



AF09(Z)B ... AF38(Z)B 4-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AF09(Z)B	AF16(Z)B	AF26(Z)B	AF38(Z)B
Standards	IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1			
Fire and smoke	EN 45545 (HL2, HL3)			
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, $\theta \leq 40^\circ\text{C}$	35 A	35 A	55 A	55 A
With conductor cross-sectional area	6 mm ²	6 mm ²	16 mm ²	16 mm ²
AC-1 Utilization category				
For air temperature close to contactor				
I_e / Rated operational current AC-1				
U_e max. ≤ 690 V, 50/60 Hz	$\theta \leq 40^\circ\text{C}$ 25 A	30 A	45 A	55 A
	$\theta \leq 60^\circ\text{C}$ 25 A	30 A	40 A	45 A
	$\theta \leq 70^\circ\text{C}$ 22 A	26 A	32 A	37 A
With conductor cross-sectional area	4 mm ²	6 mm ²	10 mm ²	16 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 9 A	18 A	23.2 A	23.2 A
	380-400 V 9 A	18 A	22 A	22 A
	415 V 9 A	18 A	21.2 A	21.2 A
	440 V 9 A	18 A	20 A	20 A
	500 V 9.5 A	15 A	17.6 A	17.6 A
	690 V 7 A	10.5 A	10.5 A	10.5 A
 3-phase motors				
Rated operational power AC-3 (1)				
	220-230-240 V 2.2 kW	4 kW	5.5 kW	5.5 kW
	380-400 V 4 kW	7.5 kW	11 kW (2)	11 kW (2)
	415 V 4 kW	9 kW	11 kW	11 kW
	440 V 4 kW	9 kW	11 kW	11 kW
	500 V 5.5 kW	9 kW	11 kW	11 kW
	690 V 5.5 kW	9 kW	9 kW	9 kW
 1500 r.p.m. 50 Hz 1800 r.p.m. 60 Hz 3-phase motors				
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			
Short-circuit protection device for contactors				
without thermal overload relay - Motor protection excluded				
$U_e \leq 500$ V AC - gG type fuse	25 A	32 A	50 A	63 A
Rated short-time withstand current I_{cw}	1 s 300 A	300 A	450 A	450 A
at 40 °C ambient temperature,	10 s 150 A	150 A	300 A	300 A
in free air from a cold state	30 s 80 A	80 A	225 A	225 A
	1 min 60 A	60 A	150 A	150 A
	15 min 35 A	35 A	55 A	55 A
Maximum breaking capacity	at 440 V 250 A	250 A	-	-
$\cos \theta = 0.45$	at 690 V 106 A	106 A	-	-
Power dissipation per pole	I_e / AC-1 0.8 W	1.2 W	1.6 W	2.3 W
	I_e / AC-3 0.1 W	0.35 W	0.42 W	0.42 W
Max. electrical switching frequency	AC-1 600 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, 1-phase or 3-phase motors, see "Motor rated operational powers and currents".

(2) 400 V 3-phase motor only.

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

Contactor types	AF09(Z)B	AF16(Z)B	AF26(Z)B	AF38(Z)B
Standards	UL 508, CSA C22.2 N°14			
Maximum operational voltage	600 V			
UL / CSA general use rating				
600 V AC	25 A	30 A	45 A	55 A
With conductor cross-sectional area	AWG 10	AWG 10	AWG 8	AWG 6
Maximum electrical switching frequency				
For general use	600			

AF09(Z)B ... AF38(Z)B 4-pole contactors

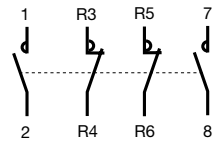
Technical data

General technical data

Contactor types	AF09(Z)B	AF16(Z)B	AF26(Z)B	AF38(Z)B
Rated insulation voltage U_i acc. to IEC 60947-4-1 acc. to UL / CSA	690 V 600 V			
Rated impulse withstand voltage U_{imp} .	6 kV			
Electromagnetic compatibility	Devices complying with IEC 60947-1 / EN 60947-1 - Environment A EN 50121-3-2			
Ambient air temperature Operation in free air Storage	-40...+70 °C -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 Maximum switching frequency	10 millions operating cycles 3600 cycles/h			
Shock and vibration withstand acc. to IEC 61373	Category 1, class B			

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



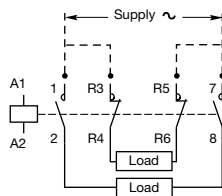
These contactors are suitable for controlling 2 separate circuits, i.e. 2 loads with 2 separate supplies, or 1 circuit comprising 2 separate loads with a single supply (see diagrams below). When the contactor operates there is no mechanical overlapping between the N.O. poles and the N.C. poles: BREAK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



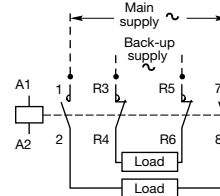
These contactors are not suitable for a reversing starter or for controlling a single load from 2 separate supplies.

Block diagrams

– Single supply and 2 separate loads



– 2 separate supplies and 2 separate loads



AF09(Z)B ... AF38(Z)B 4-pole contactors

Technical data

Magnet system characteristics

Contactor types	AF09(Z)B	AF16(Z)B	AF26(Z)B	AF38(Z)B
Coil operating limits acc. to IEC 60947-4-1	DC supply	At $\theta \leq 70^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$.		
	AC supply	at $\theta \leq 60^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$ at $\theta \leq 70^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots U_c \text{ max}$		
DC control voltage	20...250 V DC			
Rated control circuit voltage U_c	20...250 V DC			
Coil consumption	Average pull-in value	(AF..Z) 12...16 W		
	Average holding value	(AF..Z) 1.7 W		
PLC-output control	(AF..Z) $\geq 500 \text{ mA}$ 24 V DC			
AC control voltage 50/60 Hz	24 ... 250 V AC - (AF..B) 250 ... 500 V AC			
Rated control circuit voltage U_c	(AF..Z) 16 VA - (AF..B) 50 VA			
Coil consumption	Average pull-in value (AF..Z) 1.7 VA / 1.5 W - (AF..B) 2.2 VA / 2 W Average holding value (AF..Z) 1.7 VA / 1.5 W - (AF..B) 2.2 VA / 2 W			
Max. permitted control voltage during voltage fluctuation defined acc. to IEC 60077 / EN 50155	Rated control circuit voltage / Max. permitted control voltage 24 ... 60 V AC 50/60 Hz / 75 V AC 50/60 Hz 48 ... 130 V AC 50/60 Hz / 150 V AC 50/60 Hz 100 ... 250 V AC 50/60 Hz / 275 V AC 50/60 Hz 250 ... 500 V AC 50/60 Hz / 550 V AC 50/60 Hz			
Drop-out voltage	$\leq 60\%$ of $U_c \text{ min}$.			
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		


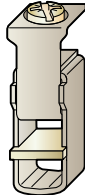














Mounting characteristics and conditions for use

Contactor types	AF09(Z)B	AF16(Z)B	AF26(Z)B	AF38(Z)B
Mounting positions				
Mounting distances	Max. add-on N.C. auxiliary contacts: see accessory fitting details for a 4-pole contactor AF09(Z)B ... AF38(Z)B			
Fixing	The contactors can be assembled side by side			
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			

AF09(Z)B ... AF38(Z)B 4-pole contactors

Technical data

Connecting characteristics

Contactor types	AF09(Z)B	AF16(Z)B	AF26(Z)B	AF38(Z)B
Main terminals	 <p>Screw terminals with cable clamp</p>		 <p>Screw terminals with double connector 2 x (5.5 width x 6.8 depth)</p>	
Connection capacity (min. ... max.)				
Main conductors (poles)				
 Rigid Solid ($\leq 4 \text{ mm}^2$) } 1 x 1...6 mm ²				1.5...16 mm ²
 Rigid Stranded ($\geq 6 \text{ mm}^2$) } 2 x 1...6 mm ²				1.5...16 mm ²
 Flexible with non insulated ferrule } 1 x 0.75...6 mm ²				1.5...16 mm ²
 Flexible with non insulated ferrule } 2 x 0.75...6 mm ²				1.5...16 mm ²
 Flexible with insulated ferrule } 1 x 0.75...4 mm ²				1.5...16 mm ²
 Flexible with insulated ferrule } 2 x 0.75...2.5 mm ²				1.5...16 mm ²
 Bars or lugs	L < 9.6 mm			
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 16...10		AWG 16...6
Stripping length		10 mm		12 mm
Tightening torque		1.5 Nm / 13 lb.in		2.5 Nm / 22 lb.in
Auxiliary conductors (coil terminals)				
 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				
 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			
Coil terminals	IP20			
Screw terminals	Delivered in open position, screws of unused terminals must be tightened			
Main terminals		M3.5	M4.5	
	Screwdriver type	Flat Ø 5.5 / Pozidriv 2		
Coil terminals		M3.5		
	Screwdriver type	Flat Ø 5.5 / Pozidriv 2		

AF09(Z)B ... AF95B 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).

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









Technical data

The tables indicate for the standard contactors the I_e 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 U_e 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	AF45	AF50	AF63	AF75	GAF75	AF95			
	3 or 4-pole			3-pole	4-pole	3-pole	3-pole	4-pole	3 or 4-pole	3 or 4-pole	1-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	110 A	120 A	120 A	-
	110 V	10 A	15 A	20 A	-	-	-	-	-	-	-	-	-	120 A	-
	220 V	-	-	-	-	-	-	-	-	-	-	-	-	120 A	-
	440 V	-	-	-	-	-	-	-	-	-	-	-	-	100 A	-
	600 V	-	-	-	-	-	-	-	-	-	-	-	-	75 A	-
	1000 V	-	-	-	-	-	-	-	-	-	-	-	-	35 A	-
	≤ 72 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	110 A	120 A	-	-
	110 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	110 A	120 A	-	145 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	110 A	120 A	-	-
	110 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	110 A	120 A	-	145 A
	220 V	25 A	27 A	30 A	45 A	45 A	50 A	50 A	55 A	70 A	100 A	110 A	120 A	-	145 A
	≤ 72 V	25 A	-	30 A	-	45 A	-	-	55 A	70 A	100 A	-	120 A	-	-
	110 V	25 A	-	30 A	-	45 A	-	-	55 A	70 A	100 A	-	120 A	-	-
	220 V	25 A	-	30 A	-	45 A	-	-	55 A	70 A	100 A	-	120 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	120 A	130 A
	110 V	6 A	7 A	8 A	-	-	-	-	-	-	-	-	-	120 A	-
	220 V	-	-	-	-	-	-	-	-	-	-	-	-	100 A	-
	440 V	-	-	-	-	-	-	-	-	-	-	-	-	85 A	-
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	110 A	120 A	-	-
	110 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	110 A	120 A	-	145 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	110 A	120 A	-	-
	110 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	110 A	120 A	-	145 A
	220 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	110 A	120 A	-	145 A
	≤ 72 V	25 A	-	30 A	-	-	-	-	70 A	100 A	-	120 A	-	-	-
	110 V	25 A	-	30 A	-	-	-	-	70 A	100 A	-	120 A	-	-	-
	220 V	25 A	-	30 A	-	-	-	-	70	100 A	-	120 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	-	50 A	50 A	63 A	75 A	85 A	-
	110 V	4 A	4 A	4 A	-	-	-	-	-	-	-	-	-	85 A	-
	220 V	-	-	-	-	-	-	-	-	-	-	-	-	85 A	-
	440 V	-	-	-	-	-	-	-	-	-	-	-	-	35 A	-
	≤ 72 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	110 A	120 A	-	-
	110 V	10 A	15 A	20 A	45 A	-	50 A	50 A	-	70 A	80 A	90 A	100 A	-	145 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	110 A	120 A	-	-
	110 V	25 A	27 A	30 A	45 A	-	50 A	50 A	-	70 A	100 A	110 A	120 A	-	145 A
	220 V	9 A	12 A	16 A	20 A	-	25 A	25 A	-	50 A	50 A	63 A	75 A	-	145 A
	≤ 72 V	25 A	-	30 A	-	-	-	-	70 A	100 A	-	120 A	-	-	-
	110 V	25 A	-	30 A	-	-	-	-	70 A	100 A	-	120 A	-	-	-
	220 V	10 A	-	20 A	-	-	-	-	70 A	70 A	-	100 A	-	-	-
	440 V	4 A	-	4 A	-	-	-	-	-	-	-	-	-	-	-