

AF40 ... AF96 3-pole contactors

30 to 60 hp at 480 V AC

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

2



AF40-30-11



AF80-30-11

Description

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.

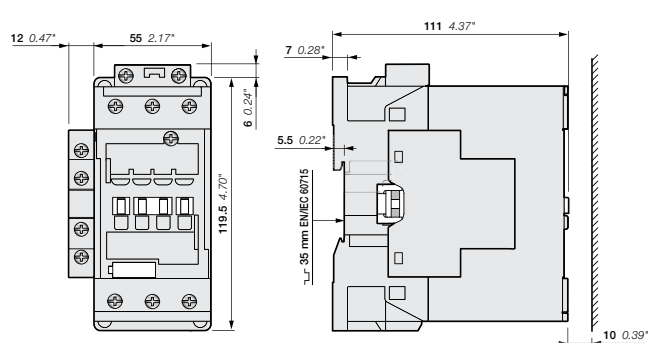
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC), only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
- can manage large control voltage variations
- reduced panel energy consumption
- very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

Ordering details

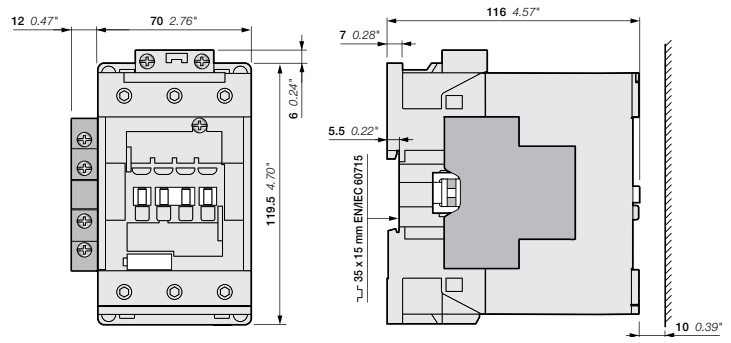
IEC		UL / CSA		Rated control circuit voltage		Auxiliary contacts fitted	Catalog number	Global reference code	Weight
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating 480 V	General use rating 600 V AC	Uc min. ... Uc max.					
400 V AC-3	AC-1	hp	A	V 50/60 Hz	V DC				Pkg (1 pce) kg
18.5	70	30	60	24...60	-	1 1	AF40-30-11-41	1SBL347001R4111	1.010
				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	1.000
				250...500	250...500	1 1	AF40-30-11-14	1SBL347001R1411	1.000
22	100	40	80	24...60	-	1 1	AF52-30-11-41	1SBL367001R4111	1.010
				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	1.000
				250...500	250...500	1 1	AF52-30-11-14	1SBL367001R1411	1.000
30	105	50	90	24...60	-	1 1	AF65-30-11-41	1SBL387001R4111	1.010
				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	1.000
				250...500	250...500	1 1	AF65-30-11-14	1SBL387001R1411	1.000
37	125	60	105	24...60	-	1 1	AF80-30-11-41	1SBL397001R4111	1.260
				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	-	1 1	AF96-30-11-41	1SBL407001R4111	1.260
				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) AF.-30-...-11 not suitable for direct control by PLC-output.

Main dimensions mm, inches



AF40, AF52, AF65



AF80, AF96

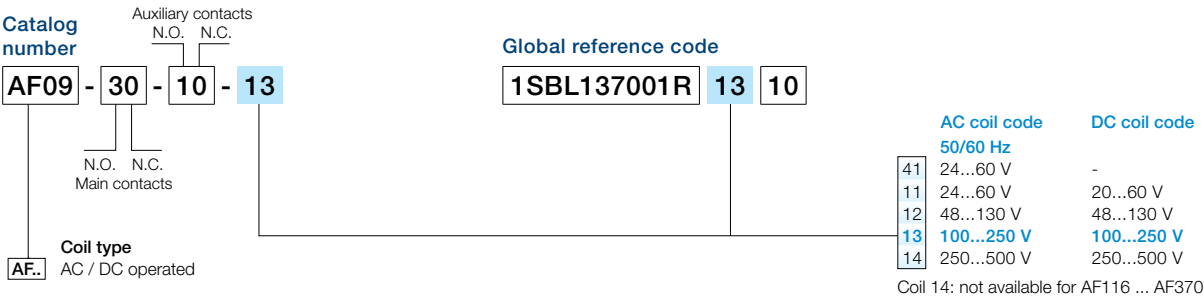
Voltage code table

The below tables indicate the available coil voltages and corresponding digits for catalog numbers. When placing an order, please give the catalog number. Select a standard contactor from ordering detail pages. Change the coil voltage code in the catalog number according to the table below.

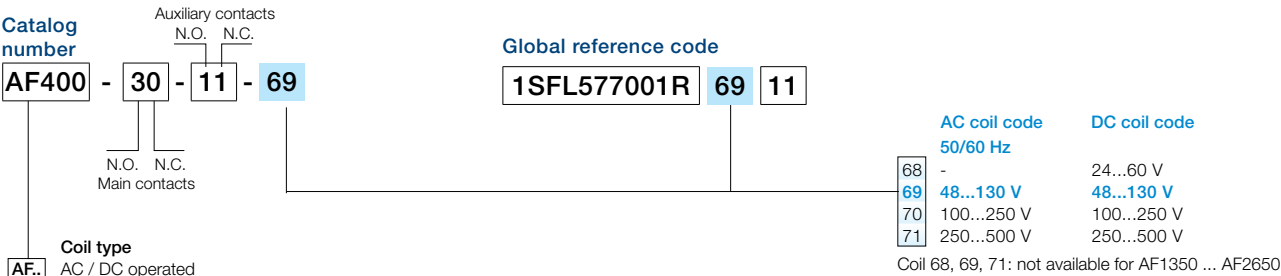
Example: for contactor AF400-30-11 and coil 100...250 V 50/60 Hz, the catalog number is AF400-30-11-70.

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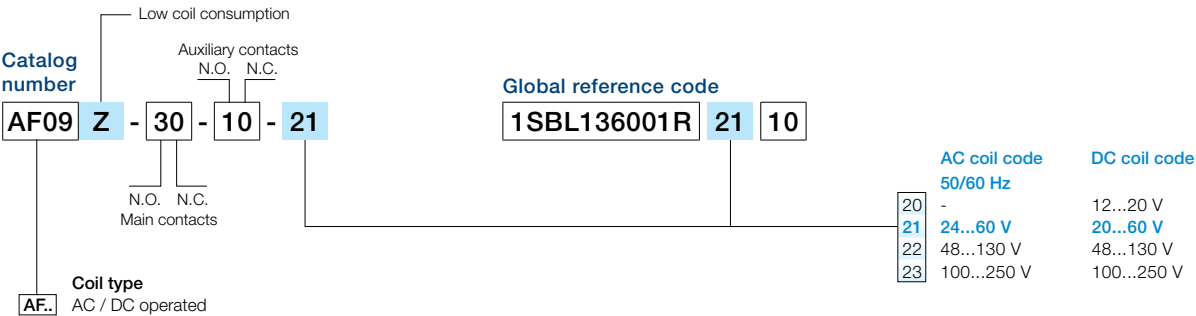
AF09 ... AF370 3-pole contactors
AF09 ... AF38 4-pole contactors



AF400 ... AF2650 3-pole contactors



AF09 ... AF38 3- and 4-pole contactors - low consumption



2

AF09 ... AF96

AF contactor (without top mounted coil terminal block)

Fixing clips

AF contactor

CAL4-11 2-pole auxiliary contact block

TF EF Overload relay

BX4 Protective cover

CA4, CC4 1-pole auxiliary contact block

CA4 4-pole auxiliary contact block

BX4-CA Protective cover

TEF4 Electronic timer

CAT4-11 2-pole auxiliary contact and A1/A2 coil terminal block

BX4-CA Protective cover

AF09 ... AF38

AF09 ... AF38

CAL4-11 2-pole auxiliary contact block

TF42 EF Overload relay

CA4, CC4 1-pole auxiliary contact block

VE4

BX4-CA Protective cover

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

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

Overload relays fitting details (1)

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

2.34 | Motor protection and control

AF09 ... AF96 3-pole contactors

Accessory fitting details

For AF09 ... AF38 contactors + CE5 auxiliary contacts for severe industrial environments

Main accessory fitting details

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

Contactor types	Main poles	Built-in auxiliary contacts	Front-mounted accessories			Side-mounted accessories	
			Auxiliary contact blocks		Electronic timer mechanical interlock set (between 2 contactors) VEM4	Auxiliary contact blocks	
			1-pole CE5	1-pole CA4 1-pole CC4		Left side 2-pole CAL4-11	Right side

3-pole contactors AF09 ... AF38

Max. N.C. built-in and add-on N.C. auxiliary contacts (CA4, CC4, 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	+	2 max.	+	1	1	-
1 max. N.C. built-in and add-on N.C. auxiliary contacts (CA4, CC4, CAL4, VEM4) 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	-	-

4-pole contactors AF09 ... AF38

Max. add-on N.C. auxiliary contacts (CA4, CC4, 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	+	2 max.	+	1	1	-
1 max. add-on N.C. auxiliary contacts (CA4, CC4, CAL4, VEM4) on positions 1, 2, 3, 4									
AF26, AF38	4 0	0 0	1	+	3 max.	-	+	1	-
			1	+	2 max.	+	1	-	-
AF09, AF16	2 2	0 0	1	+	3 max.	-	+	1	-
AF26, AF38									
1 max. add-on N.C. auxiliary contacts (CA4, CC4, CAL4, VEM4) 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							

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 U_e max.		690 V				
Rated frequency (without derating)		50 / 60 Hz				
Conventional free-air thermal current I_{th}						
acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$		105 A	105 A	105 A	130 A	130 A
With conductor cross-sectional area		35 mm ²	35 mm ²	35 mm ²	50 mm ²	50 mm ²
AC-1 Utilization category						
For air temperature close to contactor						
I_e / Rated operational current AC-1	$\theta \leq 40^\circ\text{C}$	70 A	100 A	105 A	125 A	130 A
U_e max. ≤ 690 V, 50/60 Hz	$\theta \leq 60^\circ\text{C}$	60 A	80 A	90 A	100 A	105 A
	$\theta \leq 70^\circ\text{C}$	50 A	70 A	80 A	85 A	90 A
With conductor cross-sectional area		25 mm ²	35 mm ²	35 mm ²	50 mm ²	50 mm ²
AC-3 Utilization category						
For air temperature close to contactor $\theta \leq 60^\circ\text{C}$						
I_e / 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
	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
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
	415 V	22 kW	30 kW	37 kW	45 kW	55 kW
	440 V	22 kW	30 kW	37 kW	45 kW	55 kW
	500 V	22 kW	30 kW	37 kW	45 kW	55 kW
	690 V	22 kW	30 kW	37 kW	45 kW	55 kW
Rated making capacity AC-3		10 x I_e AC-3 acc. to IEC 60947-4-1				
Rated breaking capacity AC-3		8 x I_e AC-3 acc. to IEC 60947-4-1				
AC-8a Utilization category						
(without thermal overload relay - U_e 400 V 50/60 Hz - $\theta \leq 40^\circ\text{C}$)						
I_e / 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)						
$U_e \leq 500$ V AC - gG type fuse		100 A	125 A	160 A	160 A	200 A
Rated short-time withstand current I_{cw}	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						
$\cos \varphi = 0.45$	at 440 V	(3)				
	at 690 V	(3)				
Power dissipation per pole	I_e / AC-1	3 W	6.3 W	7 W	7.6 W	8.2 W
	I_e / 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".

(3) On request.

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 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A				
Maximum operational voltage		600 V				
NEMA size		2	-	-	3	-
NEMA continuous amp rating	Thermal current	45 A	-	-	90 A	-
NEMA maximum horse power ratings						
1-phase, 60 Hz	115 V AC	3 hp	-	-	-	-
	230 V AC	7.5 hp	-	-	-	-
NEMA maximum horse power ratings						
3-phase, 60 Hz	200 V AC	10 hp	-	-	25 hp	-
	230 V AC	15 hp	-	-	30 hp	-
	460 V AC	25 hp	-	-	50 hp	-
	575 V AC	25 hp	-	-	50 hp	-
UL / CSA general use rating						
600 V AC		60 A	80 A	90 A	105 A	115 A
With conductor cross-sectional area		AWG 6	AWG 4	AWG 3	AWG 2	AWG 2
UL / CSA maximum 1-phase motor rating						
Full load current	120 V AC	34 A	34 A	56 A	80 A	80 A
	240 V AC	40 A	50 A	68 A	68 A	88 A
Horse power rating	120 V AC	3 hp	3 hp	5 hp	7-1/2 hp	7-1/2 hp
	240 V AC	7-1/2 hp	10 hp	15 hp	15 hp	20 hp
UL / CSA maximum 3-phase motor rating						
Full load current (1)	200-208 V AC	32.2 A	48.3 A	62.1 A	78.2 A	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
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".

General technical data

Contactor types	AC / DC operated	AF40	AF52	AF65	AF80	AF96
Rated insulation voltage Ui		690 V				
acc. to IEC 60947-4-1		600 V				
acc. to UL / CSA		1000 V				
Rated impulse withstand voltage Uimp.		6 kV				
Electromagnetic compatibility		8 kV				
Ambient air temperature close to contactor		Devices complying with IEC 60947-1 / EN 60947-1				
Operation	Fitted with thermal overload relay	(2)				
	Without thermal overload relay	-40...+70 °C				
Storage		-60...+80 °C				
Climatic withstand		Category B according to IEC 60947-1 Annex Q				
Maximum operating altitude (without derating)		3000 m				
Mechanical durability						
Number of operating cycles		10 millions operating cycles				
Maximum switching frequency		3600 cycles/h				
Shock 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				

(2) On request.

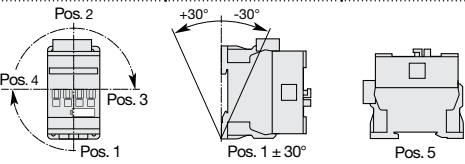
AF40 ... AF96 3-pole contactors

Technical data

Magnet system characteristics

Contact types	AC / DC operated	AF40	AF52	AF65	AF80	AF96
Coil operating limits	AC supply	At $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.85 x Uc min...1.1 x Uc max.				
acc. to IEC 60947-4-1	DC supply	At $\theta \leq 70\text{ }^{\circ}\text{C}$ 0.85 x Uc min...1.1 x Uc max.				
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 DC				
Coil consumption	Average pull-in value	25 W			40 W	
	Average holding value	2 W				
PLC-output control						
Drop-out voltage						
		$\leq 60\text{ }\%$ of Uc min.				
Voltage sag immunity						
acc. to SEMI F47-0706		conditions of use on request				
Dips withstand						
$-20\text{ }^{\circ}\text{C} \leq \theta \leq +60\text{ }^{\circ}\text{C}$		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				

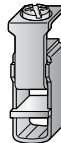
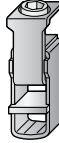
Mounting characteristics and conditions for use

Contact 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						
By screws (not supplied)						
2 x M4 or 2 x M6 screws placed diagonally						
35 x 15 mm						

AF40 ... AF96 3-pole contactors

Technical data

Connecting characteristics

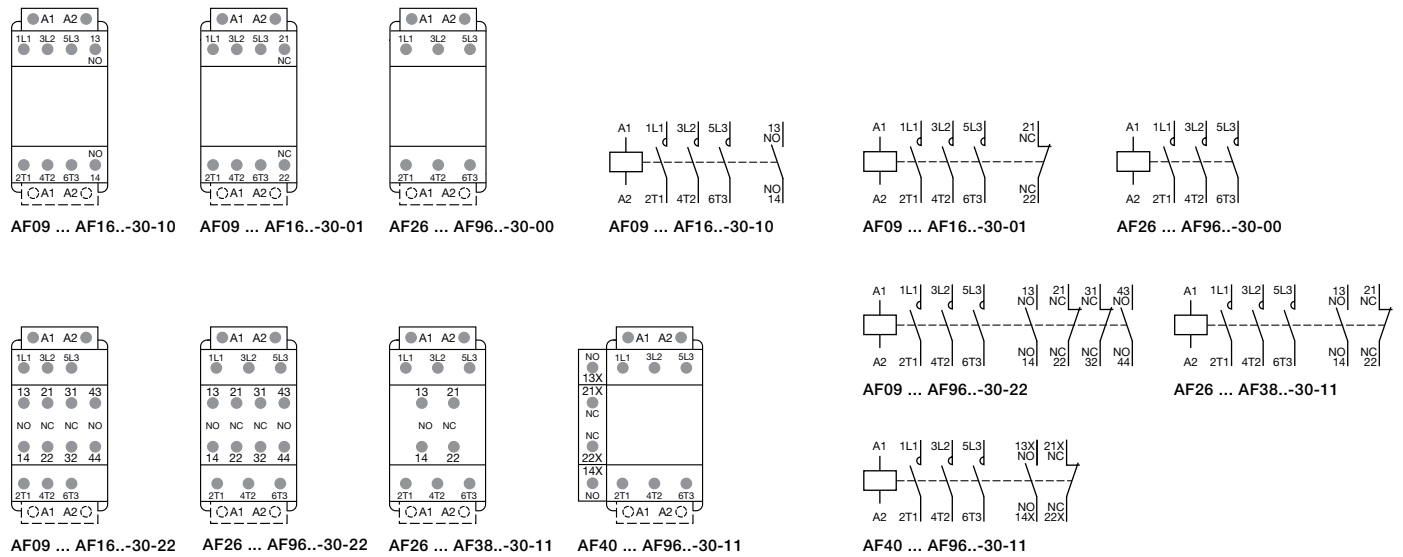
Contactor types	AC / DC operated	AF40	AF52	AF65	AF80	AF96
Main terminals		 Screw terminals with double connector 2 x (9.3 width x 7.9/10.3 depth)			 Screw terminals with double connector 2 x (12.4 width x 9.3/11.1 depth)	
Connection capacity (min. ... max.)						
Main conductors (poles)						
 Rigid	Solid ($\leq 4 \text{ mm}^2$)	} 1 x	6...35 mm ²		6...70 mm ²	
 Stranded ($\geq 6 \text{ mm}^2$)			6...35 mm ²		6...50 mm ²	
 Flexible with non insulated ferrule		1 x	4...35 mm ²		6...50 mm ²	
		2 x	4...35 mm ²		6...50 mm ²	
 Flexible with insulated ferrule		1 x	4...35 mm ²		6...50 mm ²	
		2 x	4...35 mm ²		6...50 mm ²	
 Bars or lugs		L <	9.2 mm		12.2 mm	
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 10...2		AWG 6...1	
Stripping length			16 mm		17 mm	
Tightening torque			4 Nm / 35 lb.in		6 Nm / 53 lb.in	
Auxiliary conductors (built-in auxiliary terminals + coil terminals)						
 Rigid solid		1 x	1...2.5 mm ²			
		2 x	1...2.5 mm ²			
 Flexible with non insulated ferrule		1 x	0.75...2.5 mm ²			
		2 x	0.75...2.5 mm ²			
 Flexible with insulated ferrule		1 x	0.75...2.5 mm ²			
		2 x	0.75...1.5 mm ²			
 Lugs		L <	8 mm			
Connection capacity acc. to UL/CSA		1 or 2 x	AWG 18...14			
Stripping length			10 mm			
Tightening torque						
Coil terminals			1.2 Nm / 11 lb.in			
Built-in auxiliary terminals			1.2 Nm / 11 lb.in			
Degree of protection acc. to IEC 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			

AF09 ... AF96 3-pole contactors

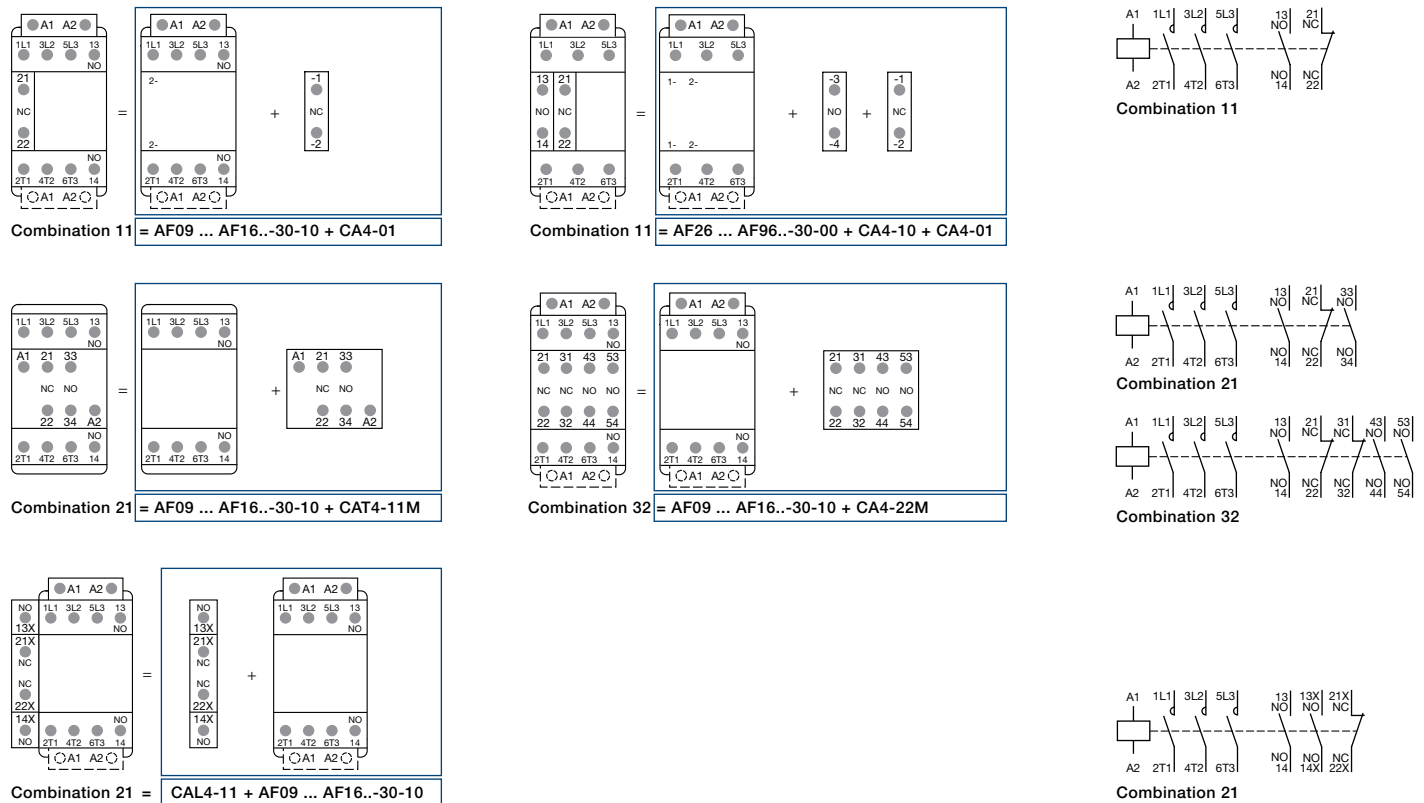
Terminal marking and positioning

AF09 ... AF96 contactors - AC / DC operated

Standard devices without addition of auxiliary contacts



Other possible contact combinations with auxiliary contacts added by the user



Note: Only AF.Z contactor 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