for two horizontal mounted contactors				
EK550, EK1000	VH800	SK829070-F	1	6.000

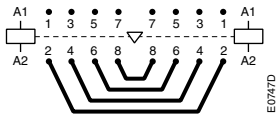
Terminal shrouds

The use of terminal shrouds on the main terminals of EK contactors is required in electrical panels or cubicles to be built in compliance with the rules for protection against direct contact with live parts in acc. with EN 50274.
On EK550, EK1000 contactors:

- The auxiliary contact blocks and coils are designed to provide an IP20 degree of protection
- The main terminals, equipped with lugs or connectors, can be protected against accidental direct contact after wiring (EN 50274) by the addition of terminal shrouds (see table below).

Each terminal shroud protects all the terminals on one side of the contactor. Two terminal shrouds should be provided for each separate contactor.

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
EK550	LT550-EK	SK178001-LB	1	0.190
EK1000	LT1000-EK	SK178001-MB	1	0.200



BSS550, BSS1000

Connection sets

Connection between the main poles of two 4-pole contactors mounted side by side so that they operate as source reversing contactors.

These sets are made up of four downstream connections.
BSS550, BSS1000 – Bare, solid copper bars.

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
Mechanical and electrical interlock units for two horizontal mounted contactors				
EK550	BSS550	SK829090-E	1	3.300
EK1000	BSS1000	SK829090-H	1	5.500

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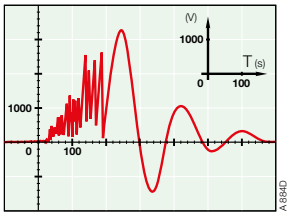
Surge suppressors for contactor coils



RC-EH

The operation of inductive circuits causes overvoltages, in particular on opening of the contactor coil.

The electromagnetic energy stored in the coil during contactor closing is restored on opening in the form of surges, the slope and amplitude of which may rise to several kilovolts. A number of drawbacks are observed ranging from interference on the electronic devices to breakdown of insulators and even destruction of certain sensitive components.
The graph opposite reproduces the oscillogram showing voltage discharges at the terminals of a 42 V / 50 Hz coil without peak clipping. The coil was switched by 8 series-connected poles of a contactor relay.

Following a burst of discharges with a very steep slope a damped oscillation emerges with a peak value of 3500 V.

Overvoltage Factor
The overvoltage factor k is defined as the ratio of the maximum overvoltage peak value Ûs to the peak value Ûc of the coil rated control voltage Uc:

$$k = \frac{\hat{U}s\ max.}{\hat{U}c} \quad \text{in DC:} \quad k = \frac{\hat{U}s\ max.}{Uc} \quad \text{or in AC:} \quad k = \frac{\hat{U}s\ max.}{Uc\sqrt{2}}$$

For example the following is obtained for the above graph: $k = \frac{3500}{42\sqrt{2}} \approx 60$

To reduce the harmful effects of these overvoltages, ABB has developed a range of surge suppressors designed to reduce the k factor defined above and to limit or even completely eliminate the high pre-damping voltage frequencies.

Each case is different, but the technical data tolerances and the generous sizing of parts have enabled us to reduce the number of variants.

We have chosen the following solutions: transil diodes, varistors and RC blocks.

Note: A varistor is a resistor whose value decreases to a very large extent when a certain voltage is applied at its terminals.

For contactors	Rated control circuit voltage Uc			Type	Order code	Pkg qty	Weight (1 pce)
	V	AC	DC				kg
EK550, EK1000	48...110	●	–	RC-EH800/110	SK829007-C	1	0.015
EK550, EK1000	24...125	–	●	RC-EH800/110	SK829007-C	1	0.015
EK550, EK1000	220...600	●	–	RC-EH800/600	SK829007-D	1	0.015

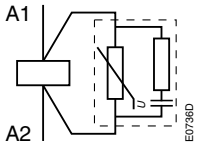
Surge suppressors for contactor coils

Technical data

Varistor + RC	RC-EH800/110	RC-EH800/600
Rated control circuit voltage Uc	48...110 V AC	220...600 V AC
	24...125 V DC	–
Residual overvoltage (clipping voltage)	205 V AC	1100 V AC
	205 V DC	–
Opening time growth factor	1.1 ... 1.15	
Operating temperature	-20 ... +70 °C	
Connection to the coil terminals (parallel mounting)	Flexible, accessible leads, equipped with forked lugs	
Fixing	Glued to the top part of the contactor base	
Advantages	- High energy absorption: good damping - Unpolarized system - The RC system damps the voltage front under the Uvdr (1) threshold.	

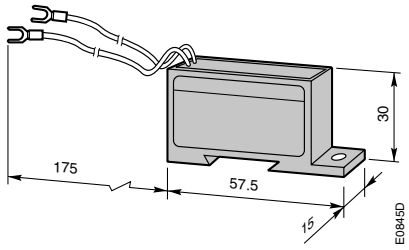
(1) Uvdr = Varistor operating (voltage dependant resistor), tolerance ±10 %.

Wiring diagrams



Varistor + RC

Main dimensions mm



RC-EH

Main contact sets

Arc chutes

1SBC586473F0304

KZK

Main contact sets

The contact sets for 4-pole contactors consist of eight fixed contacts, four moving contacts, springs and the necessary screws. In addition, the sets include four moving arcing contacts for EK550, EK1000 contactors.

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
EK550	KZK550	SK827204-B	1	2.400
EK1000	KZK1000	SK827204-F	1	3.000

Arc chutes

The arc chutes sets for EK 4-pole contactors contain 8 pieces.

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
EK550	KWK550	5223351-Z	1	3.170
EK1000	KWK1000	5223351-AN	1	3.170

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Contactor coils

1SBC273813F0302

KH800

For AC operated coil

Coils for EK550, EK1000 - AC operated.

For contactors	Rated control circuit voltage Uc (1)		Type	Order code	Pkg qty	Weight (1 pce)
	V 50 Hz	V 60 Hz				kg
EK550, EK1000	48	-	KH800	SK828100-AD	1	0.950
	110	110...120	KH800	SK828100-EF	1	0.950
	110...115	115...127	KH800	SK828100-EG	1	0.950
	220	220...240	KH800	SK828100-EL	1	0.950
	220...230	230...255	KH800	SK828100-EM	1	0.950
	380...400	400...440	KH800	SK828100-ER	1	0.950
	400...415	-	KH800	SK828100-AR	1	0.950

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

For DC operated coil

Coils for EK550, EK1000 - DC operated with sets including a DC coil, an economy resistor and a insertion contact.

For contactors	Rated control circuit voltage Uc (1)	Type	Order code	Pkg qty	Weight (1 pce)
	V DC				kg
EK550, EK1000	24	KP800	SK828150-DB	1 set	1.060
	110	KP800	SK828150-DE	1 set	1.060
	125	KP800	SK828150-DU	1 set	1.060
	220	KP800	SK828150-DF	1 set	1.060

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

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Notes

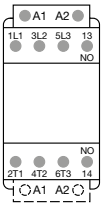
Contactors and contactor relays Terminal marking and positioning, Dimensions

AF09 ... AF96 3-pole contactors

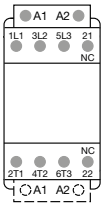
Terminal marking and positioning

AF09 ... AF96 contactors - AC / DC operated

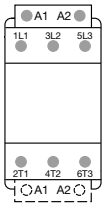
Standard devices without addition of auxiliary contacts



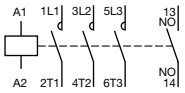
AF09 ... AF16..-30-10 (1)



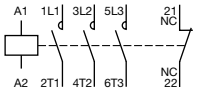
AF09 ... AF16..-30-01 (1)



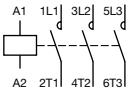
AF26 ... AF96..-30-00 (1)



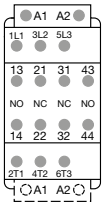
AF09 ... AF16..-30-10 (1)



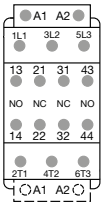
AF09 ... AF16..-30-01 (1)



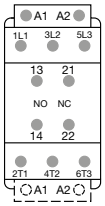
AF26 ... AF96..-30-00 (1)



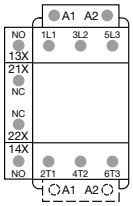
AF09 ... AF16..-30-22



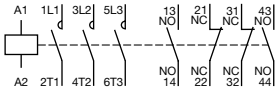
AF26 ... AF96..-30-22



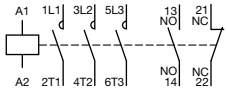
AF26 ... AF38..-30-11



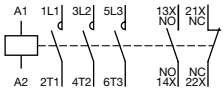
AF40 ... AF96..-30-11



AF09 ... AF96..-30-22

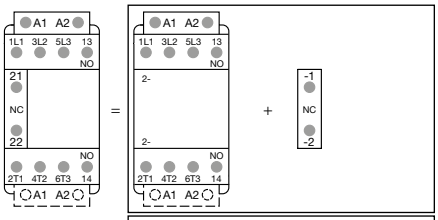


AF26 ... AF38..-30-11

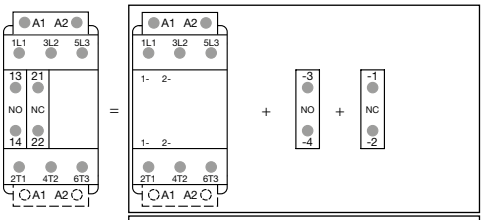


AF40 ... AF96..-30-11

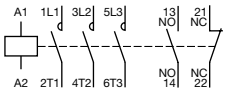
Other possible contact combinations with auxiliary contacts added by the user



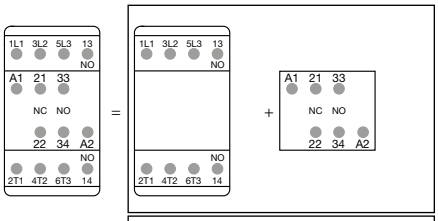
Combination 11 = AF09 ... AF16..-30-10 + CA4-01 (1)



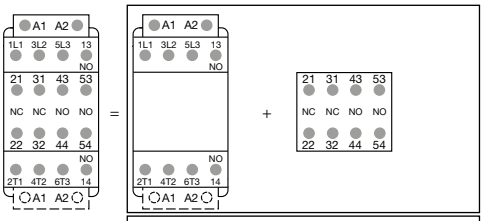
Combination 11 = AF26 ... AF96..-30-00 + CA4-10 + CA4-01 (1)



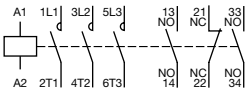
Combination 11



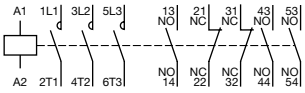
Combination 21 = AF09 ... AF16..-30-10 + CAT4-11M



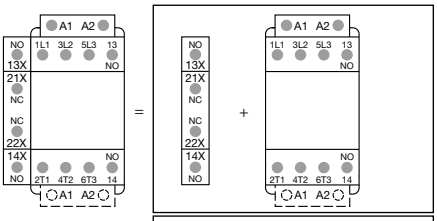
Combination 32 = AF09 ... AF16..-30-10 + CA4-22M (1)



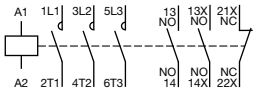
Combination 21



Combination 32



Combination 21 = CAL4-11 + AF09 ... AF16..-30-10 (1)



Combination 21

Note: only AF..Z contactor with DC control voltages 12...20 V DC (coil 20) and 24 V DC (coil 30) need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.
(1) For AF09..K ... AF38..K contactors with Push-in Spring terminals, terminal marking and positioning are the same.

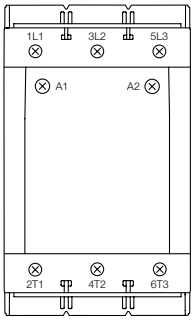
1SBC101463S0201 - Rev. B

AF116 ... AF370 3-pole contactors

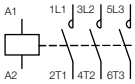
Terminal marking and positioning

AF116 ... AF370 contactors - AC / DC operated

Standard devices without addition of auxiliary contacts

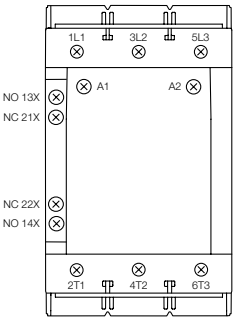


AF116 ... AF370-30-00

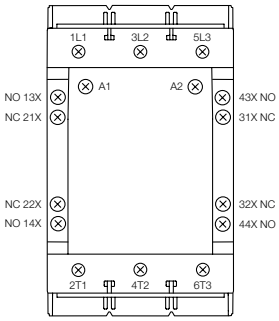


AF116 ... AF370-30-00

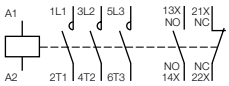
Standard devices with factory mounted auxiliary contacts



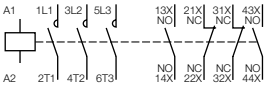
AF116 ... AF370-30-11



AF116 ... AF370-30-22



AF116 ... AF370-30-11



AF116 ... AF370-30-22

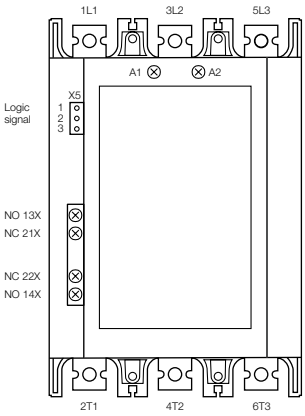
1SFC101130C0201

AF400 ... AF2850 3-pole contactors

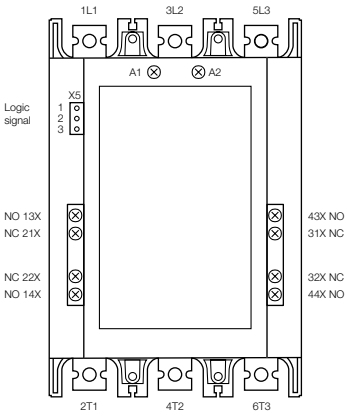
Terminal marking and positioning

AF400 ... AF1250 contactors - AC / DC operated

Standard devices with factory mounted auxiliary contacts

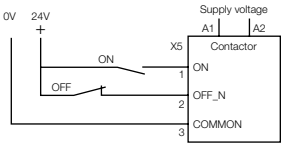


AF400 ... AF1250-30-11

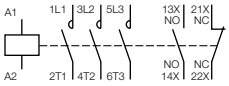


AF400 ... AF1250-30-22

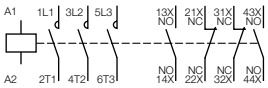
Control with logic signal



AF400 ... AF1250-30-11, AF400 ... AF1250-30-22



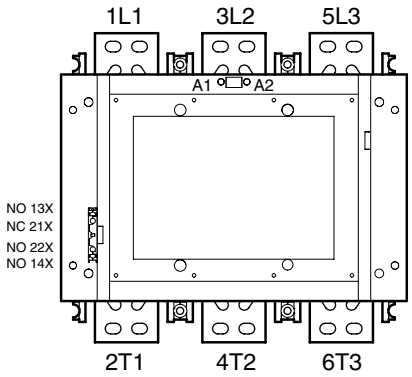
AF400 ... AF1250-30-11



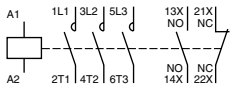
AF400 ... AF1250-30-22

AF1350 ... AF2850 contactors - AC / DC operated

Standard devices with factory mounted auxiliary contacts



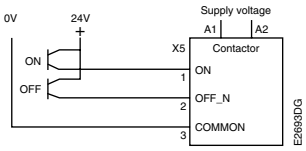
AF1350 ... AF2850-30-11



AF1350 ... AF2850-30-11

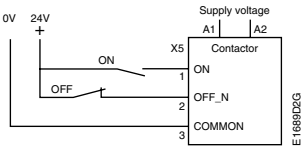
AF1350 ... AF2850-30-22

Wiring diagrams
when used with transistor output



AF1350, AF1650

when used with transistor output



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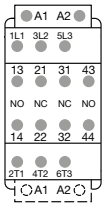
AFS09 ... AFS750 3-pole contactors for safety applications

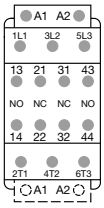
Terminal marking and positioning

AFS09 ... AFS96 contactors - AC / DC operated

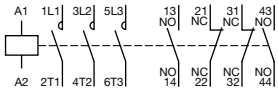
Standard devices



AFS09 ... AFS16..-30-22



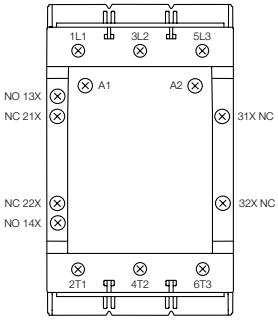
AFS26 ... AFS96..-30-22



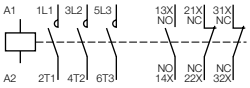
AFS09 ... AFS96..-30-22

AFS116 ... AFS370 contactors - AC / DC operated

Standard devices with factory mounted auxiliary contacts



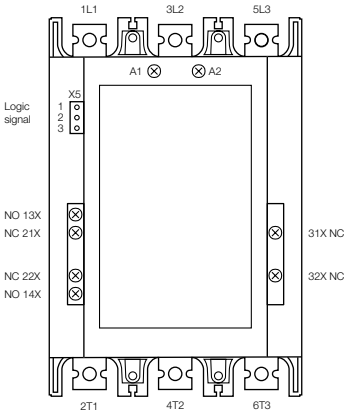
AFS116 ... AFS370-30-12



AFS116 ... AFS370-30-12

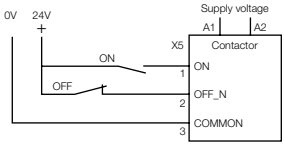
AFS400 ... AFS750 contactors - AC / DC operated

Standard devices with factory mounted auxiliary contacts

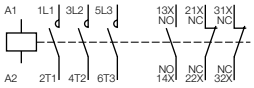


AFS400 ... AFS750-30-12

Control with logic signal



AFS400 ... AFS750-30-12



AFS400 ... AFS750-30-12

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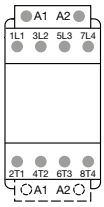
AF09 ... AF80 4-pole contactors

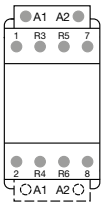
Terminal marking and positioning

AF09 ... AF38 contactors - AC / DC operated

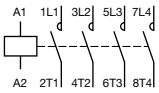
Standard devices without addition of auxiliary contacts



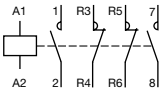
AF09 ... AF80..-40-00



AF09 ... AF40..-22-00
AF80-22-00

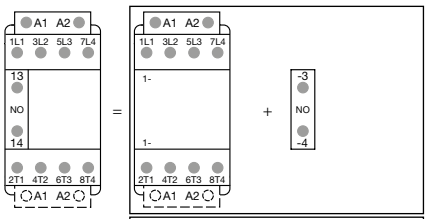


AF09 ... AF80..-40-00

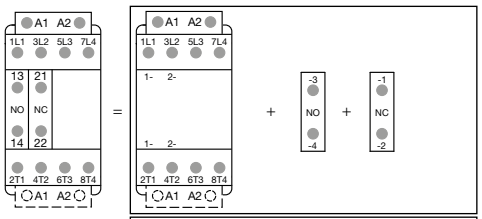


AF09 ... AF40..-22-00
AF80-22-00

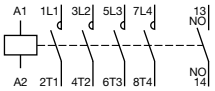
Other possible contact combinations with auxiliary contacts added by the user



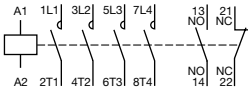
Combination 10 = AF09 ... AF80..-40-00 + CA4-10



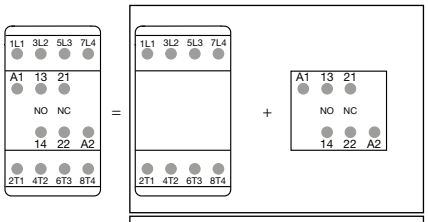
Combination 11 = AF09 ... AF80..-40-00 + CA4-10 + CA4-01



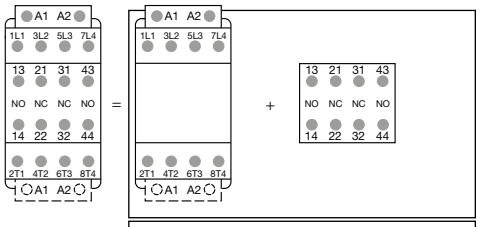
Combination 10



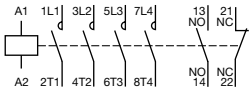
Combination 11



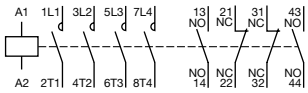
Combination 11 = AF09 ... AF80..-40-00 + CAT4-11E



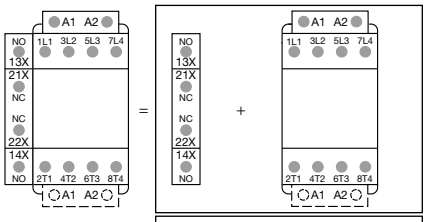
Combination 22 = AF09 ... AF80..-40-00 + CA4-22E



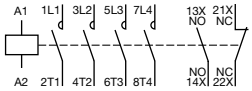
Combination 11



Combination 22



Combination 11 = CAL4-11 + AF09 ... AF80..-40-00



Combination 11

Note: only AF..Z contactor with DC control voltages 12...20 V DC (coil 20) and 24 V DC (coil 30) need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.

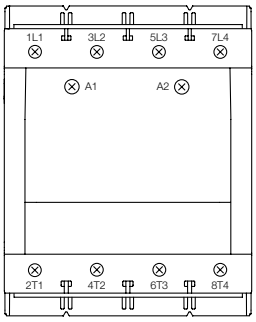
1SBC101480S0201 - Rev. B

AF116 ... AF370 4-pole contactors

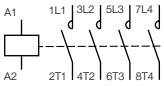
Terminal marking and positioning

AF116 ... AF370 contactors - AC / DC operated

Standard devices without addition of auxiliary contacts

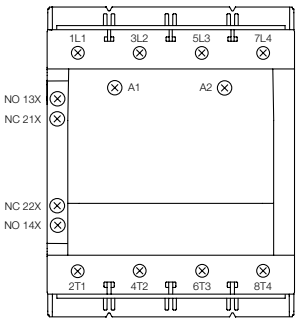


AF116 ... AF370-40-00

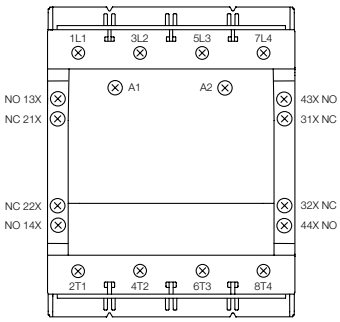


AF116 ... AF370-40-00

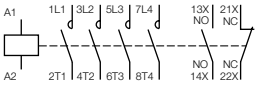
Standard devices with factory mounted auxiliary contacts



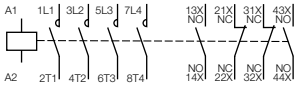
AF116 ... AF370-40-11



AF116 ... AF370-40-22



AF116 ... AF370-40-11



AF116 ... AF370-40-22

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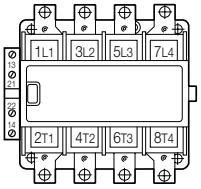
EK 4-pole contactors

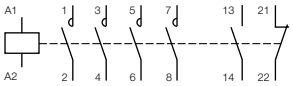
Terminal marking and positioning

EK550, EK1000 contactors - AC operated

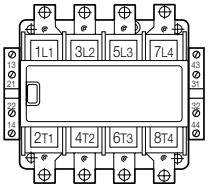
Standard devices



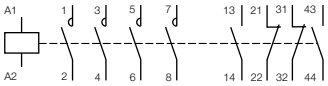
EK550, EK1000-40-11



EK550, EK1000-40-11

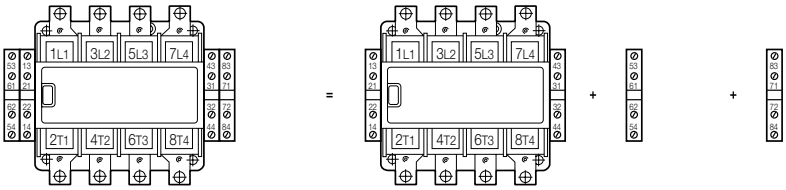


EK550, EK1000-40-22

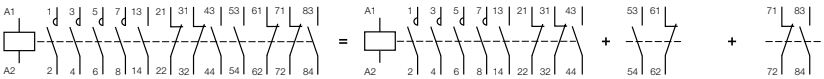


EK550, EK1000-40-22

Other possible contact combinations with auxiliary contacts added by the user



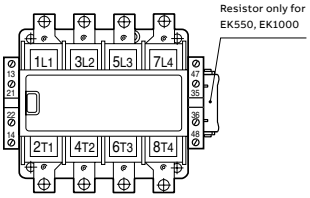
Combination 44 = EK550, EK1000-40-22 + CAL16-11C + CAL16-11D



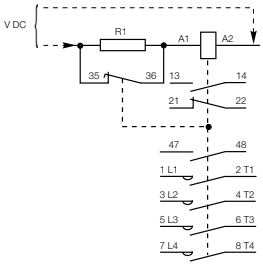
Combination 44 = EK550, EK1000-40-22 + CAL16-11C + CAL16-11D

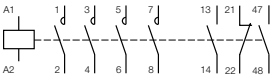
EK550, EK1000 contactors - with multifrequency coil or DC operated

Standard devices



EK550, EK1000-40-21

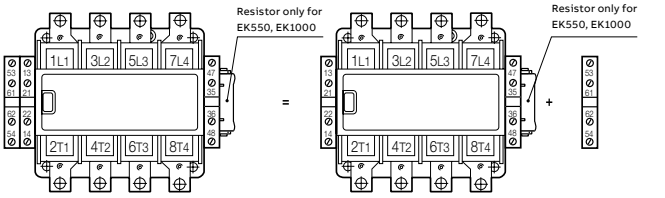




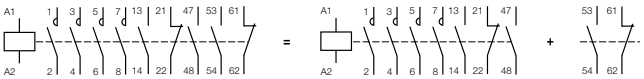
EK550, EK1000-40-21

EK550, EK1000 DC operated

Other possible contact combinations with auxiliary contacts added by the user



Combination 32 = EK550, EK1000-40-21 + CAL16-11C



Combination 32 = EK550, EK1000-40-21 + CAL16-11C

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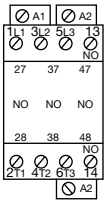
UA..RA contactors

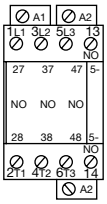
Terminal marking and positioning

UA..RA contactors - AC operated

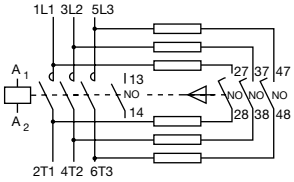
Standard devices without addition of auxiliary contacts



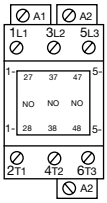
UA16-30-10 RA
UA26-30-10 RA



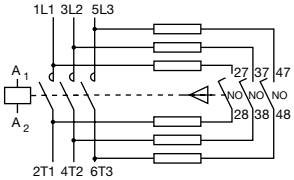
UA30-30-10 RA



UA16 ... 30-30-10 RA



UA50 ... 110-30-00 RA



UA50 ... 110-30-00 RA

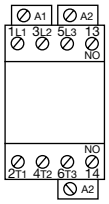
1SBC101574S0201

UA... contactors

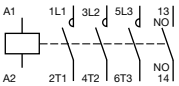
Terminal marking and positioning

UA... contactors - AC operated

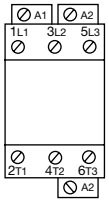
Standard devices without addition of auxiliary contacts



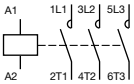
UA16 ... UA30-30-10



UA16 ... UA30-30-10

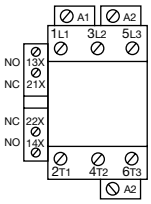


UA50 ... UA110-30-00

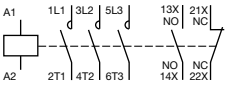


UA50 ... UA110-30-00

Standard devices with factory mounted auxiliary contacts



UA50 ... UA110-30-11



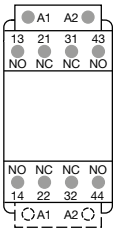
UA50 ... UA110-30-11

1SBC101571S0201

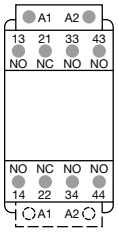
NF contactor relays

Terminal marking and positioning

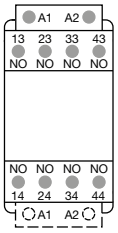
Standard devices without addition of auxiliary contacts



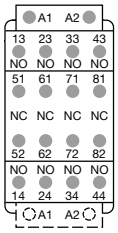
NF..22E



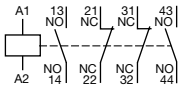
NF..31E



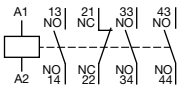
NF..40E



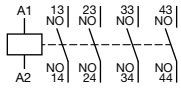
NF..44E



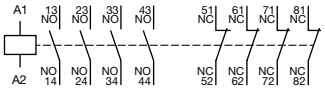
NF..22E



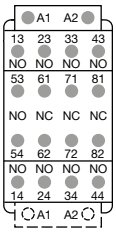
NF..31E



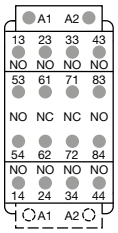
NF..40E



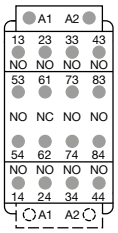
NF..44E



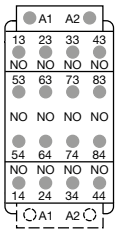
NF..53E



NF..62E



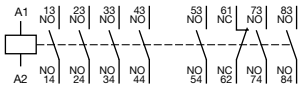
NF..71E



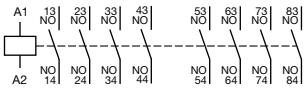
NF..80E

NF..53E

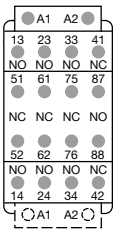
NF..62E



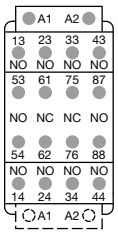
NF..71E



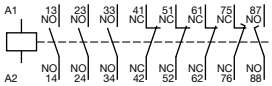
NF..80E



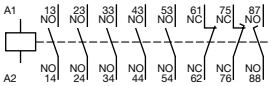
NF..33/11 (1)



NF..51/11 (1)

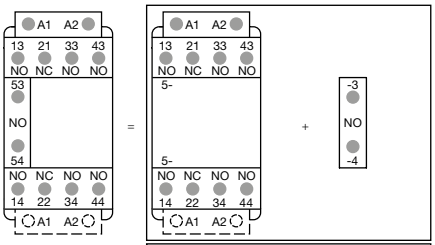


NF..33/11 (1)

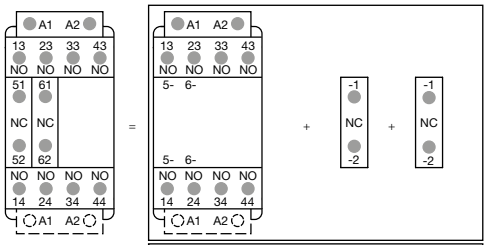


NF..51/11 (1)

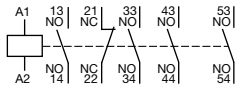
Other possible contact combinations with auxiliary contacts added by the user



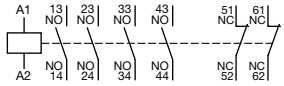
Combination 41 = NF..31E + CA4-10



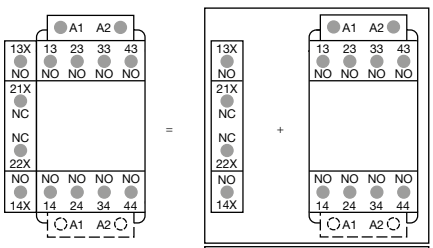
Combination 42 = NF..40E + CA4-01+CA4-01



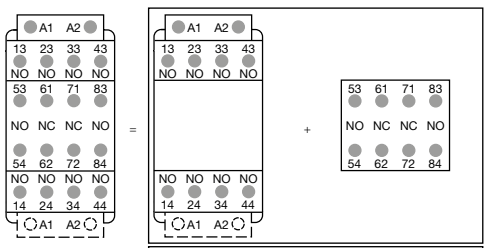
Combination 41 E



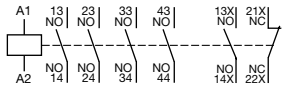
Combination 42 E



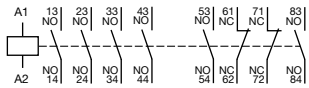
Combination 51 = CAL4-11 + NF..40E



Combination 62 = NF..40E + CA4-22N



Combination 51 E



Combination 62 E

Note: only NFZ contactor relays with DC control voltages 12...20 V DC (coil 20) and 24 V DC (coil 30) need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.
(1) Not available with Contactor relays with Push-in Spring terminals.

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NF add-on auxiliary contacts

Terminal marking and positioning

1-pole auxiliary contacts

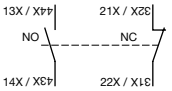
CA4-01

CA4-10

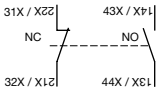
CC4-01

CC4-10

2-pole auxiliary contacts

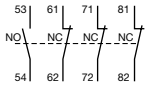


CAL4-11
(Left side-mounted)

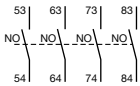


CAL4-11
(Right side-mounted)

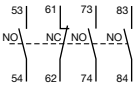
4-pole auxiliary contacts



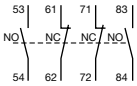
CA4-13N



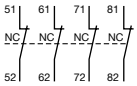
CA4-40N



CA4-31N



CA4-22N



CA4-04N

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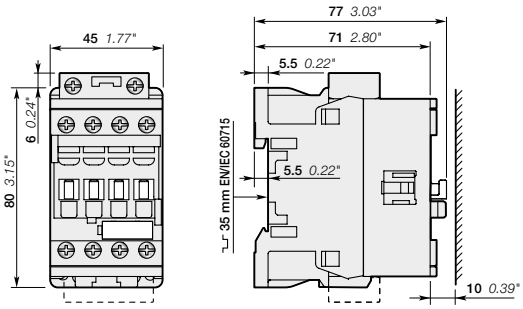
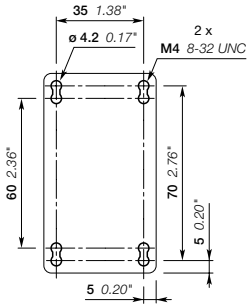
AF09, AF12, AF16 3-pole contactors

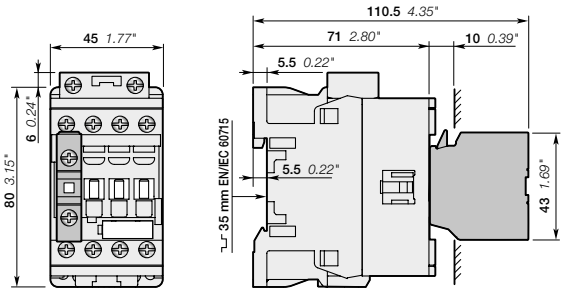
Dimensions



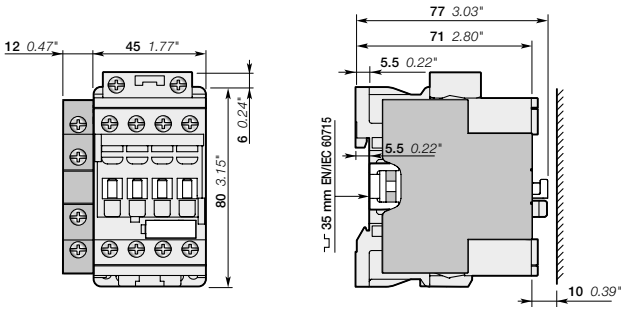
AF09, AF12, AF16



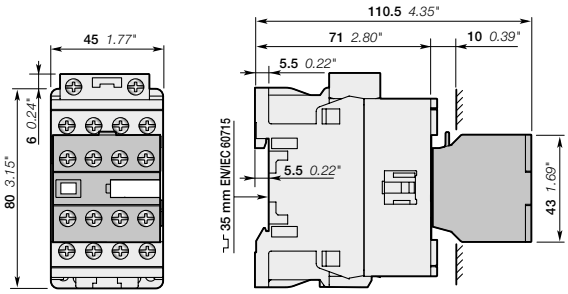
AF09, AF12, AF16



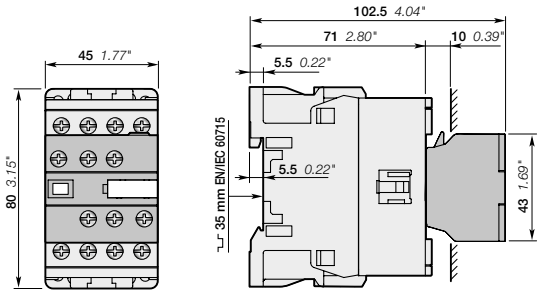
AF09, AF12, AF16
+ CA4, CC4 1-pole auxiliary contact block



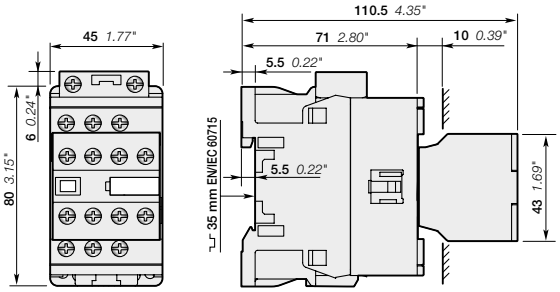
AF09, AF12, AF16
+ CAL4-11 2-pole auxiliary contact block



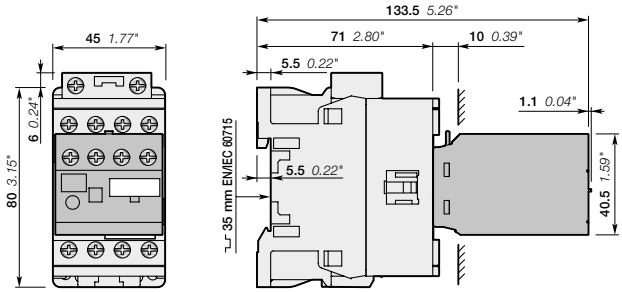
AF09, AF12, AF16
+ CA4 4-pole auxiliary contact block



AF09, AF12, AF16
+ CAT4 2-pole auxiliary contact and coil terminal block



AF09, AF12, AF16..-30-22



AF09, AF12, AF16
+ TEF4 electronic timer

(1) Note: For AF09 ... AF16 contactors, lateral distance to grounded component 2 mm 0.08" min.
24 V DC operated contactor (coil 30) depth + 20 mm + 0.79".

Main dimensions mm, inches (1)

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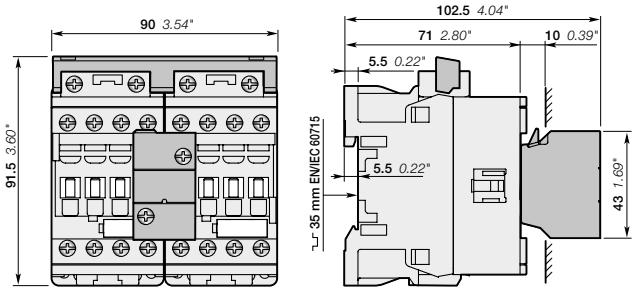
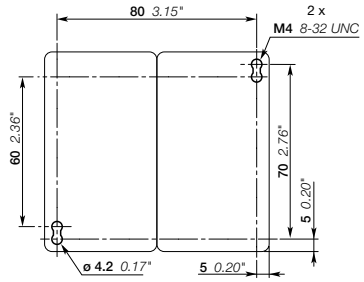
AF09, AF12, AF16 3-pole contactors

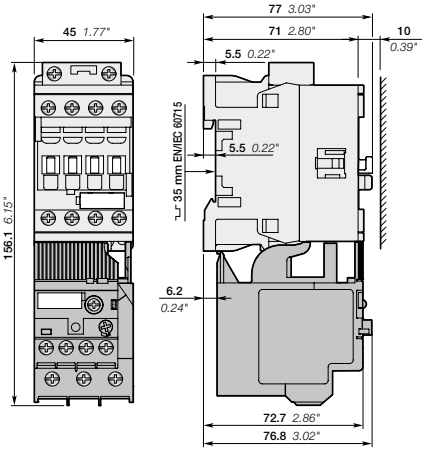
Dimensions



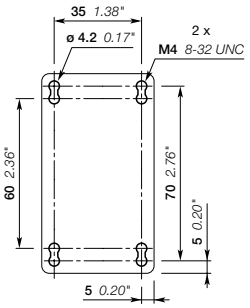
AF09, AF12, AF16
+ VEM4 mechanical and electrical interlock set



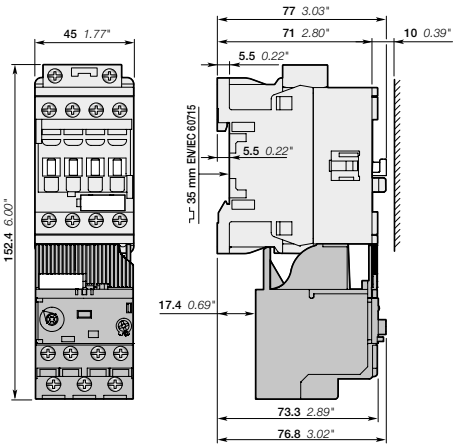
AF09, AF12, AF16
+ VEM4 mechanical and electrical interlock set



AF09, AF12, AF16
+ TF42 thermal overloard relay



AF09, AF12, AF16
+ TF42, EF19



AF09, AF12, AF16 3-pole contactors
+ EF19 electronic overload relay

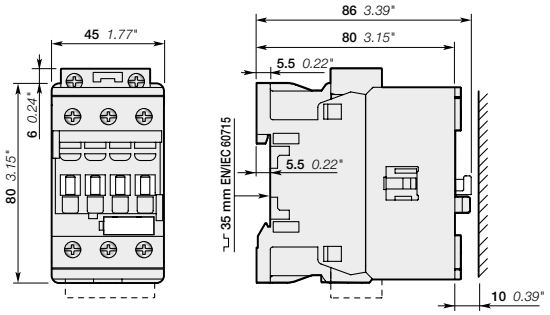
(1) Note: For AF09 ... AF16 contactors, lateral distance to grounded component 2 mm 0.08" min.
24 V DC operated contactor (coil 30) depth + 20 mm + 0.79".

Main dimensions mm, inches (1)

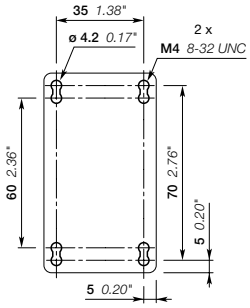
1SBC101682S0201 - Rev. B

AF26, AF30, AF38 3-pole contactors

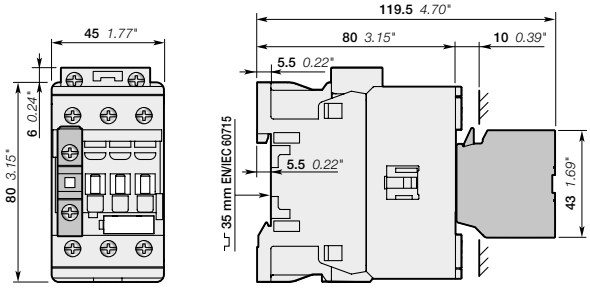
Dimensions



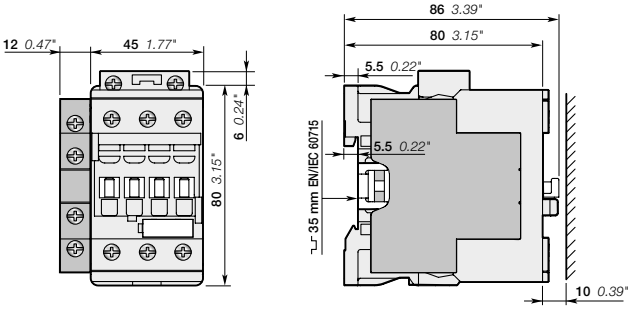
AF26, AF30, AF38



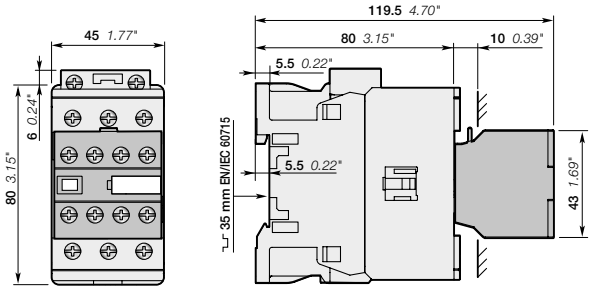
AF26, AF30, AF38



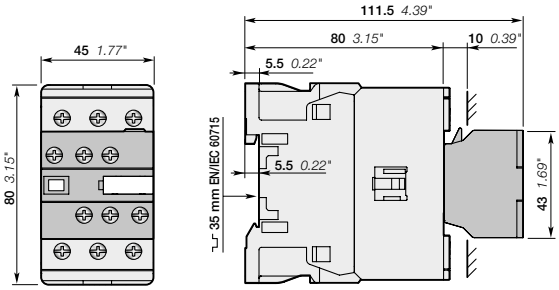
AF26, AF30, AF38
+ CA4, CC4 1-pole auxiliary contact block



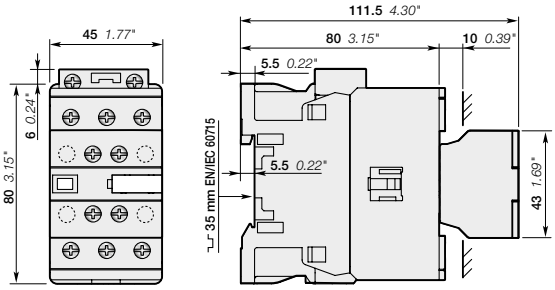
AF26, AF30, AF38
+ CAL4-11 2-pole auxiliary contact block



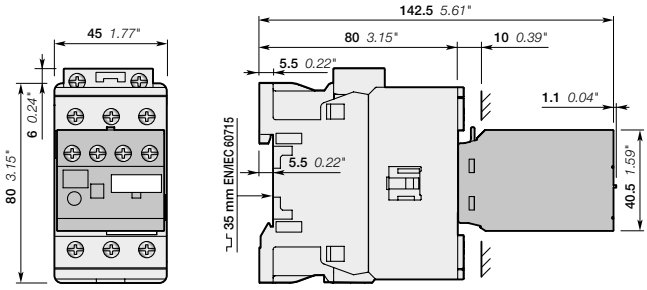
AF26, AF30, AF38
+ CA4 4-pole auxiliary contact block



AF26, AF30, AF38
+ CAT4 2-pole auxiliary contact and coil terminal block



AF26, AF30, AF38..-30-11
AF26, AF30, AF38..-30-22



AF26, AF30, AF38
+ TEF4 electronic timer

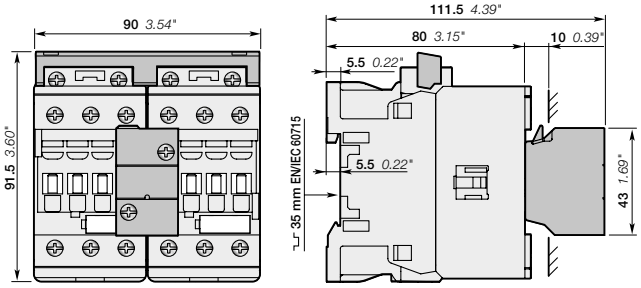
(1) Note: For AF26 ... AF38 contactors, lateral distance to grounded component 2 mm (0.08") min.
24 V DC operated contactor (coil 30) depth + 20 mm (+ 0.79").

Main dimensions mm, inches (1)

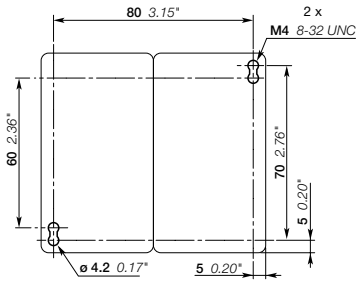
1SBC101683S0201 - Rev. B

AF26, AF30, AF38 3-pole contactors

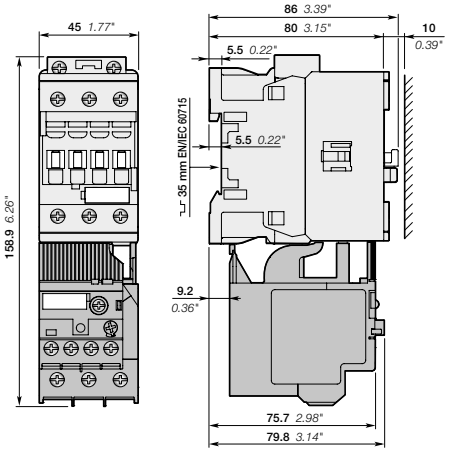
Dimensions



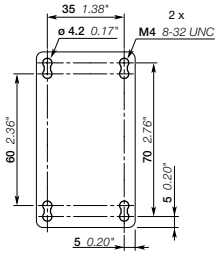
AF26, AF30, AF38
+ VEM4 mechanical and electrical interlock set



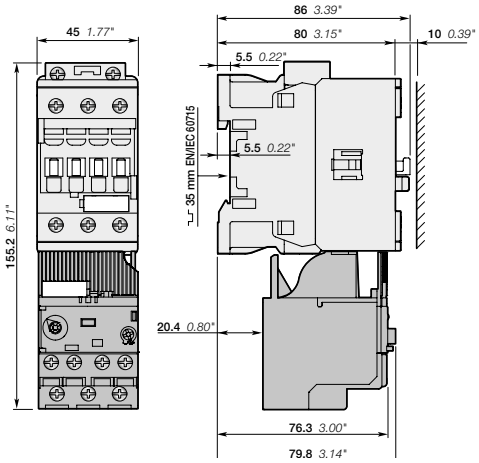
AF26, AF30, AF38
+ VEM4 mechanical and electrical interlock set



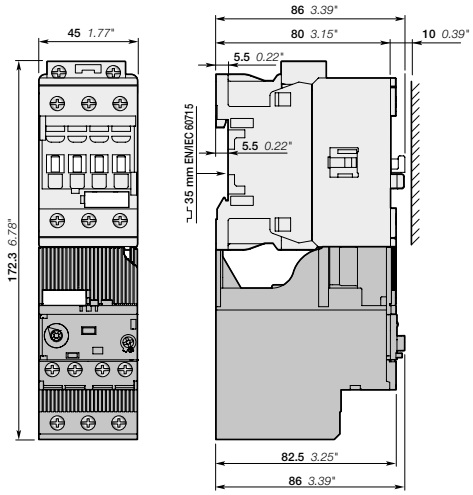
AF26, AF30, AF38
+ TF42 thermal overload relay



AF26, AF30, AF38
+ TF42, EF19, EF45



AF26 3-pole contactors
+ EF19 electronic overload relay



AF26, AF30, AF38 3-pole contactors
+ EF45 electronic overload relay

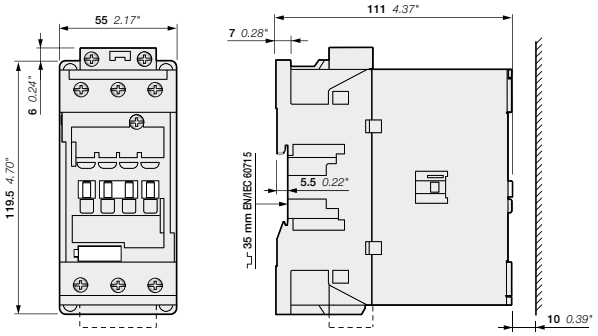
(1) Note: For AF26 ... AF38 contactors, lateral distance to grounded component 2 mm (0.08") min.
24 V DC operated contactor (coil 30) depth + 20 mm (+ 0.79").

Main dimensions mm, inches (1)

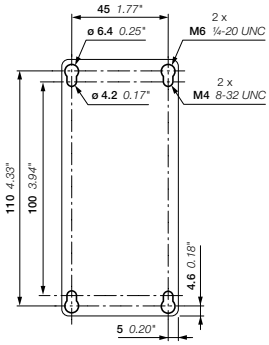
1SBC101683S0201 - Rev. B

AF40 ... AF65 3-pole contactors

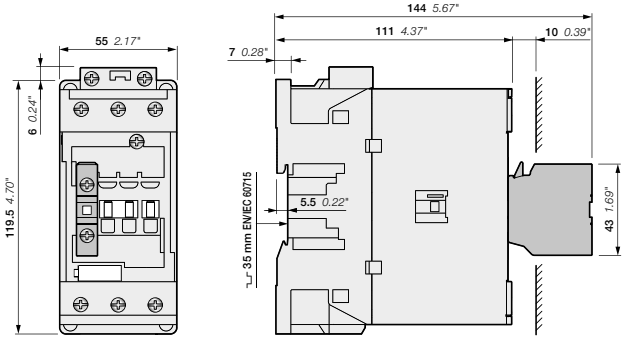
Dimensions



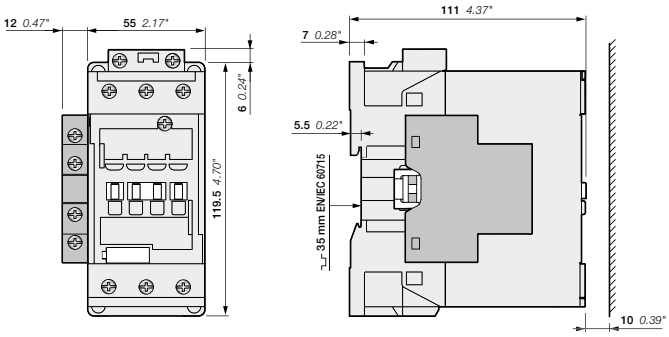
AF40, AF52, AF65



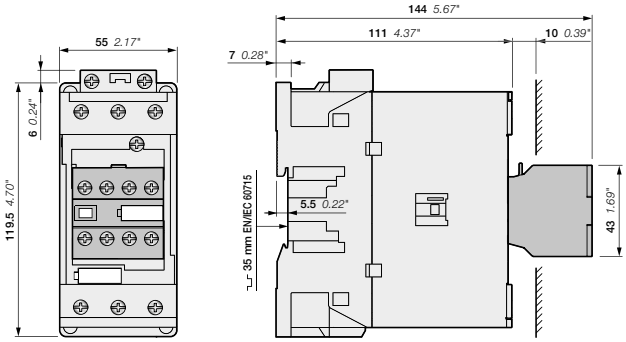
AF40, AF52, AF65



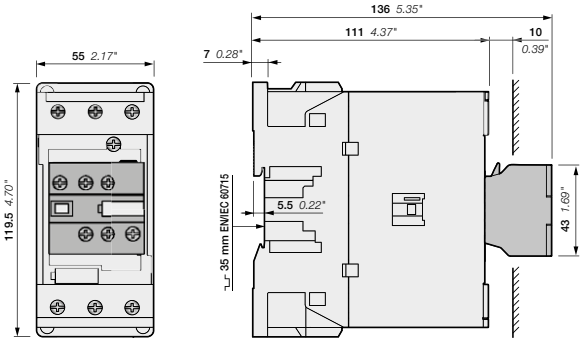
AF40, AF52, AF65
+ CA4, CC4 1-pole auxiliary contact block



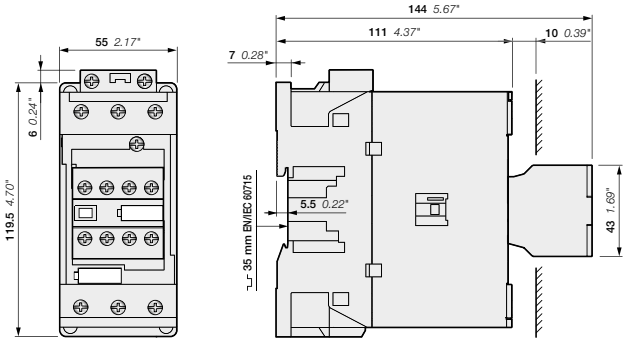
AF40, AF52, AF65-30-00 + CAL4-11 2-pole auxiliary contact block
AF40, AF52, AF65-30-11



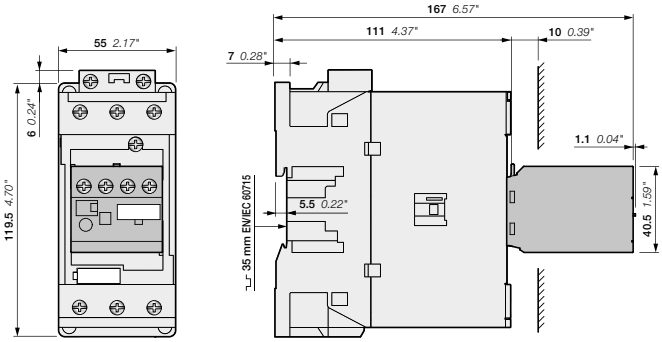
AF40, AF52, AF65
+ CA4 4-pole auxiliary contact block



AF40, AF52, AF65
+ CAT4 2-pole auxiliary contact and coil terminal block



AF40, AF52, AF65..-30-22



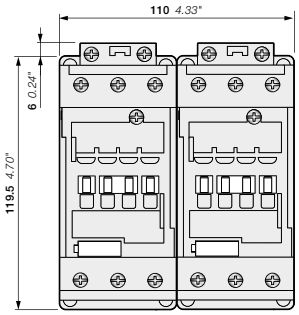
AF40, AF52, AF65
+ TEF4 electronic timer

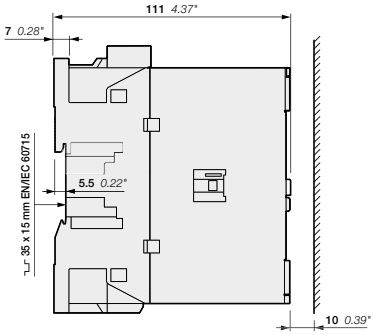
Main dimensions mm, inches

1SBC101731S0201

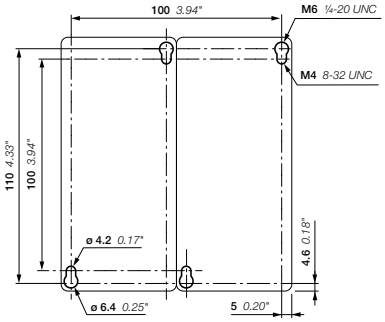
AF40 ... AF65 3-pole contactors

Dimensions

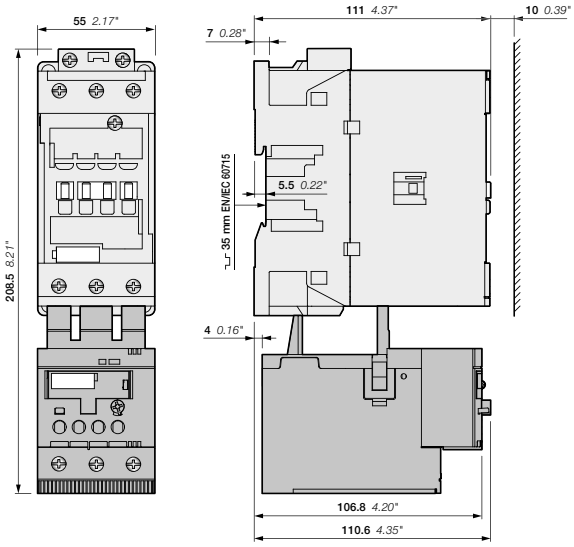




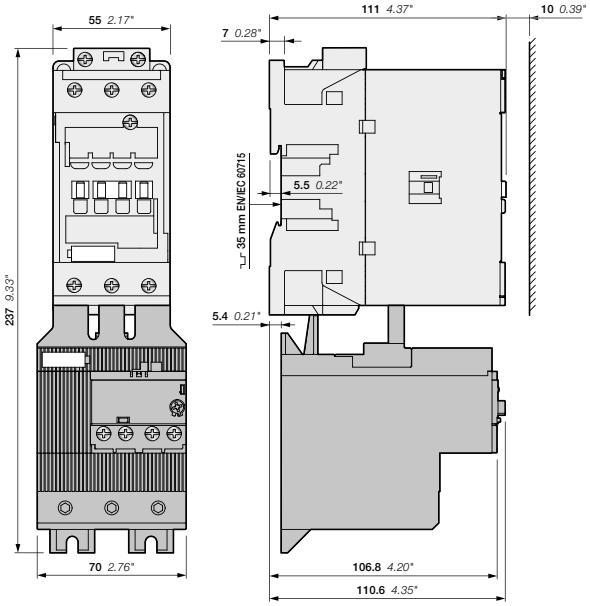
AF40, AF52, AF65
+ VM96-4 mechanical interlock unit



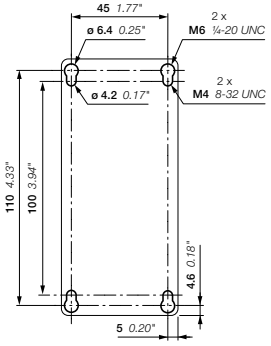
AF40, AF52, AF65
+ VM96-4 mechanical interlock set



AF40, AF52, AF65
+ TF65 thermal overload relay



AF40, AF52, AF65
+ EF65 electronic overload relay



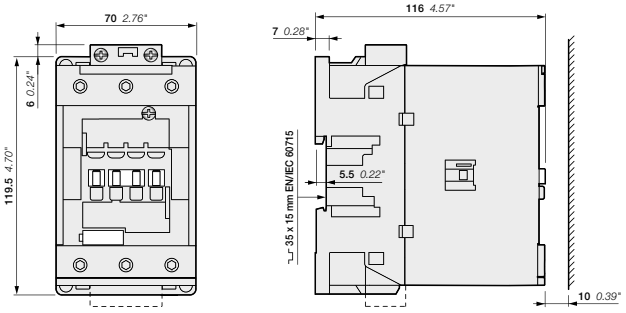
AF40, AF52, AF65
+ TF65, EF65

Main dimensions mm, inches

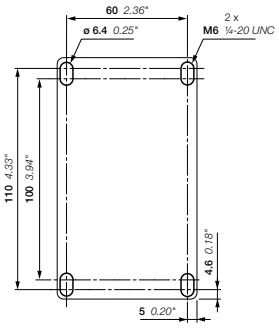
1SBC101731S0201

AF80 ... AF96 3-pole contactors

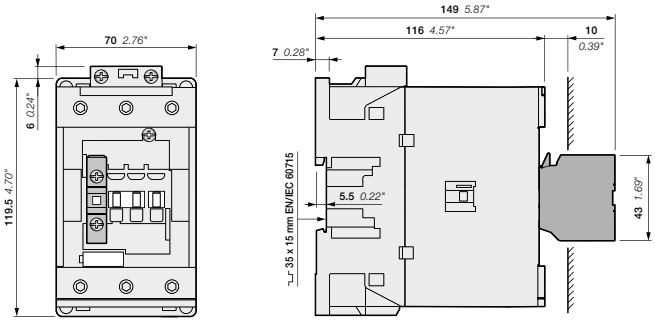
Dimensions



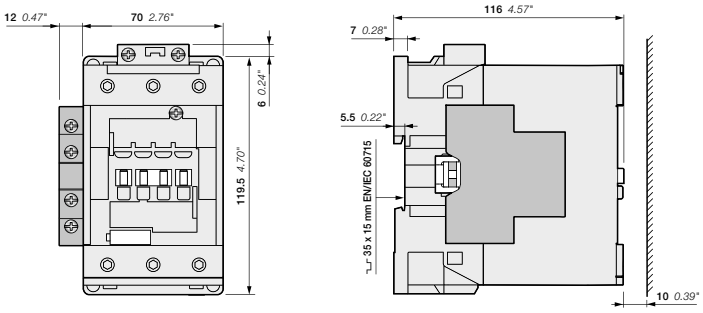
AF80, AF96



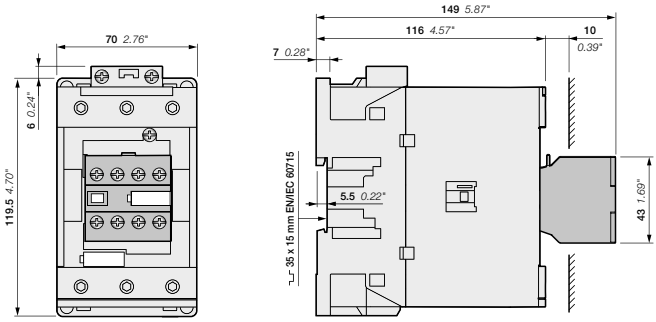
AF80, AF96



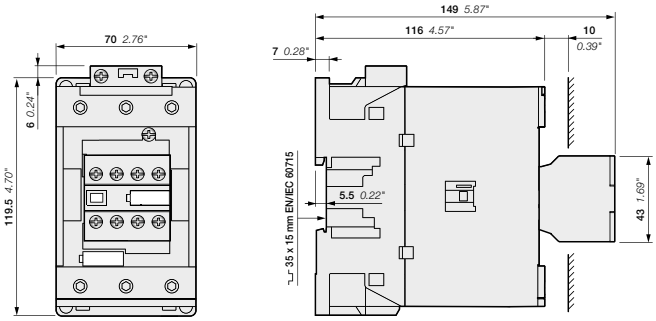
AF80, AF96
+ CA4, CC4 1-pole auxiliary contact block



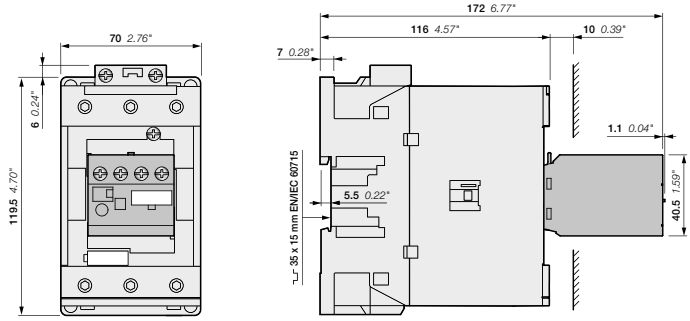
AF80, AF96-30-00 + CAL4-11 2-pole auxiliary contact block
AF80, AF96-30-11



AF80, AF96
+ CA4 4-pole auxiliary contact block



AF80, AF96..-30-22



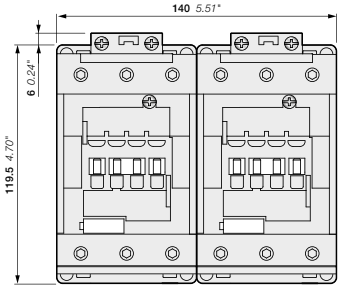
AF80, AF96
+ TEF4 electronic timer

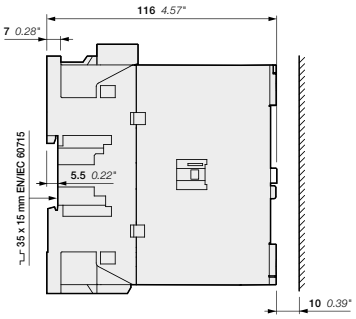
Main dimensions mm, inches

1SBC101732S0201

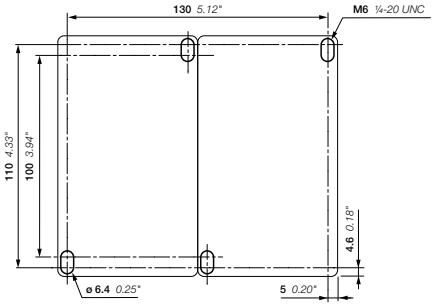
AF80 ... AF96 3-pole contactors

Dimensions

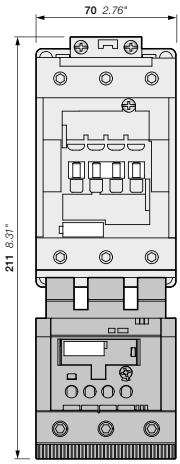


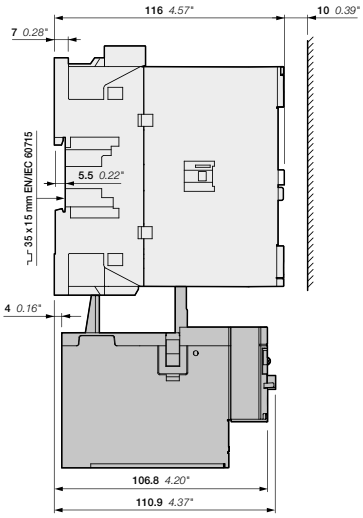


AF80, AF96
+ VM96-4 mechanical interlock unit

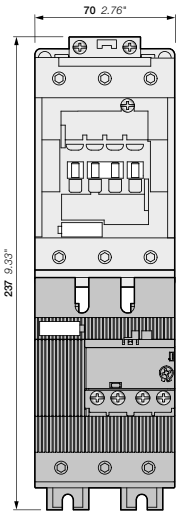


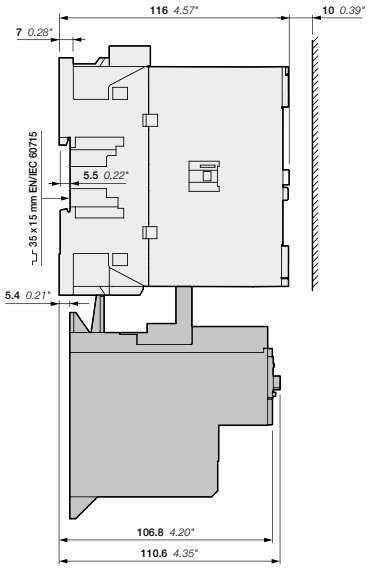
AF80, AF96
+ VM96-4 mechanical interlock set



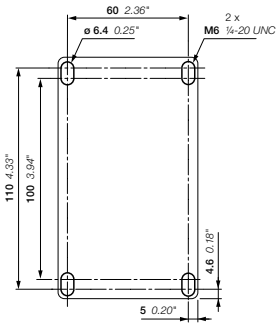


AF80, AF96
+ TF96 thermal overload relay





AF80, AF96
+ EF96 electronic overload relay



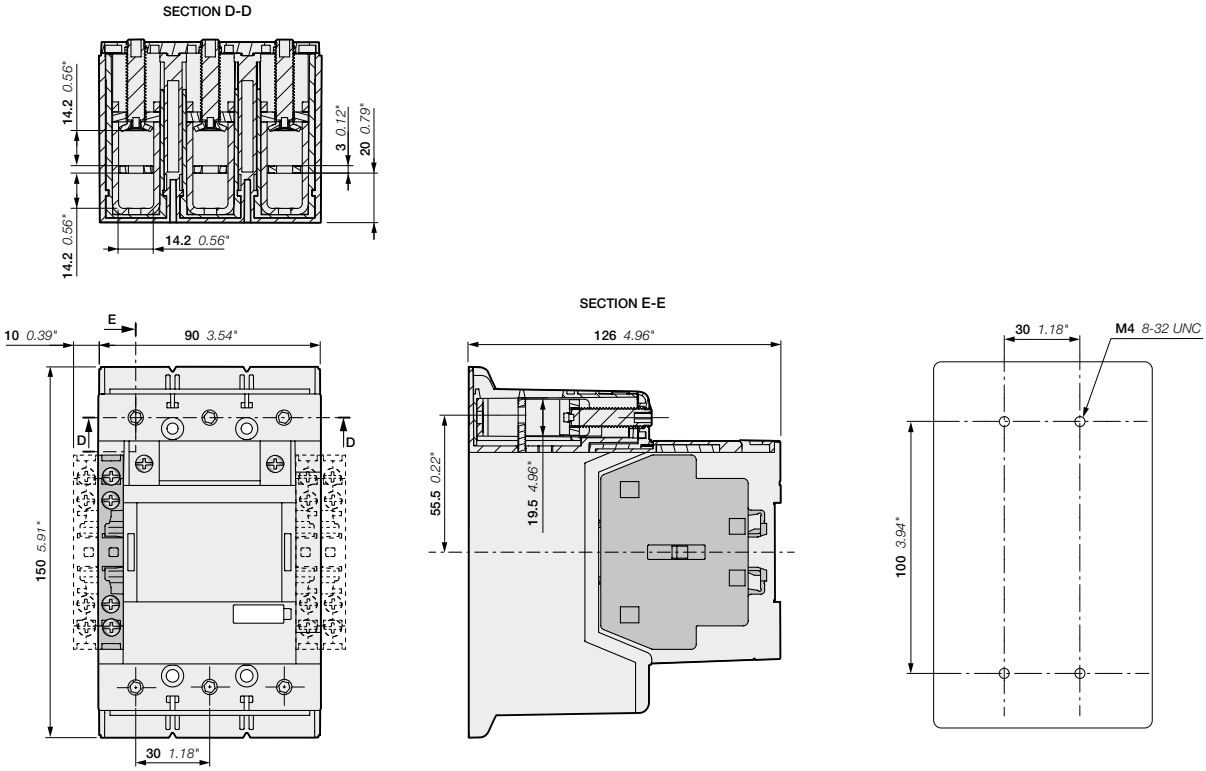
AF80, AF96
+ TF96, EF96

Main dimensions mm, inches

1SBC101732S0201

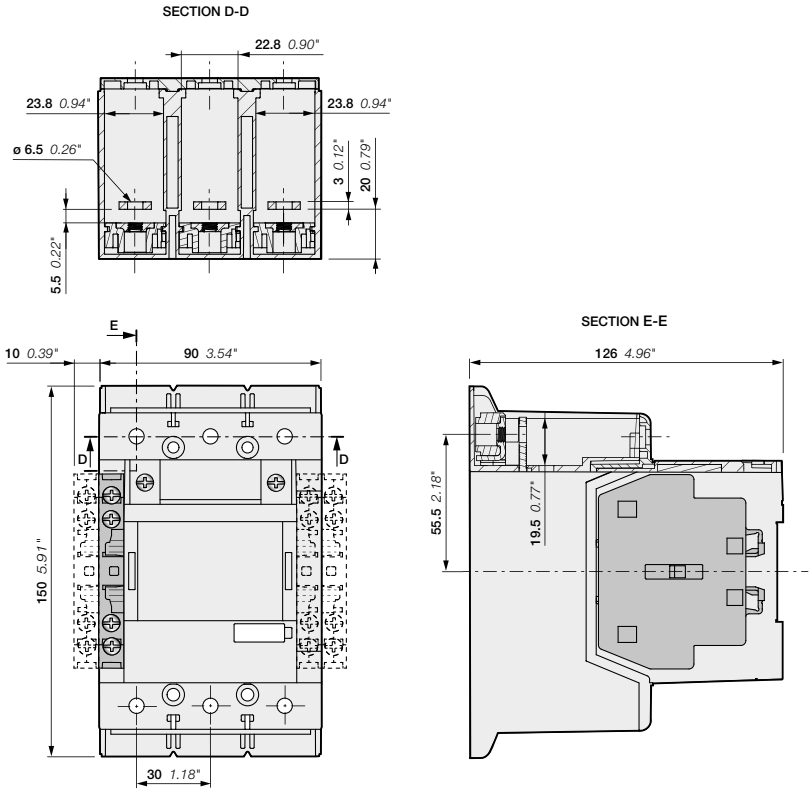
AF116, AF140, AF146 3-pole contactors

Dimensions



AF116, AF140, AF146-30-00 + CAL19 2-pole auxiliary contact block
AF116, AF140, AF146-30-11

AF116, AF140, AF146-30-..(B)



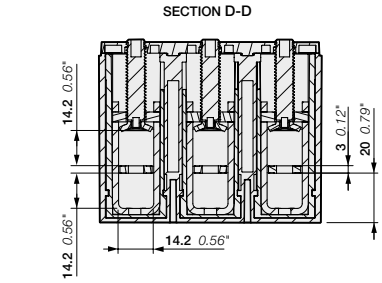
AF116, AF140, AF146-30-00B + CAL19 2-pole auxiliary contact block
AF116, AF140, AF146-30-11B

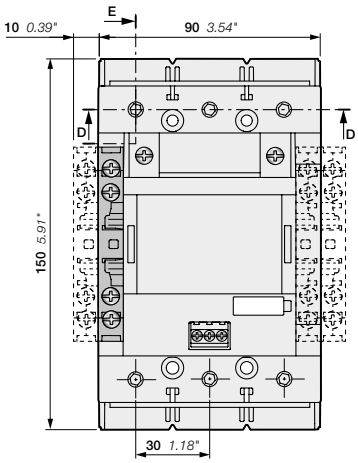
Main dimensions mm, inches

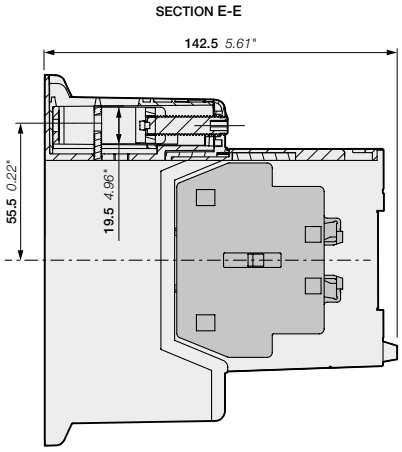
1SFC101118C0201

AF116, AF140, AF146 3-pole contactors With built-in PLC interface (coil code 33, 34)

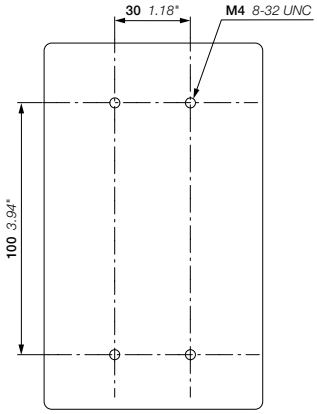
Dimensions



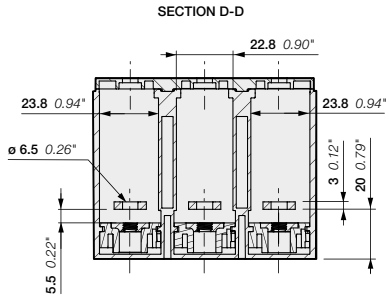


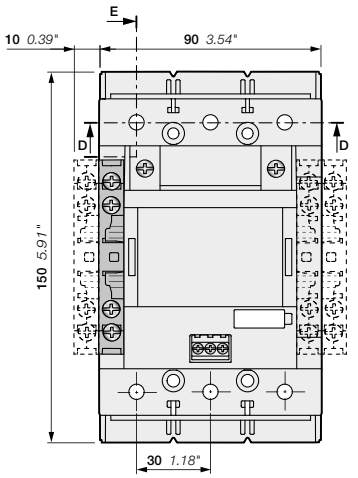


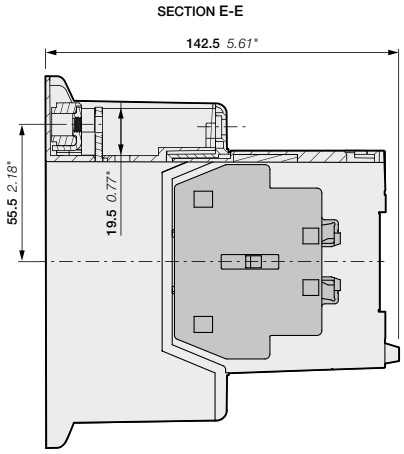
AF116, AF140, AF146-30-00 + CAL19 2-pole auxiliary contact block
AF116, AF140, AF146-30-11



AF116, AF140, AF146-30-..(B)







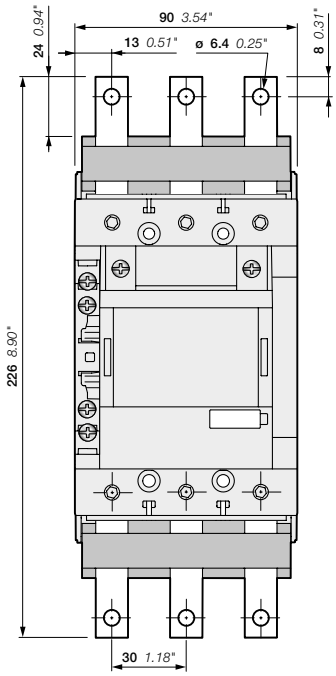
AF116, AF140, AF146-30-00B + CAL19 2-pole auxiliary contact block
AF116, AF140, AF146-30-11B

Main dimensions mm, inches

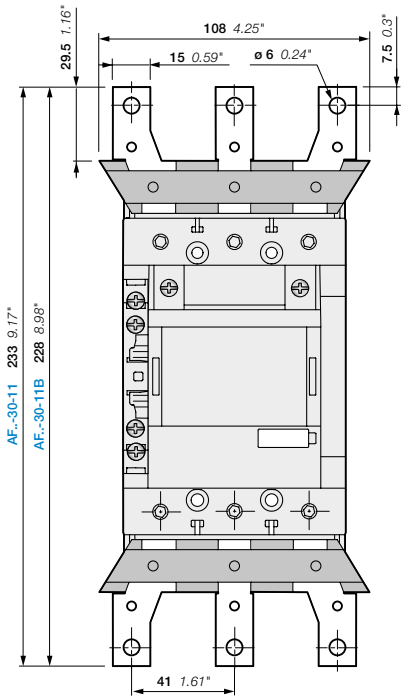
1SFC101118C0201

AF116, AF140, AF146 3-pole contactors

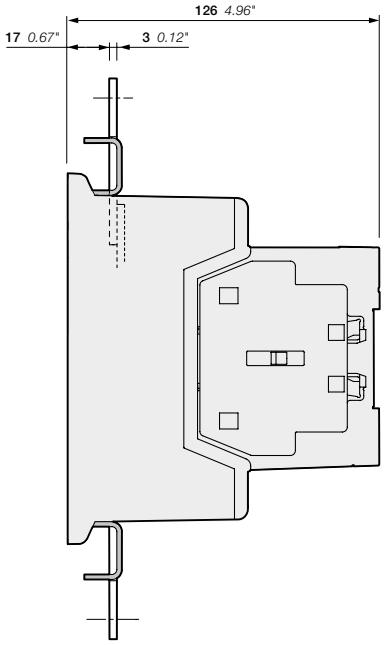
Dimensions

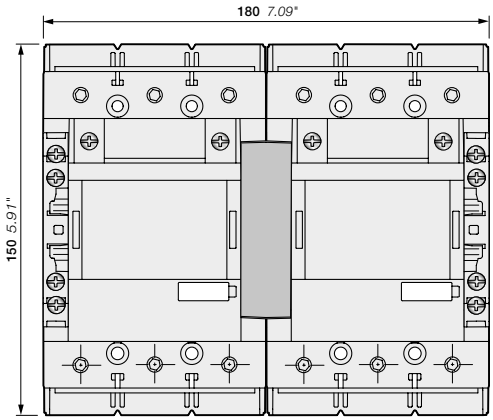


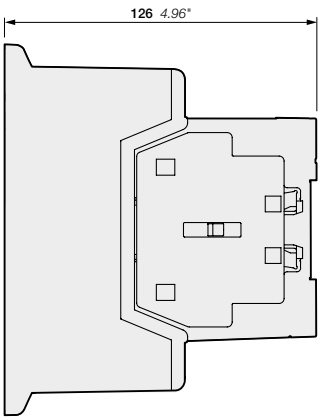
AF116, AF140, AF146-30-11
+ LX140 terminal extension



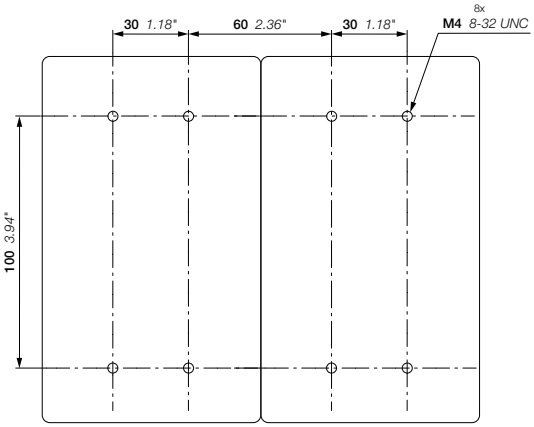
AF116, AF140, AF146-30-11(B)
+ LW140(B) terminal enlargement







AF116, AF140, AF146-30-11(B)
+ VM19 mechanical interlocking unit



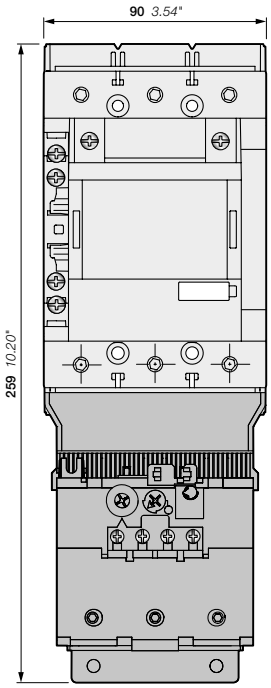
AF116, AF140, AF146-30-11(B)
+ VM19 mechanical interlocking unit

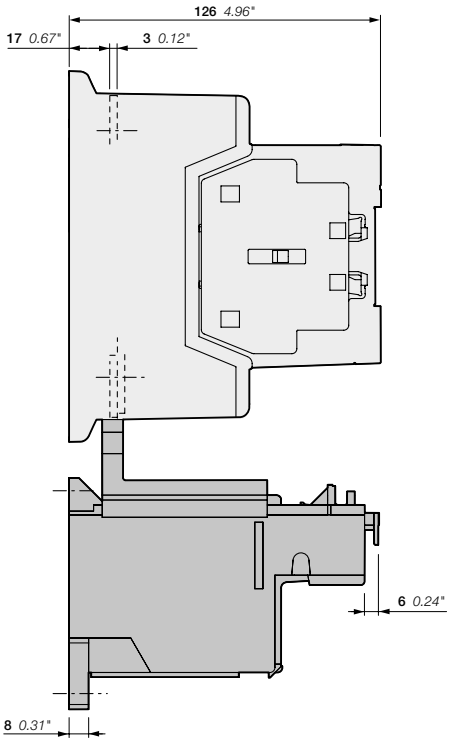
Main dimensions mm, inches

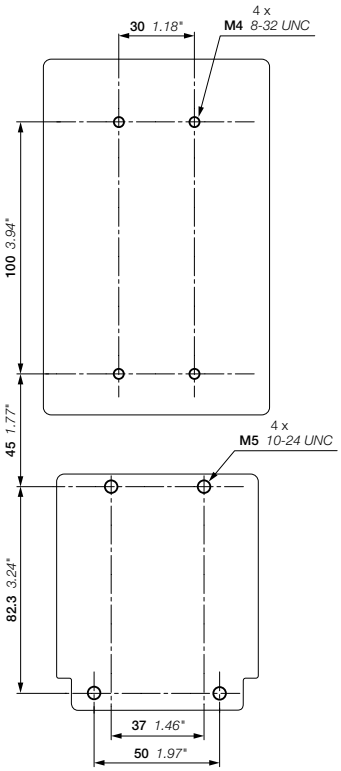
1SFC101118C0201

AF116, AF140, AF146 3-pole contactors

Dimensions

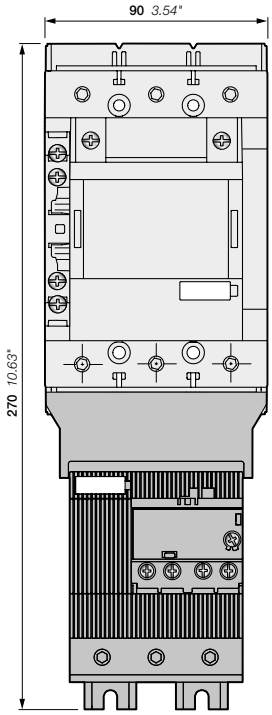


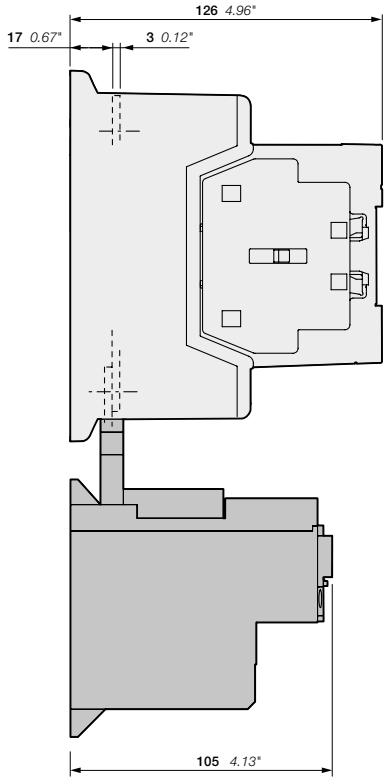


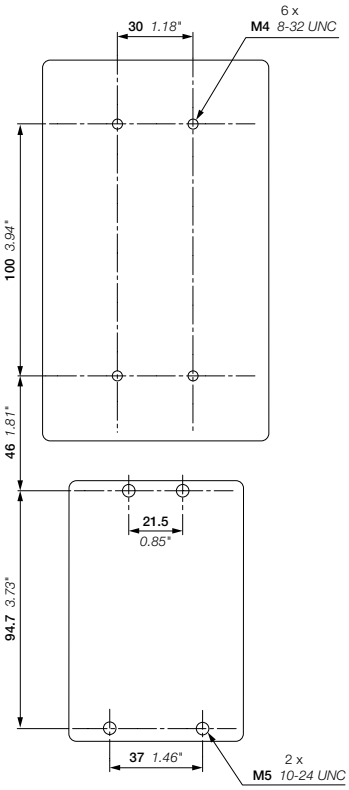


AF116, AF140-30-11(B)
+ TF140 thermal overload relay

AF116, AF140-30-11(B)
+ TF140 thermal overload relay







AF116, AF140, AF146-30-11(B)
+ EF146 electronic overload relay

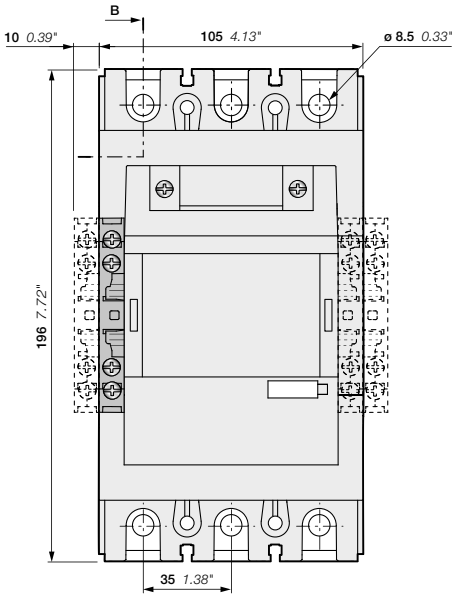
AF116, AF140, AF146-30-11(B)
+ EF146 electronic overload relay

Main dimensions mm, inches

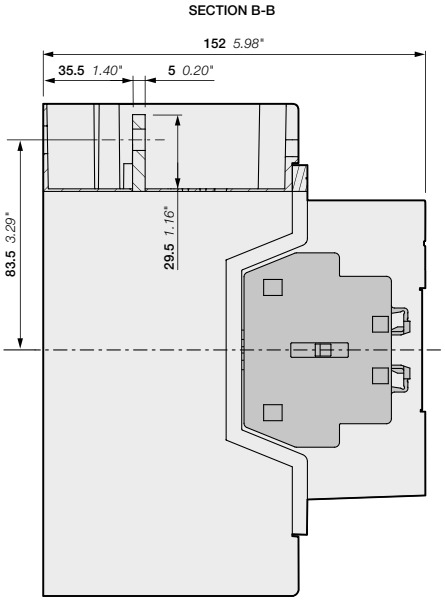
1SFC101118C0201

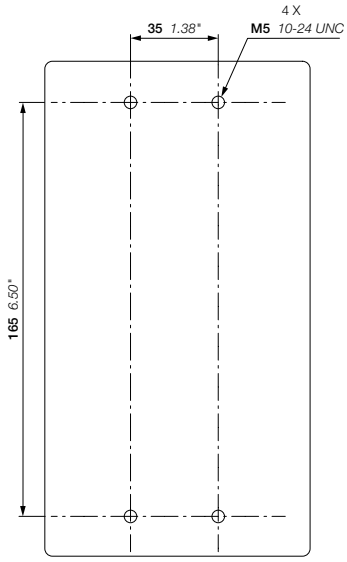
AF190, AF205 3-pole contactors

Dimensions

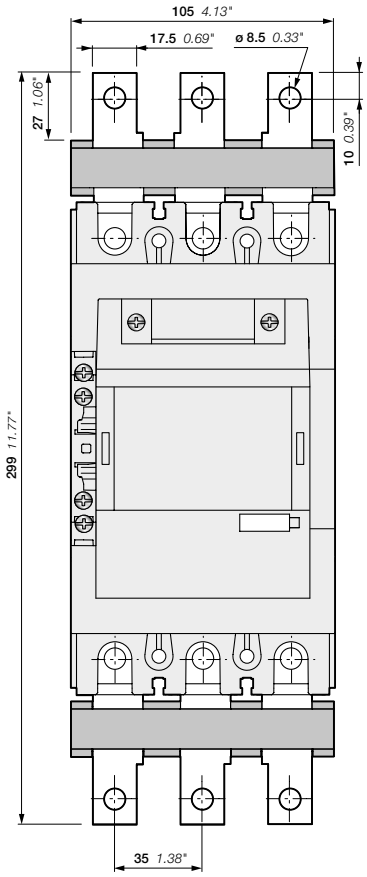


AF190, AF205-30-00 + CAL19 2-pole auxiliay contact block
AF190, AF205-30-11

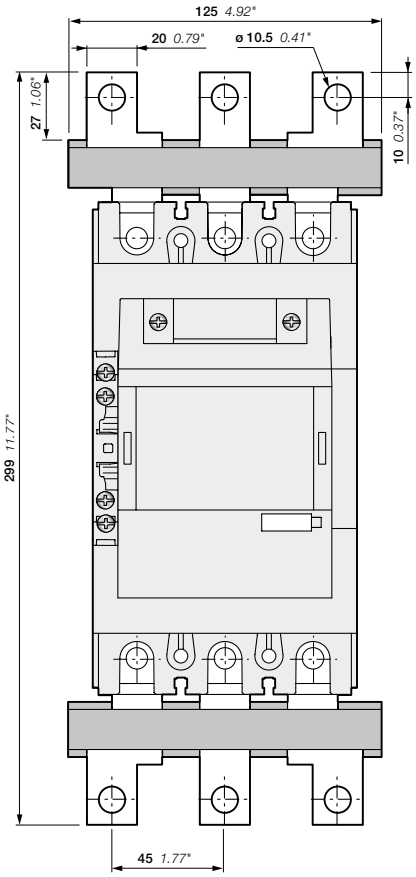




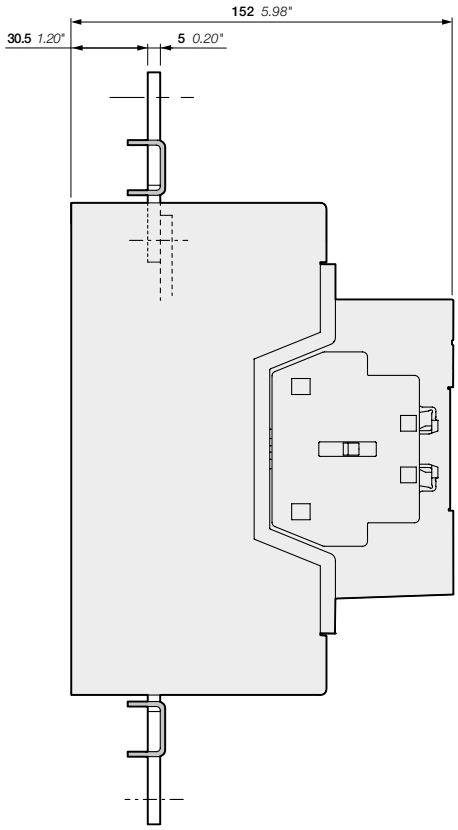
AF190, AF205



AF190, AF205-30-11
+ LX205 terminal extension



AF190, AF205-30-11
+ LW205 terminal enlargement

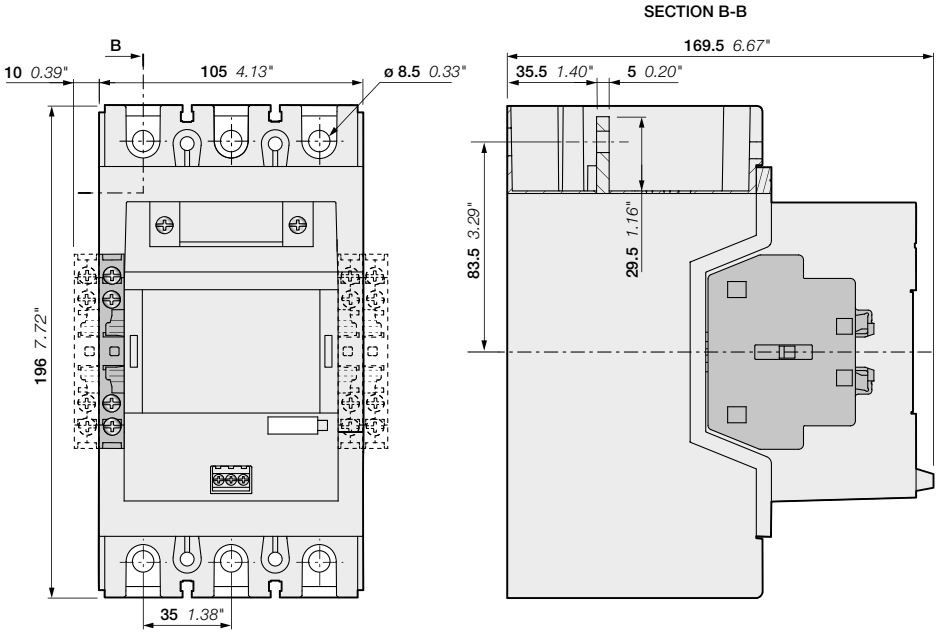


Main dimensions mm, inches

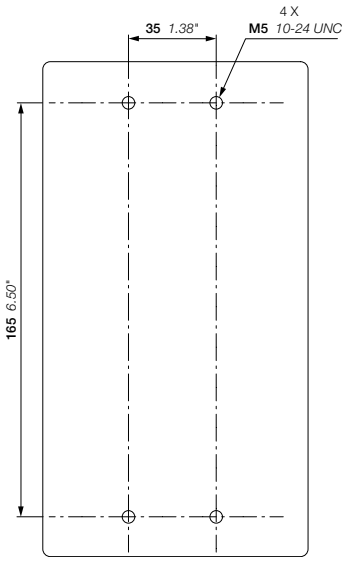
1SFC101119C0201

AF190, AF205 3-pole contactors With built-in PLC interface (coil code 33, 34)

Dimensions



AF190, AF205-30-00 + CAL19 2-pole auxiliay contact block
AF190, AF205-30-11



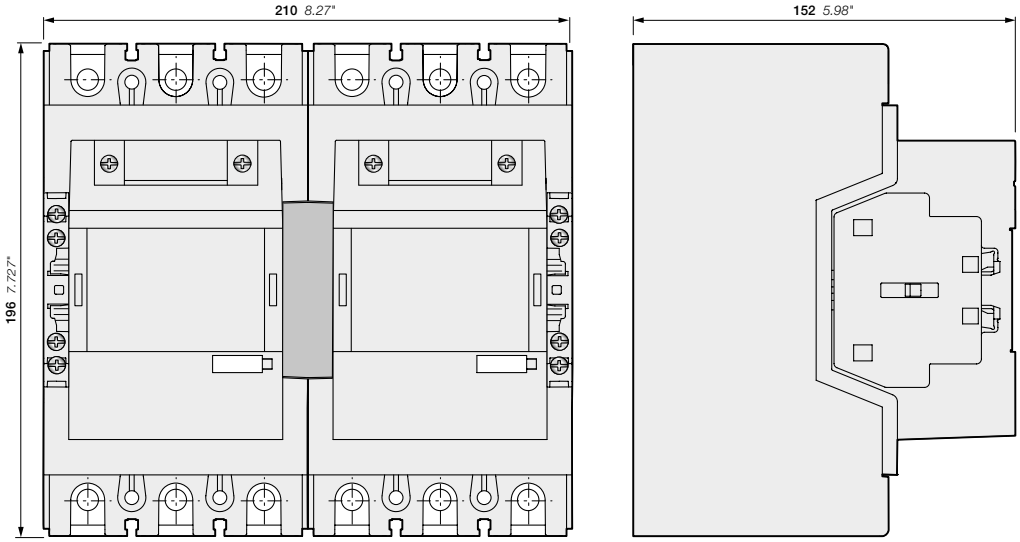
AF190, AF205

Main dimensions mm, inches

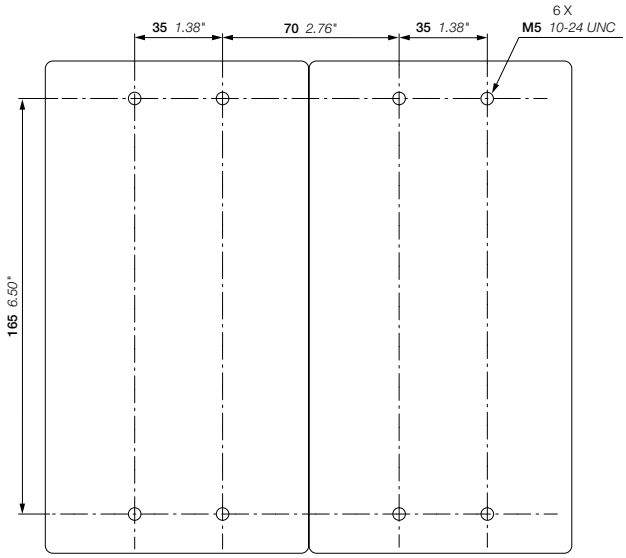
1SFC101119C0201

AF190, AF205 3-pole contactors

Dimensions



AF190, AF205-30-11
+ VM19 mechanical interlocking unit



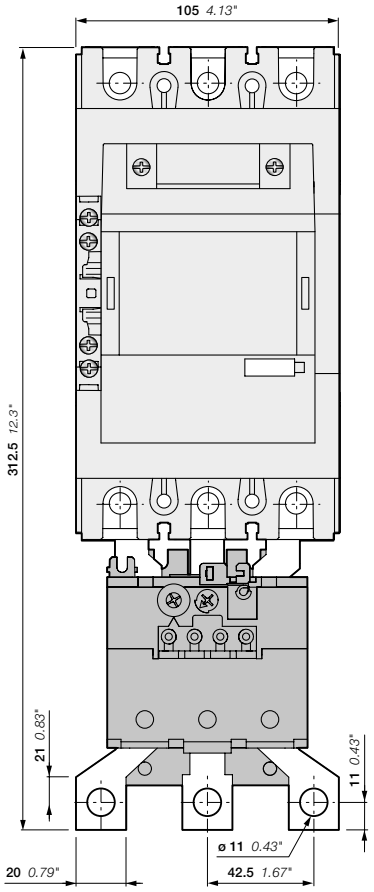
AF190, AF205
+ VM19 mechanical interlocking unit

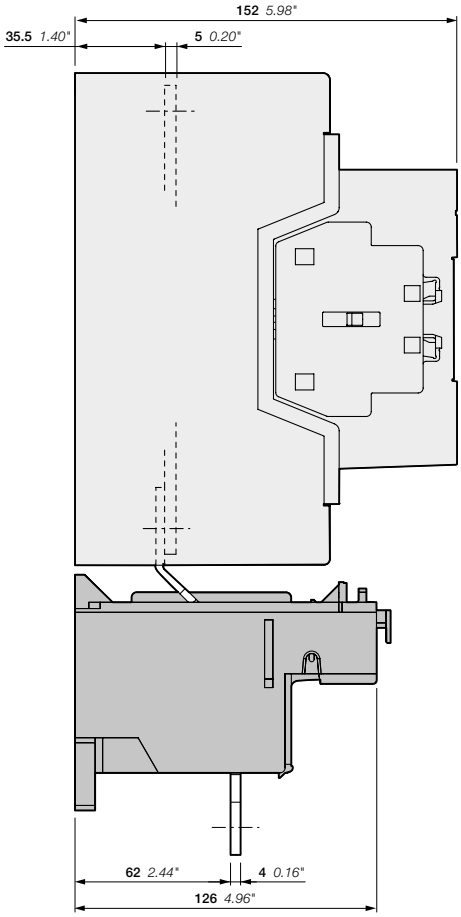
Main dimensions mm, inches

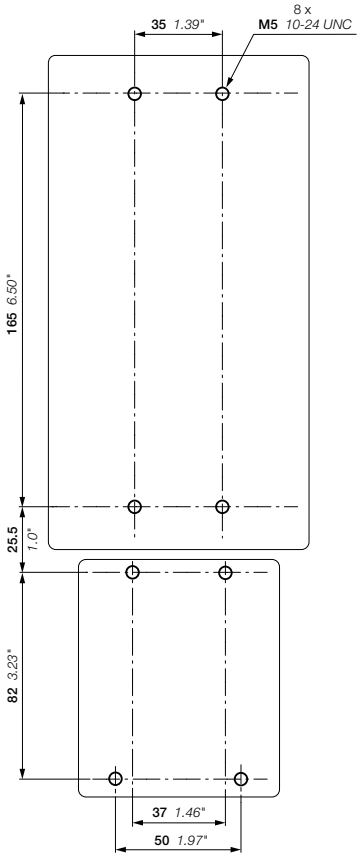
1SFC101119C0201

AF190, AF205 3-pole contactors

Dimensions







AF190, AF205-30-11
+ TA200DU thermal overload relay

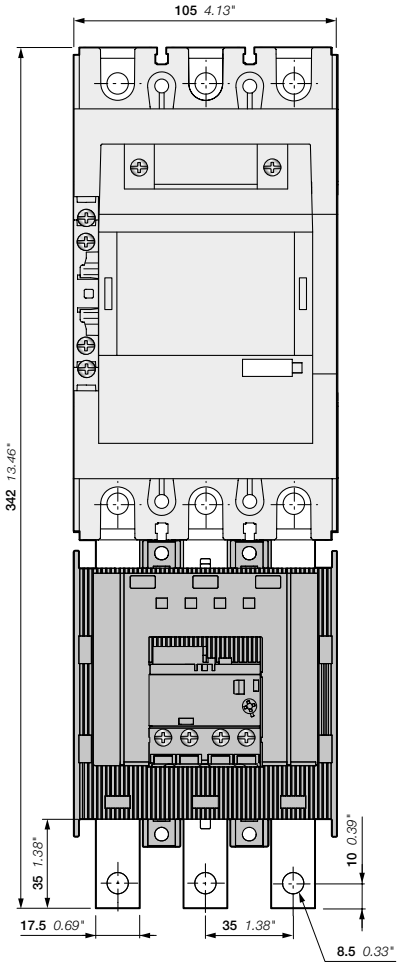
AF190, AF205
+ TA200DU thermal overload relay

Main dimensions mm, inches

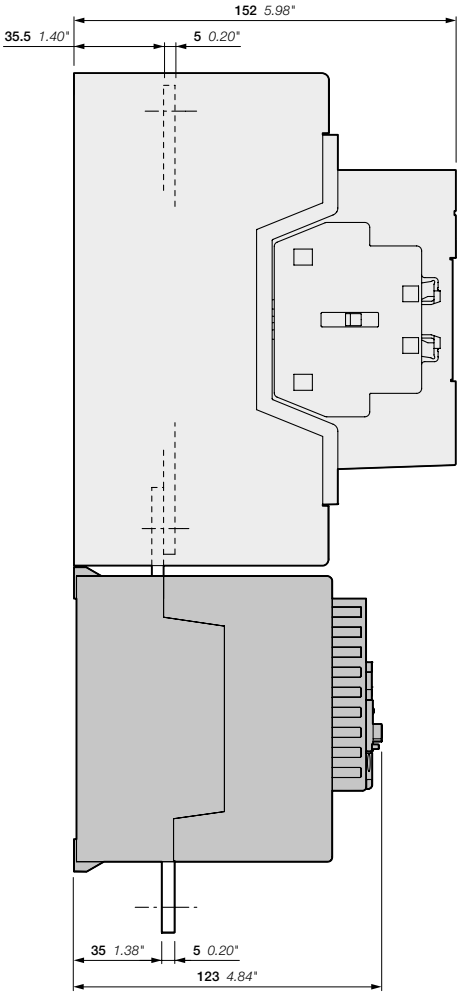
1SFC101119C0201

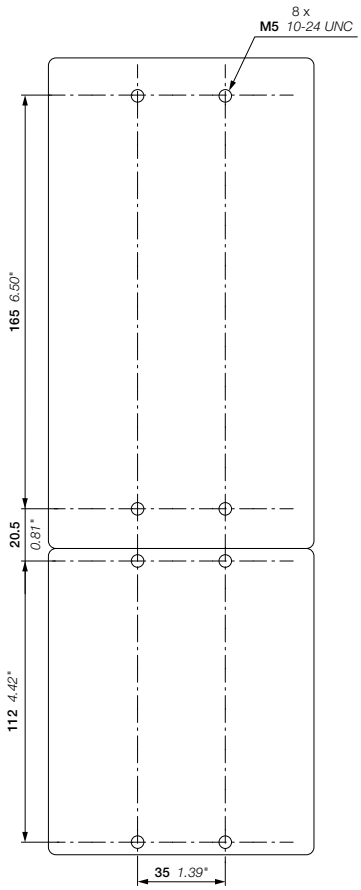
AF190, AF205 3-pole contactors

Dimensions



AF190, AF205-30-11
+ EF205 electronic overload relay





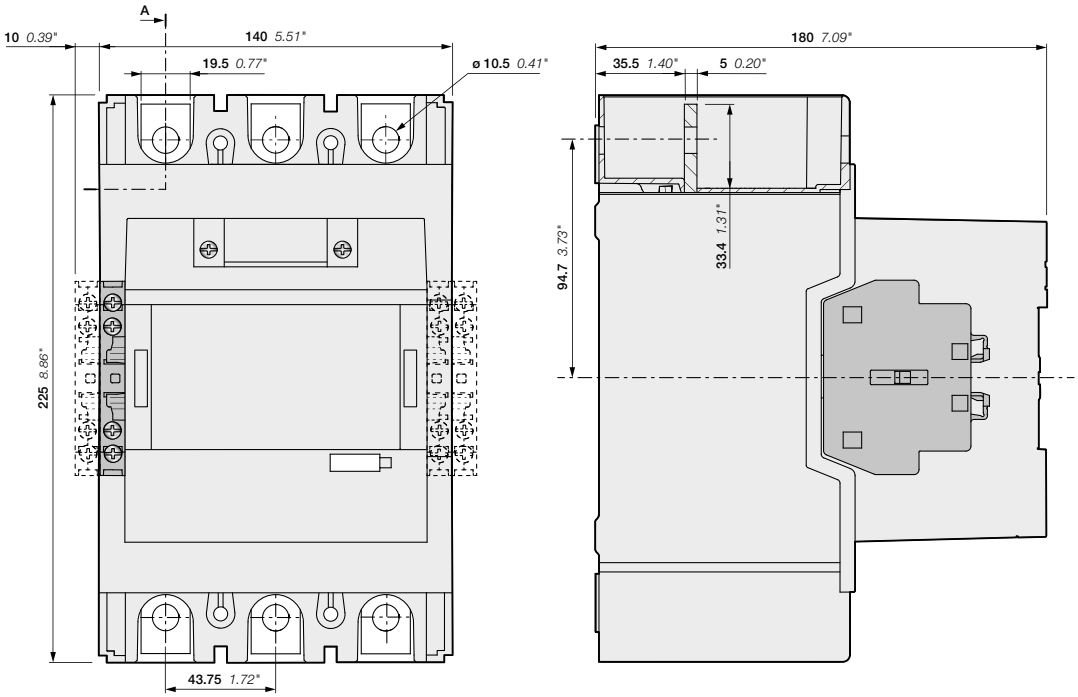
AF190, AF205
+ EF205 electronic overload relay

Main dimensions mm, inches

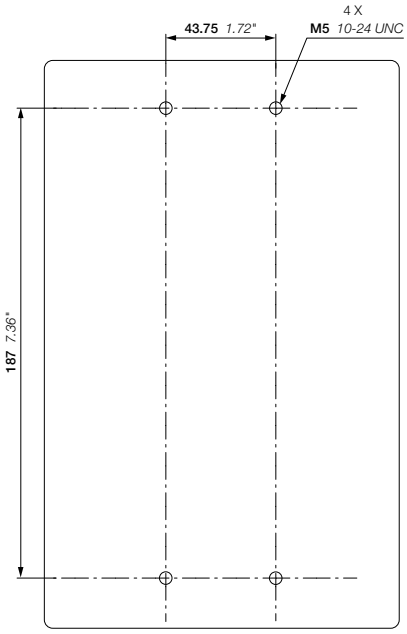
1SFC101119C0201

AF265, AF305, AF370 3-pole contactors

Dimensions



AF265, AF305, AF370-30-00 + CAL19 2-pole contact block
AF265, AF305, AF370-30-11



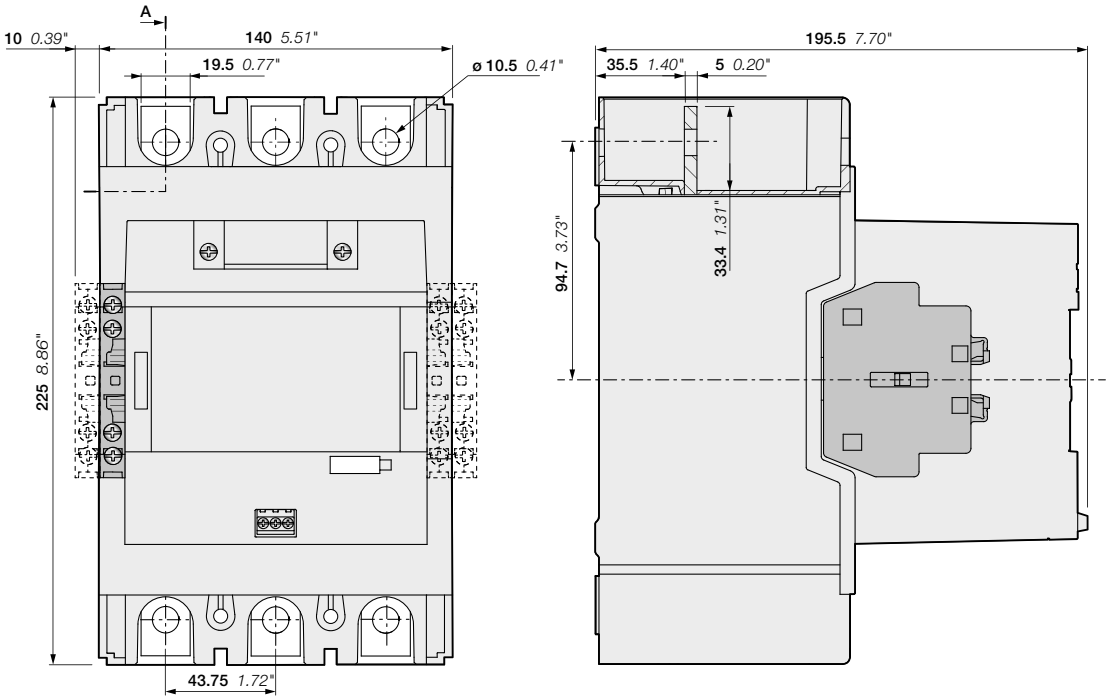
AF265, AF305, AF370

Main dimensions mm, inches

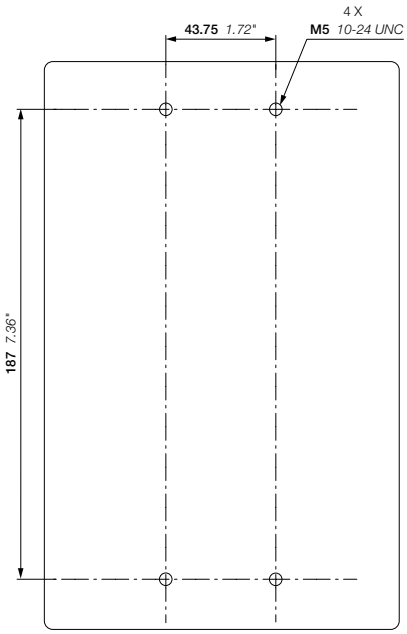
1SFC101120C0201 - Rev. B

AF265, AF305, AF370 3-pole contactors with built-in PLC interface (coil code 33, 34)

Dimensions



AF265, AF305, AF370-30-00 + CAL19 2-pole contact block
AF265, AF305, AF370-30-11



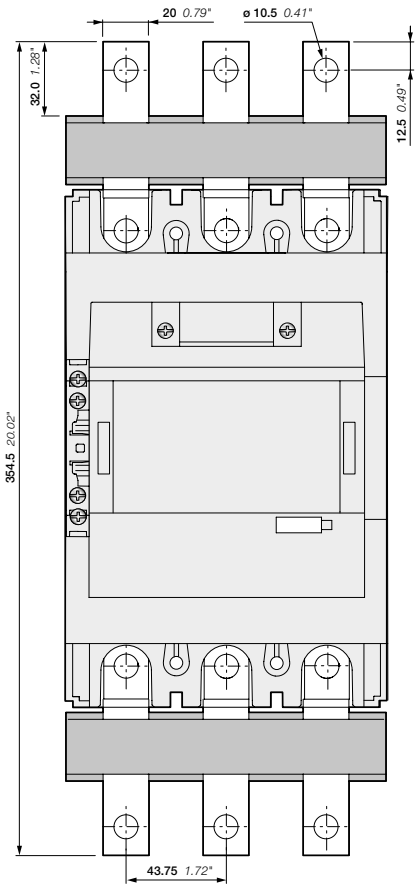
AF265, AF305, AF370

Main dimensions mm, inches

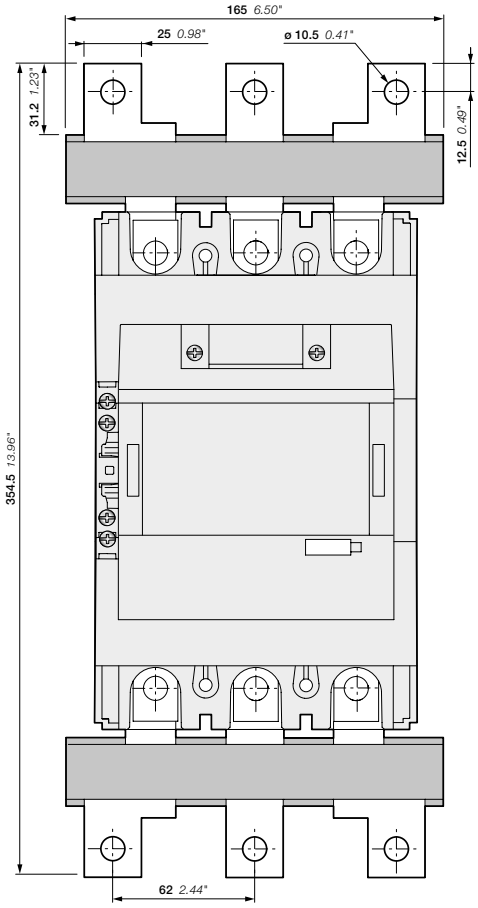
1SFC101120C0201 - Rev. B

AF265, AF305, AF370 3-pole contactors

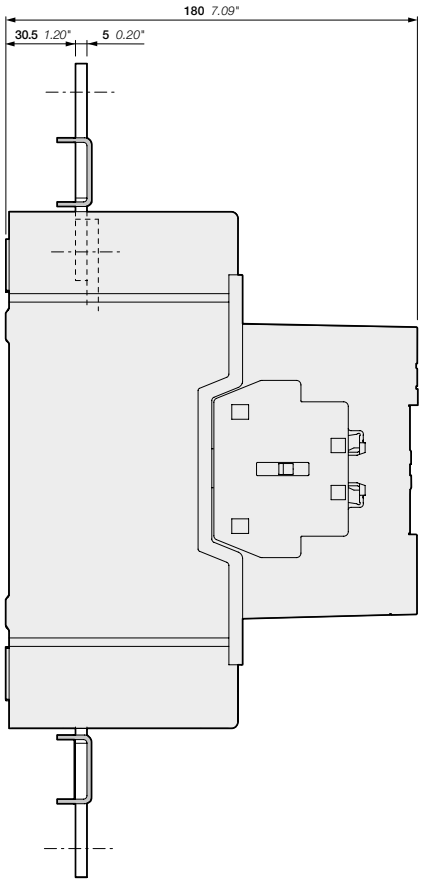
Dimensions



AF265, AF305, AF370-30-11
+ LX370 terminal extension



AF265, AF305, AF370-30-11
+ LW370 terminal enlargement

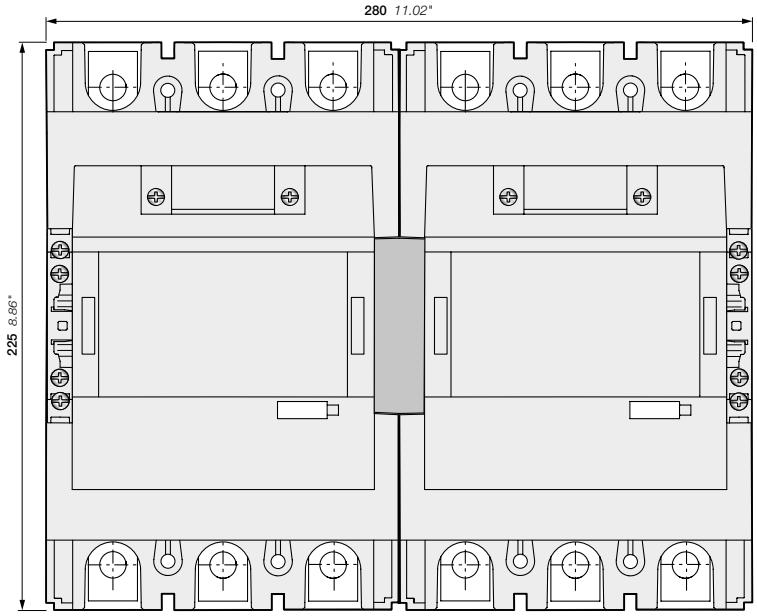


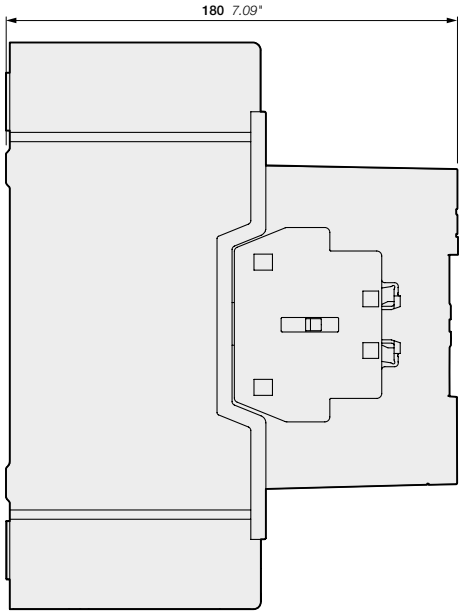
Main dimensions mm, inches

1SFC101120C0201 - Rev. B

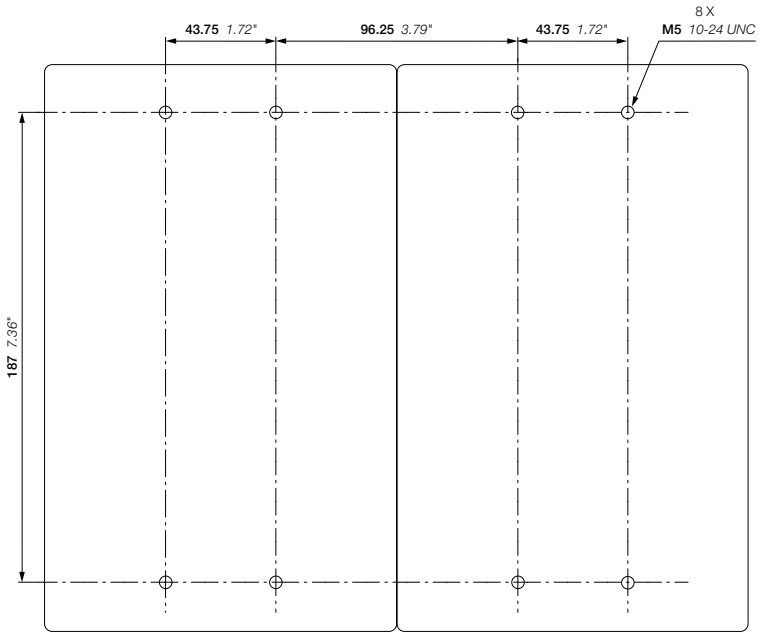
AF265, AF305, AF370 3-pole contactors

Dimensions





AF265, AF305, AF370-30-11
+ VM19 mechanical interlocking unit



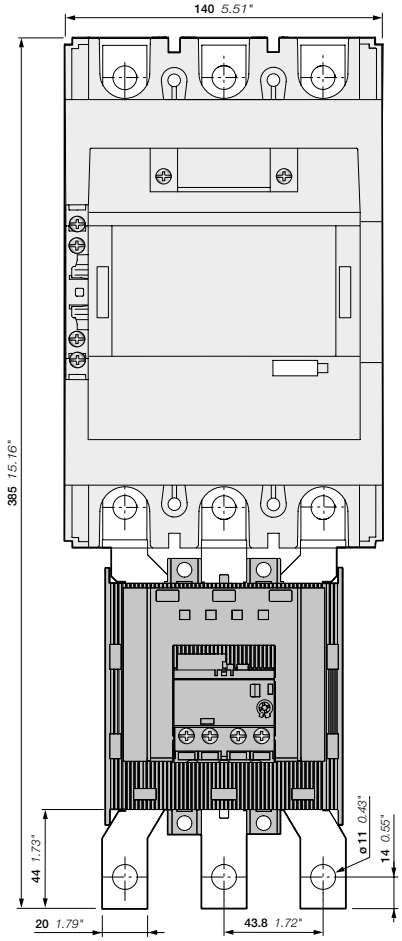
AF265, AF305, AF370
+ VM19 mechanical interlocking unit

Main dimensions mm, inches

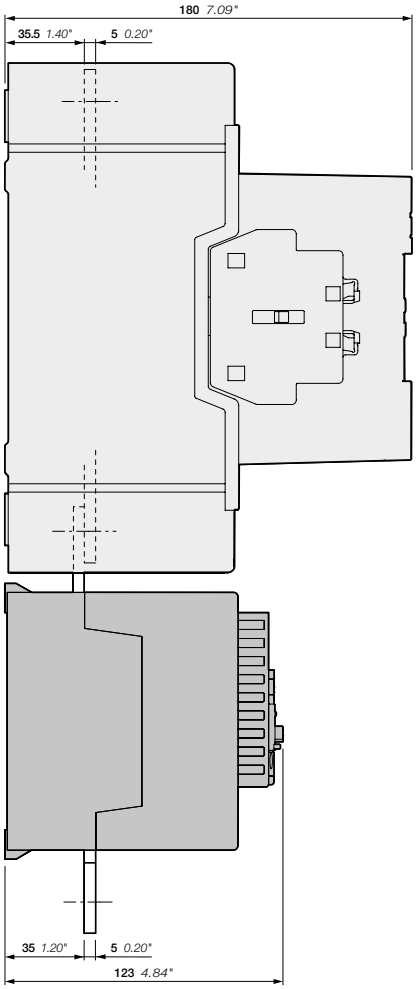
1SFC101120C0201 - Rev. B

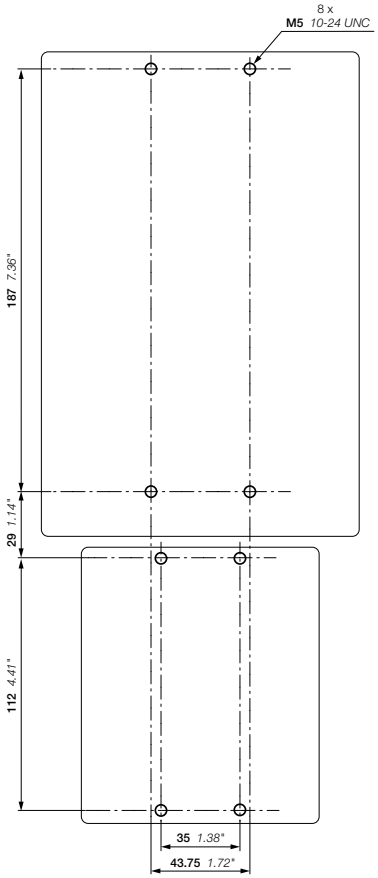
AF265, AF305, AF370 3-pole contactors

Dimensions



AF265, AF305, AF370-30-11
+ EF370 electronic overload relay





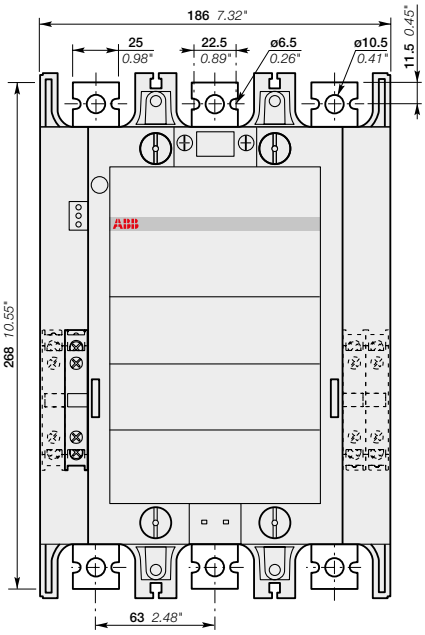
AF265, AF305, AF370
+ EF370 electronic overload relay

Main dimensions mm, inches

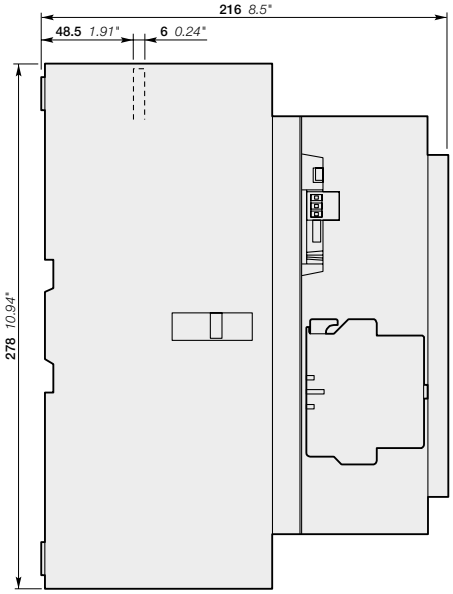
1SFC101120C0201 - Rev. B

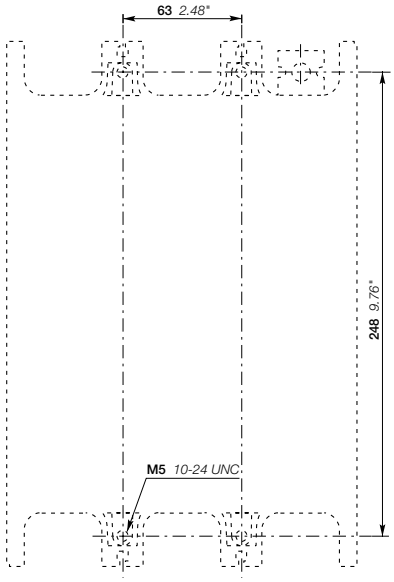
AF400 and AF460 3-pole contactors

Dimensions

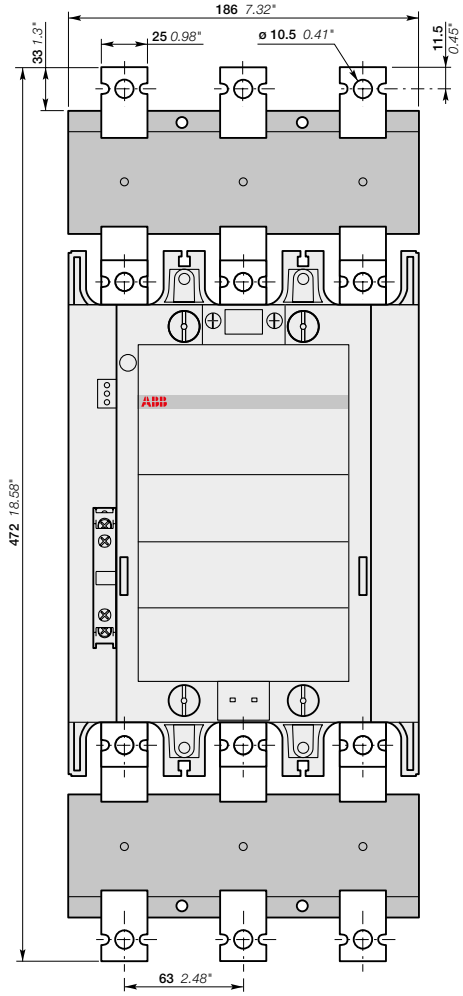


AF400, AF460-30-11

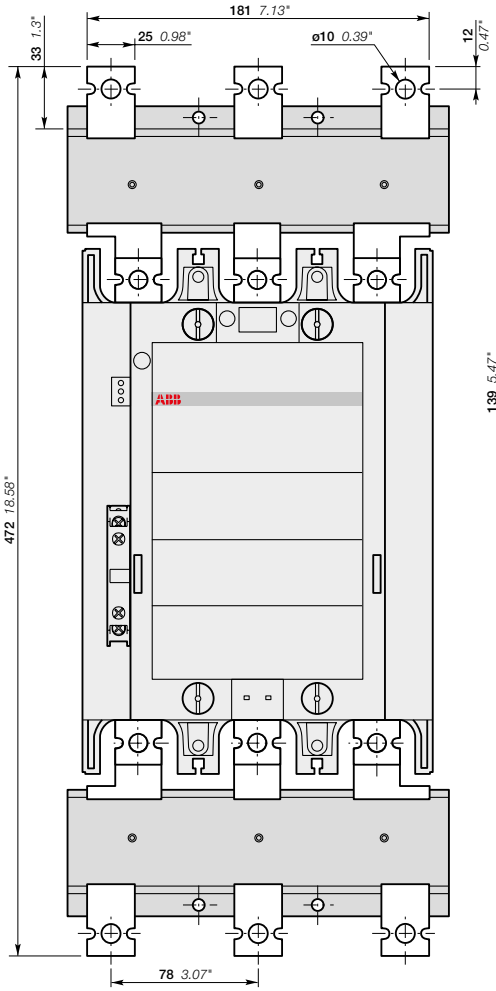




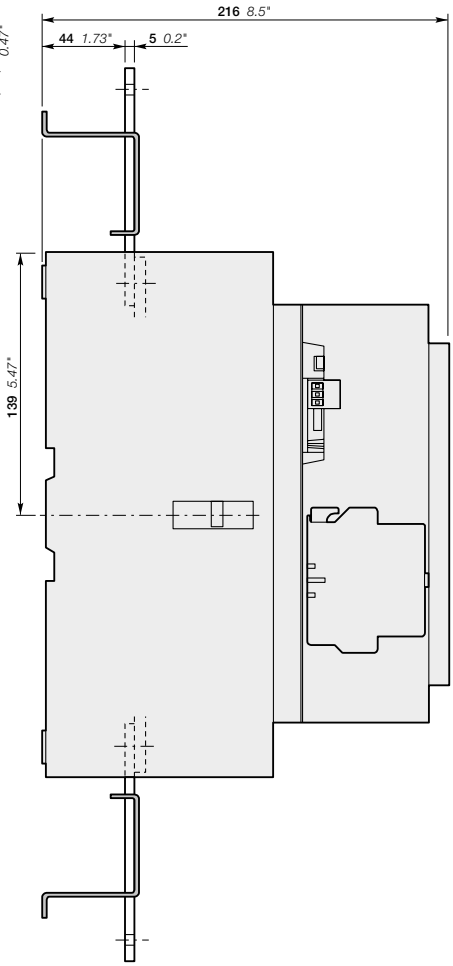
AF400, AF460



AF400, AF460-30-11
+ LX460 terminal extension



AF400, AF460-30-11
+ LW460 terminal enlargement

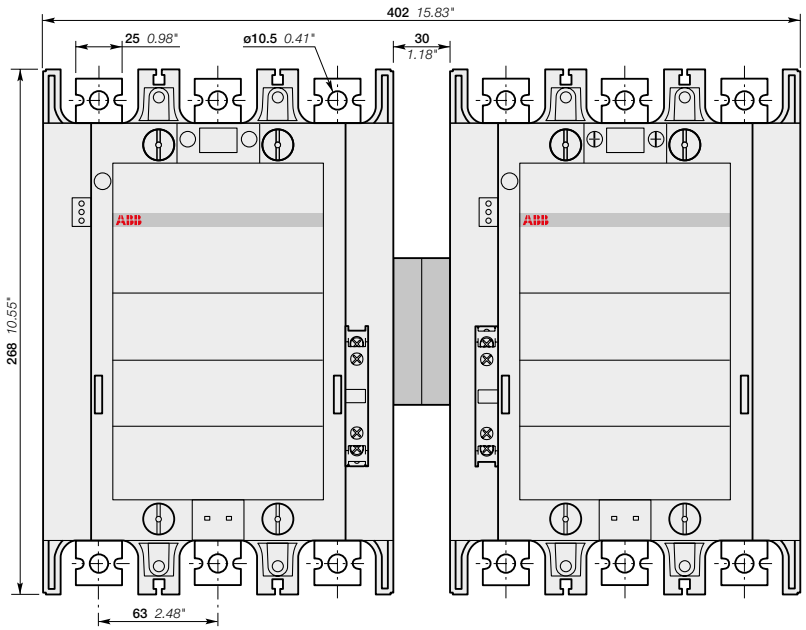


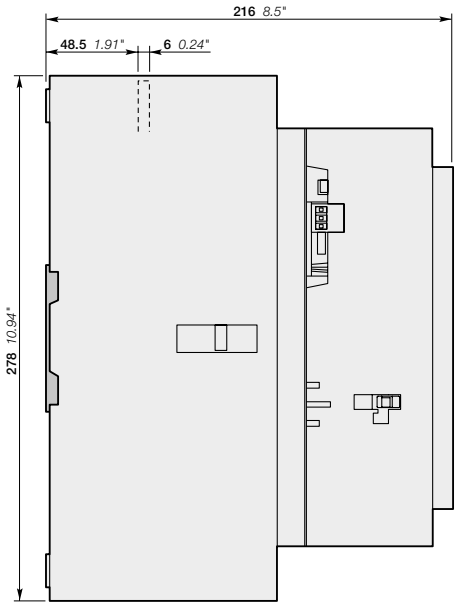
Main dimensions mm, inches

1SFC101121C0201 - Rev. A

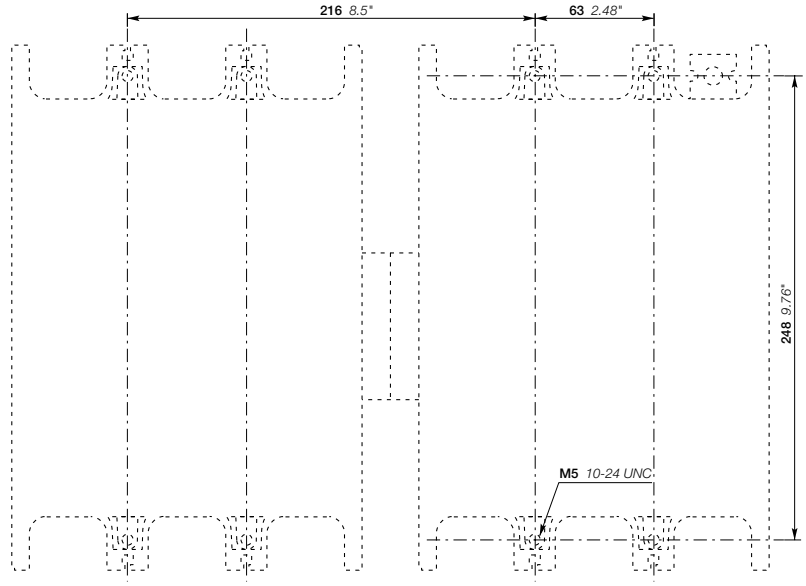
AF400 and AF460 3-pole contactors

Dimensions





AF400, AF460-30-11
+ VM750H mechanical interlock unit



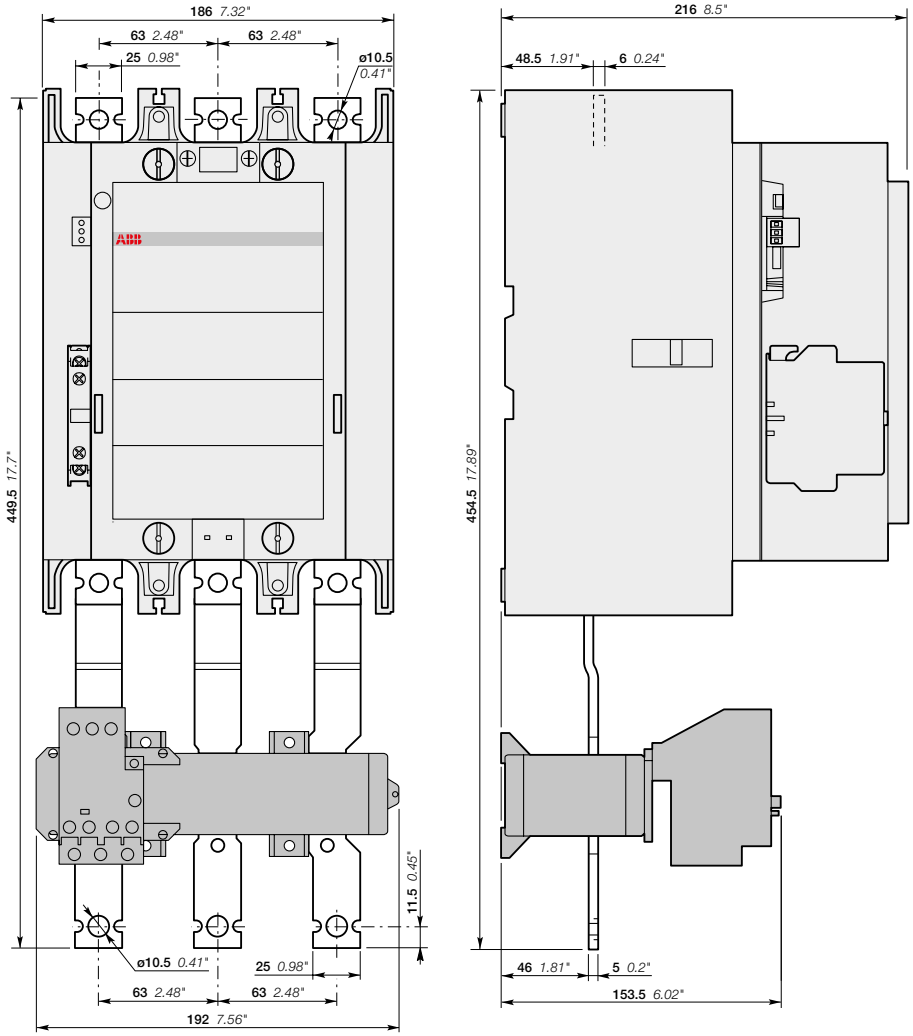
AF400, AF460
+ VM750H mechanical interlock unit

Main dimensions mm, inches

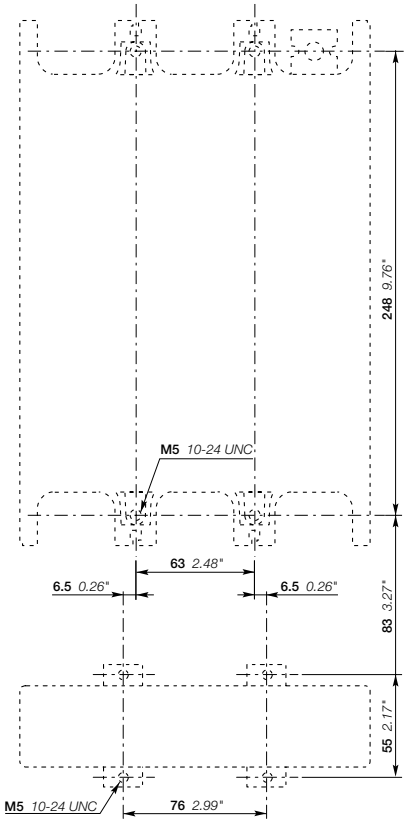
1SFC101121C0201 - Rev. A

AF400 and AF460 3-pole contactors

Dimensions



AF400, AF460-30-11
+ EF460 electronic O/L relay



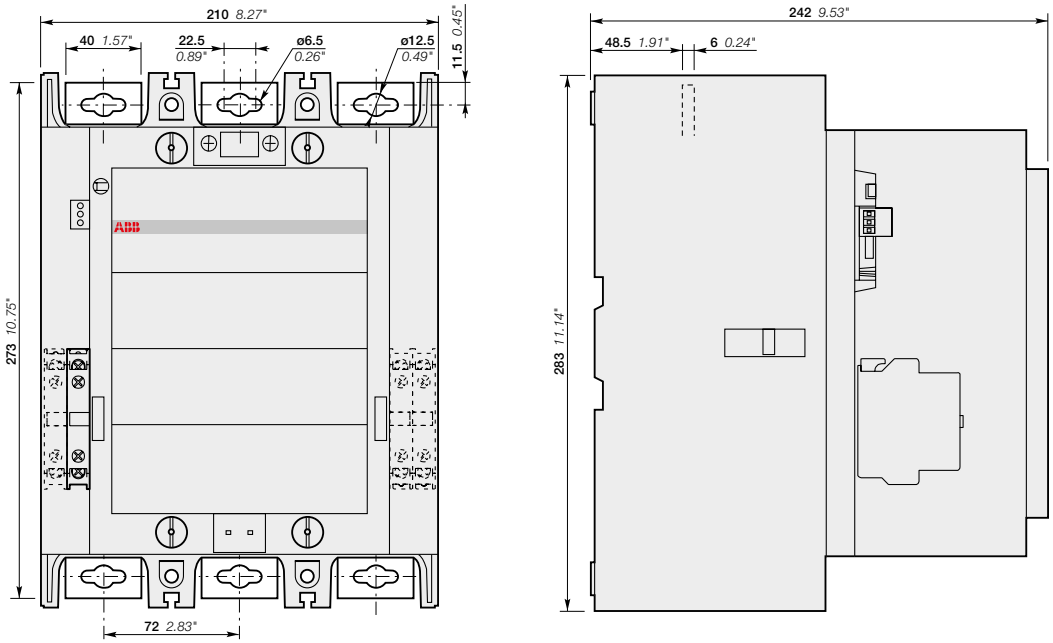
AF400, AF460
+ EF460 electronic O/L relay

Main dimensions mm, inches

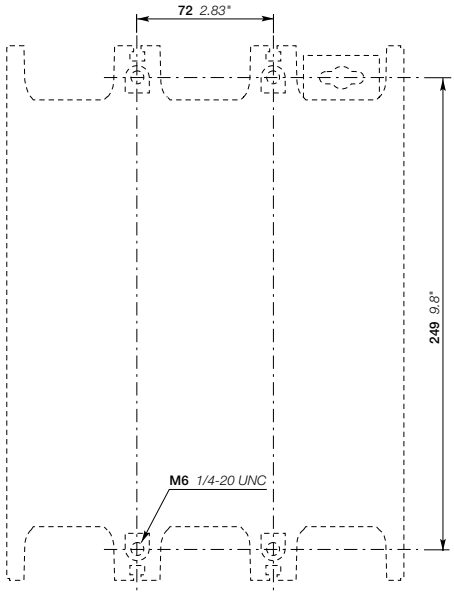
1SFC101121C0201 - Rev. A

AF580 and AF750 3-pole contactors

Dimensions



AF580 and AF750-30-11



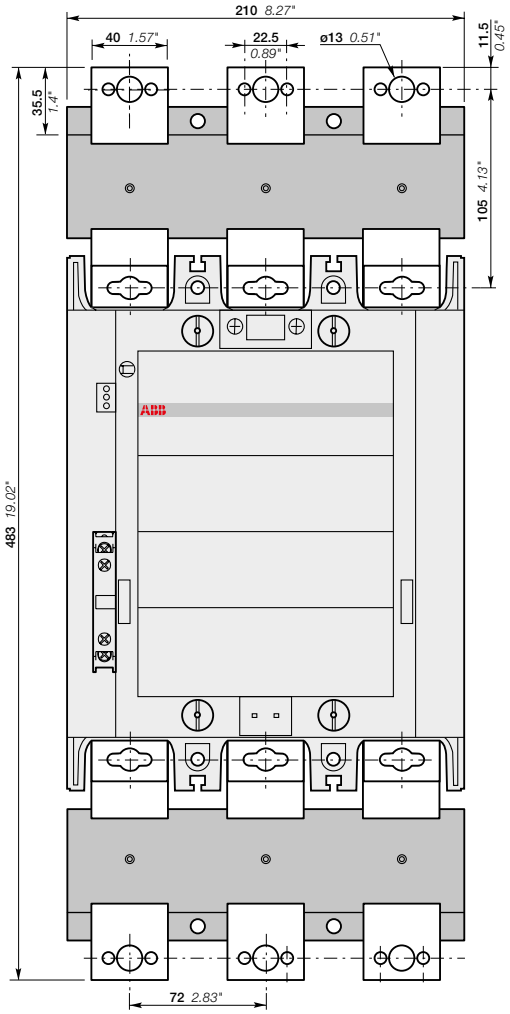
AF580 and AF750

Main dimensions mm, inches

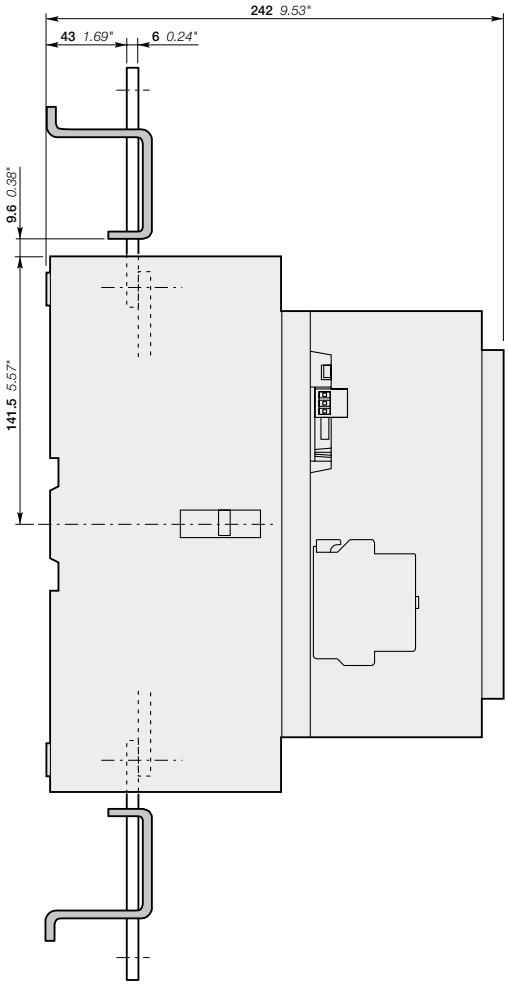
1SFC101122C0201

AF580 and AF750 3-pole contactors

Dimensions



AF580 and AF750-30-11
+ LX750 terminal extension

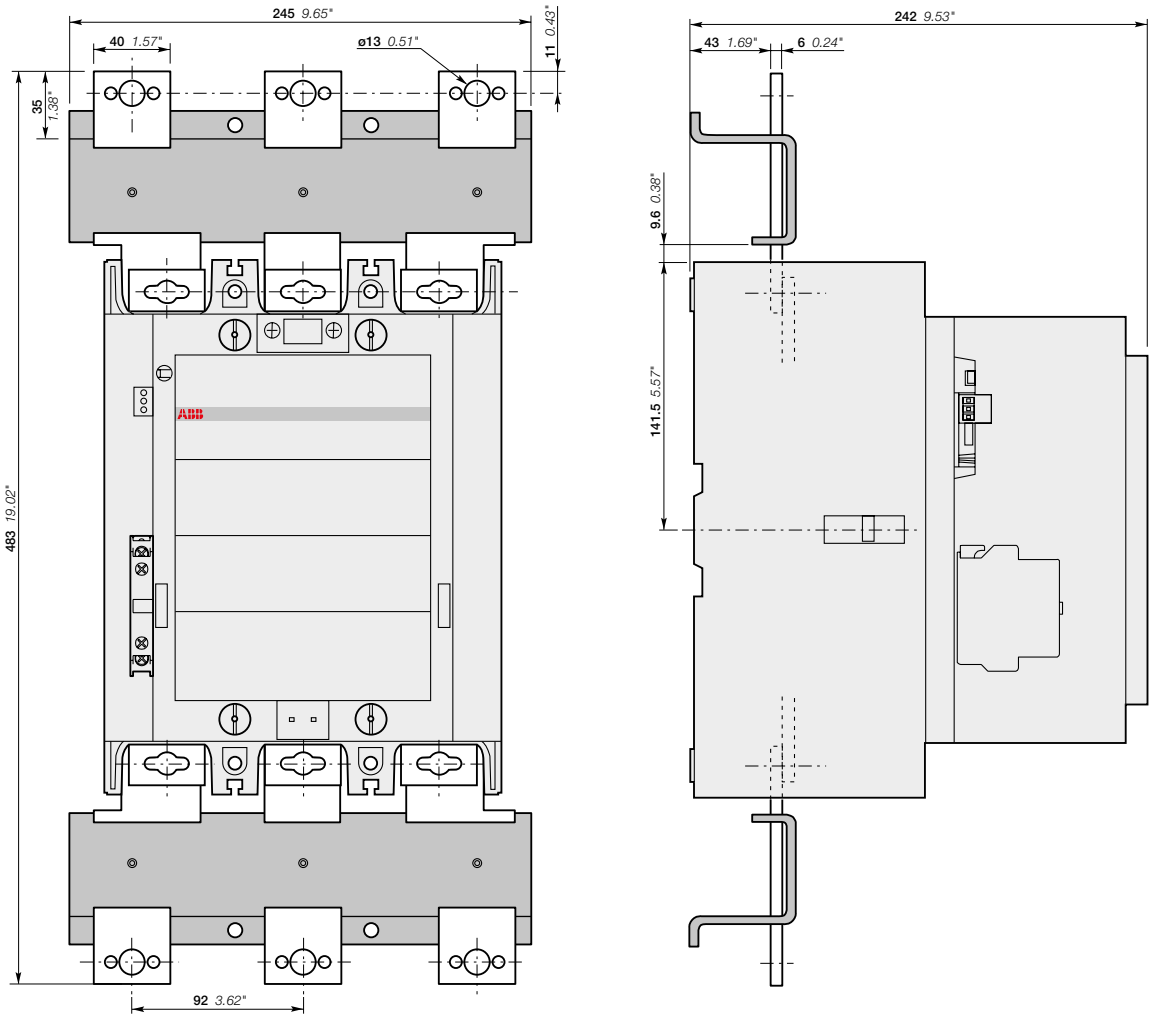


Main dimensions mm, inches

1SFC101122C0201

AF580 and AF750 3-pole contactors

Dimensions



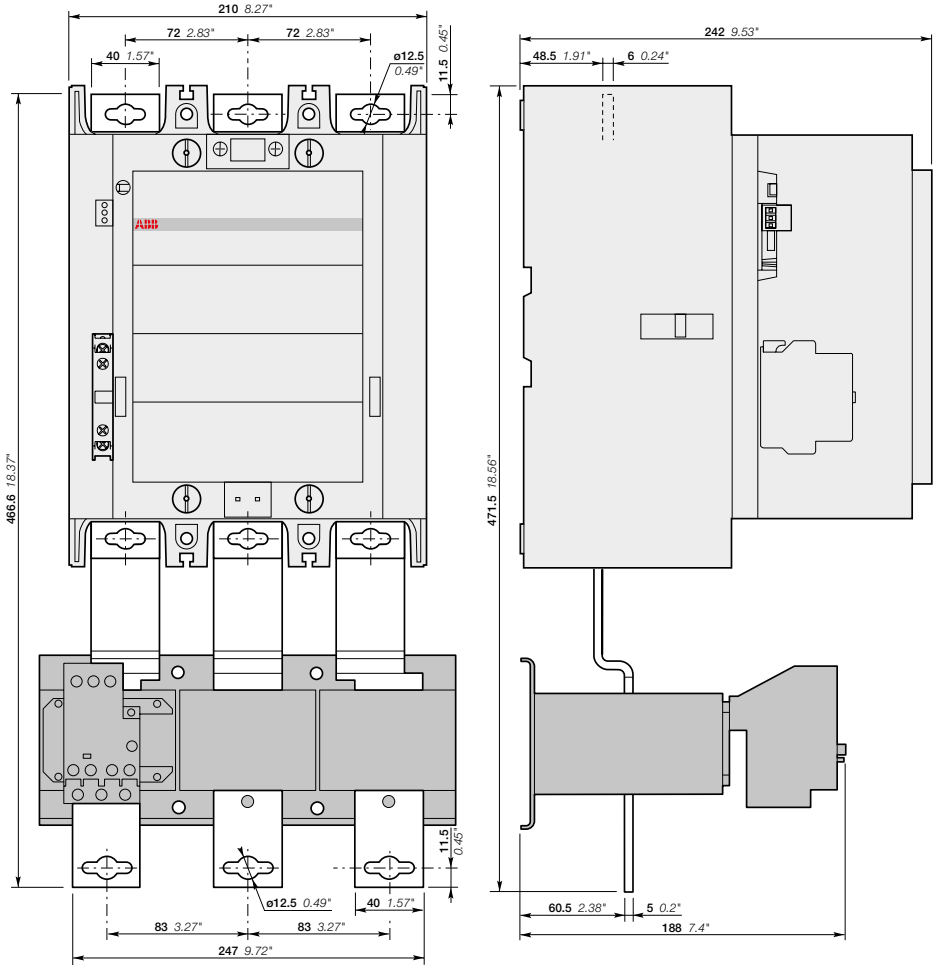
AF580 and AF750-30-11
+ LW750 terminal enlargement

Main dimensions mm, inches

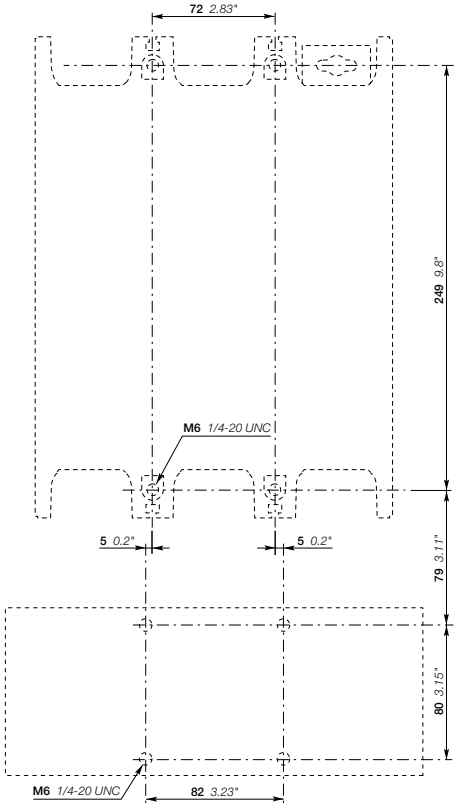
1SFC101122C0201

AF580 and AF750 3-pole contactors

Dimensions



AF580 and AF750-30-11
+ EF750 electronic O/L relay



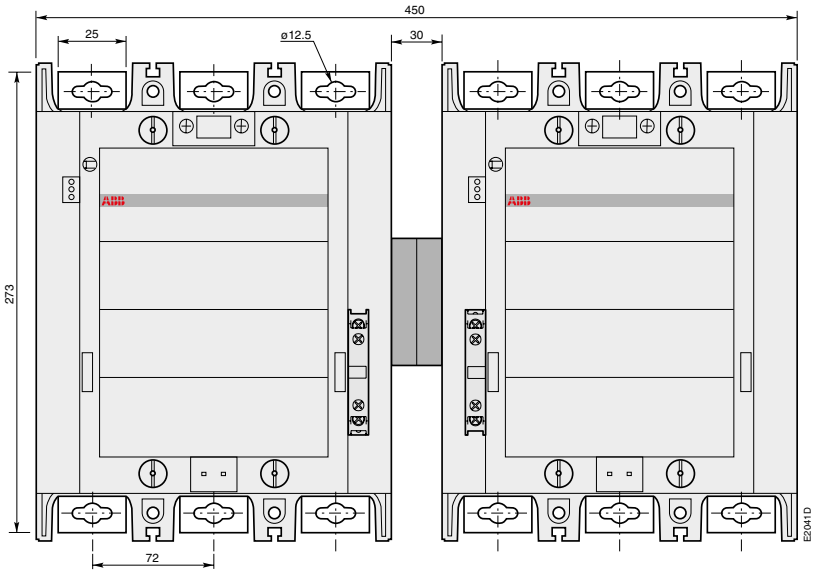
AF580 and AF750
+ EF750 electronic O/L relay

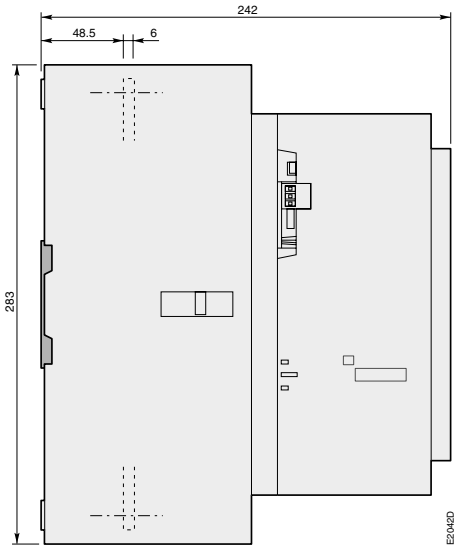
Main dimensions mm, inches

1SFC101122C0201

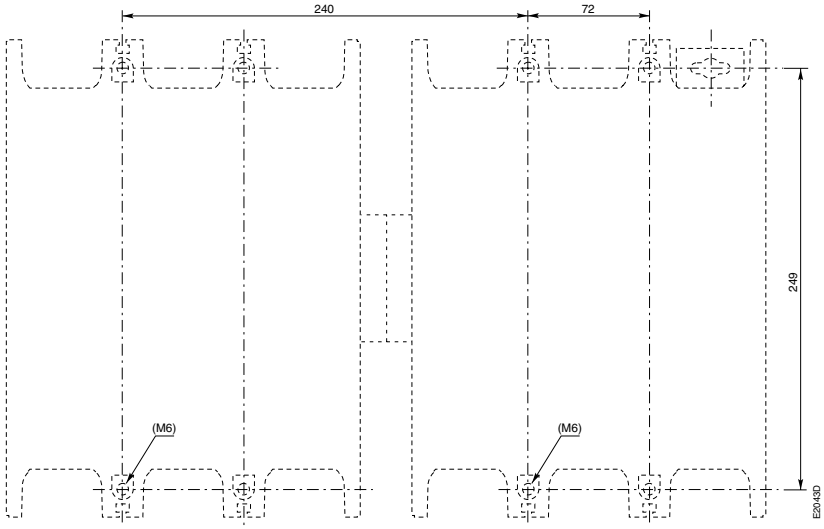
AF580 and AF750 3-pole contactors

Dimensions





AF580 and AF750-30-11
+ VM 750H mechanical interlock unit



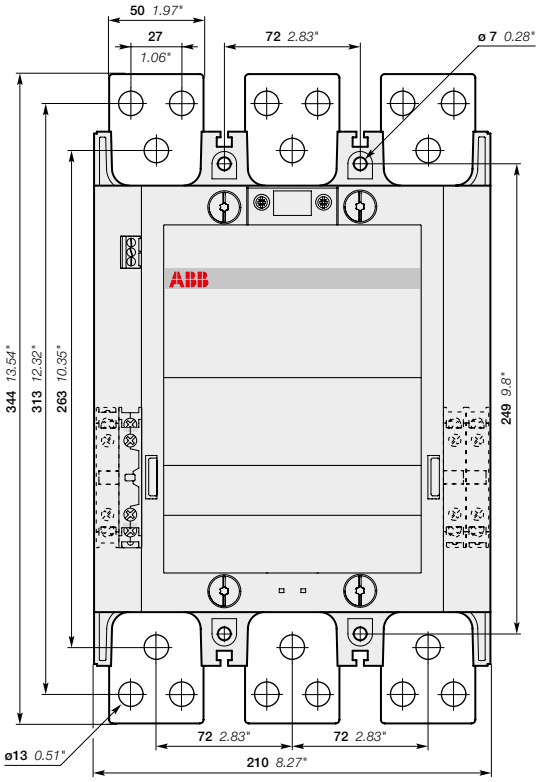
AF580 and AF750
+ VM 750H mechanical interlock unit

Main dimensions mm, inches

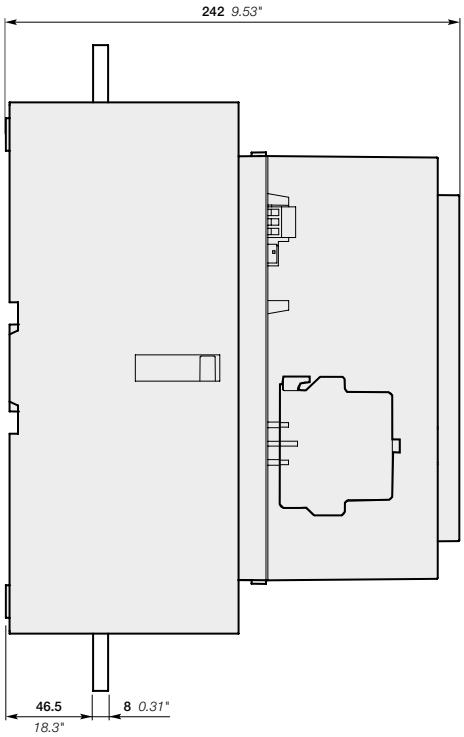
1SFC101122C0201

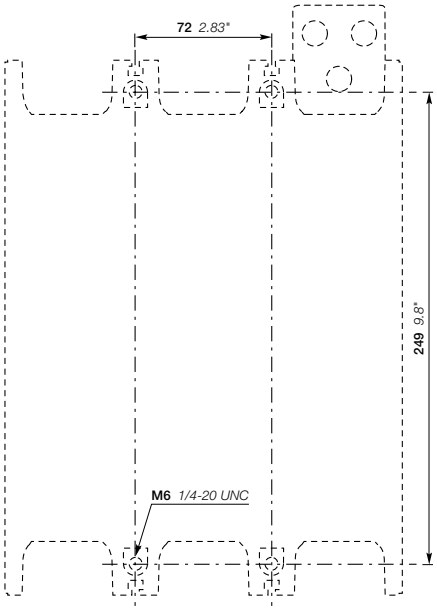
AF1250 3-pole contactors

Dimensions



AF1250-30-11





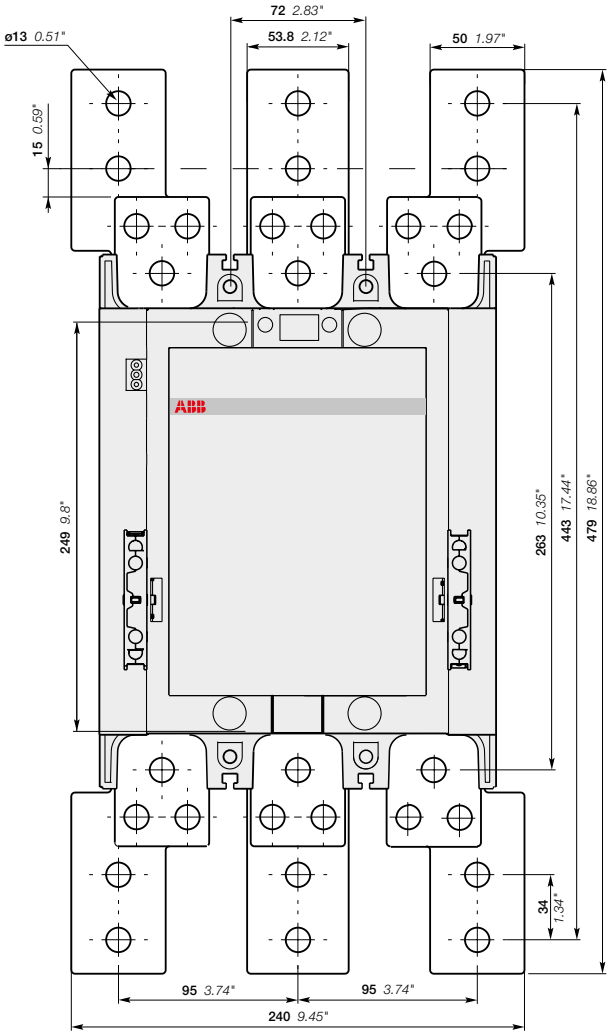
AF1250

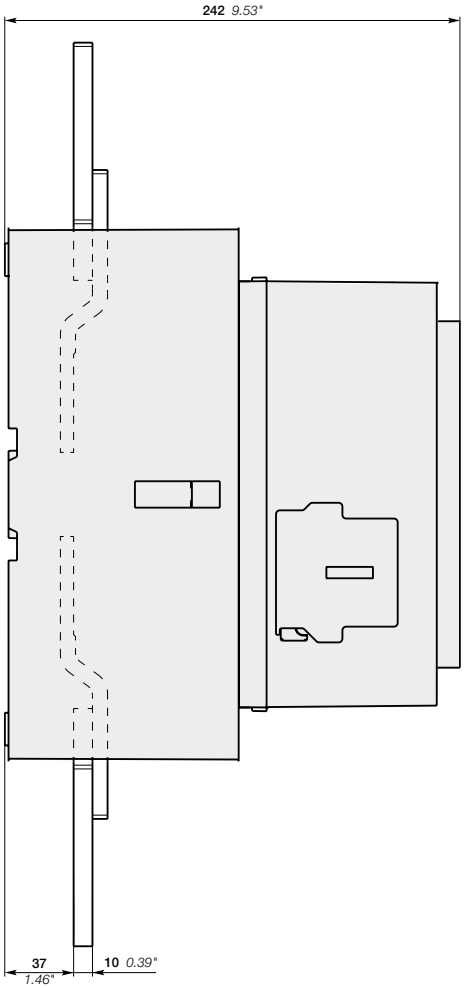
Main dimensions mm, inches

1SFC101136C0201

AF1250 3-pole contactors

Dimensions





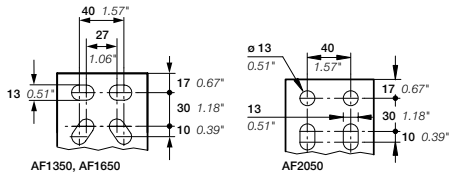
AF1250-30-11
+ LW1250 terminal enlargement

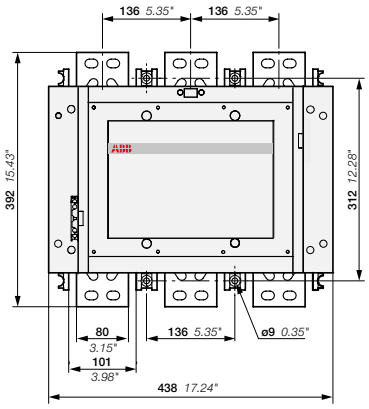
Main dimensions mm, inches

1SFC101136C0201

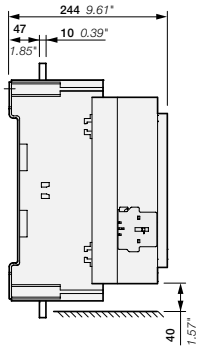
AF1350, AF1650, AF2050 and AF2850 3-pole contactors

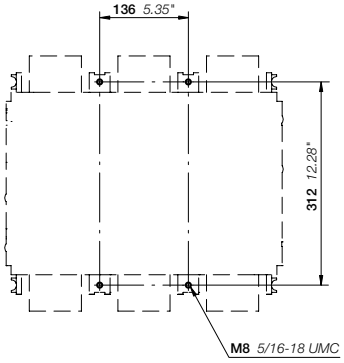
Dimensions



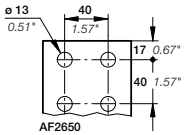


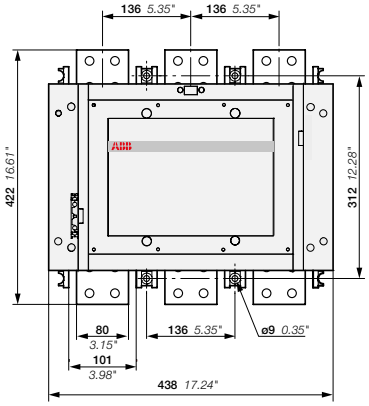
AF1350, AF1650, AF2050-30-11



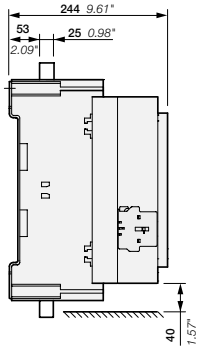


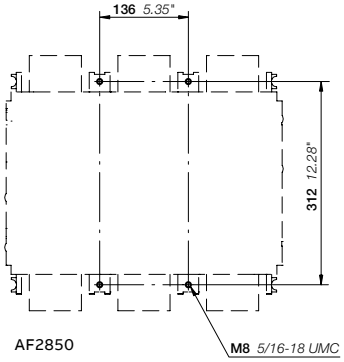
AF1350, AF1650, AF2050





AF2850-30-11





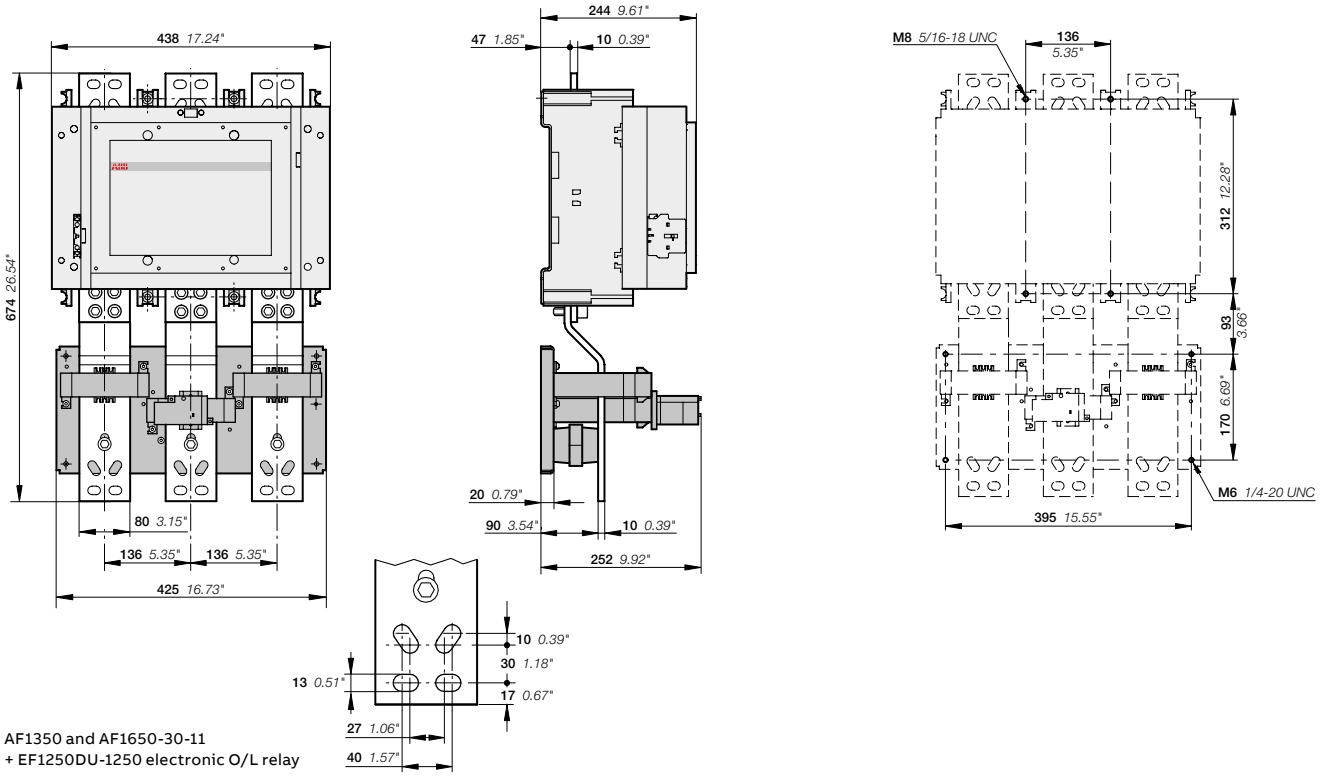
AF2850

Main dimensions mm, inches

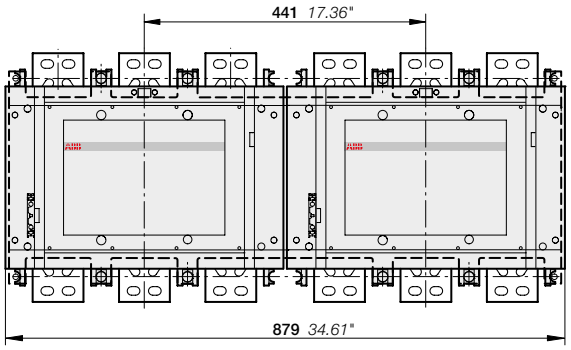
1SFC101123C0201 - Rev. B

AF1350, AF1650, AF2050 and AF2850 3-pole contactors

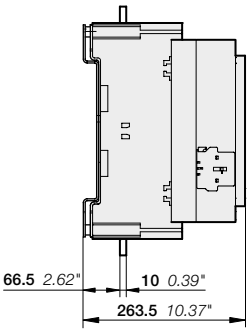
Dimensions



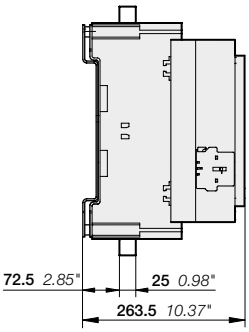
AF1350 and AF1650-30-11
+ EF1250DU-1250 electronic O/L relay



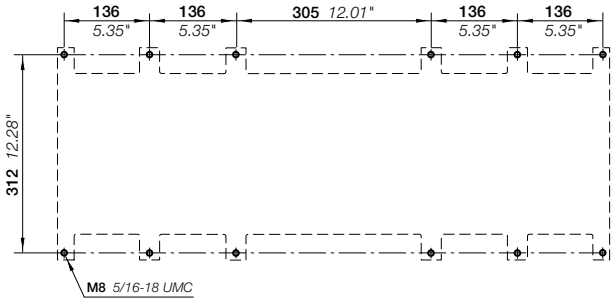
AF1350, AF1650, AF2050, AF2850-30-11
+ VM 1650H mechanical interlock unit



AF1350, AF1650, AF2050



AF2850



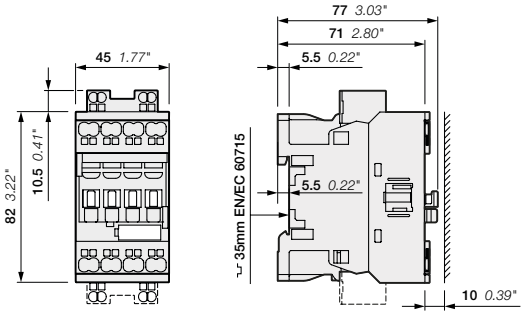
AF1350, AF1650, AF2050, AF2850
+ VM 1650H mechanical interlock unit

Main dimensions mm, inches

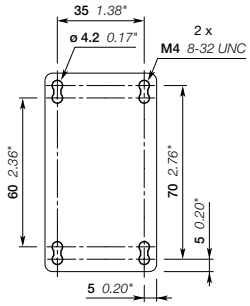
1SFC101123C0201 - Rev. B

AF09..K, AF12..K, AF16..K 3-pole contactors - with Push-in Spring terminals

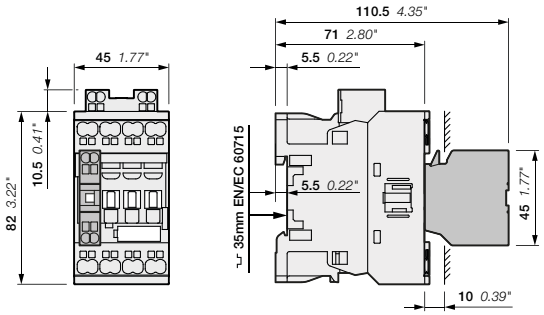
Dimensions



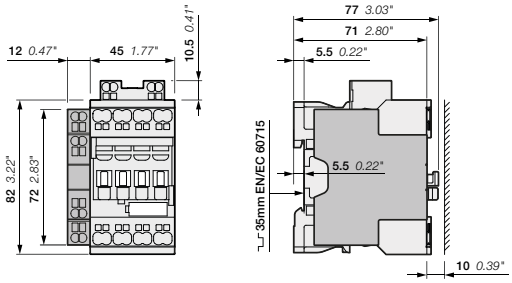
AF09..K, AF12..K, AF16..K



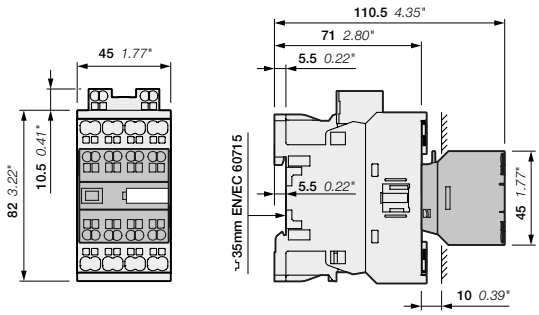
AF09..K, AF12..K, AF16..K



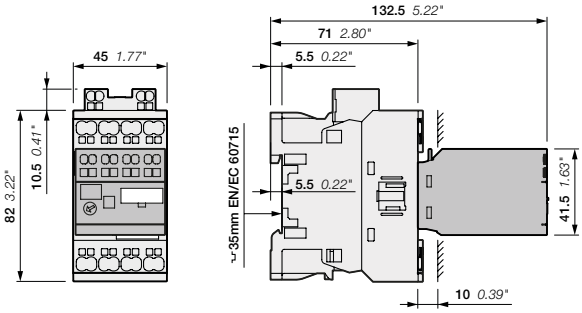
AF09..K, AF12..K, AF16..K
+ CA4..K 1-pole auxiliary contact block



AF09..K, AF12..K, AF16..K
+ CAL4-11K 2-pole auxiliary contact block



AF09..K, AF12..K, AF16..K
+ CA4..K 4-pole auxiliary contact block



AF09..K, AF12..K, AF16..K
+ TEF4S electronic timer

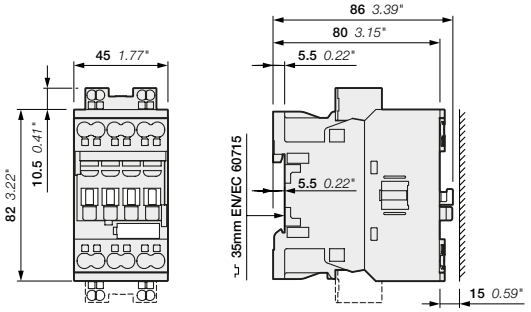
Note: For AF09..K ... AF16..K contactors, lateral distance to grounded component 2 mm 0.08" min
24 V DC operated contactor (coil 30) depth + 20 mm (0.79").

Main dimensions mm, inches

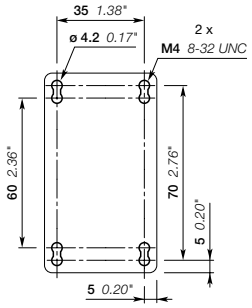
1SBC100412S0201

AF26..K, AF30..K, AF38..K 3-pole contactors - with Push-in Spring terminals

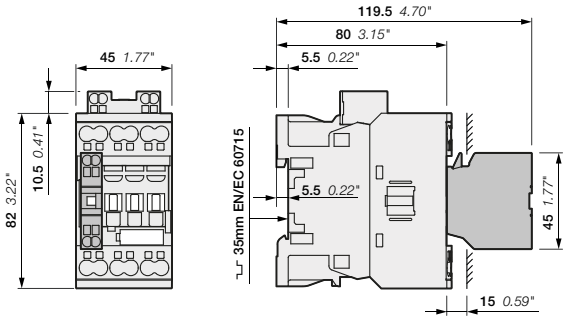
Dimensions



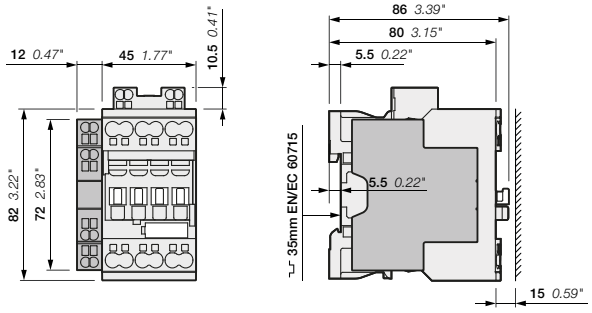
AF26..K, AF30..K, AF38..K



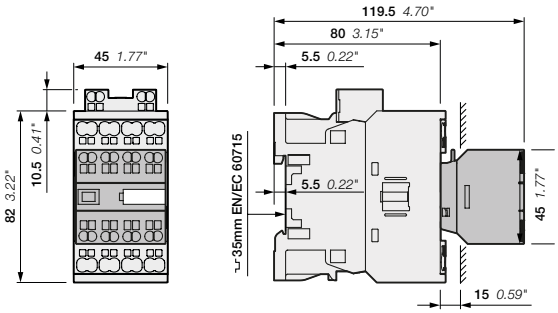
AF26..K, AF30..K, AF38..K



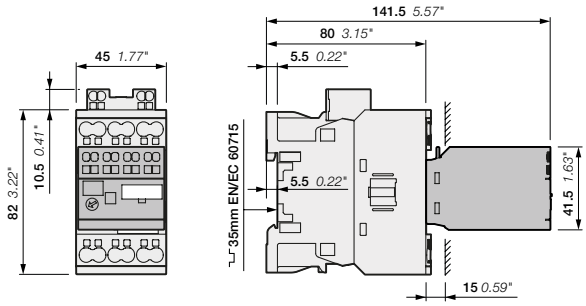
AF26..K, AF30..K, AF38..K
+ CA4..K 1-pole auxiliary contact block



AF26..K, AF30..K, AF38..K
+ CAL4-11K 2-pole auxiliary contact block



AF26..K, AF30..K, AF38..K
+ CA4..K 4-pole auxiliary contact block



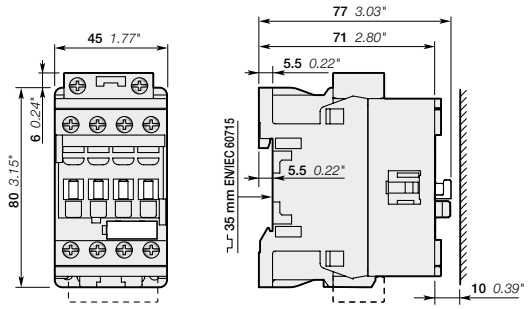
AF26..K, AF30..K, AF38..K
+ TEF4S electronic timer

Note: For AF26..K ... AF38..K contactors, lateral distance to grounded component 2 mm 0.08" min
24 V DC operated contactor (coil 30) depth + 20 mm (0.79").

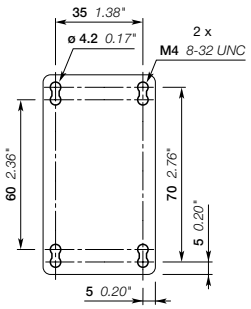
Main dimensions mm, inches

1SBC100423S0201

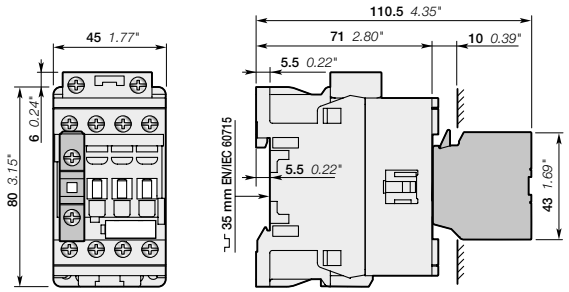
AF09, AF16 4-pole contactors



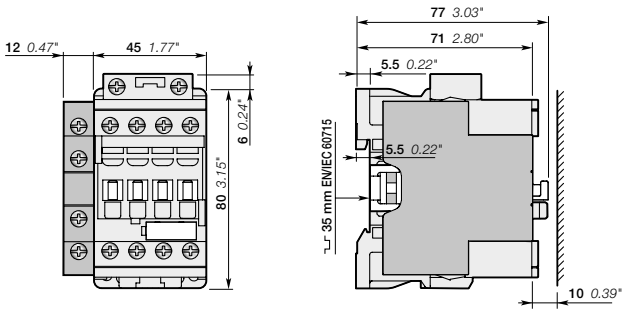
AF09, AF16



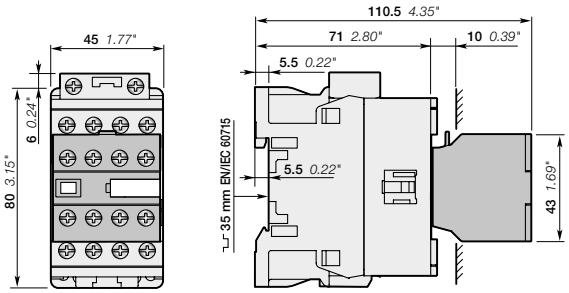
AF09, AF16



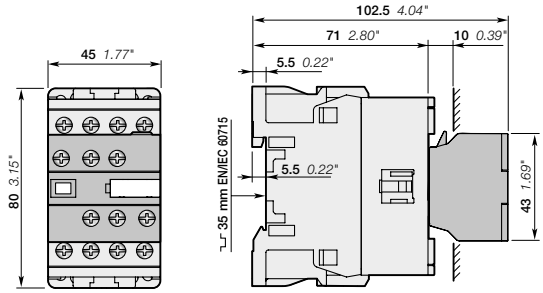
AF09, AF16
+ CA4, CC4 1-pole auxiliary contact block



AF09, AF16
+ CAL4-11 2-pole auxiliary contact block



AF09, AF16
+ CA4 4-pole auxiliary contact block

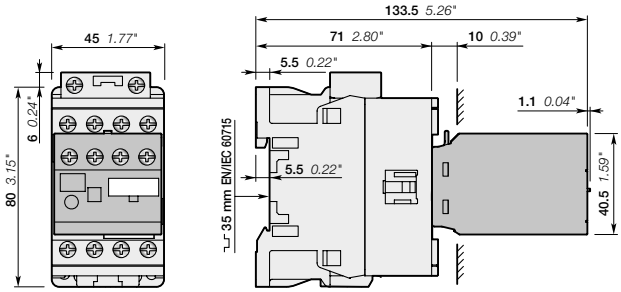


AF09, AF16
+ CAT4 2-pole auxiliary contact and coil terminal block

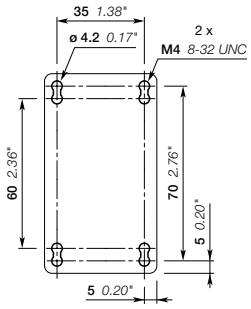
(1) Note: contactor lateral distance to grounded component 2 mm 0.08" min.
24 V DC operated contactor (coil 30) depth + 20 mm 0.79".

Main dimensions mm, inches (1)

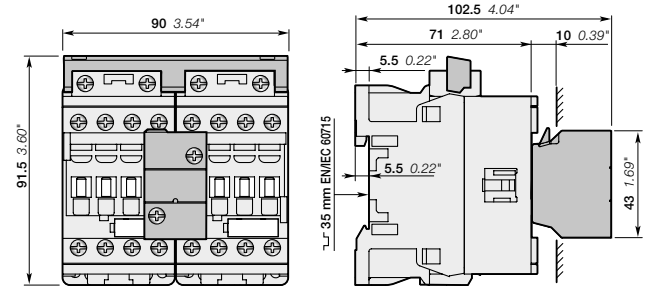
AF09, AF16 4-pole contactors



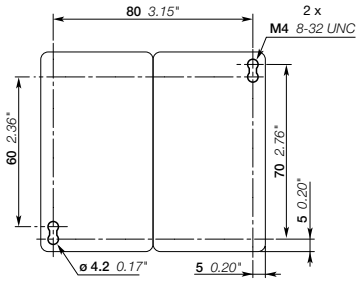
AF09, AF16
+ TEF4 electronic timer



AF09, AF16



AF09..-40-00, AF16..-40-00
+ VEM4 mechanical and electrical interlock set



AF09..-40-00, AF16..-40-00
+ VEM4 mechanical and electrical interlock set

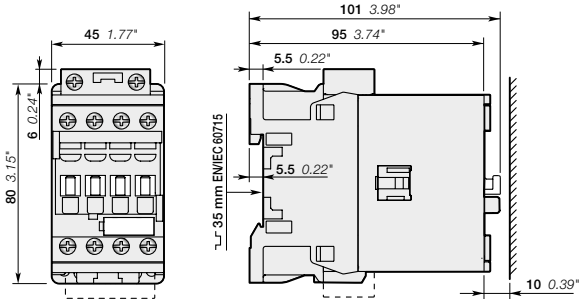
(1) Note: contactor lateral distance to grounded component 2 mm 0.08" min.
24 V DC operated contactor (coil 30) depth + 20 mm 0.79".

Main dimensions mm, inches (1)

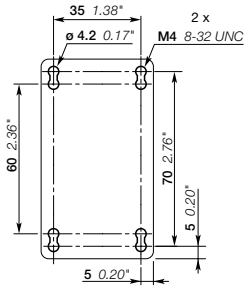
1SBC101485S0201 - Rev. B

AF26, AF38 4-pole contactors

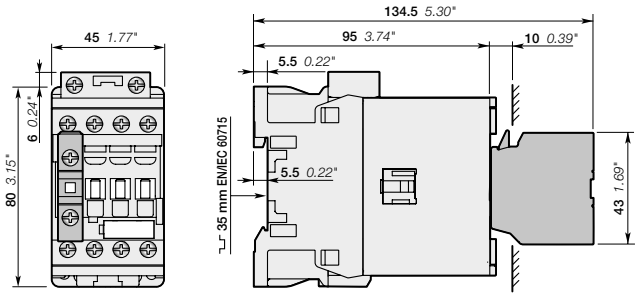
Dimensions



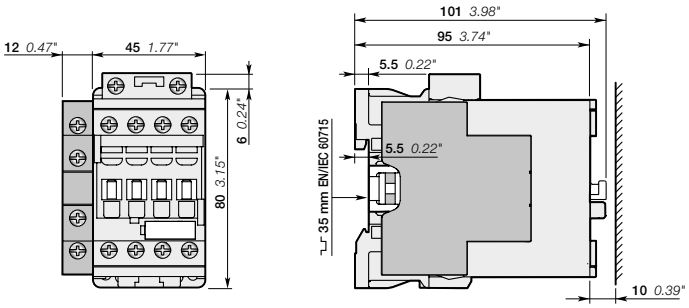
AF26, AF38



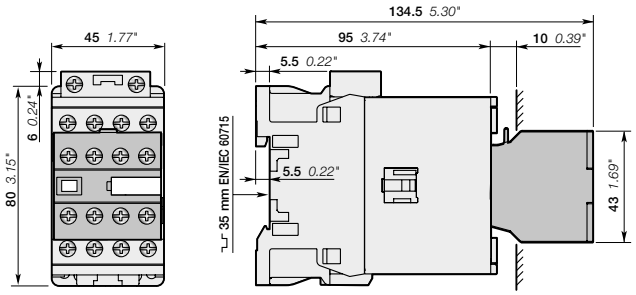
AF26, AF38



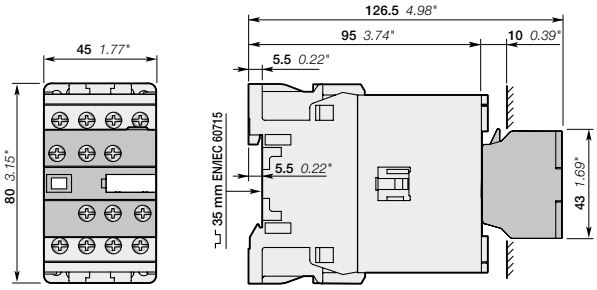
AF26, AF38
+ CA4, CC4 1-pole auxiliary contact block



AF26, AF38
+ CAL4-11 2-pole auxiliary contact block



AF26, AF38
+ CA4 4-pole auxiliary contact block



AF26, AF38
+ CAT4 2-pole auxiliary contact and coil terminal block

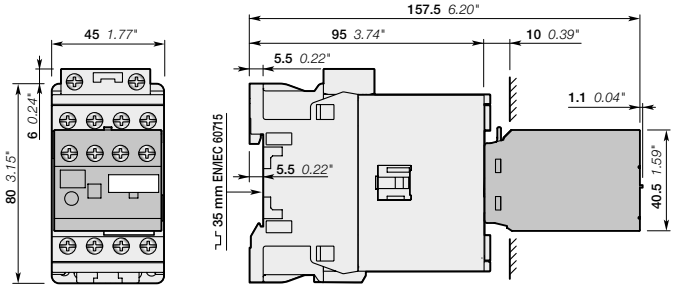
Note: For AF26 and AF38 contactors, lateral distance to grounded component 2 mm 0.08" min.

Main dimensions mm, inches

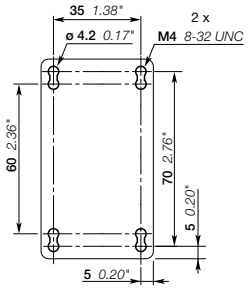
1SBC101486S0201 - Rev. A

AF26, AF38 4-pole contactors

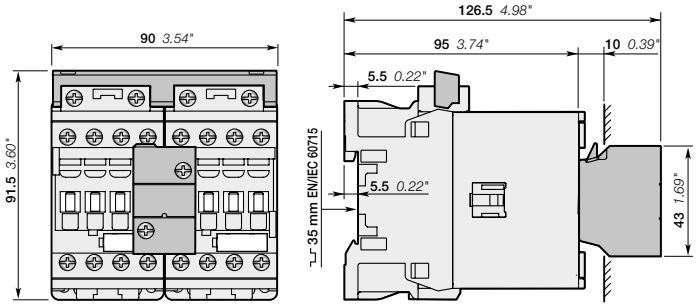
Dimensions



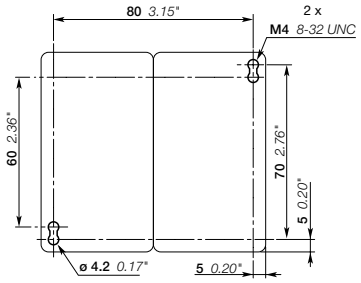
AF26, AF38
+ TEF4 electronic timer



AF26, AF38



AF26..-40-00, AF38..-40-00
+ VEM4 mechanical and electrical interlock set



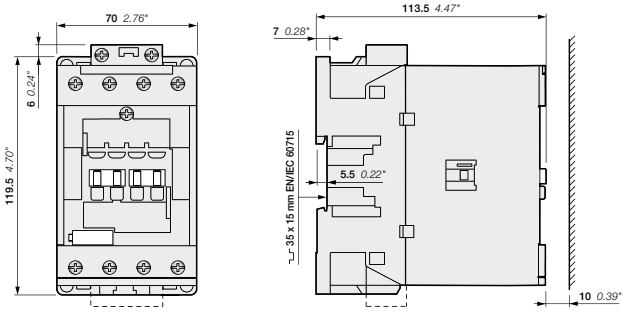
AF26..-40-00, AF38..-40-00
+ VEM4 mechanical and electrical interlock set

(1) Note: For AF26 and AF38 contactors, lateral distance to grounded component 2 mm 0.08" min.

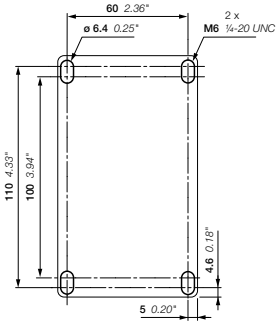
Main dimensions mm, inches (1)

AF40, AF52 4-pole contactors

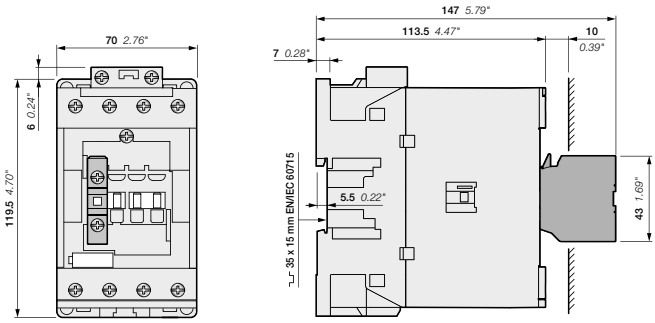
Dimensions



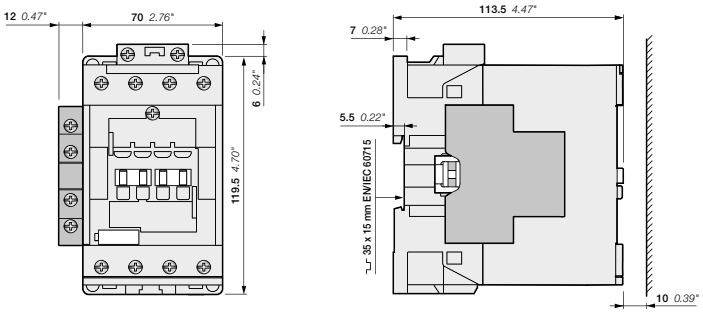
AF40, AF52



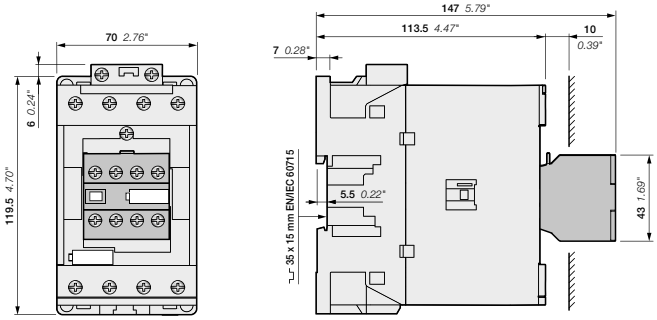
AF40, AF52



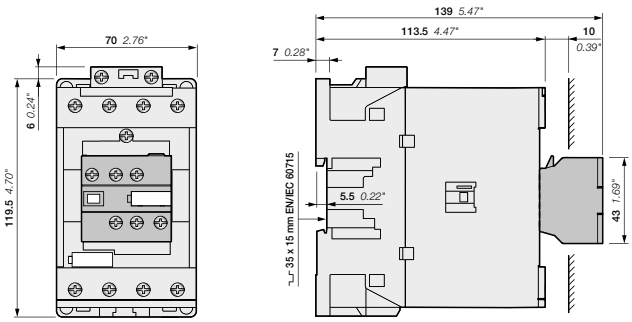
AF40, AF52
+ CA4, CC4 1-pole auxiliary contact block



AF40, AF52
+ CAL4-11 2-pole auxiliary contact block



AF40, AF52
+ CA4 4-pole auxiliary contact block



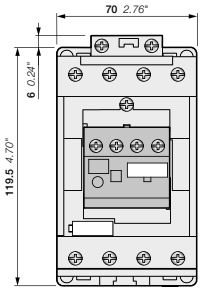
AF40, AF52
+ CAT4 2-pole auxiliary contact and coil terminal block

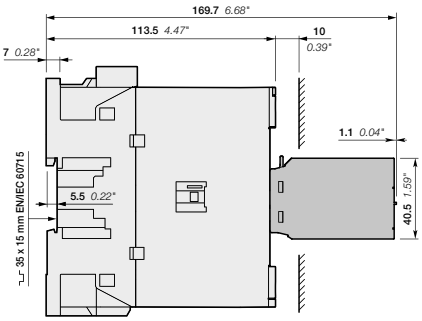
Main dimensions mm, inches

1SBC101975O201

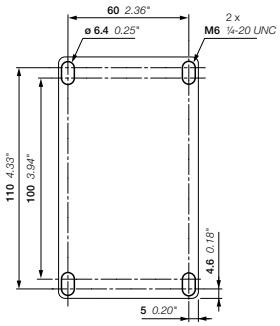
AF40, AF52 4-pole contactors

Dimensions

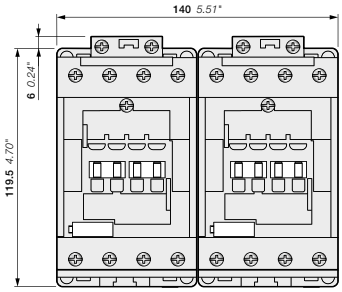




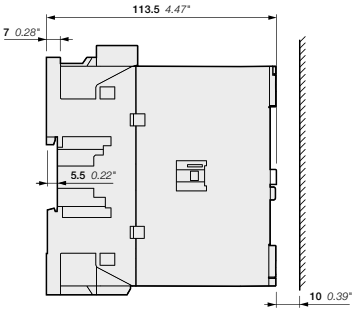
AF40, AF52
+ TEF4 electronic timer

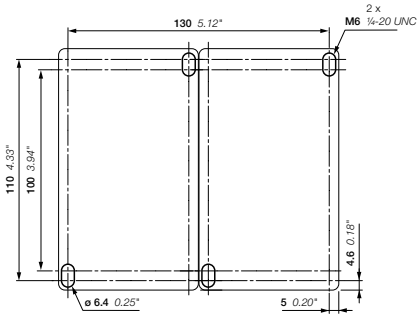


AF40, AF52



AF40, AF52
+ VM96-4 mechanical interlock unit





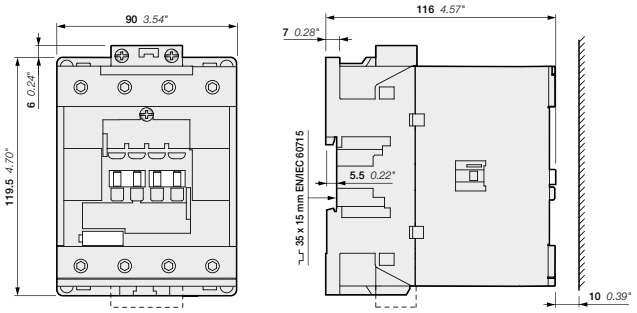
AF40, AF52
+ VM96-4 mechanical interlock unit

Main dimensions mm, inches

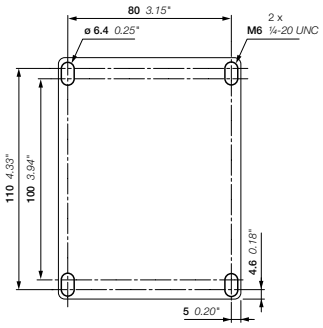
1SBC101977S0201

AF80 4-pole contactors

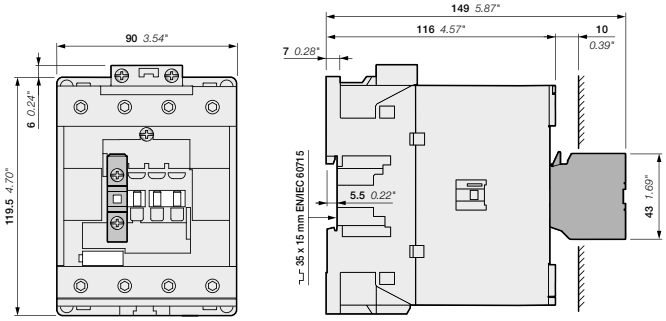
Dimensions



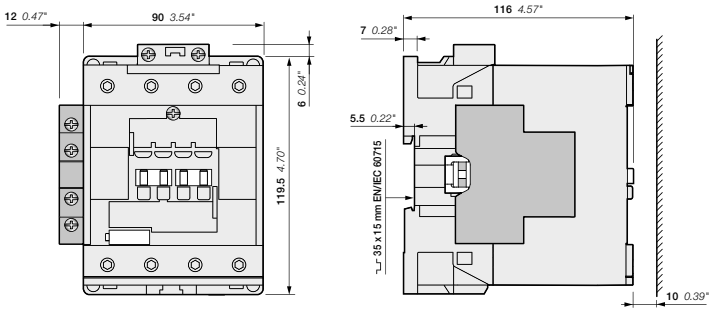
AF80



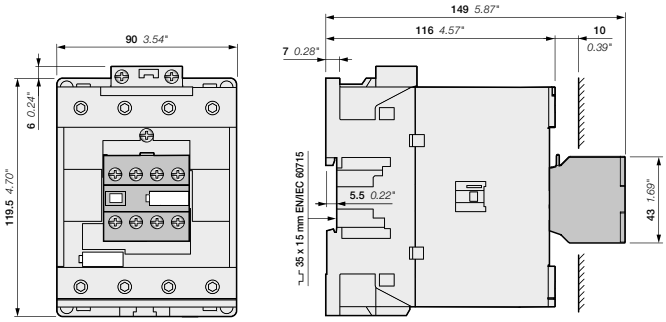
AF80



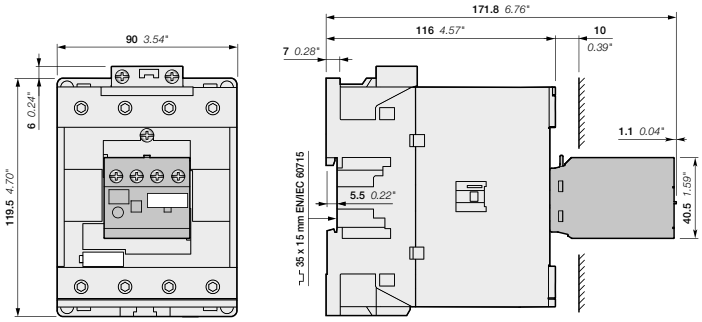
AF80
+ CA4, CC4 1-pole auxiliary contact block



AF80
+ CAL4-11 2-pole auxiliary contact block



AF80
+ CA4 4-pole auxiliary contact block



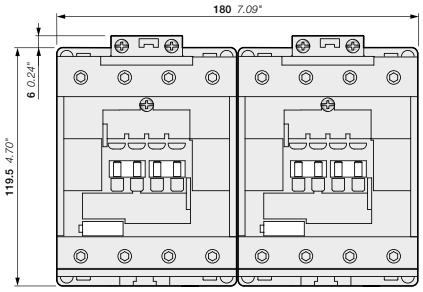
AF80
+ TEF4 Electronic timer

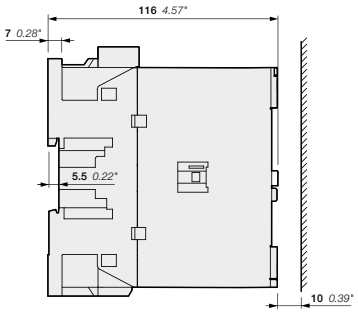
Main dimensions mm, inches

1SBC101978S0201

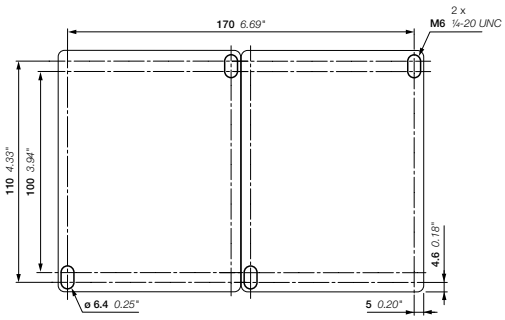
AF80 4-pole contactors

Dimensions





AF80
+ CA4, CC4 1-pole auxiliary contact block



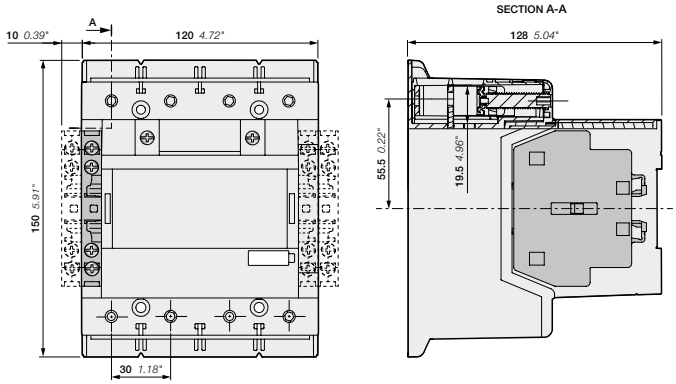
AF80
+ VM96-4 mechanical interlock unit

Main dimensions mm, inches

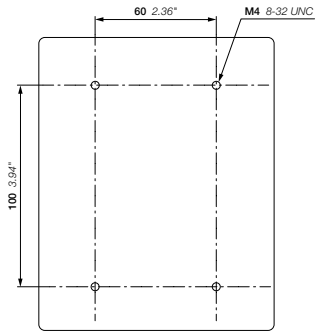
15BC1019785020 1

AF116, AF140 4-pole contactors

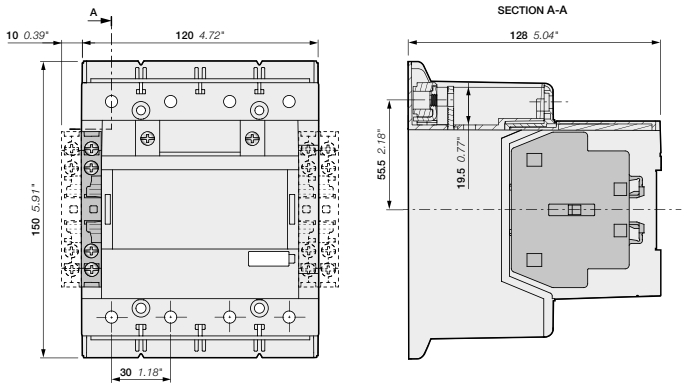
Dimensions



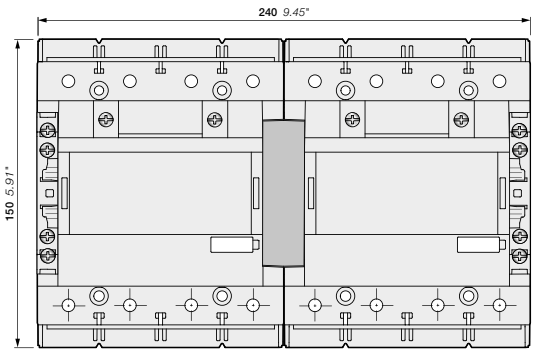
AF116, AF140-40-00 + CAL19 2-pole auxiliary contact block
AF116, AF140-40-11



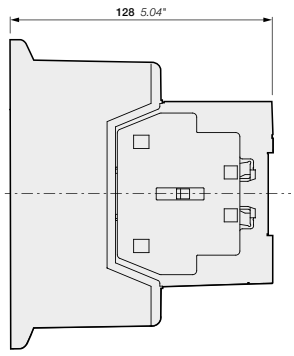
AF116, AF140-40-..(B)

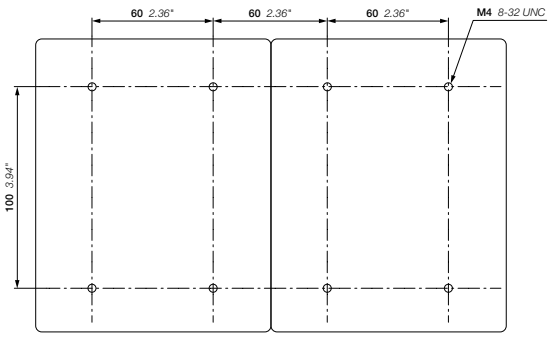


AF116, AF140-40-00B + CAL19 2-pole auxiliary contact block
AF116, AF140-40-11B



AF116, AF140-40-11
+ VM19 mechanical interlocking unit





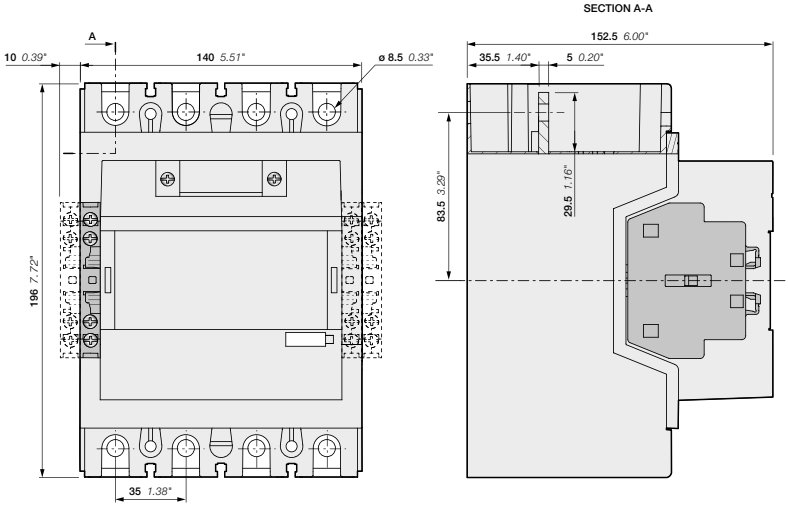
AF116, AF140
+ VM19 mechanical interlocking unit

Main dimensions mm, inches

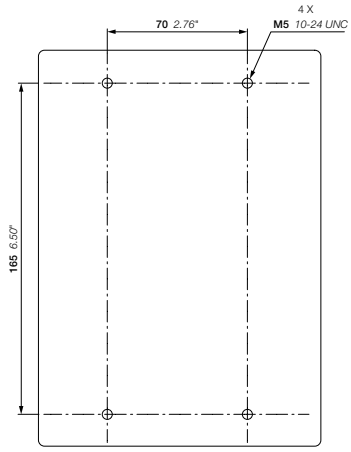
15FC101228C0201 - Rev. A

AF190, AF205 4-pole contactors

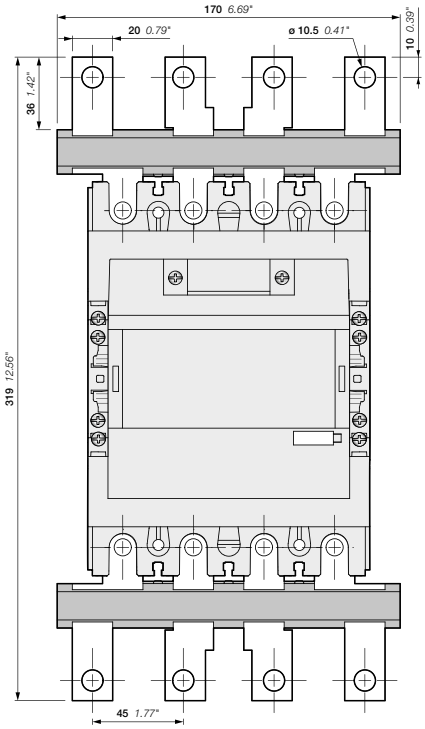
Dimensions

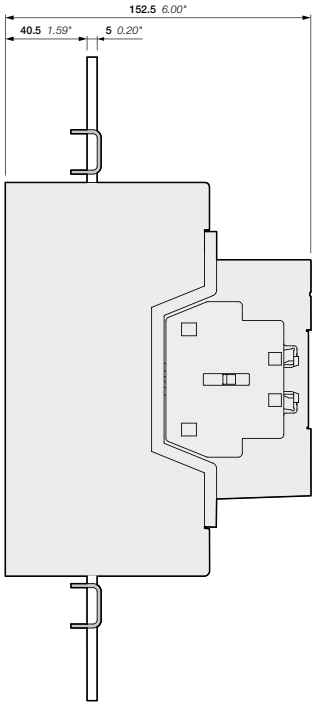


AF190, AF205-40-00 + CAL19 2-pole auxiliary contact block
AF190, AF205-40-11



AF190, AF205-40





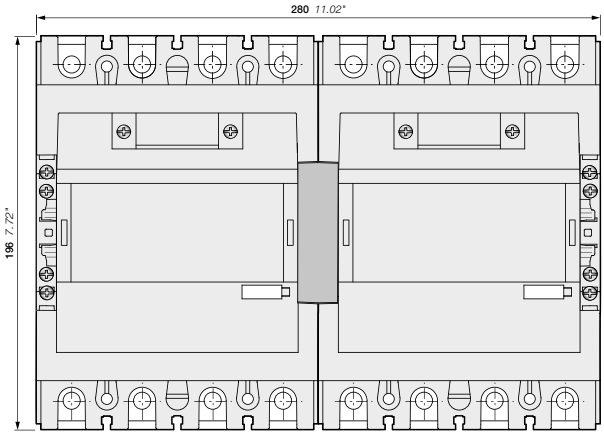
AF190, AF205-40-11
+ LW205-40 terminal enlargement

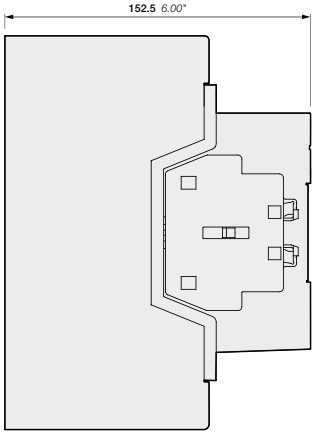
Main dimensions mm, inches

1SFC101229C0201 - Rev. A

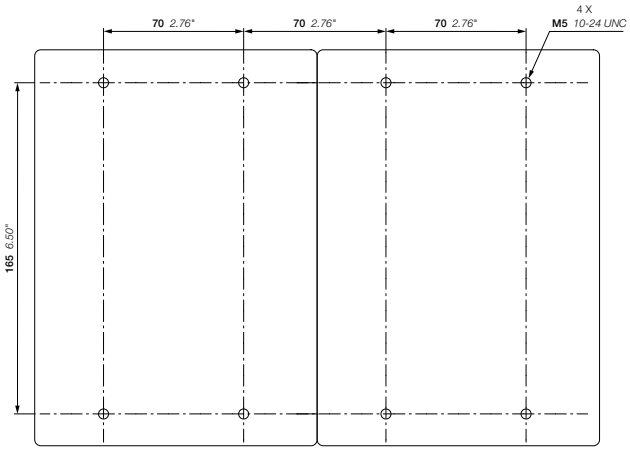
AF190, AF205 4-pole contactors

Dimensions





AF190, AF205-40-11
+ VM19 mechanical interlocking unit

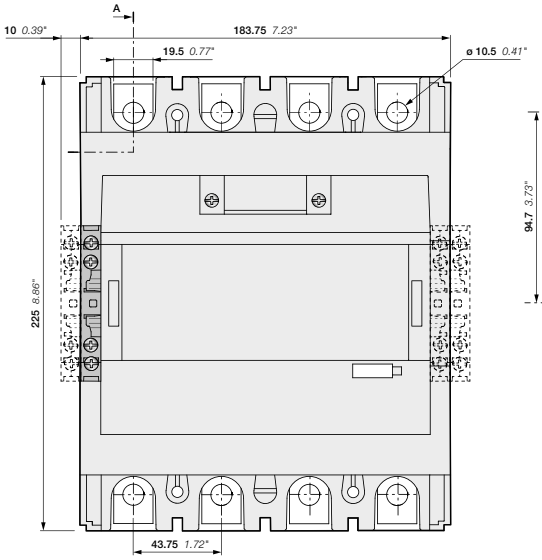


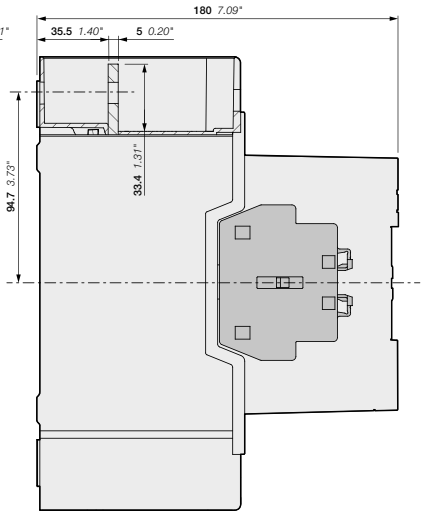
AF190, AF205
+ VM19 mechanical interlocking unit

Main dimensions mm, inches

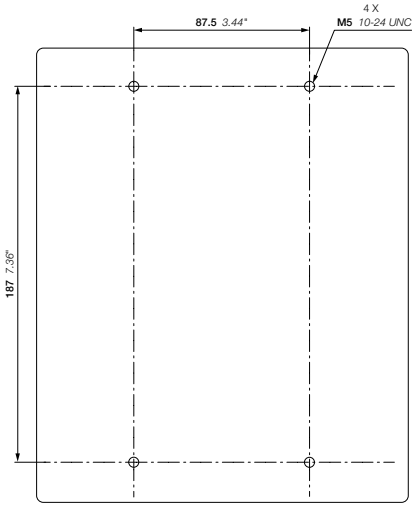
AF265, AF305, AF370 4-pole contactors

Dimensions

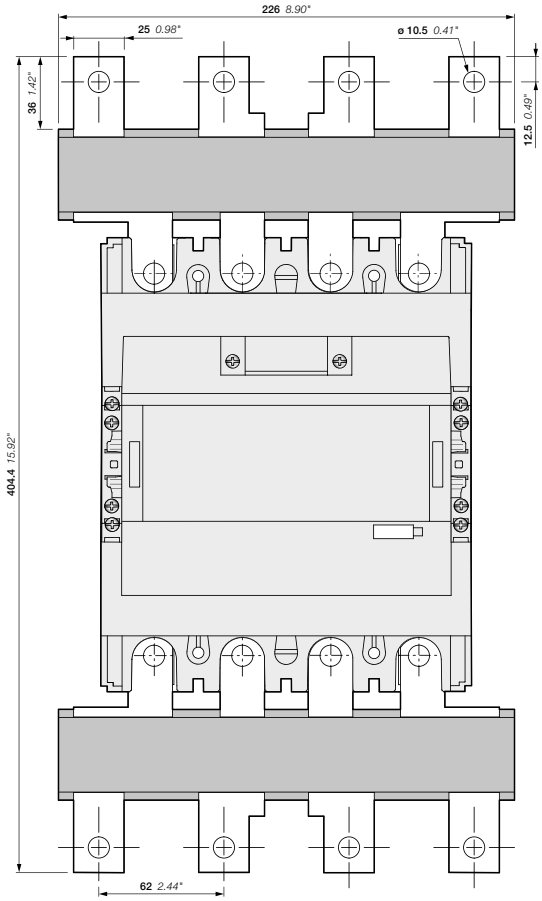


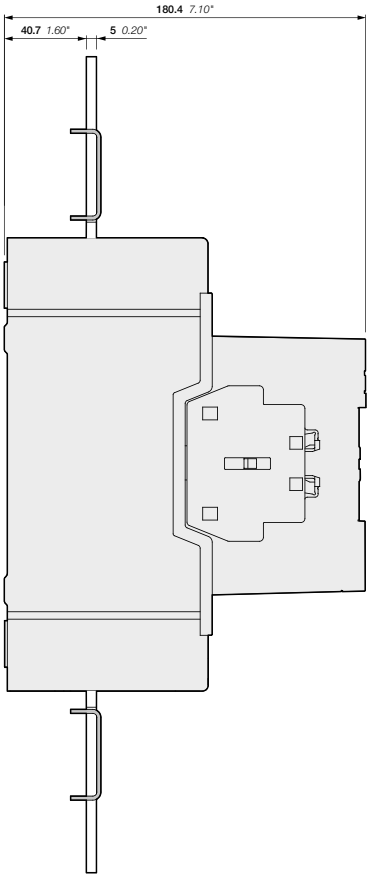


AF265, AF305, AF370-40-00 + CAL19 2-pole auxiliary contact block
AF265, AF305, AF370-40-11



AF265, AF305, AF370





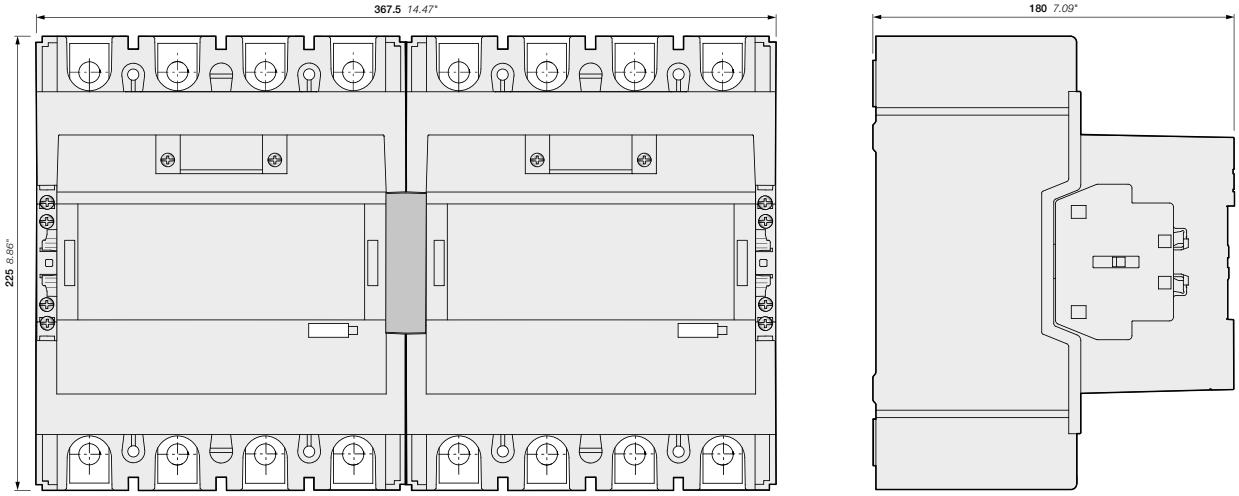
AF265, AF305, AF370-40-11
+ LW370-40 terminal enlargement

Main dimensions mm, inches

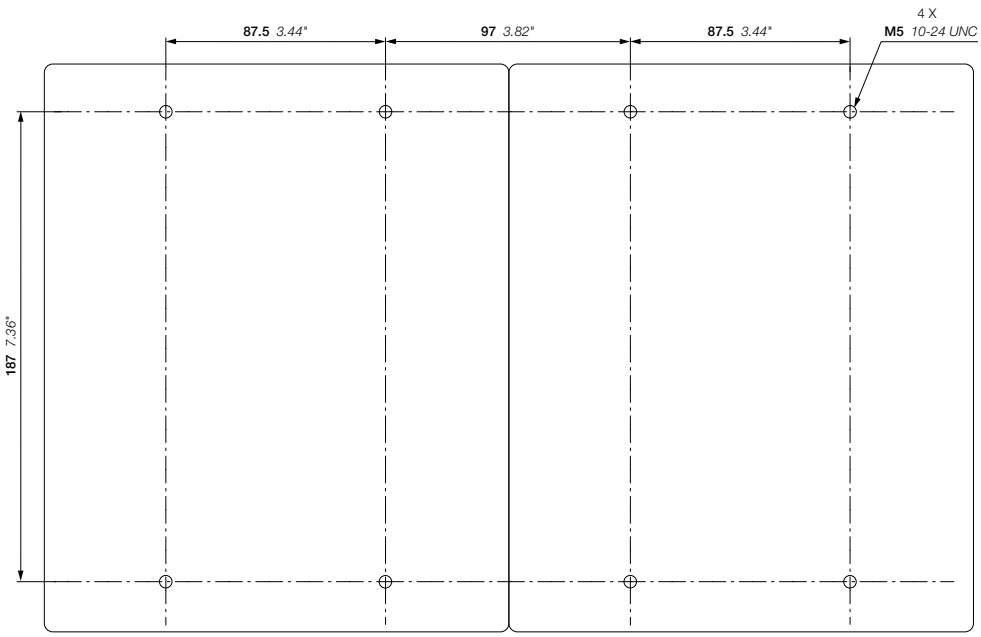
1SFC101230C0201 - Rev. A

AF265, AF305, AF370 4-pole contactors

Dimensions



AF265, AF305, AF370-40-11
+ VM19 mechanical interlocking unit

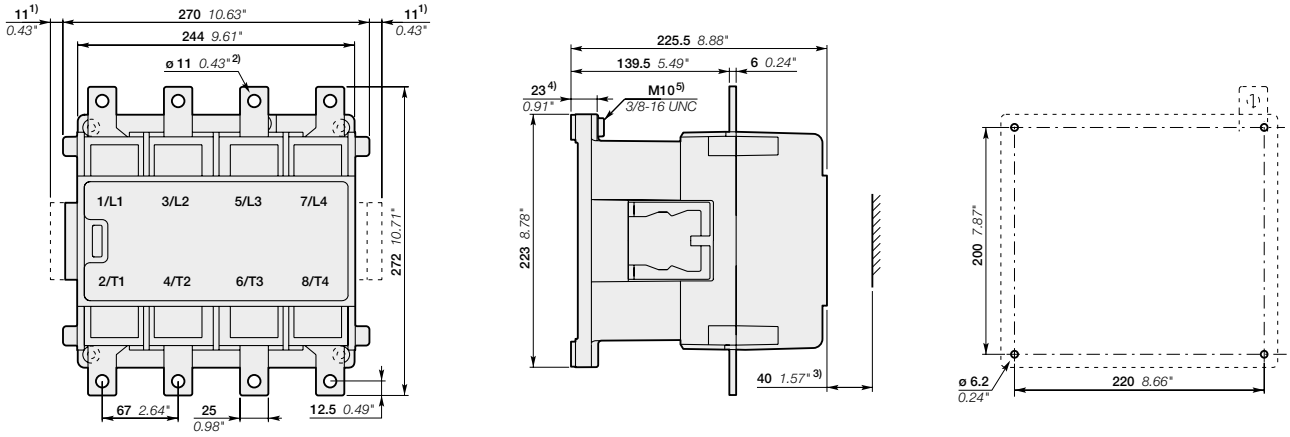


AF265, AF305, AF370
+ VM19 mechanical interlocking unit

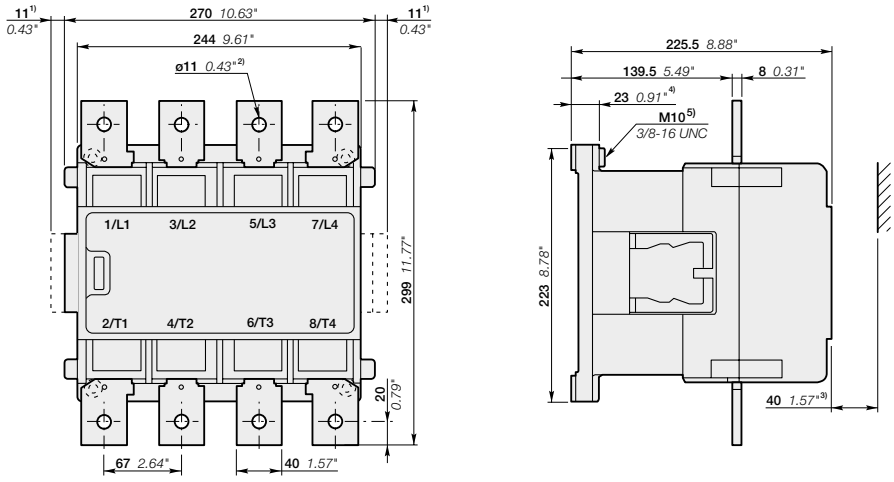
Main dimensions mm, inches

EK550, EK1000 4-pole contactors AC operated

Dimensions

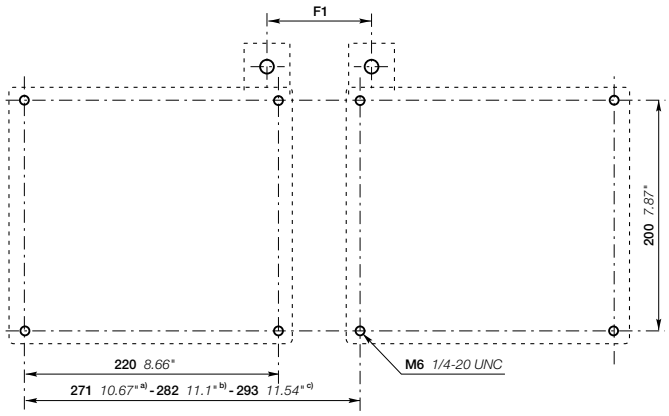


EK550



EK1000

1) Dimension for extra auxiliary contact block
2) Screw, nut and washer by-packed
3) Min. distance to uninsulated wall
4) Damping elements are included
5) Earthing screw



EK1000

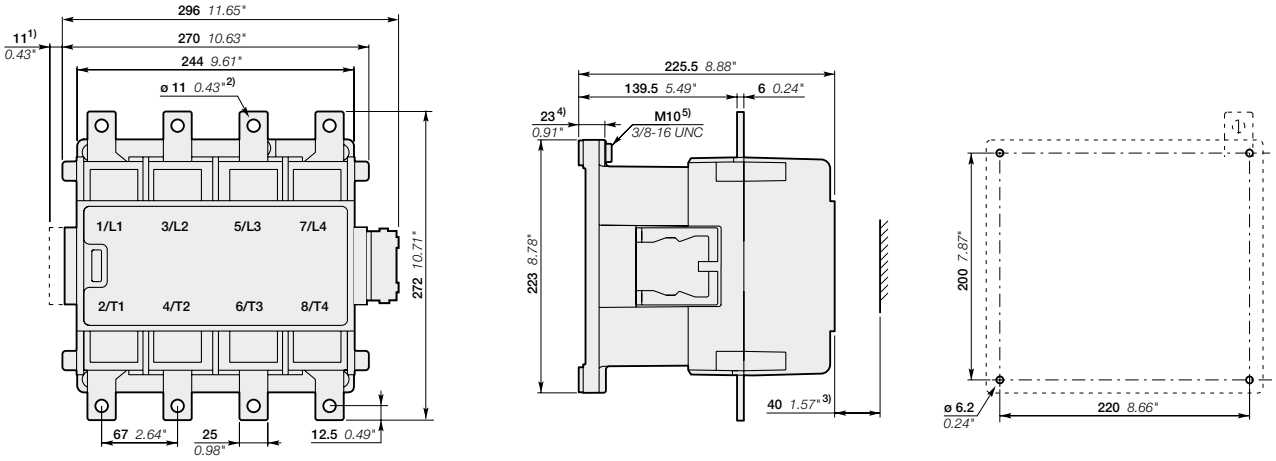
a) Min. dim Makes distance F1 = 70
b) Includes space for three auxiliary contact blocks between the contactors
c) Includes space for four auxiliary contact blocks between the contactors

Main dimensions mm, inches

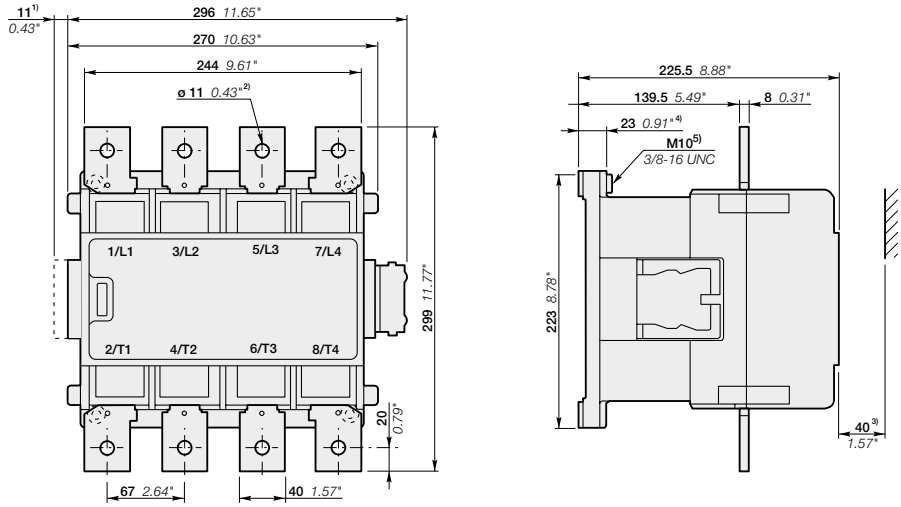
1SBC101651S0201 - Rev. A

EK550, EK1000 4-pole contactors DC operated

Dimensions

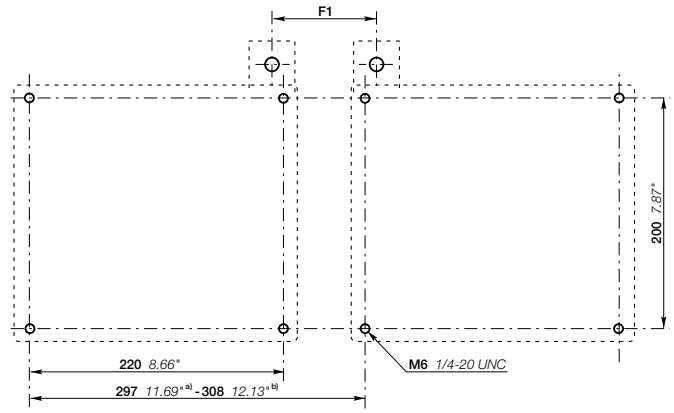


EK550



EK1000

1) Dimension for extra auxiliary contact block
2) Screw, nut and washer by-packed
3) Min. distance to uninsulated wall
4) Damping elements are included
5) Earthing screw



EK1000

a) Min. dim.
b) Includes space for two auxiliary contact blocks and the dc-unit between the contactors

Main dimensions mm, inches

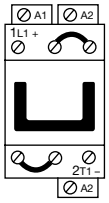
1SBC101653S0201 - Rev. A

GA75 ... GAF2050 contactors

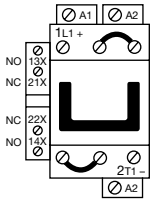
Terminal marking and positioning

GA75 contactors - AC operated

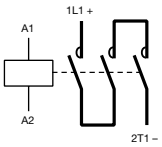
Standard devices without addition of auxiliary contacts



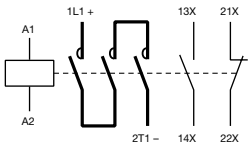
GA75-10-00



GA75-10-11



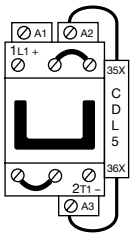
GA75-10-00



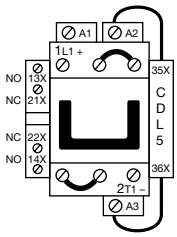
GA75-10-11

GAE75 contactors - DC operated

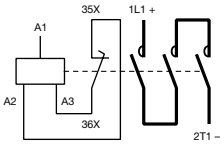
Standard devices without addition of auxiliary contacts



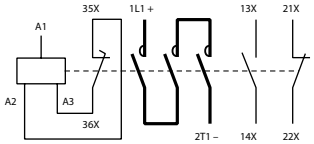
GAE75-10-00



GAE75-10-11

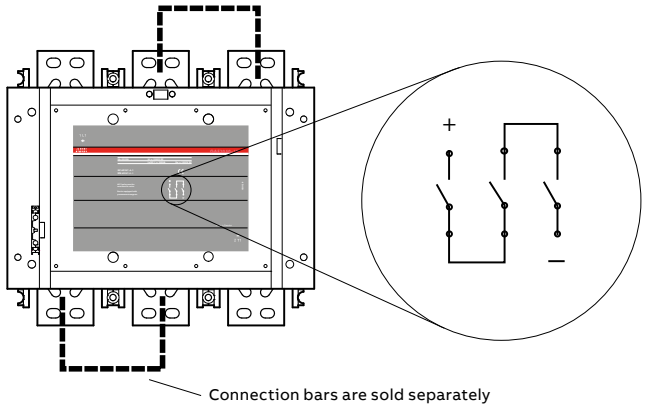


GAE75-10-00

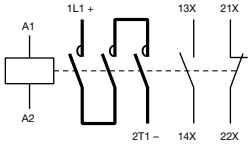


GAE75-10-11

GAF185 ... GAF2050 contactors - AC / DC operated



GAF185 ... GAF2050-10-11

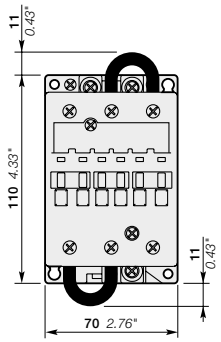


GAF185 ... GAF2050-10-11

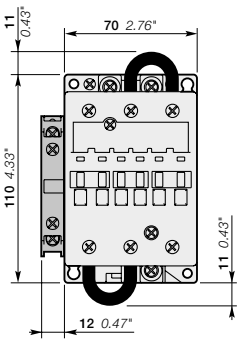
1SBC101985S0201

GA75, GAE75 1-pole contactor

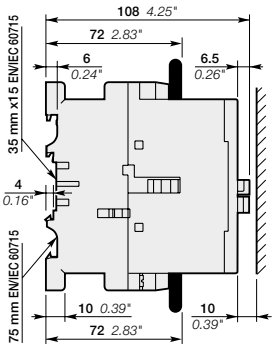
Dimensions

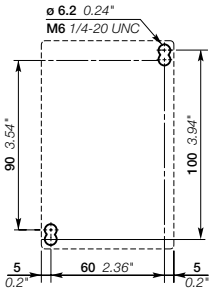


GA75-10-00

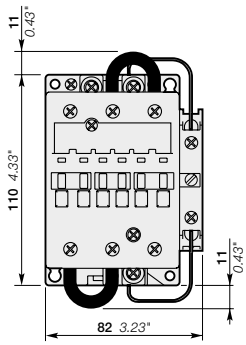


GA75-10-11

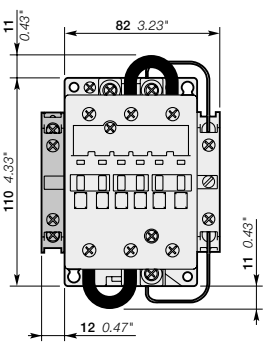




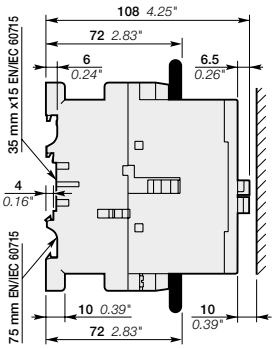
GA75

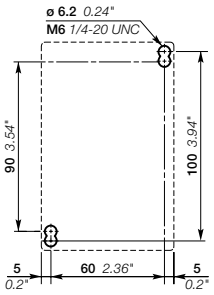


GAE75-10-00



GAE75-10-11





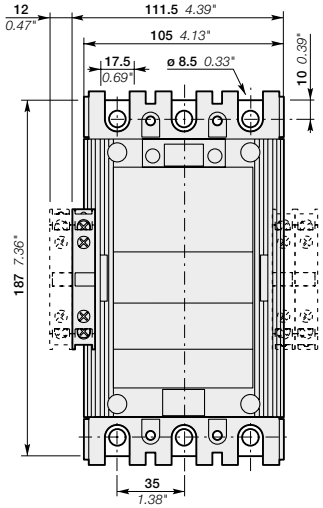
GAE75

Main dimensions mm, inches

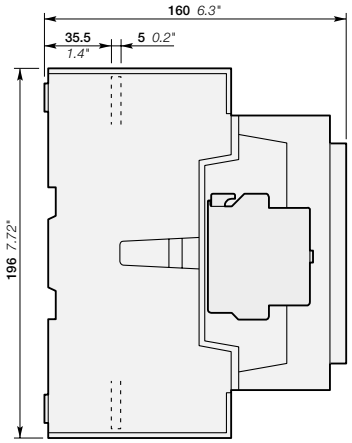
1SBC101491S0201

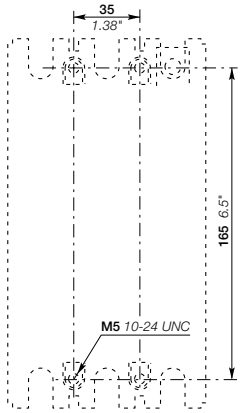
GAF185, GAF300 3-pole contactor

Dimensions

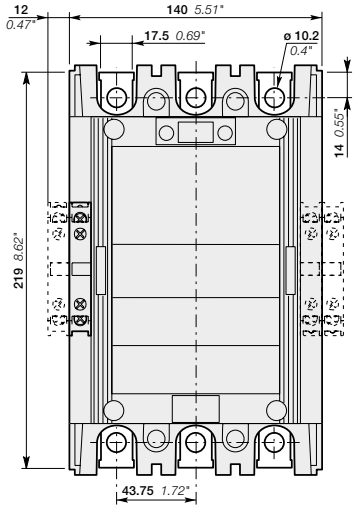


GAF185-30-11

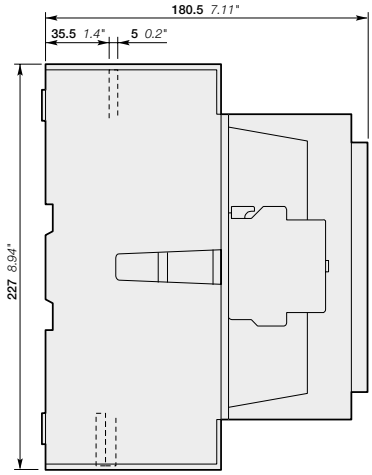


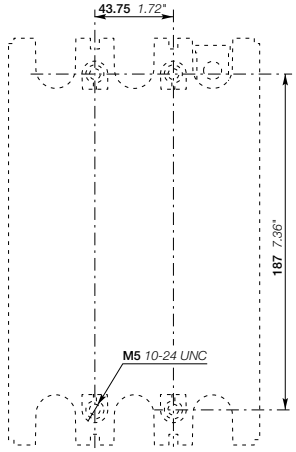


GAF185-30-11



GAF300-30-11





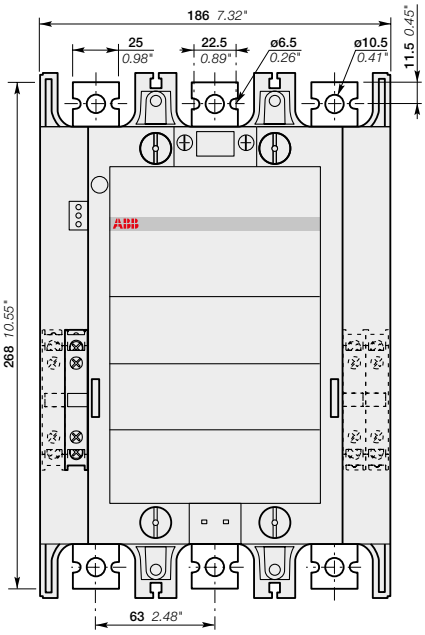
GAF300-30-11

Main dimensions mm, inches

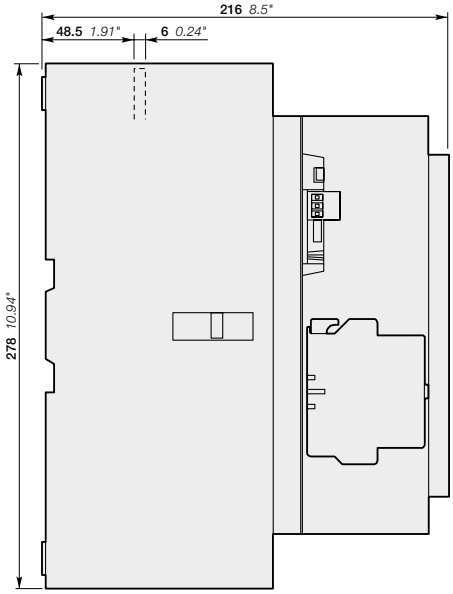
1SFC101180C0201

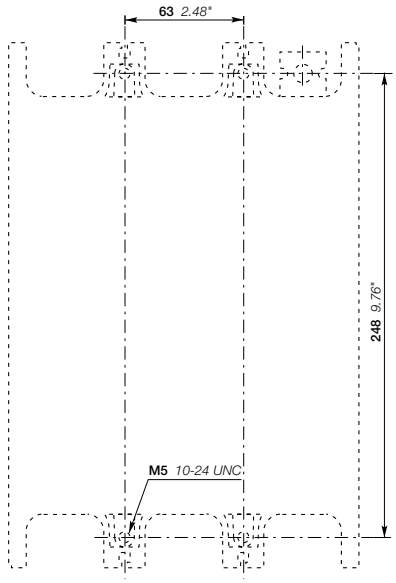
GAF460 3-pole contactor

Dimensions



GAF460-30-11



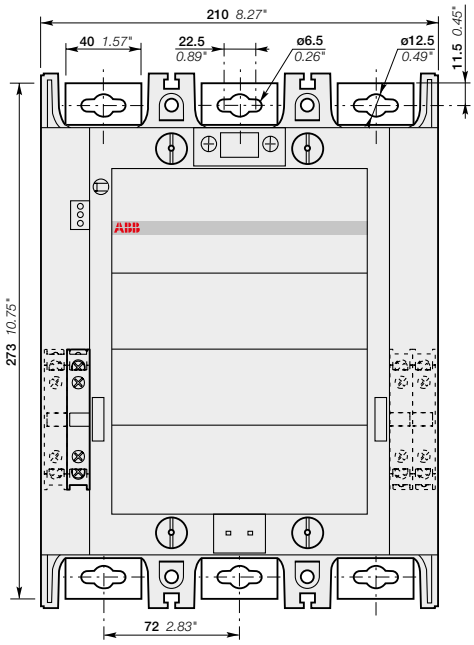


Main dimensions mm, inches

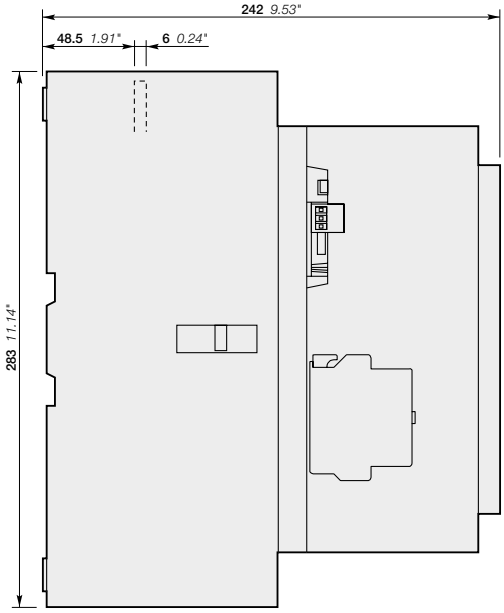
1SFC101181C0201

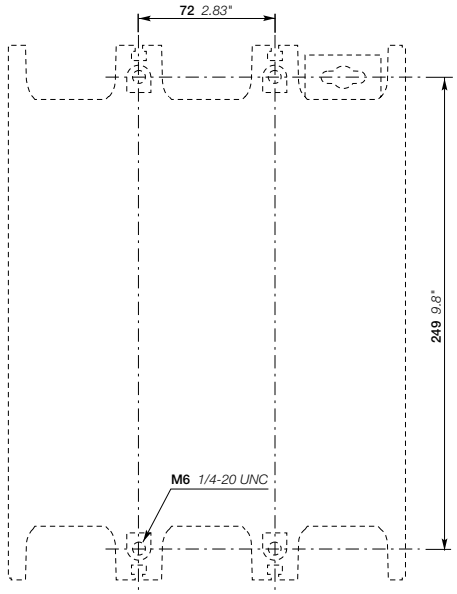
GAF750 3-pole contactor

Dimensions



GAF750-30-11



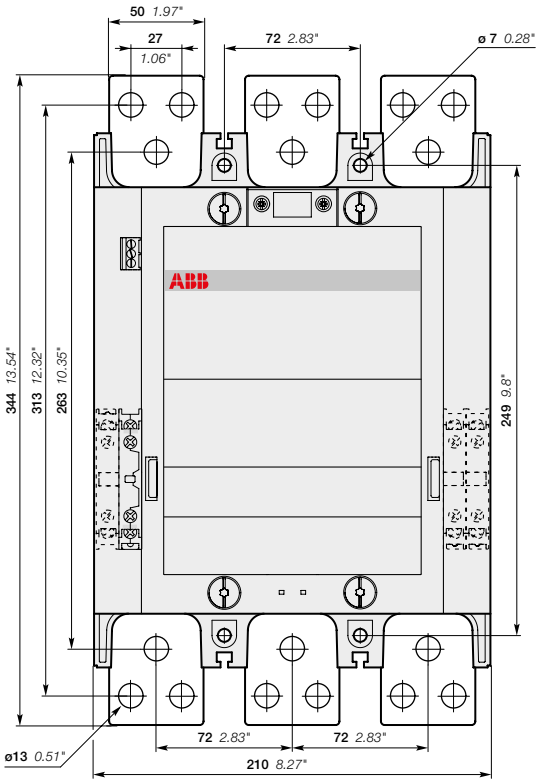


Main dimensions mm, inches

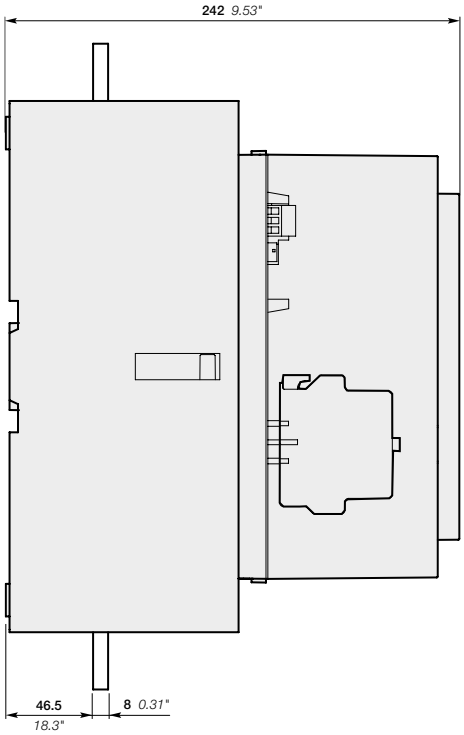
1SFC101182C0201

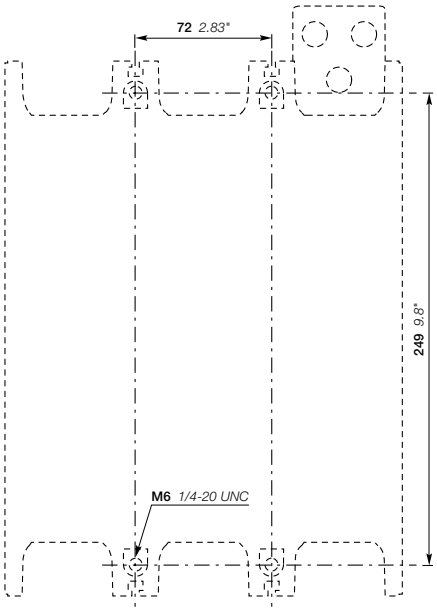
GAF1250 3-pole contactor

Dimensions



GAF1250-30-11



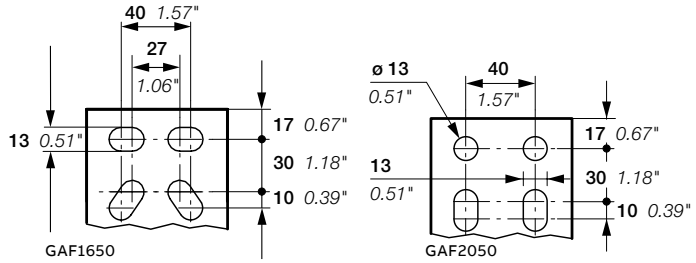


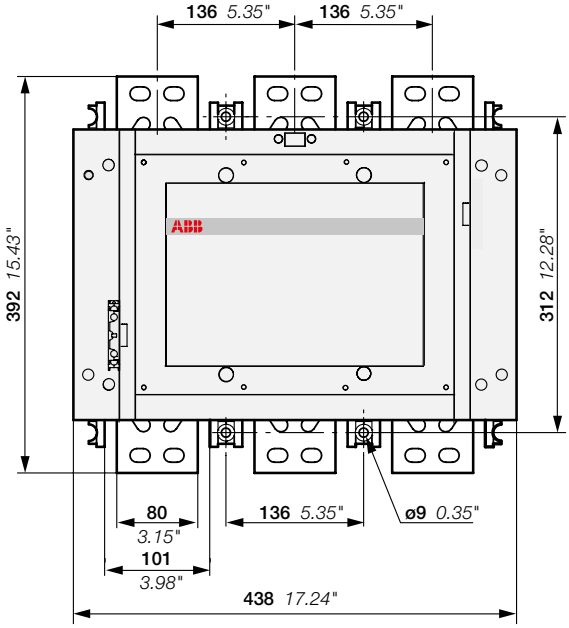
Main dimensions mm, inches

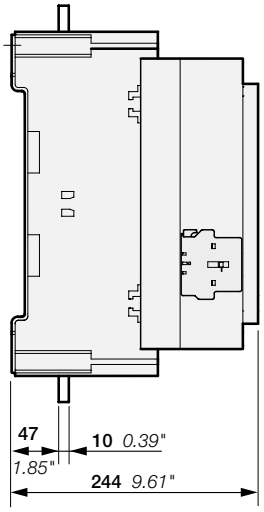
1SFC101183C0201

GAF1650, GAF2050 3-pole contactor

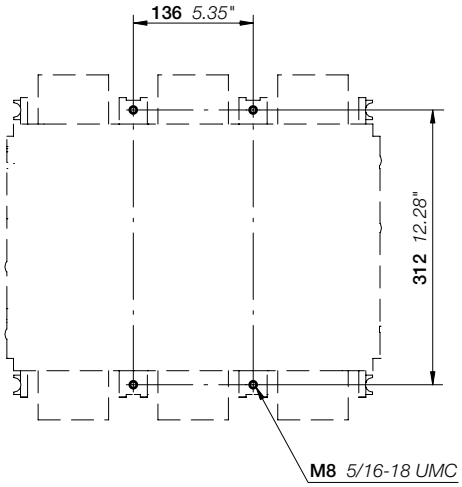
Dimensions







GAF1650, GAF2050-30-11

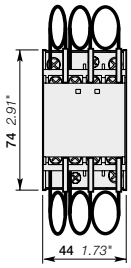


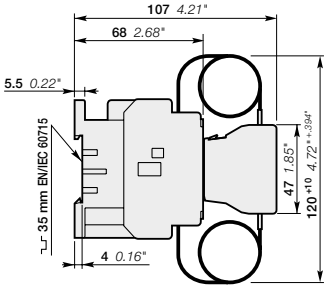
Main dimensions mm, inches

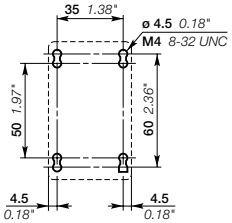
1SFC101184C0201 - Rev. A

UA..RA 3-pole contactors for capacitor switching

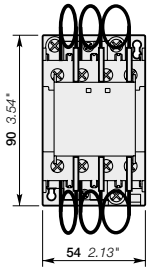
Unlimited peak current Î

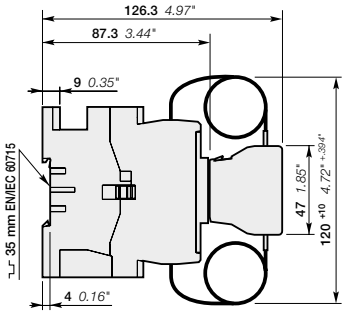


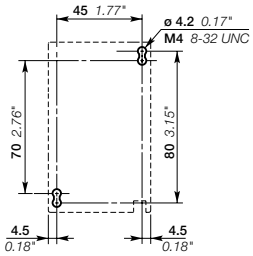




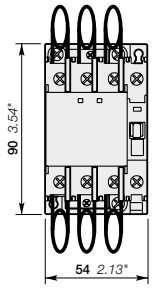
UA16..RA

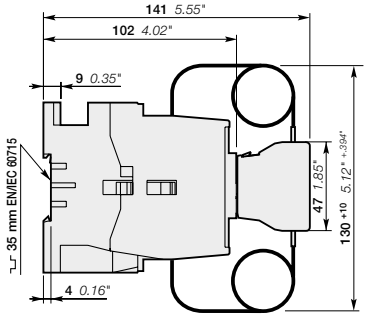


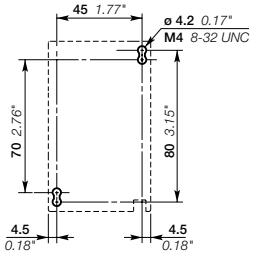




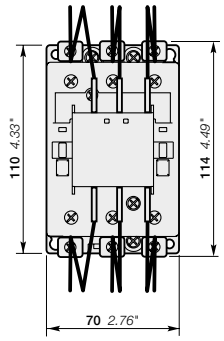
UA26..RA

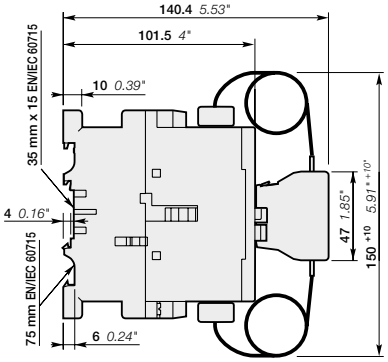


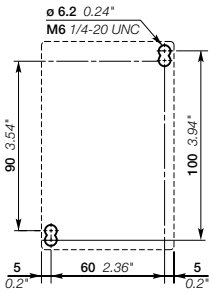




UA30..RA







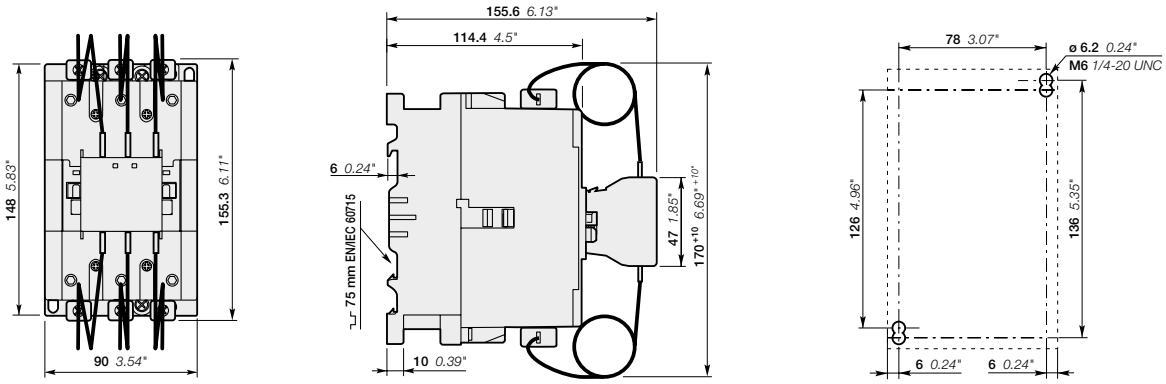
UA50..RA, UA63..RA, UA75..RA

Main dimensions mm, inches

1SBC101575S0201

UA..RA 3-pole contactors for capacitor switching

Unlimited peak current Î



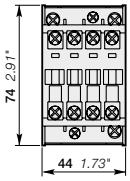
UA95..RA, UA110..RA

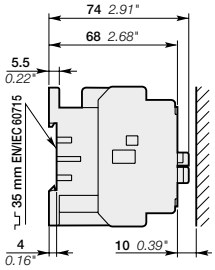
Main dimensions mm, inches

1SBC101575S0201

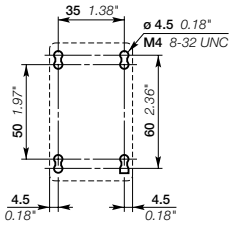
UA.. 3-pole contactors for capacitor switching

Dimensions

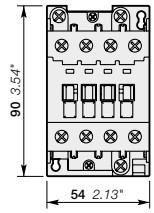


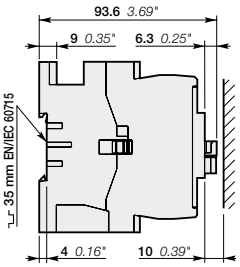


UA16

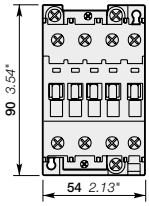


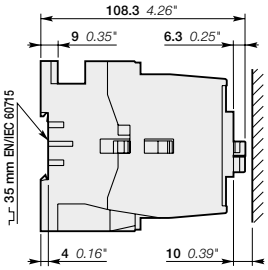
UA16 drilling plan



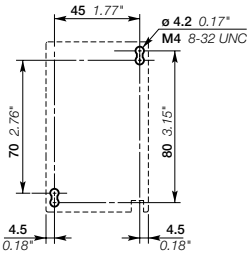


UA26

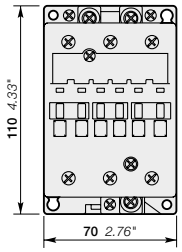




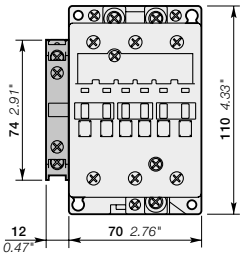
UA30



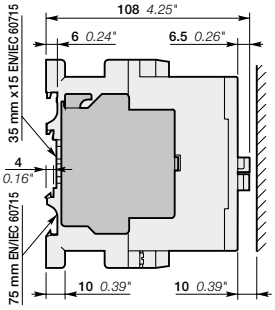
UA26, UA30 drilling plan

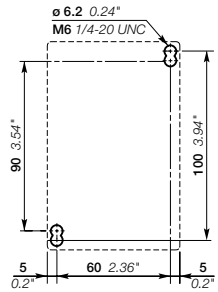


UA50, UA63, UA75-30-00

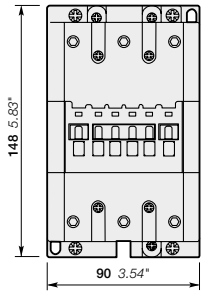


UA50, UA63, UA75-30-11

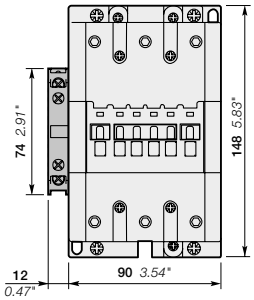




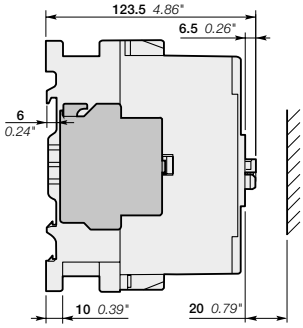
Drilling plan

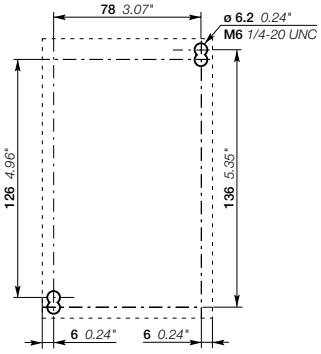


UA95, UA110-30-00



UA95, UA110-30-11





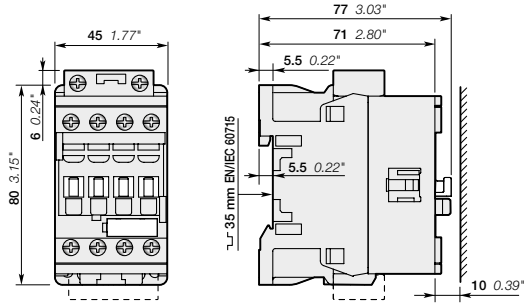
Drilling plan

Main dimensions mm, inches

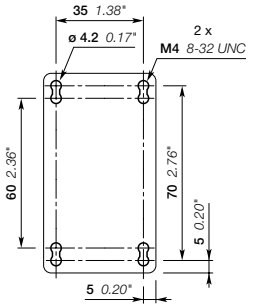
1SBC101572S0201

NF contactor relays

Dimensions



NF..22E, NF..31E, NF..40E



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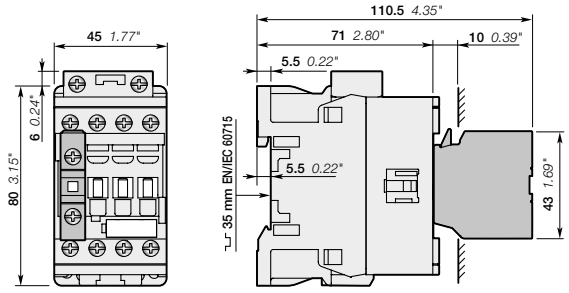
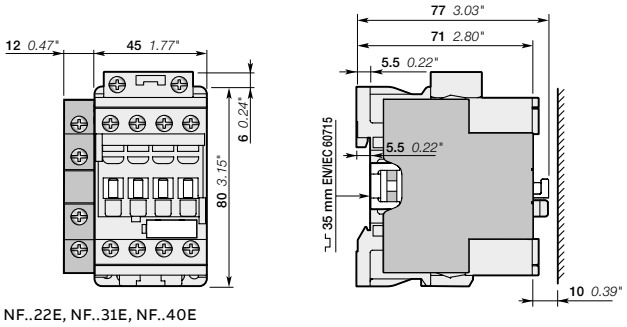
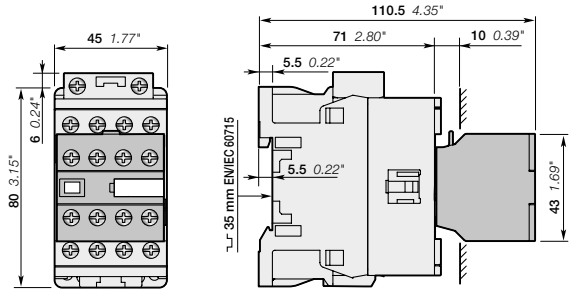


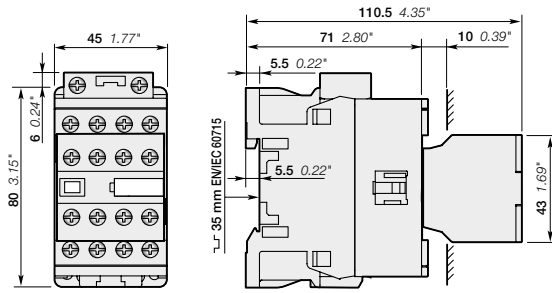
NF..22E, NF..31E, NF..40E
+ CA4, CC4 1-pole auxiliary contact block



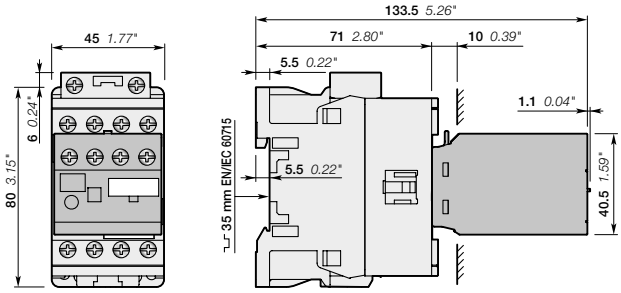
NF..22E, NF..31E, NF..40E
+ CAL4-11 2-pole auxiliary contact block



NF..22E, NF..31E, NF..40E
+ CA4 4-pole auxiliary contact block



NF..44E, NF..53E, NF..62E, NF..71E, NF..80E, NF..33/11, NF..51/11



NF..22E, NF..31E, NF..40E
+ TEF4 electronic timer

(1) Note: contactor relay lateral distance to grounded component 2 mm 0.08" min.
24 V DC operated contactor relay (coil 30) depth + 20 mm 0.79".

Main dimensions mm, inches (1)

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Notes

Other contactor application data

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**

Control of three-phase slip-ring motors

Contactor selection

General

Three kinds of contactors are used to control three-phase slip-ring motors: the stator contactor, the acceleration contactor(s) and the rotor short-circuit contactor. Refer to the diagram opposite.
The selection tables below concern complete smooth starting, excluding specific cases, such as: intermittent operation, regenerative current, controlled slipping, etc. for which you need to consult our specialised departments.
The starting and breaking technical data for slip-ring motors are defined in standard IEC 60947-4-1 in the AC-2 utilization category.
The load factor is defined by the equation:

$$\text{L.F. (\%)} = \frac{\text{Operating cycle}}{\text{Cycle time (Operating cycle + Rest cycle)}} \times 100$$

Stator contactor

Closing of the starting current, conditioned by the value of the rotor resistances: it may reach 1.5 to 4 times rated motor operational current.
Breaking of the rated operational current, or of the starting current, with possible regenerative current.
The following table gives the permissible values of the Ie / AC-2 rated operational stator current, as a function of load factor.
Temperature of 60 °C for AF09 ... AF370 and 55 °C for AF400 ... AF1650 maximum near the contactor.
Maximum switching frequency and electrical durability in AC-2 category: see "Technical data".

Contactor types				AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96
Load factor	15 %	Ie / AC-2	A	18	24	33	52	64	76	79	106	124	154	184
	25 %	Ie / AC-2	A	15	20	31	44	54	65	68	90	111	136	163
	40 %	Ie / AC-2	A	13	17	26	38	46	55	58	77	94	116	139
	60 %	Ie / AC-2	A	11	14	22	31	38	46	48	64	78	96	115
S7 acc. to IEC 60034-1: periodical continuous duty with electrical breaking			A	9	12	18	26	32	38	40	53	65	80	96

Acceleration contactors

The sizing of these contactors is based on the AC-1 rated operational current (see "Technical data") that we recall below for the maximum ambient temperature of 60 °C for AF09 to AF370 and 55 °C for AF400 to AF1650.
The table below lists the factors to be applied to the AC-1 current of the contactors in order to obtain the maximal permissible value of the rotor current after contactor closing for star connection. If delta connection is used, increase by 50 % this current. This table takes into account the number of cycles an hour (without inching) and the current flow time per cycle, in the contactor.

Number of cycles an hour		**1**	**3**	**6**	**12**	**20**	**30**	**60**	**120**
Current flow time per cycle		**Factors applicable to Ie / AC-1**							
	5 s	5.2	4.9	4.7	4.3	4.0	3.7	3.4	2.8
	10 s	3.8	3.6	3.4	3.1	3.0	2.8	2.6	2.2
	20 s	2.8	2.7	2.6	2.5	2.4	2.2	2.0	1.6
	30 s	2.4	2.3	2.2	2.1	2.1	1.9	1.7	-
	40 s	2.2	2.1	2.0	1.9	1.9	1.7	1.5	-
	60 s	1.9	1.8	1.8	1.7	1.7	1.5	-	-

Contactors		**AF09**	**AF12**	**AF16**	**AF26**	**AF30**	**AF38**	**AF40**	**AF52**	**AF65**	**AF80**	**AF96**
Rated operational current Ie / AC-1 for air temperature near the contactor ≤ 60 °C	A	25	28	30	40	42	42	60	80	90	100	105

Rotor short-circuit contactor

The duty of this contactor is characterized by small closing stresses. The decisive factor is the thermal stress. Delta connection of the contactor is considered (reduce currents by 35 % if star connection is used).
The following table gives the permissible values of the rated operational rotor current, as a function of load factor.
Temperature: 60 °C for AF09 to AF370 and 55 °C for AF400 to AF1650 maximum near the contactor.

Contactor types				**AF09**	**AF12**	**AF16**	**AF26**	**AF30**	**AF38**	**AF40**	**AF52**	**AF65**	**AF80**	**AF96**
Load factor	15 %	Ie	A	63	71	76	102	107	107	152	203	228	254	266
	25 %	Ie	A	57	64	69	92	96	96	137	183	206	229	241
	40 %	Ie	A	49	55	59	78	82	82	117	157	176	196	206
	60 %	Ie	A	43	48	51	68	72	72	103	137	154	171	180
S7 acc. to IEC 60034-1: periodical continuous duty with electrical breaking			A	36	41	44	58	61	61	87	116	131	145	152
Rated operational rotor voltage:														
- Maximum values for starting and breaking			V	1380 (1600 in star connection)									2000 (2300 in star connection)	
- Maximum values for starting and electrical braking			V	690 (730 in star connection)									690 (730 in star connection)	

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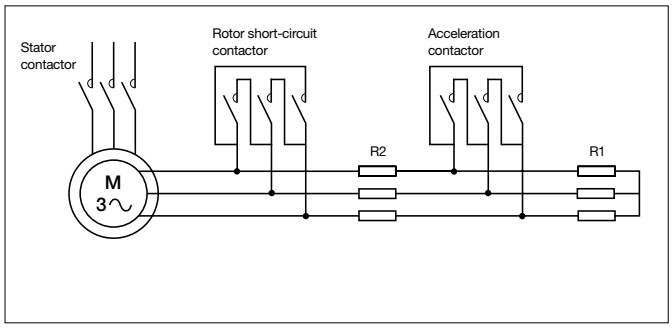
Control of three-phase slip-ring motors

Contactor selection

Example of a three-stroke starter

- The first stroke corresponds to energization of the motor by the stator contactor: all the resistances are operational in the rotor circuit
- At the second stroke, the acceleration contactor short-circuits the first resistance stack
- At the third stroke, the rotor short-circuit contactor is activated by eliminating the last resistance stack, thus completing the starting period.



Contactor types				AF116	AF140	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1350	AF1650
Load factor	15 %	Ie	/ AC-2 A	220	335	360	425	530	625	750	850	950	1150	1500	1720	2100
	25 %	Ie	/ AC-2 A	185	270	300	350	440	515	620	680	780	975	1250	1430	1750
	40 %	Ie	/ AC-2 A	150	215	250	300	370	430	515	580	650	800	1050	1200	1470
	60 %	Ie	/ AC-2 A	135	180	220	255	315	370	430	480	550	700	900	1030	1250
S7 acc. to IEC 60034-1: periodical continuous duty with electrical breaking			A	116	140	190	210	265	305	370	400	460	580	750	860	1050

Contactors		AF116	AF140	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1350	AF1650
Rated operational current Ie / AC-1 for air temperature near the contactor ≤ 60 °C (AF116-AF370) ≤ 55 °C (AF400-AF1650)	A	145	175	250	300	350	400	500	500	600	700	800	1150	1450

Contactor types				AF116	AF140	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1350	AF1650
Load factor	15 %	Ie	A	330	540	580	750	830	950	1050	1200	1400	1650	1900	2400	2800
	25 %	Ie	A	300	490	530	650	725	830	915	1050	1250	1450	1650	2100	2500
	40 %	Ie	A	260	425	460	575	630	720	800	950	1100	1300	1450	1850	2200
	60 %	Ie	A	230	375	400	500	575	650	700	810	975	1150	1300	1650	1950
S7 acc. to IEC 60034-1: periodical continuous duty with electrical breaking			A	200	300	350	380	480	550	640	700	840	980	1150	1500	1800
Rated operational rotor voltage:																
- Maximum values for starting and breaking			V	2200 (2600 in star connection)				3000 (3600 in star connection)								
- Maximum values for starting and electrical braking			V	690 (730 in star connection)												

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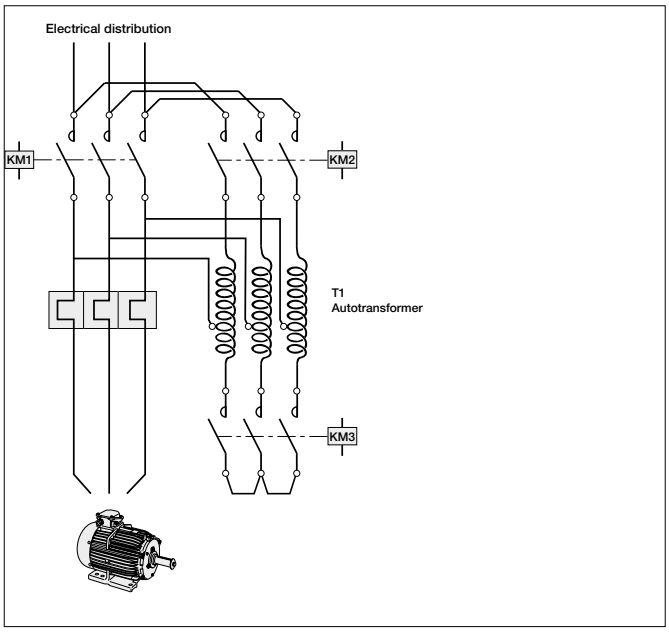
Autotransformer starters

Contactor selection

General

An autotransformer starter allows to start a squirel cage motor with a reduced starting current due to the reduced voltage within the accelerating duration.
Unlike the star-delta wiring, this autotransformer starting method needs three wires and three terminals on the motor. At the starting period, the motor is wired to the autotransformer taps: the star contactor "KM3" and the autotransformer contactor "KM2" are closed, the motor is under reduced voltage. Consequently, the torque is reduced as the square of the applied voltage. The autotransformers are generally equipped of three taps at each phase in order to adapt the starting parameters to the field requirements. When the motor reaches 80...95 % of its nominal speed, the star contactor opens. Then, the line contactor "KM1" is making and the autotransformer contactor is opening. This starting process is done without any network interruption.



Selection Table (Id starting current / In nominal current < 8 - Acceleration time ≤ 20s - 30 cycles / h max.)

kW motor ratings 50/60 Hz					Contactors					
					KM1	KM2				KM3
					line	autotransformer taps:				star
220/240 V	380/400 V	415 V	440 V	690 V		90 %	80 %	70 %	60 %	
4	7.5	7.5	7.5	9	AF16	AF16	AF12	AF09	AF09	AF09
6.5	11	11	11	15	AF26	AF26	AF16	AF16	AF09	AF16
11	18.5	18.5	18.5	22	AF38	AF30	AF26	AF26	AF16	AF26
15	22	30	30	30	AF52	AF52	AF38	AF30	AF26	AF30
18.5	30	37	37	37	AF65	AF52	AF40	AF30	AF26	AF38
22	37	45	45	45	AF80	AF65	AF52	AF40	AF30	AF40
25	45	55	55	55	AF96	AF80	AF65	AF52	AF38	AF52
30	55	55	75	55	AF116	AF116	AF80	AF65	AF52	AF65
37	75	75	90	75	AF140	AF140	AF96	AF80	AF65	AF65
45	75	75	90	90	AF146	AF140	AF96	AF80	AF65	AF65
55	90	90	110	132	AF190	AF146	AF116	AF96	AF65	AF80
55	110	110	132	160	AF205	AF190	AF140	AF116	AF80	AF96
75	132	132	160	200	AF265	AF265	AF190	AF140	AF96	AF116
90	160	160	160	250	AF305	AF265	AF205	AF190	AF116	AF140
110	200	200	200	315	AF370	AF370	AF265	AF190	AF140	AF190
132	250	250	250	355	AF460	AF400	AF305	AF265	AF190	AF205
160	315	355	355	500	AF580	AF580	AF400	AF305	AF205	AF305
220	400	425	450	600	AF750	AF750	AF580	AF400	AF305	AF400
257	475	500	560	900	AF1350	AF750	AF580	AF460	AF400	AF460
315	560	600	670	1000	AF1650	AF1350	AF750	AF580	AF460	AF580

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Three-phase transformer switching

Contactor selection

AC-6a Utilization category according to IEC 60947-4-1

General

Switching the primary of 3-phase transformers, on energization of the transformer, is characterized by high current peaks due to the magnetization phenomena.

Selection Table

The tables below show the operational ratings for:

- current peaks up to 20 to 30 times the transformer nominal current
- maximum switching frequency of 60 operating cycles per hour
- air ambient temperature ≤ 40 °C.

AC / DC operated contactors		AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96
Operational power at Ue: 50/60 Hz - according to AC-6a												
220 / 240 V	kVA	4	5	6	10	13	14	15	19	21	23	25
380 / 400 V	kVA	7	8	10	17	22	25	26	33	36	39	44
415 / 440 V	kVA	8	9	11	18	24	27	28.5	36	40	43	48
500 V	kVA	9	11	13	22	28	32	34.5	43	48	52	57
660 / 690 V	kVA	12.5	14	18	29	37	43	45.5	57	64	68	75
Max. permissible Îpeak	A	350	400	500	800	1000	1200	1250	1550	1750	1900	2100

AC / DC operated contactors		AF116	AF140	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1350	AF1650
Operational power at Ue: 50/60 Hz - according to AC-6a														
220 / 240 V	kVA	26	30	42	45	55	63	76	95	100	110	130	160	190
380 / 400 V	kVA	46	52	73	75	94	108	132	165	170	190	240	275	350
415 / 440 V	kVA	50	57	80	80	103	118	144	180	190	210	270	325	390
500 V	kVA	60	68	96	100	124	143	173	220	230	250	320	–	–
660 / 690 V	kVA	80	90	127	130	164	188	228	290	300	310	410	–	–
Max. permissible Îpeak	A	2100	2400	3300	3500	4300	4900	6000	7700	8400	9300	12000	–	–

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Notes

Lighting circuit switching

Contactor selection

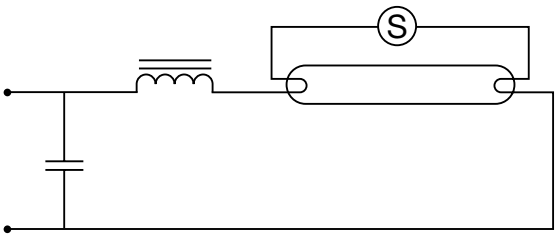
General

Contactor selection criteria for control of lighting circuits are as follows:
- type, power rating and number of lamps
- connection mode
- current values on closing and in steady state
- power factor
- presence or not of correction capacitors.

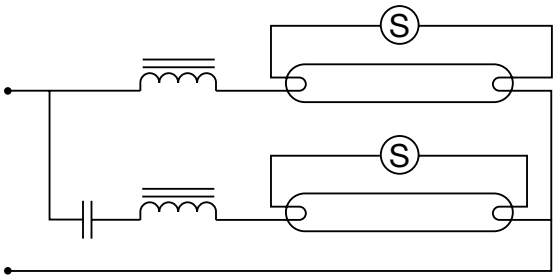
Lighting circuits

In a given circuit, the number and power rating of lamps are defined and cannot result in overload. Only short-circuit protection has to be provided. gG fuses or modular circuit-breakers will be chosen for this purpose.
The lamps have very specific technical data, according to their construction type.
- Incandescent lamps have a very high current on closing: more than 15 times nominal current.
  They do not introduce a large phase displacement between current and voltage
- Fluorescent tubes are equipped with a ballast whose purpose is two-fold: contribute to ignition and limit current to nominal value once steady state is reached. This ballast is a reactor that considerably lowers the power factor. It may or may not be compensated.

Individual compensation
(parallel compensation)



Serial compensation in dual mounting



Selection of contactors

The following tables indicate, for each contactor type, the maximum permissible number of lamps per phase. Air temperature, near the contactor, must be limited to 60 °C. Numbers are given for a 230 V voltage distributed between phase and neutral: single-phase (phase + neutral) or three-phase (3 phases + neutral) distribution, lamps are wired in star connection. In the case of a three-phase supply without neutral, 230 V phase-to-phase, the permissible number of lamps per phase will be that given in the tables multiplied by 0.58.

Example:
120 x 100 W / 230 V incandescent lamps - 400 V three-phase network with distributed neutral.
Calculate the number of lamps per phase: 120 : 3 = 40. On the 100 W line of the incandescent lamp table, contactor AF09 is limited to 38 lamps per phase, you must thus select contactor AF12 which accepts up to 43 lamps per phase.

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Lighting circuit switching

Contactor selection AF09 ... AF146 3-pole contactors

Selection table

3-pole AC / DC operated contactors			AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96	AF116	AF140	AF146
Lamp characteristics			Maximum permissible number of lamps per phase													
W	A	µF														
Incandescent and halogen lamps																**according to AC-5b**
Voltage: 220/240 V AC																
60	0.27	-	64	72	77	103	129	148	177	207	233	259	277	430	519	541
100	0.45	-	38	43	46	62	77	89	106	124	140	155	166	258	311	324
200	0.91	-	19	21	23	30	38	44	52	61	69	77	82	127	154	160
300	1.37	-	12	14	15	20	25	29	35	41	46	51	54	85	102	107
500	2.28	-	7	8	9	12	15	17	21	24	27	30	33	51	61	64
1000	4.55	-	3	4	4	6	7	8	10	12	13	15	16	25	31	32
Fluorescent lamps without compensation - Fluorescent lamps with electronic starter																**according to AC-5a**
Voltage: 220/240 V AC																
20	0.38	-	46	51	55	73	84	92	126	147	157	184	210	305	368	384
40	0.45	-	38	43	46	62	71	77	106	124	133	155	177	258	311	324
65	0.70	-	25	27	30	40	45	50	68	80	85	100	114	166	200	209
80	0.80	-	21	24	26	35	40	43	60	70	75	87	100	145	175	183
100	1.15	-	15	16	18	24	27	30	41	48	52	60	69	101	122	127
110	1.20	-	14	16	17	23	26	29	40	46	50	58	66	97	117	122
Fluorescent lamps with parallel compensation																**according to AC-5a**
Voltage: 220/240 V AC																
20	0.18	5	53	53	53	155	168	176	266	309	325	388	444	644	778	811
40	0.26	5	53	53	53	107	123	134	184	215	230	269	307	446	538	562
65	0.42	7	37	37	37	66	76	83	114	133	142	166	190	276	333	348
80	0.52	7	33	37	37	53	61	67	92	107	115	134	153	223	269	281
100	0.65	16	16	16	16	43	49	53	73	86	92	107	123	178	215	225
110	0.70	18	14	14	14	40	45	49	68	80	85	100	114	166	200	209
Fluorescent lamps in dual mounting																**according to AC-5a**
Voltage: 220/240 V AC																
2 x 20	2 x 0.14	-	62	69	75	100	114	125	171	200	214	250	285	414	500	521
2 x 40	2 x 0.25	-	35	39	42	56	64	70	96	112	120	140	160	232	280	292
2 x 65	2 x 0.40	-	21	24	26	35	40	43	60	70	75	87	100	145	175	183
2 x 80	2 x 0.48	-	18	20	21	29	33	36	50	58	62	72	83	121	146	152
2 x 100	2 x 0.60	-	14	16	17	23	26	29	40	46	50	58	66	97	117	122
2 x 110	2 x 0.65	-	13	15	16	21	24	26	36	43	46	53	61	89	108	112
Compact fluorescent lamps																**according to AC-5a**
Voltage: 220/240 V AC																
5	0.045	-	388	433	466	622	711	777	1066	1244	1333	1555	1777	2578	3111	3244
7	0.075	-	233	260	280	373	426	466	640	746	800	933	1066	1547	1867	1947
11	0.105	-	166	185	200	266	304	333	457	533	571	666	761	1105	1333	1390
15	0.135	-	129	144	155	207	237	259	355	414	444	518	592	859	1037	1081
20	0.160	-	109	121	131	175	200	218	300	350	375	437	500	725	875	913
23	0.180	-	97	108	116	155	177	194	266	311	333	388	444	644	778	811

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Contactor selection AF190 ... AF2650 3-pole contactors

Selection table

3-pole AC / DC operated contactors			AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
Lamp characteristics			Maximum permissible number of lamps per phase													
W	A	µF														
Incandescent and halogen lamps																**according to AC-5b**
Voltage: 220/240 V AC																
60	0.27	-	704	759	981	1130	1370	1481	1704	2148	2778	3009	3250	3972	4935	6380
100	0.45	-	422	456	589	678	822	889	1022	1289	1667	1806	1950	2383	2961	3828
200	0.91	-	209	225	291	335	407	440	505	637	824	893	964	1179	1464	1893
300	1.37	-	139	150	193	223	270	292	336	423	547	593	641	783	973	1257
500	2.28	-	83	90	116	134	162	175	202	254	329	356	385	470	584	755
1000	4.55	-	42	45	58	67	81	88	101	127	165	179	193	236	293	379
Fluorescent lamps without compensation - Fluorescent lamps with electronic starter																**according to AC-5a**
Voltage: 220/240 V AC																
20	0.38	-	500	539	697	803	974	1053	1211	1526	1974	2138	2309	2822	3507	4533
40	0.45	-	422	456	589	678	822	889	1022	1289	1667	1806	1950	2383	2961	3828
65	0.70	-	271	293	379	436	529	571	657	829	1071	1161	1254	1532	1904	2461
80	0.80	-	238	256	331	381	463	500	575	725	938	1016	1097	1341	1666	2153
100	1.15	-	165	178	230	265	322	348	400	504	652	707	763	933	1159	1498
110	1.20	-	158	171	221	254	308	333	383	483	625	677	731	894	1110	1435
Fluorescent lamps with parallel compensation																**according to AC-5a**
Voltage: 220/240 V AC																
20	0.18	5	1056	1139	1472	1694	2056	2222	2556	3222	4167	4514	4875	5958	7403	9569
40	0.26	5	731	788	1019	1173	1423	1538	1769	2231	2885	3125	3375	4125	5125	6625
65	0.42	7	452	488	631	726	881	952	1095	1381	1786	1935	2089	2554	3173	4101
80	0.52	7	365	394	510	587	712	769	885	1115	1442	1563	1688	2063	2563	3313
100	0.65	16	292	315	408	469	569	615	708	892	1154	1250	1350	1650	2050	2650
110	0.70	18	271	293	379	436	529	571	657	829	1071	1161	1254	1532	1904	2461
Fluorescent lamps in dual mounting																**according to AC-5a**
Voltage: 220/240 V AC																
2 x 20	2 x 0.14	-	679	732	946	1089	1321	1429	1643	2071	2679	2902	3134	3830	4759	6152
2 x 40	2 x 0.25	-	380	410	530	610	740	800	920	1160	1500	1625	1755	2145	2665	3445
2 x 65	2 x 0.40	-	238	256	331	381	463	500	575	725	938	1016	1097	1341	1666	2153
2 x 80	2 x 0.48	-	198	214	276	318	385	417	479	604	781	846	914	1117	1388	1794
2 x 100	2 x 0.60	-	158	171	221	254	308	333	383	483	625	677	731	894	1110	1435
2 x 110	2 x 0.65	-	146	158	204	235	285	308	354	446	577	625	675	825	1025	1325
Compact fluorescent lamps																**according to AC-5a**
Voltage: 220/240 V AC																
5	0.045	-	4222	4556	5889	6778	8222	8889	10222	12889	16667	18056	19500	23833	29611	38278
7	0.075	-	2533	2733	3533	4067	4933	5333	6133	7733	10000	10833	11700	14300	17767	22967
11	0.105	-	1810	1952	2524	2905	3524	3810	4381	5524	7143	7738	8357	10214	12690	16405
15	0.135	-	1407	1519	1963	2259	2741	2963	3407	4296	5556	6019	6500	7944	9870	12759
20	0.160	-	1188	1281	1656	1906	2313	2500	2875	3625	4688	5078	5484	6703	8328	10766
23	0.180	-	1056	1139	1472	1694	2056	2222	2556	3222	4167	4514	4875	5958	7403	9569

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Contactor selection AF09 ... AF146 3-pole contactors

Selection table

3-pole AC / DC operated contactors			AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96	AF116	AF140	AF146
Lamp characteristics			Maximum permissible number of lamps per phase													
W	A	µF														
Low pressure sodium vapour lamps without compensation																
Voltage: 220/240 V AC																
35	1.4	-	9	10	12	15	15	16	23	31	35	39	42	70	85	89
55	1.4	-	9	10	12	15	15	16	23	31	35	39	42	70	85	89
90	2.1	-	6	7	8	10	10	10	15	20	23	26	28	47	57	59
135	3.1	-	4	4	5	6	7	7	10	14	15	17	19	32	38	40
180	3.1	-	4	4	5	6	7	7	10	14	15	17	19	32	38	40
Low pressure sodium vapour lamps with parallel compensation																
Voltage: 220/240 V AC																
35	0.6	20	12	12	12	35	36	38	55	73	81	91	100	164	198	207
55	0.6	20	12	12	12	35	36	38	55	73	81	91	100	164	198	207
90	0.9	25	10	10	10	23	24	25	36	48	55	61	66	110	132	138
135	0.9	45	5	5	5	18	18	19	34	34	36	57	59	110	132	138
180	0.9	45	5	5	5	18	18	19	34	34	36	57	59	110	132	138
High pressure sodium vapour lamps without compensation																
Voltage: 220/240 V AC																
150	1.8	-	7	8	9	11	12	12	18	24	27	30	33	45	54	57
250	3.0	-	4	5	5	7	7	7	11	14	16	18	20	27	33	34
400	4.4	-	3	3	3	4	5	5	7	10	11	12	13	18	22	23
600	6.2	-	2	2	2	3	3	3	5	7	7	8	9	13	16	16
1000	10.3	-	1	1	1	2	2	2	3	4	4	5	5	8	10	10
High pressure sodium vapour lamps with parallel compensation																
Voltage: 220/240 V AC																
150	1.0	20	12	12	12	21	22	23	33	43	49	55	60	93	112	117
250	1.5	36	7	7	7	14	14	15	22	29	33	36	40	62	75	78
400	2.5	48	5	5	5	8	8	9	13	17	19	22	24	37	45	47
600	3.3	65	3	3	3	6	6	6	10	13	15	16	18	28	34	35
1000	6.2	100	2	2	2	3	3	3	5	7	7	8	9	15	18	19
High pressure mercury vapour lamps without compensation																
Voltage: 220/240 V AC																
50	0.60	-	22	25	28	35	36	38	55	73	82	91	100	152	190	214
80	0.80	-	16	18	21	26	27	28	41	55	61	68	75	114	143	160
125	1.15	-	11	13	14	18	19	20	28	38	43	47	52	79	99	112
250	2.15	-	6	6	7	9	10	10	15	20	23	25	27	42	53	60
400	3.25	-	4	4	5	6	6	7	10	13	15	16	18	28	35	39
700	5.40	-	2	2	3	3	4	4	6	8	9	10	11	17	21	24
1000	7.50	-	1	2	2	2	2	3	4	5	6	7	8	12	15	17
Voltage: 380/415 V AC																
2000	8.00	-	1	1	2	2	2	2	4	5	6	6	7	11	14	16
High pressure mercury vapour lamps with compensation																
Voltage: 220/240 V AC																
50	0.28	7	36	36	36	75	78	82	117	157	176	196	214	326	407	458
80	0.43	8	31	31	31	48	51	53	76	102	115	127	139	212	265	298
125	0.66	10	20	22	25	31	33	34	50	66	75	83	90	138	173	194
250	1.28	18	10	11	13	16	17	17	25	34	38	42	46	71	89	100
400	2.05	25	6	7	8	10	10	11	16	21	24	26	29	44	56	63
700	3.55	40	3	4	4	5	6	6	9	12	13	15	16	26	32	36
1000	4.83	60	2	3	3	4	4	4	6	9	10	11	12	19	24	27
Voltage: 380/415 V AC																
2000	5.45	35	2	2	3	3	4	4	6	8	9	10	11	17	21	24

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Contactor selection AF190 ... AF2650 3-pole contactors

Selection table

3-pole AC / DC operated contactors			AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
Lamp characteristics			Maximum permissible number of lamps per phase													
W	A	µF														
Low pressure sodium vapour lamps without compensation																
Voltage: 220/240 V AC																
35	1.4	-	115	124	161	185	225	243	279	352	455	493	533	651	809	1046
55	1.4	-	115	124	161	185	225	243	279	352	455	493	533	651	809	1046
90	2.1	-	77	83	107	123	150	162	186	235	304	329	355	434	539	697
135	3.1	-	52	56	73	84	101	110	126	159	206	223	241	294	365	472
180	3.1	-	52	56	73	84	101	110	126	159	206	223	241	294	365	472
Low pressure sodium vapour lamps with parallel compensation																
Voltage: 220/240 V AC																
35	0.6	20	269	290	375	432	524	567	652	822	1063	1151	1243	1519	1888	2440
55	0.6	20	269	290	375	432	524	567	652	822	1063	1151	1243	1519	1888	2440
90	0.9	25	179	194	250	288	349	378	434	548	708	767	829	1013	1258	1627
135	0.9	45	179	194	250	288	349	378	434	548	708	767	829	1013	1258	1627
180	0.9	45	179	194	250	288	349	378	434	548	708	767	829	1013	1258	1627
High pressure sodium vapour lamps without compensation																
Voltage: 220/240 V AC																
150	1.8	-	74	80	103	119	144	156	179	226	292	313	338	413	513	663
250	3.0	-	44	48	62	71	86	93	107	135	175	188	203	248	308	398
400	4.4	-	30	33	42	49	59	64	73	92	119	128	138	169	210	271
600	6.2	-	21	23	30	34	42	45	52	65	85	91	98	120	149	192
1000	10.3	-	13	14	18	21	25	27	31	39	51	55	59	72	90	116
High pressure sodium vapour lamps with parallel compensation																
Voltage: 220/240 V AC																
150	1.0	20	152	164	212	244	296	320	368	464	600	625	675	825	1025	1325
250	1.5	36	101	109	141	163	197	213	245	309	400	417	450	550	683	883
400	2.5	48	61	66	85	98	118	128	147	186	240	250	270	330	410	530
600	3.3	65	46	50	64	74	90	97	112	141	182	189	205	250	311	402
1000	6.2	100	25	26	34	39	48	52	59	75	97	101	109	133	165	214
High pressure mercury vapour lamps without compensation																
Voltage: 220/240 V AC																
50	0.60	-	261	333	380	475	570	570	665	760	998	1188	1283	1568	1948	2518
80	0.80	-	196	249	285	356	428	428	499	570	748	891	962	1176	1461	1888
125	1.15	-	136	173	198	248	297	297	347	397	520	620	669	818	1016	1313
250	2.15	-	73	93	106	133	159	159	186	212	278	331	358	437	543	703
400	3.25	-	48	61	70	88	105	105	123	140	184	219	237	289	360	465
700	5.40	-	29	37	42	53	63	63	74	84	111	132	143	174	216	280
1000	7.50	-	21	27	30	38	46	46	53	61	80	95	103	125	156	201
Voltage: 380/415 V AC																
2000	8.00	-	20	25	29	36	43	43	50	57	75	89	96	118	146	189
High pressure mercury vapour lamps with compensation																
Voltage: 220/240 V AC																
50	0.28	7	560	713	814	1018	1221	1221	1425	1629	2138	2545	2748	3359	4173	5395
80	0.43	8	365	464	530	663	795	795	928	1060	1392	1657	1790	2187	2717	3513
125	0.66	10	238	302	345	432	518	518	605	691	907	1080	1166	1425	1770	2289
250	1.28	18	122	156	178	223	267	267	312	356	468	557	601	735	913	1180
400	2.05	25	76	97	111	139	167	167	195	222	292	348	375	459	570	737
700	3.55	40	44	56	64	80	96	96	112	128	169	201	217	265	329	425
1000	4.83	60	32	41	47	59	71	71	83	94	124	148	159	195	242	313
Voltage: 380/415 V AC																
2000	5.45	35	29	37	42	52	63	63	73	84	110	131	141	173	214	277

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Contactor selection AF09 ... AF146 3-pole contactors

Selection table

3-pole AC / DC operated contactors			AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96	AF116	AF140	AF146
Lamp characteristics			Maximum permissible number of lamps per phase													
W	A	µF														
Metal halide vapour lamps without compensation																
Voltage: 220/240 V AC																
250	3	-	4	5	5	7	7	7	11	14	16	18	20	27	33	38
400	4	-	3	3	4	5	5	5	8	11	12	13	15	20	25	28
1000	9.5	-	1	1	1	2	2	2	3	4	5	5	6	8	11	12
2000	16.5	-	0	0	1	1	1	1	2	2	3	3	3	5	6	7
Voltage: 380/415 V AC																
2000	10.5	-	1	1	1	2	2	2	3	4	4	5	5	8	10	11
Metal halide vapour lamps with compensation																
Voltage: 220/240 V AC																
250	1.32	33	7	7	7	15	16	17	25	33	37	41	45	69	86	97
400	2.22	45	5	5	5	9	9	10	14	19	22	24	27	41	51	58
1000	5.14	85	2	2	3	4	4	4	6	8	9	10	11	18	22	25
2000	11.5	148	1	1	1	1	1	2	2	3	4	4	5	8	10	11
Voltage: 380/415 V AC																
2000	6.10	60	2	2	2	3	3	3	5	7	8	9	9	15	19	21

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Contactor selection AF190 ... AF2650 3-pole contactors

Selection table

3-pole AC / DC operated contactors			AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
Lamp characteristics			Maximum permissible number of lamps per phase													
W	A	µF														
Metal halide vapour lamps without compensation																
Voltage: 220/240 V AC																
250	3	-	46	58	67	83	100	100	117	133	175	208	225	275	342	442
400	4	-	34	44	50	63	75	75	88	100	131	156	169	206	256	331
1000	9.5	-	14	18	21	26	32	32	37	42	55	66	71	87	108	139
2000	16.5	-	8	11	12	15	18	18	21	24	32	38	41	50	62	80
Voltage: 380/415 V AC																
2000	10.5	-	13	17	19	24	29	29	33	38	50	60	64	79	98	126
Metal halide vapour lamps with compensation																
Voltage: 220/240 V AC																
250	1.32	33	119	151	173	216	259	259	302	345	453	540	583	713	885	1144
400	2.22	45	71	90	103	128	154	154	180	205	270	321	347	424	526	680
1000	5.14	85	30	39	44	55	67	67	78	89	116	139	150	183	227	294
2000	11.5	148	14	17	20	25	30	30	35	40	52	62	67	82	102	131
Voltage: 380/415 V AC																
2000	6.10	60	26	33	37	47	56	56	65	75	98	117	126	154	192	248

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Contactor selection AF09 ... AF370 4-pole contactors

Selection table

4-pole AC / DC operated contactors			AF09	AF16	AF26	AF38	AF40	AF52	AF80	AF116	AF140	AF190	AF205	AF265	AF305	AF370
Lamp characteristics			Maximum permissible number of lamps per phase													
W	A	µF														
Incandescent and halogen lamps																**according to AC-5b**
Voltage: 220/240 V AC																
60	0.27	-	64	77	103	114	177	207	259	430	519	704	759	981	1130	1370
100	0.45	-	38	46	62	68	106	124	155	258	311	422	456	589	678	822
200	0.91	-	19	23	30	34	52	61	77	127	154	209	225	291	335	407
300	1.37	-	12	15	20	22	35	41	51	85	102	139	150	193	223	270
500	2.28	-	7	9	12	13	21	24	30	51	61	83	90	116	134	162
1000	4.55	-	3	4	6	6	10	12	15	25	31	42	45	58	67	81
Fluorescent lamps without compensation - Fluorescent lamps with electronic starter																**according to AC-5a**
Voltage: 220/240 V AC																
20	0.38	-	46	55	73	81	126	147	184	305	368	500	539	697	803	974
40	0.45	-	38	46	62	68	106	124	155	258	311	422	456	589	678	822
65	0.70	-	25	30	40	44	68	80	100	166	200	271	293	379	436	529
80	0.80	-	21	26	35	38	60	70	87	145	175	238	256	331	381	463
100	1.15	-	15	18	24	26	41	48	60	101	122	165	178	230	265	322
110	1.20	-	14	17	23	25	40	46	58	97	117	158	171	221	254	308
Fluorescent lamps with parallel compensation																**according to AC-5a**
Voltage: 220/240 V AC																
20	0.18	5	53	53	110	110	266	309	309	644	778	1056	1139	1472	1694	2056
40	0.26	5	53	53	107	110	184	215	269	446	538	731	788	1019	1173	1423
65	0.42	7	37	37	66	73	114	133	166	276	333	452	488	631	726	881
80	0.52	7	33	37	53	59	92	107	134	223	269	365	394	510	587	712
100	0.65	16	16	16	34	34	73	86	96	178	215	292	315	408	469	569
110	0.70	18	14	14	30	30	68	80	86	166	200	271	293	379	436	529
Fluorescent lamps in dual mounting																**according to AC-5a**
Voltage: 220/240 V AC																
2 x 20	2 x 0.14	-	62	75	100	110	171	200	250	414	500	679	732	946	1089	1321
2 x 40	2 x 0.25	-	35	42	56	62	96	112	140	232	280	380	410	530	610	740
2 x 65	2 x 0.40	-	21	26	35	38	60	70	87	145	175	238	256	331	381	463
2 x 80	2 x 0.48	-	18	21	29	32	50	58	72	121	146	198	214	276	318	385
2 x 100	2 x 0.60	-	14	17	23	25	40	46	58	97	117	158	171	221	254	308
2 x 110	2 x 0.65	-	13	16	21	23	36	43	53	89	108	146	158	204	235	285
Compact fluorescent lamps																**according to AC-5a**
Voltage: 220/240 V AC																
5	0.045	-	388	466	622	688	1066	1244	1555	2578	3111	4222	4556	5889	6778	8222
7	0.075	-	233	280	373	413	640	746	933	1547	1867	2533	2733	3533	4067	4933
11	0.105	-	166	200	266	295	457	533	666	1105	1333	1810	1952	2524	2905	3524
15	0.135	-	129	155	207	229	355	414	518	859	1037	1407	1519	1963	2259	2741
20	0.160	-	109	131	175	193	300	350	437	725	875	1188	1281	1656	1906	2313
23	0.180	-	97	116	155	172	266	311	388	644	778	1056	1139	1472	1694	2056
Low pressure sodium vapour lamps without compensation																
Voltage: 220/240 V AC																
35	1.4	-	9	12	15	16	23	31	39	70	85	115	124	161	185	225
55	1.4	-	9	12	15	16	23	31	39	70	85	115	124	161	185	225
90	2.1	-	6	8	10	10	15	20	26	47	57	77	83	107	123	150
135	3.1	-	4	5	6	7	10	14	17	32	38	52	56	73	84	101
180	3.1	-	4	5	6	7	10	14	17	32	38	52	56	73	84	101
Low pressure sodium vapour lamps with parallel compensation																
Voltage: 220/240 V AC																
35	0.6	20	12	12	27	27	55	73	77	164	198	269	290	375	432	524
55	0.6	20	12	12	27	27	55	73	77	164	198	269	290	375	432	524
90	0.9	25	10	10	22	22	36	48	61	110	132	179	194	250	288	349
135	0.9	45	5	5	12	12	34	34	34	110	132	179	194	250	288	349
180	0.9	45	5	5	12	12	34	34	34	110	132	179	194	250	288	349

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Lighting circuit switching

Contactor selection AF09 ... AF370 4-pole contactors

Selection table

4-pole AC / DC operated contactors			AF09	AF16	AF26	AF38	AF40	AF52	AF80	AF116	AF140	AF190	AF205	AF265	AF305	AF370
Lamp characteristics			Maximum permissible number of lamps per phase													
W	A	µF														
High pressure sodium vapour lamps without compensation																
Voltage: 220/240 V AC																
150	1.8	-	7	9	11	12	18	24	30	45	54	74	80	103	119	144
250	3,0	-	4	5	7	7	11	14	18	27	33	44	48	62	71	86
400	4.4	-	3	3	4	5	7	10	12	18	22	30	33	42	49	59
600	6.2	-	2	2	3	3	5	7	8	13	16	21	23	30	34	42
1000	10.3	-	1	1	2	2	3	4	5	8	10	13	14	18	21	25
High pressure sodium vapour lamps with parallel compensation																
Voltage: 220/240 V AC																
150	1,0	20	12	12	21	23	33	43	55	93	112	152	164	212	244	296
250	1.5	36	7	7	14	15	22	29	36	62	75	101	109	141	163	197
400	2.5	48	5	5	8	9	13	17	22	37	45	61	66	85	98	118
600	3.3	65	3	3	6	6	10	13	16	28	34	46	50	64	74	90
1000	6.2	100	2	2	3	3	5	7	8	15	18	25	26	34	39	48
High pressure mercury vapour lamps without compensation																
Voltage: 220/240 V AC																
50	0.60	-	22	28	35	38	55	73	91	152	190	261	333	380	475	570
80	0.80	-	16	21	26	28	41	55	68	114	143	196	249	285	356	428
125	1.15	-	11	14	18	20	28	38	47	79	99	136	173	198	248	297
250	2.15	-	6	7	9	10	15	20	25	42	53	73	93	106	133	159
400	3.25	-	4	5	6	7	10	13	16	28	35	48	61	70	88	105
700	5.40	-	2	3	3	4	6	8	10	17	21	29	37	42	53	63
1000	7.50	-	1	2	2	3	4	5	7	12	15	21	27	30	38	46
Voltage: 380/415 V AC																
2000	8	-	1	2	2	2	4	5	6	11	14	20	25	29	36	43
High pressure mercury vapour lamps with compensation																
Voltage: 220/240 V AC																
50	0.28	7	36	36	75	79	117	157	196	326	407	560	713	814	1018	1221
80	0.43	8	31	31	48	53	76	102	127	212	265	365	464	530	663	795
125	0.66	10	20	25	31	34	50	66	83	138	173	238	302	345	432	518
250	1.28	18	10	13	16	17	25	34	42	71	89	122	156	178	223	267
400	2.05	25	6	8	10	11	16	21	26	44	56	76	97	111	139	167
700	3.55	40	3	4	5	6	9	12	15	26	32	44	56	64	80	96
1000	4.83	60	2	3	4	4	6	9	11	19	24	32	41	47	59	71
Voltage: 380/415 V AC																
2000	5,45	35	2	3	3	4	6	8	10	17	21	29	37	42	52	63
Metal halide vapour lamps without compensation																
Voltage: 220/240 V AC																
250	3	-	4	5	7	7	11	14	18	27	33	46	58	67	83	100
400	4	-	3	4	5	5	8	11	13	20	25	34	44	50	63	75
1000	9.5	-	1	1	2	2	3	4	5	8	11	14	18	21	26	32
2000	16.5	-	0	1	1	1	2	2	3	5	6	8	11	12	15	18
Voltage: 380/415 V AC																
2000	10.5	-	1	1	2	2	3	4	5	8	10	13	17	19	24	29
Metal halide vapour lamps with compensation																
Voltage: 220/240 V AC																
250	1.32	33	7	7	15	16	25	33	41	69	86	119	151	173	216	259
400	2.22	45	5	5	9	10	14	19	24	41	51	71	90	103	128	154
1000	5.14	85	2	3	4	4	6	8	10	18	22	30	39	44	55	67
2000	11.5	148	1	1	1	2	2	3	4	8	10	14	17	20	25	30
Voltage: 380/415 V AC																
2000	6.10	60	2	2	3	3	5	7	9	15	19	26	33	37	47	56

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Parallel connection of main poles

General

Purpose: Increasing the AC resistive load by wiring connection of main poles in parallel.

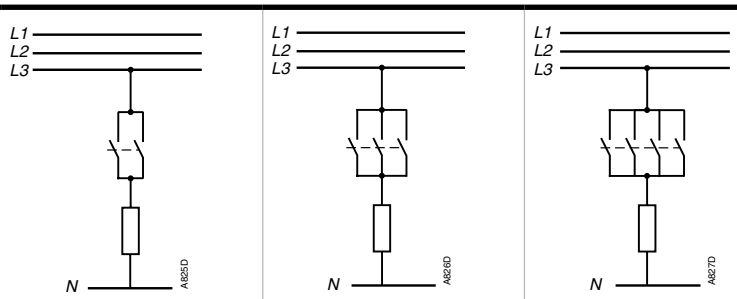
Remarks:

- Parallel connection of main poles to increase the DC resistive load is not acceptable
- Parallel connection of main poles does not increase the breaking capacity.

The table below shows the uprating factor for Ie / AC-1 max. in relation to the number of poles wired connected in parallel and for a maximum switching frequency.

Note: The poles can be connected in parallel via following connecting strips. See details and permissible current in "Accessory" part.

- LP, LH, LY and LF for parallel connection of 2 or 3 poles
- LG for parallel connection of 4 poles.



			2 poles in parallel	3 poles in parallel	4 poles in parallel
Contactors			**Factor to be applied to the rated operational current Ie / AC-1 to obtain the permissible current Ie / AC-1 with "n" poles in parallel**		
AC operated	DC operated	Cycles / h			
3-pole contactors					
AF09 ... AF96	AF09 ... AF96	600	1.6	2.2	–
AF116 ... AF1250	AF116 ... AF1250	300	1.6	2.2	–
AF1350 ... AF2650	AF1350 ... AF2650	30	1.6	2.2	–
4-pole contactors					
AF09 ... AF38 A45 ... A75	AF09 ... AF38	600	1.6	2.2	2.6
AF45 ... AF75	AE45 ... AE75 TAE45 ... TAE75 AF45 ... AF75	300	1.6	2.2	2.6
EK	EK	300	1.6	2.2	2.8

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Temporary or intermittent duty

Utilization of contactors for temporary / intermittent duty

The table below shows the factor (known as "On-load factor") to be applied to the rated operational current Ie / AC-1 to obtain the permissible operational current Ie / AC-1 in relation to the switching frequency and the current flow time per cycle.

Operating cycles per hour		1	2	3	6	12	20	30	60	120
Prefered classes acc. to IEC 60947-4-1		1	–	3	–	12	–	30	–	120
Current flow time per cycle		Factors applicable to Ie / AC-1								
	5 s	5.2	5	4.9	4.7	4.3	4.0	3.7	3.4	2.8
	10 s	3.8	3.7	3.6	3.4	3.1	3.0	2.8	2.6	2.2
	20 s	2.8	2.7	2.7	2.6	2.5	2.4	2.2	2.0	1.5
	30 s	2.4	2.3	2.3	2.2	2.1	2.1	1.9	1.7	–
	40 s	2.2	2.1	2.1	2.0	1.9	1.9	1.7	1.5	–
	60 s	1.9	1.8	1.8	1.8	1.7	1.7	1.5	–	–

Example:

AF09 contactor (intermittent duty, resistive load)

Rated operational current Ie / AC-1 at 60 °C	
(see "Technical data: main pole utilization characteristics")	25 A
Switching frequency	2 operating cycles/h
Current flow time per cycle	20 s
Factor to be applied to the current Ie / AC-1	2.7
Permissible current: 2.7 x 25 =	67 A

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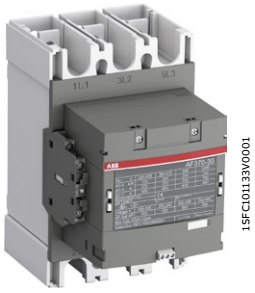
Influence of the length of conductors used in contactor control circuit

AF40-30-00



AF370-30-11

Under certain conditions the excessive length of the control circuit conductors may prevent the contactor from carrying out closing and opening orders.

- **no closing:** due to excessive voltage drop (in AC or DC)
- **no opening:** due to excessive capacitance (in AC).

Contactor Closing (contactor with AC or DC operated coil).

The voltage drop is due to the pull-in current (pull-in power) and to the resistance of the control circuit conductors.

The table and graph below can be used to determine the single length of line feeders (distance between the control device and the contactor coil) in relation to:

- the coil pull-in consumption.
- the supply voltage.
- the connecting wire cross-sectional area.

The graph has been drawn for a max. line voltage drop of 5 %.

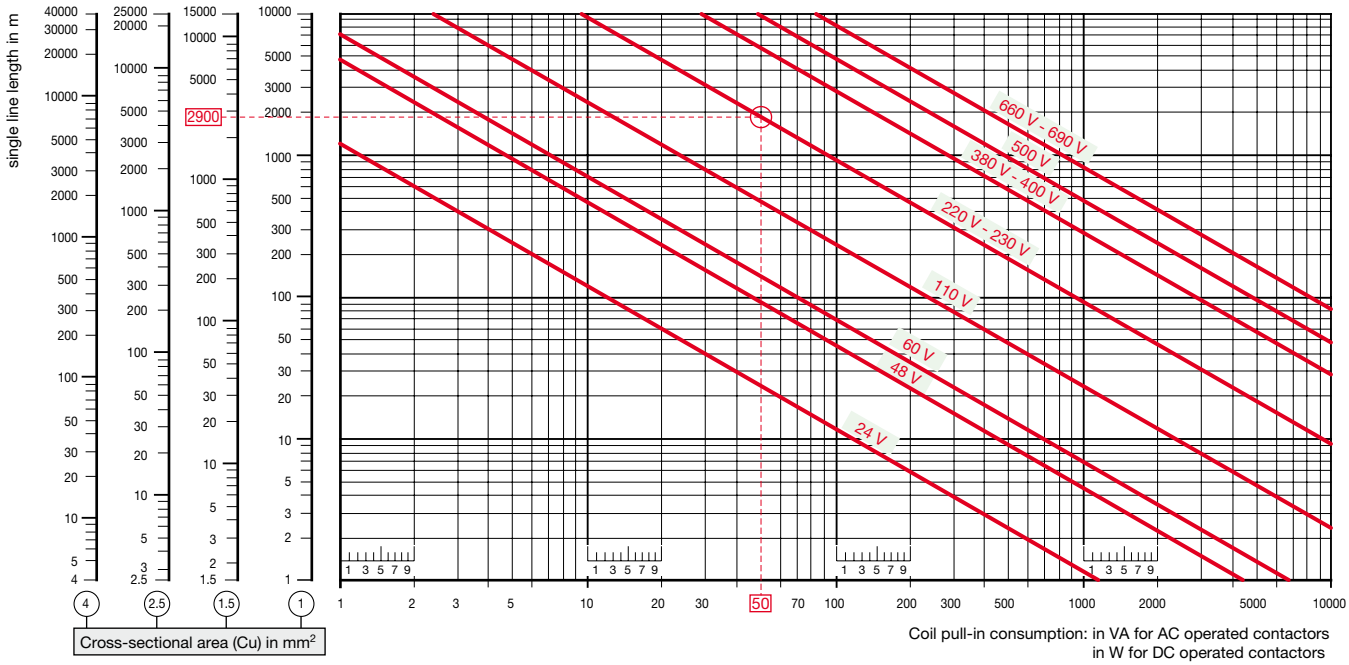
Coil pull-in consumption (average value)

3-pole contactors	AC control supply 50/60 Hz	DC control supply
AF09, AF12, AF16, AF26, AF30, AF38	50 VA	50 W
AF09Z, AF12Z, AF16Z, AF26Z, AF30Z, AF38Z	20 VA	20 W
AF40, AF52, AF65	25 VA	25 W
AF80, AF96	40 VA	40 W
AF116, AF140, AF146	180 VA	170 W
AF190, AF205	195 VA	185 W
AF265, AF305, AF370	405 VA	465 W
AF400, AF460	1005 VA	960 W
AF580, AF750, AF1250	940 VA	900 W
AF1350, AF1650, AF2050, AF2650	2450 VA	2290 W

4-pole contactors	AC control supply 50/60 Hz	DC control supply
AF09, AF16, AF26, AF38	50 VA	50 W
AF09Z, AF16Z, AF26Z, AF38Z	20 W	20 W
AF40, AF52, AF80	40 VA	40 W
AF116, AF140	185 VA	170 W
AF190, AF205	190 VA	180 W
AF265, AF305, AF370	405 VA	445 W

Permissible single length for the control circuit conductors on contactor closing:

Depending on the coil pull-in power consumption on the supply voltage and on the control circuit conductor cross-sectional area.



Example AF09 contactor: Coil voltage: 230 V 50 Hz, contactor coil pull-in power consumption: 50 VA, control circuit conductor cross-sectional area: Cu 1.5 mm². Max. permissible length: 2900 m.

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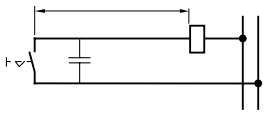
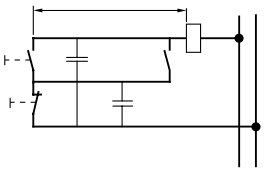
Influence of the length of conductors used in contactor control circuit

Single control line length



Wiring diagram A
Via maintained pushbutton and 2-core cable (with a capacity of 0.2 µF/km, for example).



Wiring diagram B
Via momentary pushbutton plus hold-in contact and 3-core cable (with a capacity of 2 x 0.2 = 0.4 µF/km, for example).

Contactor Opening (contactor with AC operated coil)

Under certain conditions, an AC operated contactor does not open when the control circuit is de-energized.

This is due to a critical capacity of the excessively long control circuit line and the type of contactor coil control layout (see diagrams A and B opposite). This may be caused by the following factors:

- high control voltage
- low coil holding consumption
- low contactor drop-out voltage (according to IEC 60947-4-1: 0.2 to 0.75 x Uc).

If lines longer than those indicated are required, the following measures must be taken:

- select a contactor with a higher rating
- select a lower control voltage
- connect "Rp" resistance in parallel with the contactor coil:

$$RP = \frac{103}{C} \quad \text{(with C in µF)}$$

The table and graph below can be used to determine the single length of line feeders (distance between the control device and the contactor coil) in relation to:

- the coil holding consumption VA
- the supply voltage
- the capacity in µF/km (depending on the control layout).

Wiring diagrams A and B opposite show two supply and coil control wiring examples.

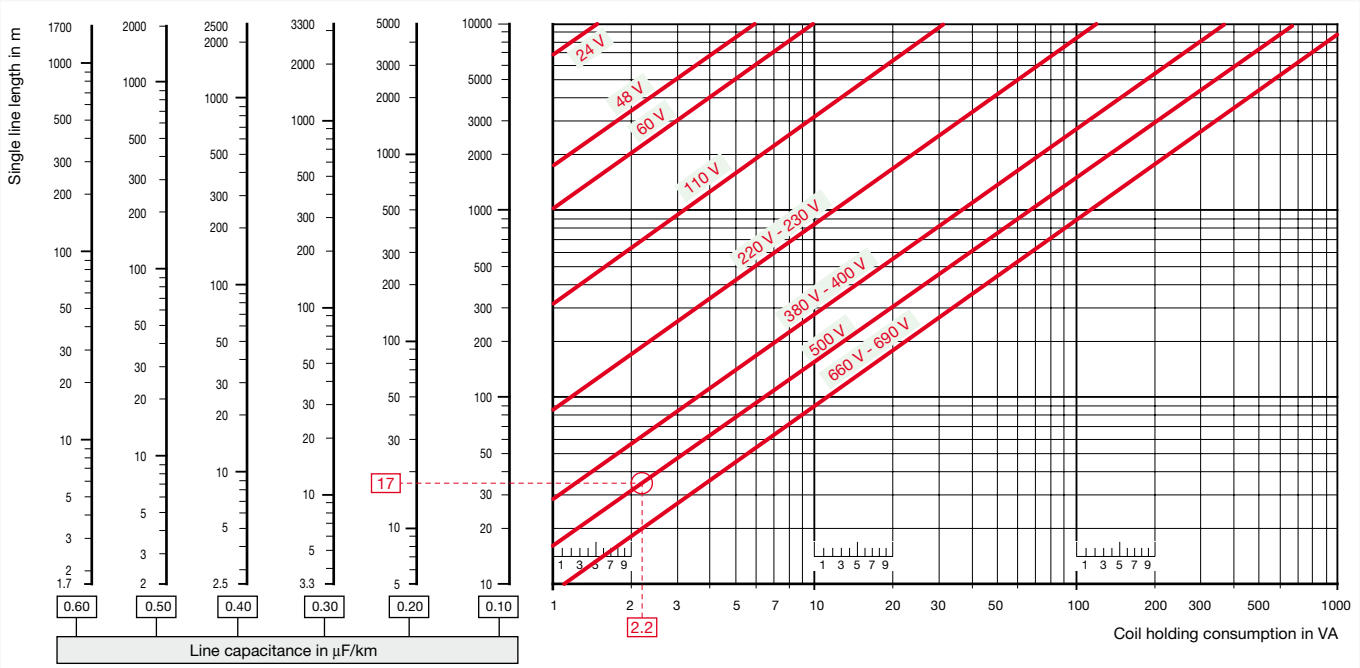
Coil holding consumption (average value)

3-pole contactors	AC control supply 50/60 Hz
AF09, AF12, AF16, AF26, AF30, AF38	2.2 VA
AF09Z, AF12Z, AF16Z, AF26Z, AF30Z, AF38Z	1.7 VA
AF40, AF52, AF65, AF80, AF96	4 VA
AF116, AF140, AF146	8.9 VA
AF190, AF205	9.3 VA
AF265, AF305, AF370	16.6 VA
AF400, AF460, AF580, AF750, AF1250	12 VA
AF1350, AF1650, AF2050, AF2650	48 VA

4-pole contactors	AC control supply 50/60 Hz
AF09, AF16, AF26, AF38	2.2 VA
AF09Z, AF16Z, AF26Z, AF38Z	1.7 VA
AF40, AF52, AF80	4 VA
AF116, AF140, AF190, AF205	8 VA
AF265, AF305, AF370	16 VA

Permissible single length for the control circuit conductors on contactor opening:

Depending on the coil holding power consumption, on the supply voltage and on the control circuit conductor capacity.



Example AF16 contactor: Coil voltage Uc = 500 V, 50 Hz, 2.2 VA contactor coil holding consumption, control type: diagram A, via maintained pushbutton, and 2-core cable with a capacity of 0.2 µF/km. Max. permissible length: 17 m.

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Voltage code table

The below tables indicate the available coil voltages and corresponding digits for order codes. When placing an order, please give the order code. 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 AF400-30-11 and coil 100...250 V 50/60 Hz, the order code is: 1SFL577001R7011.

AF09 ... AF370 3-pole contactors
AF09 ... AF370 4-pole contactors

	AC coil code 50/60 Hz	DC coil code
41	24...60 V	-
11	24...60 V	20...60 V
12	48...130 V	48...130 V
13	**100...250 V**	**100...250 V**
14	250...500 V	250...500 V

Coil 41: not available for AF116 ... AF370

AF116 ... AF370 3-pole contactors with built-in PLC interface

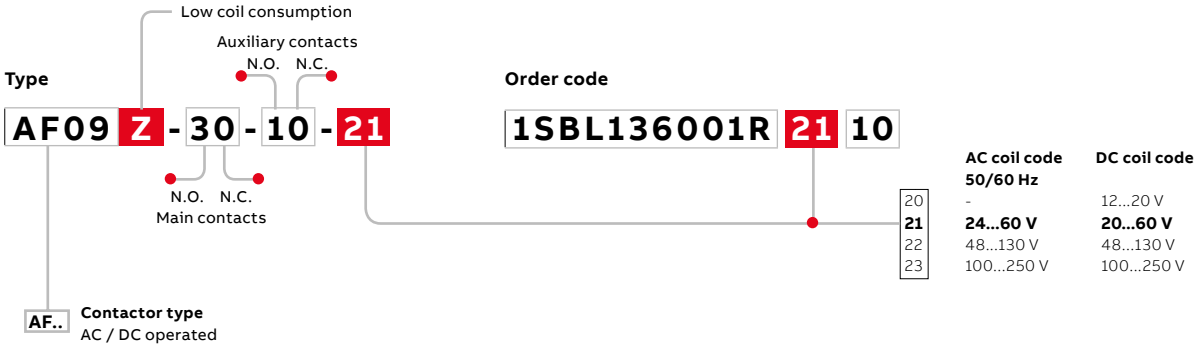
	AC coil code 50/60 Hz	DC coil code
33	100...250 V	100...250 V
34	250...500 V	250...500 V

AF400 ... AF2650 3-pole contactors

	AC coil code 50/60 Hz	DC coil code
68	-	24...60 V
69	**48...130 V**	**48...130 V**
70	100...250 V	100...250 V
71	250...500 V	250...500 V

Coil 68, 69, 71: not available for AF1350 ... AF2650

AF09 ... AF38 3- and 4-pole contactors - low consumption



	AC coil code 50/60 Hz	DC coil code
20	-	12...20 V
21	**24...60 V**	**20...60 V**
22	48...130 V	48...130 V
23	100...250 V	100...250 V

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Voltage code table

NF contactor relays

Type

NF 22 E - 13

N.O. N.C.
Number contacts

NF **Contactor type**
AC / DC operated

Order code

1SBH137001R 13 22

	AC coil code 50/60 Hz	DC coil code
41	24...60 V	-
11	24...60 V	20...60 V
12	48...130 V	48...130 V
13	**100...250 V**	**100...250 V**
14	250...500 V	250...500 V

NF contactor relays with overlapping of lagging / leading contacts

N.O. leading contacts
N.C. lagging contacts

Type

NF 33 / 11 - 13

N.O. N.C.
Number contacts

NF **Contactor type**
AC / DC operated

Order code

1SBH137001R 13 39

	AC coil code 50/60 Hz	DC coil code
41	24...60 V	-
11	24...60 V	20...60 V
12	48...130 V	48...130 V
13	**100...250 V**	**100...250 V**
14	250...500 V	250...500 V

NF contactor relays - low consumption

Low coil consumption

Type

NF Z 22 E - 21

N.O. N.C.
Number contacts

NF **Contactor type**
AC / DC operated

Order code

1SBH136001R 21 22

	AC coil code 50/60 Hz	DC coil code
20	-	12...20 V
21	**24...60 V**	**20...60 V**
22	48...130 V	48...130 V
23	100...250 V	100...250 V

NF contactor relays with overlapping of lagging / leading contacts - low consumption

Low coil consumption
N.O. leading contacts
N.C. lagging contacts

Type

NF Z 33 / 11 E - 21

N.O. N.C.
Number contacts

NF **Contactor type**
AC / DC operated

Order code

1SBH136001R 21 39

	AC coil code 50/60 Hz	DC coil code
20	-	12...20 V
21	**24...60 V**	**20...60 V**
22	48...130 V	48...130 V
23	100...250 V	100...250 V

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Voltage code table

GA contactors

Type

GA75 - 10 - 00

Auxiliary contacts: N.O. N.C.

Main contacts: N.O. N.C.

Contactor type

GA	DC switching - AC operated
GAE	DC switching - DC operated

Order code

1SBL411025R 82 00

Contactors: GA
AC coil code

	50 Hz	60 Hz
81	**24 V**	**24 V**
82	**42 V**	**42 V**
83	**48 V**	**48 V**
84	**110 V**	**110**...120 V
89	110...**115 V**	**115**...127 V
80	220...**230 V**	**230**...240 V
88	230...**240 V**	**240**...260 V
42	230...240 V	277 V
85	380...4**00 V**	**400**...415 V
86	400...**415 V**	**415**...440 V

Codes in bold for dual frequency coils.

Contactors: GAE
DC coil code

80	12 V
81	24 V
82	42 V
83	48 V
86	110 V
87	125 V
88	220 V
89	240 V
38	250 V

GAF185 ... GAF300 contactors

Type

GAF185 - 10 - 11

Auxiliary contacts: N.O. N.C.

Main contacts: N.O. N.C.

GAF **Contactor type**
AC / DC operated

Order code

1SFL497025R 69 11

	AC coil code 50/60 Hz	DC coil code
72	- 20...60 V	
69	**48...130 V**	**48...130 V**
70	100...250 V	100...250 V

GAF460 ... GAF1250 contactors

Type

GAF460 - 10 - 11

Auxiliary contacts: N.O. N.C.

Main contacts: N.O. N.C.

GAF **Contactor type**
AC / DC operated

Order code

1SFL597025R 69 11

	AC coil code 50/60 Hz	DC coil code
68	- 24...60 V	
69	**48...130 V**	**48...130 V**
70	100...250 V	100...250 V
71	250...500 V	250...500 V

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Voltage code table

GAF1650, GAF2050 contactors

Type

GAF1650 - 10 - 11

Auxiliary contacts N.O. N.C.

N.O. N.C. Main contacts

GAF **Contactor type** AC / DC operated

Order code

1SFL677025R 70 11

	AC coil code 50/60 Hz	DC coil code
70	100...250 V	100...250 V

UA..RA contactors

Type

UA16 - 30 - 10 RA

Auxiliary contacts N.O. N.C.

N.O. N.C. Main contacts

UA..RA **Contactor type** Capacitor switching - AC operated

Order code

1SBL181024R 84 10

Contactors: UA..RA

	AC coil code 50 Hz	60 Hz
81	**24 V**	**24 V**
84	**110 V**	**110**...120 V
89	110...**115 V**	**115**...127 V
36	190 V	220 V
80	220...**230 V**	**230**...240 V
88	230...**240 V**	**240**...260 V
85	380...**400 V**	**400**...415 V
86	400...**415 V**	**415**...440 V
75	**200 V**	**200**...220 V

Codes in bold for dual frequency coils.

UA contactors

Type

UA16 - 30 - 10

Auxiliary contacts N.O. N.C.

N.O. N.C. Main contacts

UA **Contactor** type Capacitor switching - AC operated

Order code

1SBL181022R 83 10

Contactors: UA

	AC coil code 50 Hz	60 Hz
81	**24 V**	**24 V**
83	**48 V**	**48 V**
84	**110 V**	**110**...120 V
89	110...**115 V**	**115**...127 V
36	190 V	220 V
80	220...**230 V**	**230**...240 V
88	230...**240 V**	**240**...260 V
42	230...240 V	277 V
85	380...**400 V**	**400**...415 V
86	400...**415 V**	**415**...440 V
75	**200 V**	**200**...220 V

Codes in bold for dual frequency coils.

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Voltage code table

EK550, EK1000 contactors

Type

EK550 - **40** - **11**

Auxiliary contacts
N.O. N.C.

N.O. N.C.
Main contacts

EK

Contactor type
AC operated or DC operated

Order code

SK827041 - **AD**

AC coil code

	50 Hz	60 Hz
AD	48 V	-
AE	-	110 V
AF	110 V	120 V
AG	127 V	-
AZ	-	208 V
AH	190 V	220 V
AK	-	240 V
AL	220...230 V	240 V
AM	230...240 V	-
AN	-	380 V
AP	380...400 V	440 V
AR	400...415 V	-
AS	-	480 V
AT	440 V	-
AU	500 V	-
AV	-	600 V

Dual frequency coil code

	50 Hz	60 Hz
EF	110 V	110...120 V
EG	110...115 V	115...127 V
EL	220 V	220...240 V
EM	220...230 V	230...255 V
EP	380 V	380...415 V
ER	380...400 V	400...440 V

2 auxiliary contact blocks maximum per contactor, ambient temperature ≤ 55 °C and mounting positions 2 and 6 excluded.

DC coil code

DB	24 V
DC	36 V
DD	48 V
DT	60 V
DG	75 V
DE	110 V
DU	125 V
DF	220 V

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Questionnaire for product specifications: Block contactors

Tel.: e-mail:
Segments:

Tel.: e-mail:
Date:

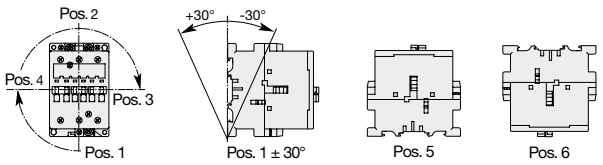
Application

Type: No of phases:
Utilisation category (AC/DC): % AC4 if any:
Rated operational voltage Ue: V Cos j:

Frequency: Hz L/R: ms
Nominal current In: A
Making current: A Breaking current: A
Duty: ☐ continuous ☐ temporary ☐ intermittent
Load factor (% of ON time): %
Number of cycles per hour: or per year:
Expected durability: operating cycles
Number of main poles N.O.: N.C.:
Other information:

Installation

Ambient temperature:
Ambient environment:
Humidity: %
Chemical pollution:
Other:
Mounting position, see drawing below (Position 6: please consult factory):



Wiring: ☐ Clamping screws or cage connectors
☐ Cable lugs (ring tongue)
Other: Cross section:
Additional comments:

Control circuit

Rated control Uc voltage: V ☐ DC ☐ AC f: Hz
Minimum / maximum: V to V
Surge suppressor: type:
Interface with PLC: mA V DC
Accessories:
Number of auxiliary contacts: N.O.: N.C.:
Low level contacts: mA V ☐ DC ☐ AC

Protection

Short circuit protection:
Type: ☐ Fuse ☐ Circuit breaker ☐ Manual motor starter
Max short circuit current: A
Motor protection: ☐ Overload relay ☐ Manual Motor Starter ☐ Electronic overload relay

Logistic and packaging

Quantity by batch:
Delivery order:
Expected quantity: per year
Expected first delivery date: and Qty:
Quantity on first 6 month: on first year:

Approvals and other requirements

Reference standards:
Required approvals:
Customer specifications:
Shock and vibrations:
Specific quality assurance clauses:
Other comments:

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Questionnaire for product specifications: Block contactors

Other comments:

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User Guide for the questionnaire

This document is used to define the contactor specifications according to the complete information on the application. Do not hesitate to join some complementary documents if necessary (schemes, tables, customer specification...).

Please see below some definitions to help you :

Operating cycle

Includes one making operation and one breaking operation.

Electrical Durability

Number of on-load operating cycles that the contactor is able to carry out. It depends on the utilization category.

Mechanical Durability

Number of no-current operating cycles that the contactor is able to carry out

Load Factor

Ratio of the on-load operating time to the total cycle time x 100 (%).

Intermittent Duty

Duty during which the contactor is successively closed or open for periods which are too short to enable the contactor to achieve thermal balance.

Temporary Duty

Duty in which the main contacts of the contactor remain closed for periods insufficient to allow the equipment to reach stabilized temperature, the unload periods being separated by off-load periods of sufficient duration to restore the ambient temperature

Continuous Duty

Duty in which the main contacts of the contactor remain closed, with a continuous current during enough time to reach thermal stabilization, but no more than eight hours without interruption.

Ambient Temperature

Air temperature close to the contactor.

Mounting Position

Comply with the manufacturer's instructions. Restrictions could be taken into account for certain mounting positions.

A contactor's duty is characterized by the utilization category together with the rated operational voltage and current indicated:

Utilization categories for contactors according to IEC 60947-4-1
Utilization categories for contactor relays according to IEC 60947-5-1

See our catalog p7/8

Making and breaking current

Current at contactor closing or at contactor opening

Time constant L/R (for DC circuit)

Ratio of the inductance to the resistance (L/R = mH/Ω = ms)

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Notes