

AF116 ... AF370 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1							
Rated operational voltage U_e max.		690 V	690 V	1000 V	1000 V	1000 V	1000 V	1000 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, $\theta \leq 40^\circ\text{C}$		160 A	200 A	225 A	275 A	350 A	400 A	500 A	600 A
With conductor cross-sectional area		70 mm ²	95 mm ²	95 mm ²	150 mm ²	240 mm ² (3)	240 mm ²	300 mm ² (4)	2 x 185 mm ² (4)
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	225 A	275 A	350 A	400 A	500 A	600 A
$\theta \leq 60^\circ\text{C}$		145 A	175 A	200 A	250 A	300 A	350 A	400 A	500 A
$\theta \leq 70^\circ\text{C}$		130 A	160 A	175 A	200 A	240 A	290 A	325 A	400 A
I_e / Rated operational current AC-1									
$\theta \leq 40^\circ\text{C}$		—	—	225 A	250 A	275 A	350 A	375 A	400 A
$\theta \leq 60^\circ\text{C}$		—	—	200 A	225 A	250 A	300 A	325 A	350 A
$\theta \leq 70^\circ\text{C}$		—	—	175 A	185 A	200 A	240 A	260 A	290 A
With conductor cross-sectional area		70 mm ²	95 mm ²	95 mm ²	150 mm ²	240 mm ² (3)	240 mm ²	300 mm ² (4)	2 x 185 mm ² (4)
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		116 A	140 A	146 A	190 A	205 A	265 A	305 A	370 A
380-400 V		116 A	140 A	146 A	190 A	205 A	265 A	305 A	370 A
415 V		116 A	140 A	146 A	190 A	205 A	265 A	305 A	370 A
440 V		116 A	140 A	146 A	190 A	205 A	265 A	305 A	370 A
500 V		110 A	130 A	130 A	135 A	165 A	250 A	290 A	315 A
690 V		65 A	80 A	93 A	135 A	165 A	250 A	290 A	315 A
1000 V		—	—	60 A	85 A	100 A	100 A	100 A	100 A
Rated operational power AC-3 (1)									
220-230-240 V		30 kW	37 kW	45 kW	55 kW	55 kW	75 kW	90 kW	110 kW
380-400 V		55 kW	75 kW	75 kW	90 kW	110 kW	132 kW	160 kW	200 kW
415 V		55 kW	75 kW	75 kW	90 kW	110 kW	132 kW	160 kW	200 kW
440 V		75 kW	90 kW	90 kW	110 kW	132 kW	160 kW	160 kW	200 kW
500 V		75 kW	90 kW	90 kW	90 kW	110 kW	200 kW	200 kW	250 kW
690 V		55 kW	75 kW	90 kW	132 kW	160 kW	200 kW	250 kW	315 kW
1000 V		—	—	75 kW	110 kW	132 kW	132 kW	132 kW	132 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		250 A	315 A	315 A	355 A	400 A	500 A	500 A	630 A
Rated short-time withstand current I_{cw}									
1 s		1300 A	1460 A	1460 A	1900 A	2050 A	2650 A	3050 A	3700 A
10 s		928 A	1168 A	1168 A	1520 A	1640 A	2120 A	2440 A	2960 A
30 s		536 A	674 A	674 A	878 A	947 A	1224 A	1409 A	1709 A
at 40 °C ambient temperature, in free air from a cold state									
1 min		379 A	477 A	477 A	621 A	670 A	865 A	996 A	1208 A
15 min		160 A	200 A	225 A	275 A	350 A	400 A	500 A	600 A
Maximum breaking capacity									
$\cos \varphi = 0.45$									
at 440 V		2000 A	3000 A	3000 A	3300 A	3500 A	3800 A	4600 A	5000 A
at 690 V		1000 A	1500 A	1500 A	2200 A	2500 A	3300 A	3800 A	4000 A
($\cos \varphi = 0.35$ for $I_e > 100$ A)									
Power dissipation per pole									
I_e / AC-1		12 W	18 W	23 W	15 W	25 W	32 W	50 W	72 W
I_e / AC-3		6 W	9 W	10 W	7 W	8 W	14 W	19 W	27 W
Maximum electrical switching frequency									
AC-1		300 cycles/h							
AC-3		300 cycles/h							
AC-2, AC-4		150 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) For the protection of motor starters against short circuits, see "Coordination with short-circuit protection devices".

(3) For currents above 275A use terminal enlargements or terminal extensions.

(4) For currents above 450A use terminal enlargements or terminal extensions.

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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
Standards		UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A							
Maximum operational voltage		600V							
NEMA size		—	4	—	—	—	5	—	—
NEMA continuous amp rating	Thermal current	—	135 A	—	—	—	270 A	—	—
NEMA maximum horse power ratings									
1-phase, 60 Hz	115 V AC	—	—	—	—	—	—	—	—
	230 V AC	—	—	—	—	—	—	—	—
NEMA maximum horse power ratings									
3-phase, 60 Hz	200 V AC	—	40 hp	—	—	—	75 hp	—	—
	230 V AC	—	50hp	—	—	—	100 hp	—	—
	460 V AC	—	100 hp	—	—	—	200 hp	—	—
	575 V AC	—	100 hp	—	—	—	200 hp	—	—
UL / CSA general use rating									
600 V AC		160 A	200 A	200 A	250 A	300 A	350 A	400 A	520 A
With conductor cross-sectional area		AWG 2/0	AWG 3/0	AWG 3/0	MCM 250	MCM 350 (2)	MCM 500	2//AWG 3/0	2//MCM 300
1 pole	90 V DC	160 A	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	160 A	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	160 A	200 A	200 A	—	—	—	—	—
	300 V DC	—	—	—	250 A	350 A	—	—	—
	340 V DC	—	—	—	—	—	400 A	500 A	520 A
With conductor cross-sectional area		AWG 2/0	AWG 3/0	AWG 3/0	MCM 250	MCM 350 (2)	MCM 500	2//AWG 3/0	2//MCM 300
UL / CSA maximum 1-phase motor rating									
Full load current	120 V AC	—	—	—	—	—	—	—	—
	240 V AC	—	—	—	—	—	—	—	—
Horse power rating	120 V AC	—	—	—	—	—	—	—	—
	240 V AC	—	—	—	—	—	—	—	—
UL / CSA maximum 3-phase motor rating									
Full load current (1)	200-208 V AC	92 A	120 A	120 A	150 A	177 A	221 A	285 A	359 A
	220-240 V AC	104 A	130 A	130 A	154 A	192 A	248 A	312 A	360 A
	440-480 V AC	96 A	124 A	124 A	156 A	180 A	240 A	302 A	361 A
	550-600 V AC	99 A	125 A	125 A	144 A	192 A	242 A	289 A	336 A
Horse power rating (1)	200-208 V AC	30 hp	40 hp	40 hp	50 hp	60 hp	75 hp	100 hp	125 hp
	220-240 V AC	40 hp	50 hp	50 hp	60 hp	75 hp	100 hp	125 hp	150 hp
	440-480 V AC	75 hp	100 hp	100 hp	125 hp	150 hp	200 hp	250 hp	300 hp
	550-600 V AC	100 hp	125 hp	125 hp	150 hp	200 hp	250 hp	300 hp	350 hp
Short-circuit protection device for contactors									
without thermal overload relay - Motor protection excluded									
High fault current		100 kA							
Fuse rating		225 A	250 A	250 A	450 A	400 A	500 A	600 A	800 A
Fuse type, 600 V		J							
Maximum electrical switching frequency									
For general use		300 cycles/h							
For motor use		300 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 conductor cross-sectional area above MCM 300 use terminal enlargements LW205.

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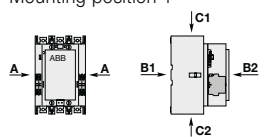
Main pole utilization characteristics - 3 N.O. non-reversing contactors

Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
HVAC application - UL / CSA									
Definite purpose heating rating - 3-phase									
Full Load Amps (FLA)		116 A	125 A	160 A	200 A	250 A	300 A	350 A	520 A
Locked Rotor Amps (LRA)	200-208 V AC	800 A	875 A	1050 A	1400 A	1500 A	2100 A	2450 A	3120 A
	220-240 V AC	800 A	875 A	1050 A	1400 A	1500 A	2100 A	2450 A	3120 A
	440-480 V AC	800 A	875 A	1050 A	1400 A	1500 A	2100 A	2450 A	3120 A
	550-600 V AC	800 A	875 A	1050 A	1400 A	1500 A	2100 A	2450 A	3120 A
Definite purpose air conditioning rating - 3-phase									
Full Load Amps (FLA)		116 A	125 A	160 A	200 A	250 A	300 A	350 A	520 A
Locked Rotor Amps (LRA)	200-208 V AC	800 A	875 A	1050 A	1400 A	1500 A	2100 A	2450 A	3120 A
	220-240 V AC	800 A	875 A	1050 A	1400 A	1500 A	2100 A	2450 A	3120 A
	440-480 V AC	800 A	875 A	1050 A	1400 A	1500 A	2100 A	2450 A	3120 A
	550-600 V AC	800 A	875 A	1050 A	1400 A	1500 A	2100 A	2450 A	3120 A
AC Resistance air heating									
Full Load Amps (FLA)	600 V AC	160 A	200 A	200 A	250 A	300 A	400 A	450 A	520 A
Elevator control, load switching, 500 000 electrical operating cycles									
acc. to CSA B44.1 / ASME 17.5 paragraph 19.2.1									
3-phase									
Horse power rating	200-208 V AC	15 hp	15 hp	15 hp	-	-	-	-	-
	220-240 V AC	20 hp	20 hp	20 hp	-	-	-	-	-
	440-480 V AC	40 hp	40 hp	40 hp	-	-	-	-	-
	550-600 V AC	50 hp	50 hp	50 hp	-	-	-	-	-
Elevator control, 500 000 mechanical operating cycles, 5 electrical operating cycles									
acc. to CSA B44.1 / ASME 17.5. paragraph 19.2.2									
3-phase									
Horse power rating	200-208 V AC	30 hp	40 hp	40 hp	50 hp	60 hp	75 hp	100 hp	125 hp
	220-240 V AC	40 hp	50 hp	50 hp	60 hp	75 hp	100 hp	125 hp	150 hp
	440-480 V AC	75 hp	100 hp	100 hp	125 hp	150 hp	200 hp	250 hp	300 hp
	550-600 V AC	100 hp	125 hp	125 hp	150 hp	200 hp	250 hp	300 hp	350 hp
Lighting application - UL / CSA									
Tungsten lamps									
1-phase per pole	347 V AC	-	-	-	-	-	-	-	-
3-phase break all lines	600 V AC	-	-	-	-	-	-	-	-
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

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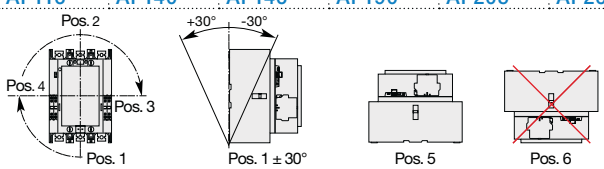
General technical data

Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
Rated insulation voltage Ui acc. to IEC 60947-4-1 acc. to UL / CSA		1000 V	600 V	8 kV					
Rated impulse withstand voltage Uimp.		8 kV							
Electromagnetic compatibility		AF contactors comply 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		-40 to +70 °C							
Climatic withstand		Category B according to IEC 60947-1 Annex Q							
Maximum operating altitude (without derating)		3000 m							
Mechanical durability		5 million operating cycles							
Number of operating cycles		300 cycles/h							
Maximum switching frequency									
Shock withstand		No change in contact position, closed or open position							
acc. to IEC 60068-2-27 and EN 60068-2-27									
Mounting position 1									
	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		0.7 g closed position / 0.7 g open position 13.2...100 Hz							
acc. to IEC 60068-2-6									

Magnet system characteristics

Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
Coil operating limits	AC supply	At $\theta \leq 70$ °C $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$							
acc. to IEC 60947-4-1	DC supply	At $\theta \leq 70$ °C $0.80 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$							
Rated control circuit voltage Uc		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 $U_c \text{ min}$							
Voltage sag immunity		Conditions of use on request							
acc. to SEMI F47									
Dips withstand		≥ 20 ms							
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		

Mounting characteristics and conditions for use

Contactor types	AC / DC operated	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370
Mounting positions									
		Max. add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 3-pole contactor AF116 ... AF370							
Mounting distances		The contactors can be assembled side by side							
Fixing									
On rail acc. to IEC 60715, EN 60715		-							
By screws (not supplied)		4 x M4				4 x M5			

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Connecting characteristics

Contactor types	AC / DC operated	AF116	AF140	AF146	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	LD... included (1)		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	LD... included (1)		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	LD... included (1)		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	LD... included (1)		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	L ≤	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	LD... included (1)		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					-	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						
		l >	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.