

AF09-40-00-.. / AF09Z-40-00-.. 4-pole Contactors AC / DC Operated - with Screw Terminals

AF09(Z) contactors are used for controlling power circuits up to 690 V AC and 440 V DC.

They are mainly used for controlling non-inductive or slightly inductive loads (i.e. resistance furnaces...).

- AF..(Z) contactors include an electronic coil interface providing reduced pull-in and holding consumption, particularly for AC control circuits
- Only four coils are needed to cover control voltages between 24...500 V 50/60 Hz or 20...500 V DC.

AF..(Z) offer extended operating limits and are suitable worldwide for different control voltages. e.g.: the coil 100...250 V 50/60 Hz - DC is suitable for Europe (230 V 50 Hz) and for North America (120 V 60 Hz and 208 V 60 Hz).

AF..(Z) contactors can manage large control voltage variations.

- AF.Z contactors equipped with a 24...60 V 50/60 Hz - 20...60 V DC coil allow direct control by 24 V DC 500 mA PLC-output
- AF.Z contactors withstand short voltage dips and voltage sags (SEMI F47-0706 compliance)
- AF..(Z) contactors have built-in surge protection and do not require additional surge suppressors.



		25 A	
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3D CAD outline drawings available on «Control Product 3D» portal

Ordering Details

IEC	UL/CSA	Control voltage		Auxiliary contacts fitted	Type	Order code	EAN	Weight
AC-1	General use	Uc min. ... Uc max.						
Rated current	rating							
$\theta \leq 40^\circ\text{C}$	600 V AC	V 50/60 Hz	V DC					Pack ^(ing)
A	A							1 piece
								kg

4-pole Contactors 4 N.O. Main Poles

25	25	24...60	20...60	0 0	AF09-40-00-11	1SBL 137 201 R1100	3471523115019	0.270
		48...130	48...130	0 0	AF09-40-00-12	1SBL 137 201 R1200	3471523115026	0.270
		100...250	100...250	0 0	AF09-40-00-13	1SBL 137 201 R1300	3471523115033	0.270
		250...500	250...500	0 0	AF09-40-00-14	1SBL 137 201 R1400	3471523115040	0.310

Note: AF09-40-00-11 not suitable for a direct control by PLC-output. AF09-40-00-11 available in some countries: please consult your ABB representative.

4-pole Contactors 4 N.O. Main Poles - Low Consumption

25	25	-	12...20	0 0	AF09Z-40-00-20	1SBL 136 201 R2000	3471523115804	0.310
		24...60	20...60	0 0	AF09Z-40-00-21	1SBL 136 201 R2100	3471523115811	0.310
		48...130	48...130	0 0	AF09Z-40-00-22	1SBL 136 201 R2200	3471523115828	0.310
		100...250	100...250	0 0	AF09Z-40-00-23	1SBL 136 201 R2300	3471523115835	0.310

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

Certifications and Approvals

CE	cULus	CCC	PG	C-Tick															

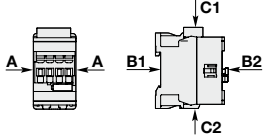
Main Pole - Utilization Characteristics according to IEC

Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1
Rated operational voltage U_e max.		690 V
Rated frequency limits		25 ... 400 Hz
Conventional free-air thermal current I_{th}		
acc. to IEC 60947-4-1, open contactors, $\theta \leq 40\text{ °C}$		35 A
with conductor cross-sectional area		6 mm ²
AC-1 Utilization category		
for air temperature close to contactor		
I_e / AC-1 rated operational current	$\theta \leq 40\text{ °C}$	25 A
U_e max. $\leq 690\text{ V}$, 50/60 Hz	$\theta \leq 60\text{ °C}$	25 A
	$\theta \leq 70\text{ °C}$	22 A
with conductor cross-sectional area		4 mm ²
Short-circuit protection		
for contactors without thermal O/L relay - Motor protection excluded		
U _e $\leq 500\text{ V AC}$ - gG type fuse		25 A
Rated short-time withstand current I_{cw}	1 s	300 A
at 40 °C ambient temperature, in free air from a cold state	10 s	150 A
	30 s	80 A
	1 min	60 A
	15 min	35 A
Heat dissipation per pole	I_e / AC-1	0.8 W
Max. electrical switching frequency	AC-1	600 cycles/h

Main Pole - Utilization Characteristics according to UL / CSA

Standards		UL 508, CSA C22.2 N°14
Rated operational voltage U_e max.		600 V
UL General use rating		
600 V AC		25 A
With conductor cross-sectional area		AWG 10
80 V DC - 1-pole for 4 N.O. main poles		25 A
With conductor cross-sectional area		AWG 10
80 V DC - 1-pole for 2 N.O. / 2 N.C. main poles		
With conductor cross-sectional area		
Max. electrical switching frequency		
for general use		600 cycles/h

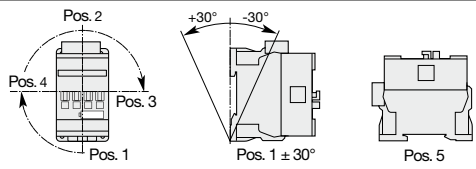
General Technical Data

Rated insulation voltage U_i		
acc. to IEC 60947-4-1		690 V
acc. to UL		600 V
Rated impulse withstand voltage U_{imp}		6 kV
Electromagnetic compatibility		Devices complying with IEC 60947-1 / EN 60947-1 - Environment A
Ambient air temperature close to contactor		
Operation in free air		-40 ... +70 °C
Storage		-60 ... +80 °C
Climatic withstand		Category B according to IEC 60947-1 Annex Q
Operating altitude		≤ 3000 m
Mechanical durability		
Number of operating cycles		10 millions operating cycles
Max. switching frequency		3600 cycles/h
Shock withstand acc. IEC 60068-2-27 and EN 60068-2-27		
Mounting position 1		
	Closed or open position	Shock direction 1/2 sinusoidal shock for 11 ms: no change in contact position
	Main poles	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

Magnet System Characteristics

Coil operating limits		
acc. to IEC 60947-4-1		
		AC supply
		at $\theta \leq 60$ °C 0.85 x U_c min ... 1.1 x U_c max
		at $\theta \leq 70$ °C 0.85 x U_c min ... U_c max
		DC supply
		at $\theta \leq 60$ °C 0.85 x U_c min ... 1.1 x U_c max
		at $\theta \leq 70$ °C (AF) 0.85 x U_c min ... U_c max - (AF..Z) 0.85 x U_c min ... 1.1 x U_c max
AC control voltage 50/60 Hz	Rated control circuit voltage U_c	24 ... 500 V AC
	Coil consumption	Average pull-in value (AF) 50 VA - (AF..Z) 16 VA
		Average holding value (AF) 2.2 VA / 2 W - (AF..Z) 1.7 VA / 1.5 W
DC control voltage	Rated control circuit voltage U_c	12 ... 500 V DC
	Coil consumption	Average pull-in value (AF) 50 W - (AF..Z) 12 ... 16 W
		Average holding value (AF) 2 W - (AF..Z) 1.7 W
PLC-Output control		(AF..Z) ≥ 500 mA 24 V DC
Drop-out voltage in % of U_c min.		≤ 60 % U_c min
Voltage sag immunity according to SEMI F47-0706		(AF..Z) conditions of use on request
Dips withstand (level 0% according to IEC 61000-4-11)		(AF..Z) 22 ms average for $U_c = 24 ... 250$ V 50/60Hz
-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

Mounting Characteristics

Mounting positions		
		
		Max. add-on N.C. auxiliary contacts: see accessory fitting details for a 4-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

Connecting Characteristics

Main terminals



Screw terminals with cable clamp

Connecting capacity (min. ... max.)

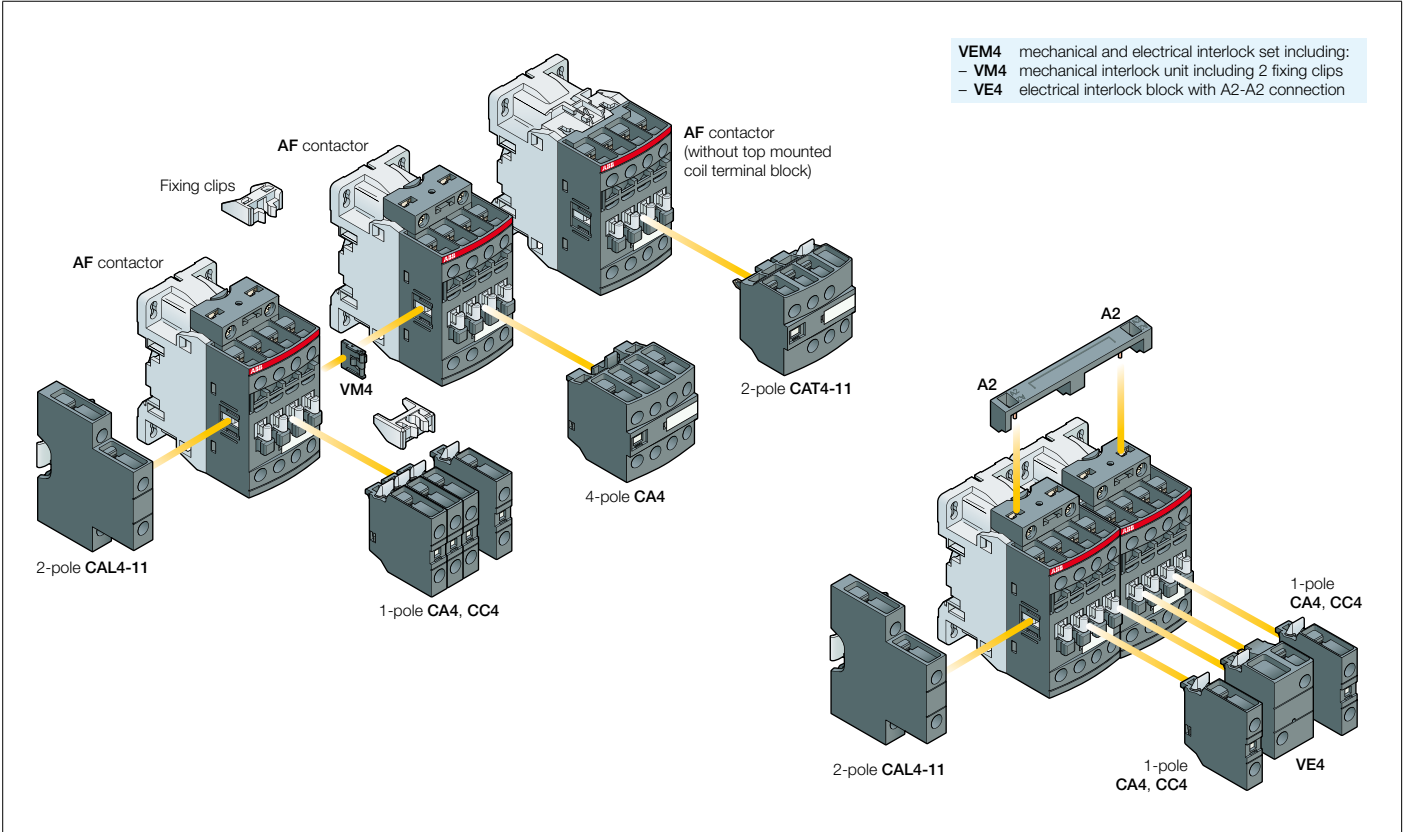
Main conductors (poles)		
 Rigid	solid ($\leq 4 \text{ mm}^2$)	1 x : 1 ... 6 mm ²
 Rigid	stranded ($\geq 6 \text{ mm}^2$)	2 x : 1 ... 6 mm ²
 Flexible with non insulated ferrule		1 x : 0.75 ... 6 mm ²
 Flexible with non insulated ferrule		2 x : 0.75 ... 6 mm ²
 Flexible with insulated ferrule		1 x : 0.75 ... 4 mm ²
 Flexible with insulated ferrule		2 x : 0.75 ... 2.5 mm ²
 Bars or lugs		L < 9.6 mm
Capacity according to UL/CSA		1 or 2 x : AWG 16 ... 10
Stripping length		10 mm
Auxiliary conductors		
 Rigid solid		1 x : 1 ... 2.5 mm ²
 Rigid solid		2 x : 1 ... 2.5 mm ²
 Flexible with non insulated ferrule		1 x : 0.75 ... 2.5 mm ²
 Flexible with non insulated ferrule		2 x : 0.75 ... 2.5 mm ²
 Flexible with insulated ferrule		1 x : 0.75 ... 2.5 mm ²
 Flexible with insulated ferrule		2 x : 0.75 ... 1.5 mm ²
 Bars or lugs		L < 8 mm
Capacity according 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
Screw terminals		
Main terminals		(delivered in open position, screws of unused terminals must be tightened)
Coil terminals		M3.5
Screwdriver type		
Tightening torque		Flat Ø 5.5 / Pozidriv 2
Main pole terminals		1.5 Nm / 13 lb.in
Coil terminals		1.2 Nm / 11 lb.in

Accessory Fitting Details for a 4-pole Contactor

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

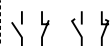
Main poles	Built-in auxiliary contacts	Front-mounted accessories				Side-mounted accessories			
		Auxiliary contact blocks		Electrical and mechanical interlock set (between 2 contactors)		Auxiliary contact blocks			
		1-pole CA4					Left side		Right side
		1-pole CC4	2-pole CAT4-11	4-pole CA4	VEM4	2-pole CAL4-11			
Max. add-on N.C. auxiliary contacts: 4 N.C. max. on positions 1, 2, 3, 4 and 3 N.C. max. on positions 1 ±30°, 5									
4 0 0 0		4 max.	or 1	or 1	-	+	1	-	
		2 max.	or 1	-	-	+	1	+	1
		3 max.	-	-	+	1	+	1	or 1

Overview of main accessories (other accessories available)



Main Accessories

Ordering Details

Description		Auxiliary contacts 	Type	Order code	EAN	Pack ^(ing) piece	Weight kg ^(1 pce)
Additional auxiliary contact blocks	Front-mounted instantaneous auxiliary contact blocks	0 1 - -	CA4-01	1SBN 010 110 R1001	3471523130029	1	0.014
		1 0 - -	CA4-10	1SBN 010 110 R1010	3471523130005	1	0.014
		0 1 - -	CA4-01-T	1SBN 010 110 T1001	3471523130395	10	0.014
		1 0 - -	CA4-10-T	1SBN 010 110 T1010	3471523130371	10	0.014
	Front-mounted auxiliary contact blocks with N.O. leading contact and N.C. lagging contact	- - 0 1	CC4-01	1SBN 010 111 R1001	3471523130432	1	0.014
		- - 1 0	CC4-10	1SBN 010 111 R1010	3471523130425	1	0.014
	Side-mounted instantaneous auxiliary contact blocks	1 1 - -	CAL4-11	1SBN 010 120 R1011	3471523130043	1	0.040
		1 1 - -	CAL4-11-T	1SBN 010 120 T1011	3471523130418	10	0.040
	Front-mounted instantaneous auxiliary contact blocks	0 4 - -	CA4-04E	1SBN 010 140 R1004	3471523130159	1	0.055
		2 2 - -	CA4-22E	1SBN 010 140 R1022	3471523130128	1	0.055
		3 1 - -	CA4-31E	1SBN 010 140 R1031	3471523130135	1	0.055
		4 0 - -	CA4-40E	1SBN 010 140 R1040	3471523130142	1	0.055
	Front-mounted instantaneous auxiliary contact and A1/A2 coil terminal blocks	1 1 - -	CAT4-11E	1SBN 010 151 R1011	3471523130067	1	0.040
Interlocks	Mechanical interlock unit		VM4	1SBN 030 105 T1000	3471523130609	10	0.005
	Mechanical and electrical interlock set	1 1 - -	VEM4	1SBN 030 111 R1000	3471523130616	1	0.035
	Fixing clips		BB4	1SBN 110 120 W1000	3471523130722	50	0.002
Additional coil terminal block	Additional coil terminal block		LDC4	1SBN 070 156 T1000	3471523130678	10	0.010
Protective covers	Protective covers		BX4	1SBN 110 108 T1000	3471523130708	10	0.006
			BX4-CA	1SBN 110 109 W1000	3471523130715	50	0.001
Function markers	Function markers		BA4	1SNA 235 156 R2700	3472592351568	16	0.011
			HTP500-BA4	1SNA 235 712 R2400	3472592357126	1	0.220
			SPRC 1	1SNA 360 010 R1500	3472593600108	1	0.290

Note:

- CAT4: not fittable on AF..Z contactors with DC control voltage 12...20VDC.

- VM4: includes 2 fixing clips (BB4) to maintain together both contactors.

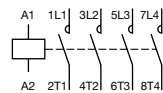
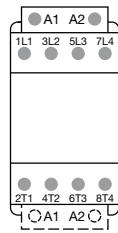
- VEM4: includes a VM4 mechanical interlock unit with 2 fixing clips (BB4), a VE4 electrical interlock block and A2-A2 connection.

VE4 block must be used with its A2-A2 connection to respect the electrical connection diagram.

VEM4 not fittable on AF..Z contactors with DC control voltage 12...20 V DC.

Terminal Marking and Positioning

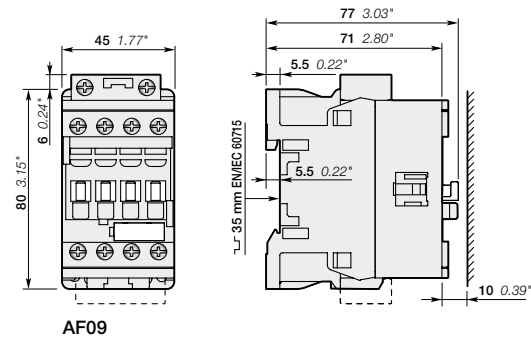
Standard devices without addition of auxiliary contacts



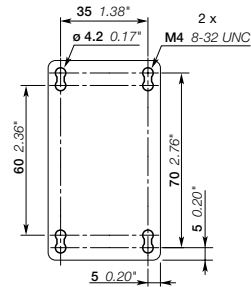
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AF09-40-00-... / AF09Z-40-00-...

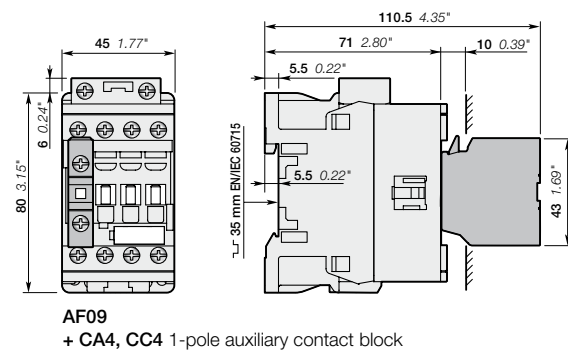
Dimensions mm, inches



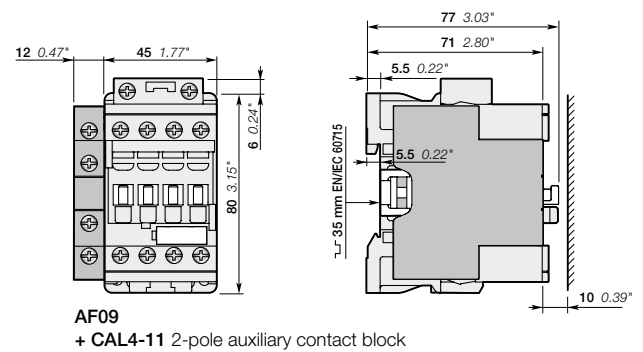
AF09



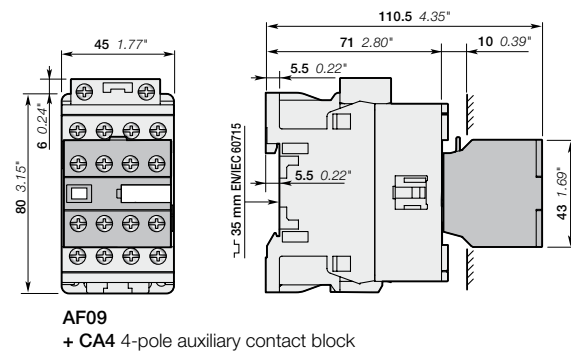
AF09



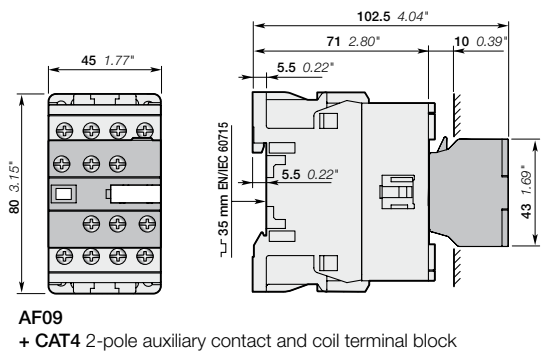
AF09
+ CA4, CC4 1-pole auxiliary contact block



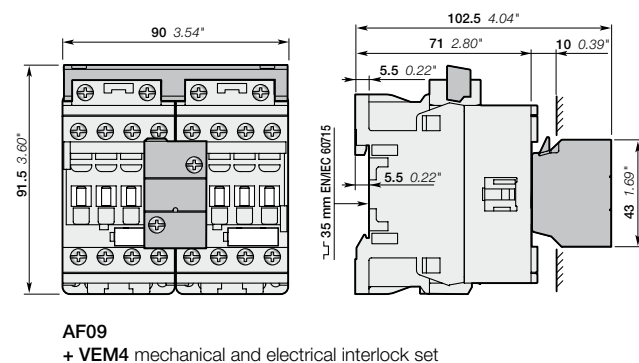
AF09
+ CAL4-11 2-pole auxiliary contact block



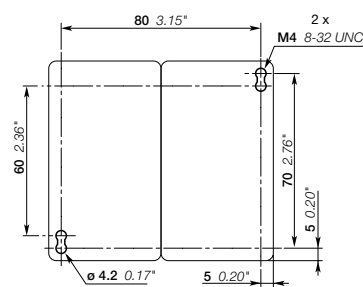
AF09
+ CA4 4-pole auxiliary contact block



AF09
+ CAT4 2-pole auxiliary contact and coil terminal block



AF09
+ VEM4 mechanical and electrical interlock set



AF09
+ VEM4 mechanical and electrical interlock set

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

Contact us

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

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