

AF116 ... AF370 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 U_e max.		690 V			1000 V						
Rated frequency (without derating)		50 / 60 Hz									
Conventional free-air thermal current I_{th} acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$ With conductor cross-sectional area		160 A	200 A	275 A	350 A	400 A	500 A	525 A	800 A	1000 A	
		70 mm ²	95 mm ²	150 mm ²	240 mm ² (3)	240 mm ²	300 mm ² (4)	2x 185 mm ² (4)	2x 240 mm ²	2x 300 mm ²	
AC-1 Utilization category For air temperature close to contactor											
I_e / Rated operational current AC-1	$\theta \leq 40^\circ\text{C}$	160 A	200 A	275 A	350 A	400 A	500 A	525 A	800 A	1000 A	
U_e max. $\leq 690\text{ V}, 50/60\text{ Hz}$	$\theta \leq 60^\circ\text{C}$	145 A	175 A	250 A	300 A	350 A	400 A	425 A	650 A	800 A	
	$\theta \leq 70^\circ\text{C}$	130 A	160 A	200 A	240 A	290 A	325 A	350 A	575 A	720 A	
U_e max. $\leq 1000\text{ V}, 50/60\text{ Hz}$	$\theta \leq 40^\circ\text{C}$	-	-	250 A	275 A	350 A	375 A	400 A	800 A	1000 A	
	$\theta \leq 60^\circ\text{C}$ (2)	-	-	225 A	250 A	300 A	325 A	350 A	650 A	800 A	
	$\theta \leq 70^\circ\text{C}$	-	-	185 A	200 A	240 A	260 A	290 A	575 A	720 A	
With conductor cross-sectional area		70 mm ²	95 mm ²	150 mm ²	240 mm ² (3)	240 mm ²	300 mm ² (4)	2x 185 mm ² (4)	2x 240 mm ²	2x 300 mm ²	
AC-3 Utilization category For air temperature close to contactor $\theta \leq 60^\circ\text{C}$ (2)											
I_e / Max. rated operational current AC-3 (1)											
	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)											
	220-230-240 V	30 kW	37 kW	55 kW	55 kW	75 kW	90 kW	110 kW	160 kW	-	
	380-400 V	55 kW	75 kW	90 kW	110 kW	132 kW	160 kW	200 kW	280 kW	-	
	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 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 $\leq 500\text{ V AC}$ - 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 I_{sw} At 40 °C ambient temperature, in free air from a cold state	1 s	1300 A	1460 A	1900 A	2050 A	2650 A	3050 A	3700 A	5500 A	6800 A	
	10 s	928 A	1168 A	1520 A	1640 A	2120 A	2440 A	2960 A	5300 A	6400 A	
	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 cos $\phi = 0.45$	at 440 V	2000 A	3000 A	3300 A	3500 A	3800 A	4600 A	5000 A	5400 A	-	
	at 690 V	-	-	-	-	-	-	-	5400 A	-	
Power dissipation per pole	I _e / AC-1	12 W	18 W	15 W	25 W	32 W	50 W	72 W	60 W	80 W	
	I _e / AC-3	-	-	-	-	-	-	-	25 W	-	
Max. electrical switching frequency	AC-1	300 cycles/h									
	AC-3	300 cycles/h									
	AC-2, AC4								120 cycles/h		-



3-phase motors



1500 r.p.m. 50 Hz
1800 r.p.m. 60 Hz
3-phase motors

(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) $\theta \leq 55^\circ\text{C}$ 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.

Main pole - Utilization characteristics according to UL / 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	-	-
Max. electrical switching frequency For general use		300 cycles/h								

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

Contactor types	AC / DC operated	AF116	AF140	AF146	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									

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

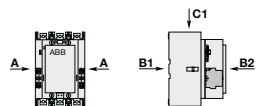
Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370	EK550	EK1000
Lighting application - UL/CSA - breaking all lines											
Electrical discharge lamps (ballast)											
1-phase per pole	347 V AC	160 A	200 A	200 A	250 A	300 A	400 A	450 A	520 A	-	-
3-phase break all lines	600 V AC	160 A	200 A	200 A	250 A	300 A	400 A	450 A	520 A	-	-

AF116 ... EK1000 4-pole contactors

Technical data

General technical data

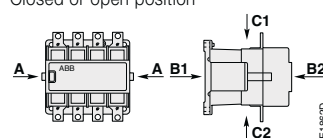
Contactor types	AC / DC operated	AF116	AF140	AF190	AF205	AF265	AF305	AF370
Rated insulation voltage U_i acc. to IEC 60947-4-1		1000 V						
acc. to UL / CSA		600 V						
Rated impulse withstand voltage U_{imp}		8 kV						
Electromagnetic compatibility		AF contactors comply with IEC 60947-1 / EN 60947-1 - Environment A						
Ambient air temperature close to contactor								
Operation		-40 to +70 °C						
Storage		-40 to +70 °C						
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						



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General technical data

Contactor types	AC or DC operated	EK550	EK1000
Rated insulation voltage U_i acc. to IEC 60947-4-1		1000 V	
acc. to UL		600 V	
Rated impulse withstand voltage U_{imp}		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		1/2 sinusoidal shock for 15 ms: no change in contact position, 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	



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Magnet system characteristics

Contactor types	AC / DC operated	AF116	AF140	AF190	AF205	AF265	AF305	AF370
Coil operating limits acc. to IEC 60947-4-1	AC supply	At $\theta \leq 70^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$						
	DC supply	At $\theta \leq 70^\circ\text{C}$ $0.80 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$						
Rated control circuit voltage U_c		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 $U_c \text{ min}$						
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			

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Mounting characteristics and conditions for use

Contactor types	AC / DC operated	AF116	AF140	AF190	AF205	AF265	AF305	AF370
Mounting positions								
Mounting distances		Max. add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 4-pole contactor AF116 ... AF370						
Fixing		The contactors can be assembled side by side						
On rail acc. to IEC 60715, EN 60715		-						
By screws (not supplied)		4 x M5						

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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 mm ²		6...150 mm ²		16...300 mm ²	
	Clamp type		LD... included (1)		1SDA066917R1		1SDA055016R1	
	Tightening torque		8 Nm		14 Nm		25 Nm	
	Cu cable - Stranded	2 x	10...95 mm ²		50...120 mm ²		70...185 mm ²	
	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 mm ²		185...240 mm ²	
	Clamp type		–		1SDA054988R1		1SDA055020R1	
	Tightening torque		–		31 Nm		43 Nm	
	Cu cable - Flexible	1 x	10...70 mm ²		6...120 mm ²		16...240 mm ²	
	Clamp type		LD... included (1)		1SDA066917R1		1SDA055016R1	
	Tightening torque		8 Nm		14 Nm		25 Nm	
	Cu cable - Flexible	2 x	10...70 mm ²		50...95 mm ²		70...185 mm ²	
	Clamp type		LD... included (1)		1SFN074709R1000, LZ185-2C/120		1SCA022194R0890, OZXB4	
	Tightening torque		8 Nm		16 Nm		22 Nm	
	Lugs	W ≤	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 mm ²					
		2 x	1...4 mm ²					
	Flexible	1 x	0.75...2.5 mm ²					
		2 x	0.75...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...2.5 mm ²					
	Lugs	L <	8 mm					
		I >	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.