

AF09(Z)B ... AF38(Z)B 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AF09(Z)B	AF12(Z)B	AF16(Z)B	AF26(Z)B	AF30(Z)B	AF38(Z)B	
Standards	IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1 IEC 60077-1, IEC 60077-2, EN 50155 (applicable parts)						
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	35 A	50 A	50 A	50 A	
With conductor cross-sectional area	6 mm ²	6 mm ²	6 mm ²	10 mm ²	10 mm ²	10 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	28 A	30 A	45 A	50 A	50 A
	$\theta \leq 60^\circ\text{C}$	25 A	28 A	30 A	40 A	42 A	42 A
	$\theta \leq 70^\circ\text{C}$	22 A	24 A	26 A	32 A	37 A	37 A
With conductor cross-sectional area		4 mm ²	6 mm ²	6 mm ²	10 mm ²	10 mm ²	10 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	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)							
	220-230-240 V	2.2 kW	3 kW	4 kW	6.5 kW	9 kW	11 kW
	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
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 (2)							
$U_e \leq 500$ V AC - gG type fuse							
Rated short-time withstand current I_{cw} at 40 °C ambient temperature, in free air from a cold state	1 s	25 A	32 A	32 A	50 A	63 A	63 A
	10 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 $\cos \varphi = 0.45$							
	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							
	I_e / AC-1	0.8 W	1 W	1.2 W	1.8 W	2.4 W	2.4 W
	I_e / 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-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".

AF09(Z)B ... AF38(Z)B 3-pole contactors

Technical data

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

Contactor types		AF09(Z)B	AF12(Z)B	AF16(Z)B	AF26(Z)B	AF30(Z)B	AF38(Z)B
Standards		UL 508, CSA C22.2 N°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	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
	550-600 V AC	9 A	11 A	17 A	22 A	27 A	32 A
	200-208 V AC	2 hp	3 hp	5 hp	7-1/2 hp	10 hp	10 hp
Horse power rating (1)	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
Short-circuit protection device for contactors without thermal overload relay - Motor protection excluded							
Fuse rating		30	30	60	60	100	100
Fuse type, 600 V		J					
Maximum electrical switching frequency							
For general use		600					
For motor use		1200					

(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".

AF09(Z)B ... AF38(Z)B 3-pole contactors

Technical data

General technical data

Contactor types	AF09(Z)B	AF12(Z)B	AF16(Z)B	AF26(Z)B	AF30(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 close to contactor						
Operation	Fitted with thermal overload relay					-20...+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					
Maximum switching frequency	3600 cycles/h					
Shock and vibration withstand acc. to IEC 61373	Category 1, class B					

Magnet system characteristics

Contactor types	AF09(Z)B	AF12(Z)B	AF16(Z)B	AF26(Z)B	AF30(Z)B	AF38(Z)B
Coil operating limits acc. to IEC 60947-4-1	DC supply (AF..ZB) at $\theta \leq 70$ °C $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$ AC supply (AF..B) at $\theta \leq 60$ °C $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$; at $\theta \leq 70$ °C $0.85 \times U_c \text{ min} \dots U_c \text{ max}$ at $\theta \leq 60$ °C $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$ at $\theta \leq 70$ °C $0.85 \times U_c \text{ min} \dots U_c \text{ max}$					
DC control voltage						
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) ≥ 500 mA 24 V DC					
AC control voltage 50/60 Hz						
Rated control circuit voltage U_c	(AF..ZB) 24 ... 250 V AC - (AF..B) 250 ... 500 V AC					
Coil consumption	Average pull-in value (AF..ZB) 16 VA - (AF..B) 50 VA Average holding value (AF..ZB) 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	≤ 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	AF12(Z)B	AF16(Z)B	AF26(Z)B	AF30(Z)B	AF38(Z)B
Mounting positions						
Mounting distances	Max. N.C. built-in add add-on N.C. auxiliary contacts: see accessory fitting details for a 3-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 3-pole contactors

Technical data

Connecting characteristics

Contactor types	AF09(Z)B	AF12(Z)B	AF16(Z)B	AF26(Z)B	AF30(Z)B	AF38(Z)B
Main terminals	 <p>Screw terminals with cable clamp</p>					
Connection capacity (min. ... max.)						
Main conductors (poles)						
 Rigid Solid ($\leq 4 \text{ mm}^2$)	1 x	1...6 mm ²			2.5...10 mm ²	
 Stranded ($\geq 6 \text{ mm}^2$)	2 x	1...6 mm ²			2.5...10 mm ²	
 Flexible with non insulated ferrule	1 x	0.75...6 mm ²			1.5...10 mm ²	
	2 x	0.75...6 mm ²			1.5...10 mm ²	
 Flexible with insulated ferrule	1 x	0.75...4 mm ²			1.5...10 mm ²	
	2 x	0.75...2.5 mm ²			1.5...4 mm ²	
 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...18	
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 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	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			-	

AF09(Z)B ... AF16(Z)B 3-pole contactors

Technical data

Built-in auxiliary contacts according to IEC

Contactor types	AF09(Z)B	AF12(Z)B	AF16(Z)B
Rated operational voltage U_e max.	690 V		
Rated frequency (without derating)	50 / 60 Hz		
Conventional free air thermal current $I_{th} - \theta \leq 40^\circ\text{C}$	16 A		
le / 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 le AC-15 acc. to IEC 60947-5-1		
Breaking capacity AC-15	10 x le AC-15 acc. to IEC 60947-5-1		
le / 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 I_{cw}	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		
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, 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	AF09(Z)B	AF12(Z)B	AF16(Z)B
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		

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	-	-	-	-	-	-	-	-	-	-	-