

AF116B ... AF146B 3-pole contactors

55 to 75 kW

DC operated - connection with standard ferrules



AF146B-30-22

1SFC101218V0001

Description

AF116B ... AF146B 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. AF116B ... AF140B are mainly used for controlling 3-phase motors and power circuits up to 690 V AC, AF146B up to 1000 V AC and AF116B ... AF146B up to 220 V DC. These contactors are of the block type design with 3 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

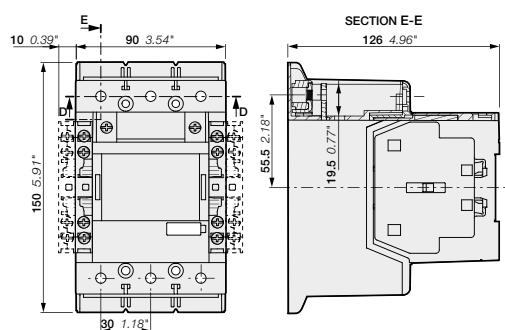
IEC		UL / CSA		Supply control voltage Uc (IEC 60077) (1)	Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1) (1)	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
Rated operational power 0 ≤ 40 °C 400 V AC-3 kW	operational current Ie AC-1 A	3-phase motor rating 480 V hp	General use rating 600 V AC A						
55	160	75	160	24, 33, 48 72, 96, 110 220	20..60 48..130 100..250	2 2	AF116B-30-22-11 AF116B-30-22-12 AF116B-30-22-13	1SFL427063R1122 1SFL427063R1222 1SFL427063R1322	1.5
75	200	100	200	24, 33, 48 72, 96, 110 220	20..60 48..130 100..250	2 2	AF140B-30-22-11 AF140B-30-22-12 AF140B-30-22-13	1SFL447063R1122 1SFL447063R1222 1SFL447063R1322	1.5
75	225	100	200	24, 33, 48 72, 96, 110 220	20..60 48..130 100..250	2 2	AF146B-30-22-11 AF146B-30-22-12 AF146B-30-22-13	1SFL467063R1122 1SFL467063R1222 1SFL467063R1322	1.5

With bar connections

55	160	75	160	24, 33, 48 72, 96, 110 220	20..60 48..130 100..250	2 2	AF116B-30-22-11 AF116B-30-22-12 AF116B-30-22-13	1SFL427063R1122 1SFL427063R1222 1SFL427063R1322	1.5
75	200	100	200	24, 33, 48 72, 96, 110 220	20..60 48..130 100..250	2 2	AF140B-30-22-11 AF140B-30-22-12 AF140B-30-22-13	1SFL447063R1122 1SFL447063R1222 1SFL447063R1322	1.5
75	225	100	200	24, 33, 48 72, 96, 110 220	20..60 48..130 100..250	2 2	AF146B-30-22-11 AF146B-30-22-12 AF146B-30-22-13	1SFL467063R1122 1SFL467063R1222 1SFL467063R1322	1.5

(1) Other control voltages, see voltage code table.

Main dimensions mm, inches



AF116B, AF140B, AF146B-30-22

AF116B ... AF146B 3-pole contactors

55 to 75 kW

AC operated - connection with standard ferrules



AF146B-30-22

1SFC1012180001

Description

AF116B ... AF146B 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds.

AF116B ... AF140B are mainly used for controlling 3-phase motors and power circuits up to 690 V AC, AF146B up to 1000 V AC and AF116B ... AF146B up to 220 V DC. These contactors are of the block type design with 3 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max. of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

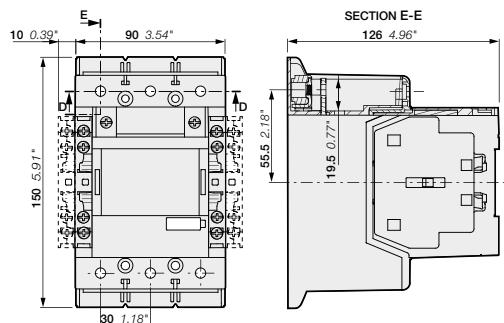
Ordering details

IEC	UL / CSA			Rated control circuit voltage	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power	3-phase motor rating	General use rating		Uc min. ... Uc max. (IEC 60947-4-1)				Pkg (1 pce)
400 V AC-3 kW	AC-1 A	480 V hp	A	V AC 50/60 Hz	1 1			kg

With bar connections

55	160	75	160	24...60	2 2	AF116B-30-22-11	1SFL427063R1122	1.5
				48...130	2 2	AF116B-30-22-12	1SFL427063R1222	1.5
				100...250	2 2	AF116B-30-22-13	1SFL427063R1322	1.5
				250...500	2 2	AF116B-30-22-14	1SFL427063R1422	1.5
75	200	100	200	24...60	2 2	AF140B-30-22-11	1SFL447063R1122	1.5
				48...130	2 2	AF140B-30-22-12	1SFL447063R1222	1.5
				100...250	2 2	AF140B-30-22-13	1SFL447063R1322	1.5
				250...500	2 2	AF140B-30-22-14	1SFL447063R1422	1.5
75	225	100	200	24...60	2 2	AF146B-30-22-11	1SFL467063R1122	1.5
				48...130	2 2	AF146B-30-22-12	1SFL467063R1222	1.5
				100...250	2 2	AF146B-30-22-13	1SFL467063R1322	1.5
				250...500	2 2	AF146B-30-22-14	1SFL467063R1422	1.5

Main dimensions mm, inches



AF116B, AF140B, AF146B-30-22

AF190B ... AF370B 3-pole contactors

90 to 200 kW

DC operated - connection with standard ferrules



AF205B-30-22



AF370B-30-22

Description

AF190B ... AF370B 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC and up to 220 V DC. These contactors are of the block type design with 3 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

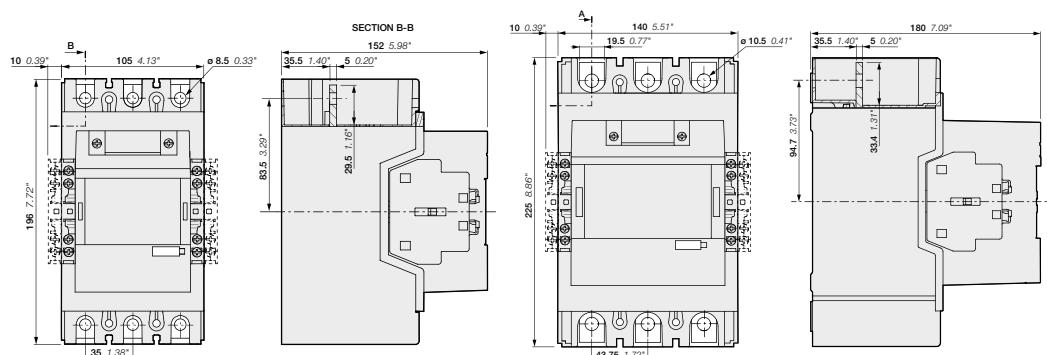
IEC	UL / CSA	Supply control voltage	Rated control circuit voltage	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power current θ ≤ 40 °C	3-phase motor rating 480 V AC-3	General use rating 600 V AC	Uc (IEC 60077)	Uc min. ... Uc max. (IEC 60947-4-1)	(1) V DC		Pkg (1 pc)
kW	A	hp	A	V DC			kg

With bar connections

90	275	125	250	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	2 2 2 2 2 2	AF190B-30-22-11 AF190B-30-22-12 AF190B-30-22-13	1SFL487063R1122 1SFL487063R1222 1SFL487063R1322	3 3 3
110	350	150	300	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	2 2 2 2 2 2	AF205B-30-22-11 AF205B-30-22-12 AF205B-30-22-13	1SFL527063R1122 1SFL527063R1222 1SFL527063R1322	3 3 3
132	400	200	350	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	2 2 2 2 2 2	AF265B-30-22-11 AF265B-30-22-12 AF265B-30-22-13	1SFL547063R1122 1SFL547063R1222 1SFL547063R1322	4.675 4.675 4.675
160	500	250	400	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	2 2 2 2 2 2	AF305B-30-22-11 AF305B-30-22-12 AF305B-30-22-13	1SFL587063R1122 1SFL587063R1222 1SFL587063R1322	4.675 4.675 4.675
200	600	300	520	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	2 2 2 2 2 2	AF370B-30-22-11 AF370B-30-22-12 AF370B-30-22-13	1SFL607063R1122 1SFL607063R1222 1SFL607063R1322	4.675 4.675 4.675

(1) Other control voltages, see voltage code table.

Main dimensions mm, inches



AF190B, AF205B-30-22

AF265B, AF305B, AF370B-30-22

AF190B ... AF370B 3-pole contactors

90 to 200 kW

AC operated - connection with standard ferrules



AF205B-30-22



AF370B-30-22

Description

AF190B ... AF370B 3-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling 3-phase motors and power circuits up to 1000 V AC and up to 220 V DC.

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- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max. of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

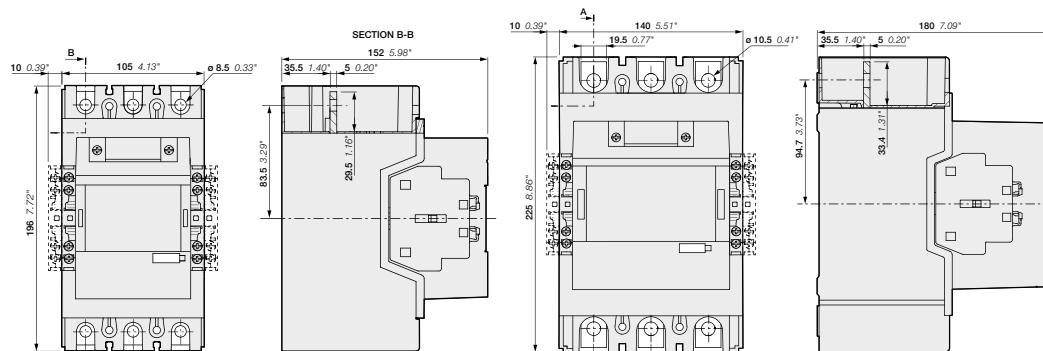
Ordering details

IEC	UL / CSA		Rated control circuit voltage Uc min. ... Uc max. (IEC 60947-4-1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power kW	Rated current @ 40 °C A	3-phase motor rating 480 V hp	General use rating 600 V AC A				Pkg (1 pce) kg
400 V AC-3	AC-1						

With bar connections

90	275	125	250	24...60	2 2	AF190B-30-22-11	1SFL487063R1122	3
				48...130	2 2	AF190B-30-22-12	1SFL487063R1222	3
				100...250	2 2	AF190B-30-22-13	1SFL487063R1322	3
				250...500	2 2	AF190B-30-22-14	1SFL487063R1422	3
110	350	150	300	24...60	2 2	AF205B-30-22-11	1SFL527063R1122	3
				48...130	2 2	AF205B-30-22-12	1SFL527063R1222	3
				100...250	2 2	AF205B-30-22-13	1SFL527063R1322	3
				250...500	2 2	AF205B-30-22-14	1SFL527063R1422	3
132	400	200	350	24...60	2 2	AF265B-30-22-11	1SFL547063R1122	4.675
				48...130	2 2	AF265B-30-22-12	1SFL547063R1222	4.675
				100...250	2 2	AF265B-30-22-13	1SFL547063R1322	4.675
				250...500	2 2	AF265B-30-22-14	1SFL547063R1422	4.675
160	500	250	400	24...60	2 2	AF305B-30-22-11	1SFL587063R1122	4.675
				48...130	2 2	AF305B-30-22-12	1SFL587063R1222	4.675
				100...250	2 2	AF305B-30-22-13	1SFL587063R1322	4.675
				250...500	2 2	AF305B-30-22-14	1SFL587063R1422	4.675
200	600	300	520	24...60	2 2	AF370B-30-22-11	1SFL607063R1122	4.675
				48...130	2 2	AF370B-30-22-12	1SFL607063R1222	4.675
				100...250	2 2	AF370B-30-22-13	1SFL607063R1322	4.675
				250...500	2 2	AF370B-30-22-14	1SFL607063R1422	4.675

Main dimensions mm, inches



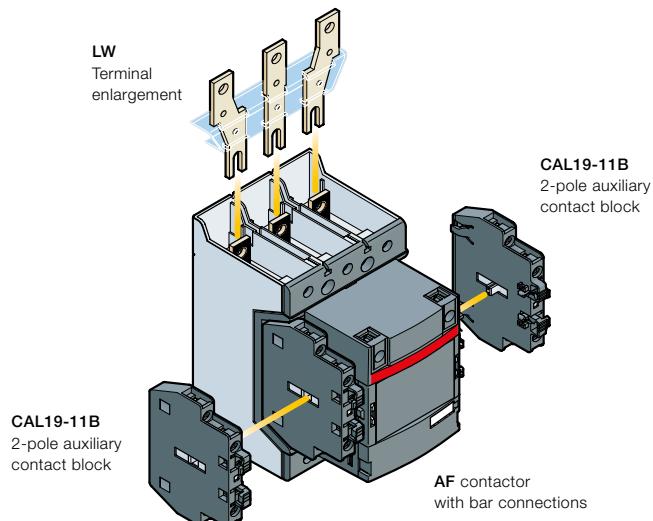
AF190B, AF205B-30-22

AF265B, AF305B, AF370B-30-22

AF116B ... AF370B 3-pole contactors

Main accessories

Main accessories (other accessories available)



Main accessory fitting details

Contactor types	Main poles	Available auxiliary contacts	Side-mounted accessories	Auxiliary contact blocks
			CAL19-11	CAL19-11B
AF116B ... AF370B	3	0 2 2	2 x CAL19-11 included	+ 2 x CAL19-11B

AF116B ... AF370B 3-pole contactors

Main accessories



CAL19-11

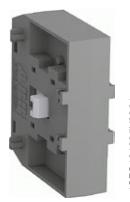
1SFC101071V0001

Ordering details (1)

For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce) kg

Side-mounted instantaneous auxiliary contact blocks

AF116B ... AF370B	1st block	1	1	CAL19-11	1SFN010820R1011	2	0.04
	2nd block	1	1	CAL19-11B	1SFN010820R3311	2	0.04



VM19

1SFC101035V0001

Mechanical interlock unit

AF116B ... AF370B	VM19	1SFN030300R1000	1	0.054
AF116B ... AF146B and AF190B, AF205B	VM140/190	1SFN034403R1000	1	0.088
AF190B, AF205B and AF265B ... AF370B	VM205/265	1SFN035203R1000	1	0.09

Note: To mount VM mechanical interlock unit, remove CAL19-11.



LT370-30C

1SFC101041V0001

Terminal shrouds

AF116B ... AF146B, with compression lugs	LT140-30L	1SFN124203R1000	2	0.07
AF190B, AF205B, with cable clamps	LT205-30C	1SFN124801R1000	2	0.05
AF190B, AF205B, with compression lugs	LT205-30L	1SFN124803R1000	2	0.22
AF190B, AF205B, with shorting bar or between contactor and TOL/EOL in DOL-starters	LT205-30Y	1SFN124804R1000	1	0.05
AF265B ... AF370B, with cable clamps	LT370-30C	1SFN125401R1000	2	0.035
AF265B ... AF370B, with compression lugs	LT370-30L	1SFN125403R1000	2	0.28
AF265B ... AF370B, with shorting bar or between contactor and TOL/EOL in DOL-starters	LT370-30Y	1SFN125404R1000	1	0.075
AF265B ... AF370B, for use with extending cable clamps, ATK300/2 and OZXB4	LT370-30D	1SFN125406R1000	1	0.15

For contactors	Dimensions hole Ø mm	Dimensions bar mm	Type	Order code	Pkg qty	Weight (1 pce) kg

Terminal enlargements

AF116B ... AF146B	6.5	13 x 3	LW140	1SFN074207R1000	1	0.115
AF190B ... AF205B	10.5	17.5 x 5	LW205	1SFN074807R1000	1	0.26
AF265B ... AF370B	10.5	20 x 5	LW370	1SFN075407R1000	1	0.34

Terminal extension

AF116B ... AF146B	6.5	13 x 3	LX140	1SFN074210R1000	1	0.072
AF190B ... AF205B	8.5	17.5 x 5	LX205	1SFN074810R1000	1	0.18
AF265B ... AF370B	10.5	20 x 5	LX370	1SFN075410R1000	1	0.234

(1) For more information, refer to "Accessories" section.



LX140

1SFC101049V0001

AF116B ... AF370B 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AF116B	AF140B	AF146B	AF190B	AF205B	AF265B	AF305B	AF370B			
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)										
Rated operational voltage Ue 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 Ith											
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											
Ie / 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			
Ue max. $\leq 690\text{ V}, 50/60\text{ Hz}$	$\theta \leq 60^\circ\text{C}$	145 A	175 A	200 A	250 A	300 A	350 A	400 A			
	$\theta \leq 70^\circ\text{C}$	130 A	160 A	175 A	200 A	240 A	290 A	325 A			
Ie / Rated operational current AC-1	$\theta \leq 40^\circ\text{C}$			225 A	250 A	275 A	350 A	400 A			
Ue max. $\leq 1000\text{ V}, 50/60\text{ Hz}$	$\theta \leq 60^\circ\text{C}$			200 A	225 A	250 A	300 A	325 A			
	$\theta \leq 70^\circ\text{C}$			175 A	185 A	200 A	240 A	260 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 $\theta \leq 60^\circ\text{C}$											
Ie / Max. rated operational current AC-3 (1)											
	3-phase motors	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)		1500 r.p.m. 50 Hz 1800 r.p.m. 60 Hz 3-phase motors	220-230-240 V	30 kW	37 kW	45 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 Ie AC-3 acc. to IEC 60947-4-1								
Rated breaking capacity AC-3			8 x Ie AC-3 acc. to IEC 60947-4-1								
Short-circuit protection device for contactors											
without thermal overload relay - Motor protection excluded (2)											
Ue $\leq 500\text{ V AC}$ - gG type fuse	250 A	315 A	315 A	355 A	400 A	500 A	500 A	630 A			
Rated short-time withstand current Icw	1 s	1300 A	1460 A	1460 A	1900 A	2050 A	2650 A	3050 A	3700 A		
at 40 °C ambient temperature, in free air from a cold state	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		
	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		
($\cos \varphi = 0.35$ for Ie > 100 A)	at 690 V	1000 A	1500 A	1500 A	2200 A	2500 A	3300 A	3800 A	4000 A		
Power dissipation per pole	Ie / AC-1	12 W	18 W	23 W	15 W	25 W	32 W	50 W	72 W		
Maximum electrical switching frequency	AC-1	300 cycles/h									
	AC-3	300 cycles/h									
	AC-2, AC-4	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".

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

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

AF116B ... AF370B 3-pole contactors

Technical data

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

Contactor types	AF116B	AF140B	AF146B	AF190B	AF205B	AF265B	AF305B	AF370B
Standards	UL 60947-1 / 60947-4-1A and CSA 60947-1 / 60947-4-1A							
Maximum operational voltage	600 V							
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	—	50 hp	—	—	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
	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
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
		220-240 V AC	104 A	130 A	130 A	154 A	192 A	248 A
		440-480 V AC	96 A	124 A	124 A	156 A	180 A	240 A
		550-600 V AC	99 A	125 A	125 A	144 A	192 A	242 A
	Horse power rating (1)	200-208 V AC	30 hp	40 hp	40 hp	50 hp	60 hp	75 hp
		220-240 V AC	40 hp	50 hp	50 hp	60 hp	75 hp	100 hp
		440-480 V AC	75 hp	100 hp	100 hp	125 hp	150 hp	200 hp
		550-600 V AC	100 hp	125 hp	125 hp	150 hp	200 hp	250 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
Fuse type, 600 V		J						800 A
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.

AF116B ... AF370B 3-pole contactors

Technical data

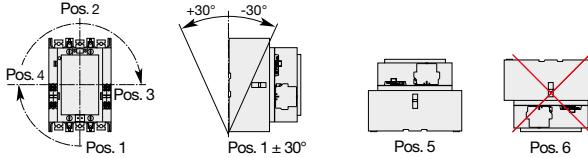
General technical data

Contactor types	AF116B	AF140B	AF146B	AF190B	AF205B	AF265B	AF305B	AF370B
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	Fitted with thermal overload relay							
	-25 to +55 °C							
Without thermal overload relay	-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 and vibration withstand								
acc to IEC 61373	Category 1, class B							

Magnet system characteristics

Contactor types	AF116B	AF140B	AF146B	AF190B	AF205B	AF265B	AF305B	AF370B
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								
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		
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		
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 / 66 V AC 50/60 Hz						
		48 ... 130 V AC 50/60 Hz / 143 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		55 % of U_c 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		

Mounting characteristics and conditions for use

Contactor types	AF116B	AF140B	AF146B	AF190B	AF205B	AF265B	AF305B	AF370B	
Mounting positions									
									
	Max. add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 3-pole contactor AF116B ... AF370B								
Mounting distances		The contactors can be assembled side by side							
Fixing		-							
On rail acc. to IEC 60715, EN 60715		4 x M5							
By screws (not supplied)									

AF116B ... AF370B 3-pole contactors

Technical data

Connecting characteristics

Contactor types	AC / DC operated	AF116B	AF140B	AF146B	AF190B	AF205B	AF265B	AF305B	AF370B
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	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			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 AF116B ... AF146B.

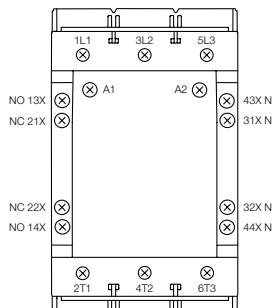
(2) Available in North America only.

AF116B ... AF370B 3-pole contactors

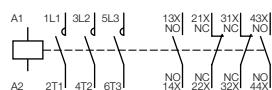
Terminal marking and positioning

AF116B ... AF370B contactors

Standard devices with factory mounted auxiliary contacts



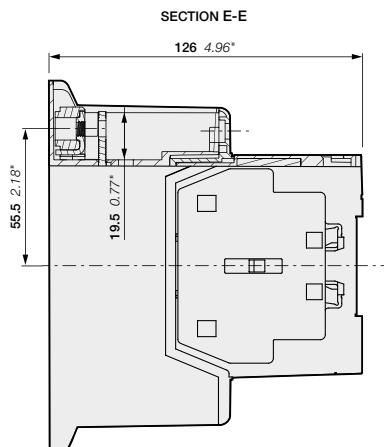
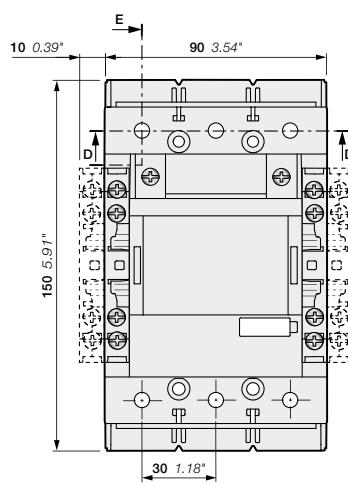
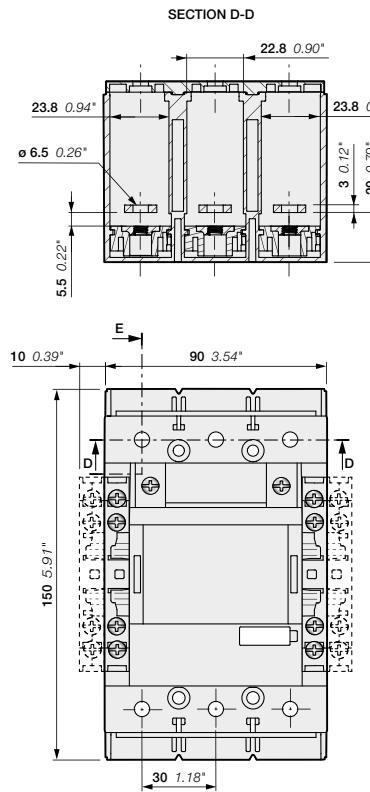
AF116B ... AF370B-30-22



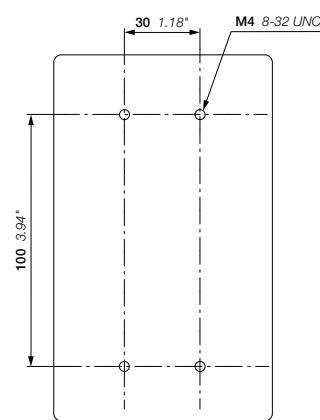
AF116B ... AF370B-30-22

AF116B, AF140B, AF146B 3-pole contactors

Main dimensions mm, inches



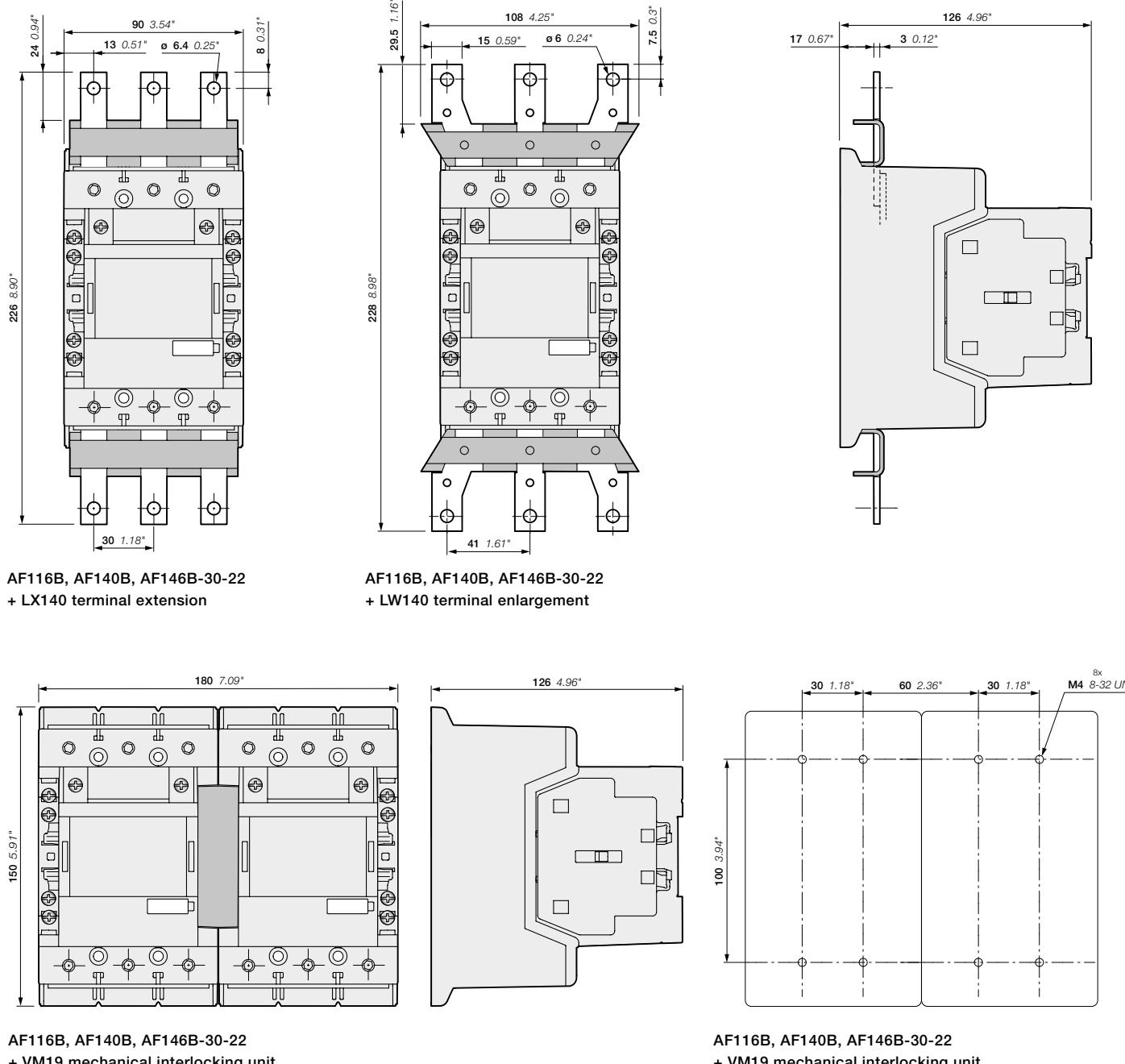
AF116B, AF140B, AF146B-30-22



AF116B, AF140B, AF146B-30-22

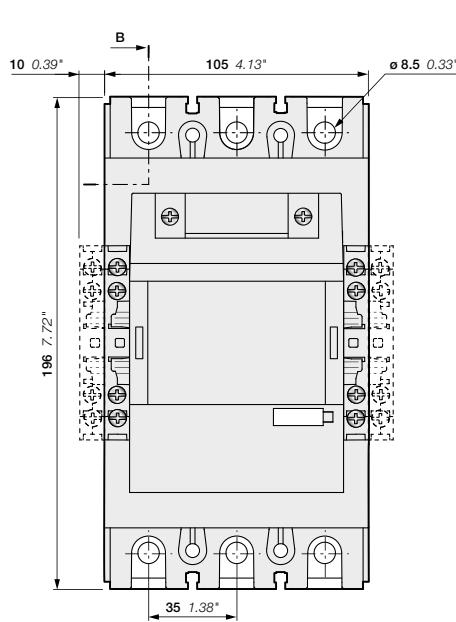
AF116B, AF140B, AF146B 3-pole contactors

Main dimensions mm, inches

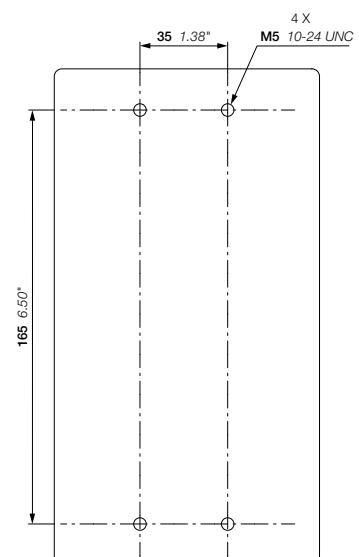
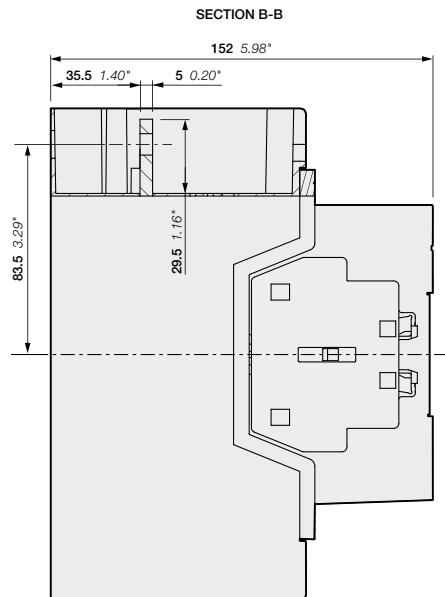


AF190B, AF205B 3-pole contactors

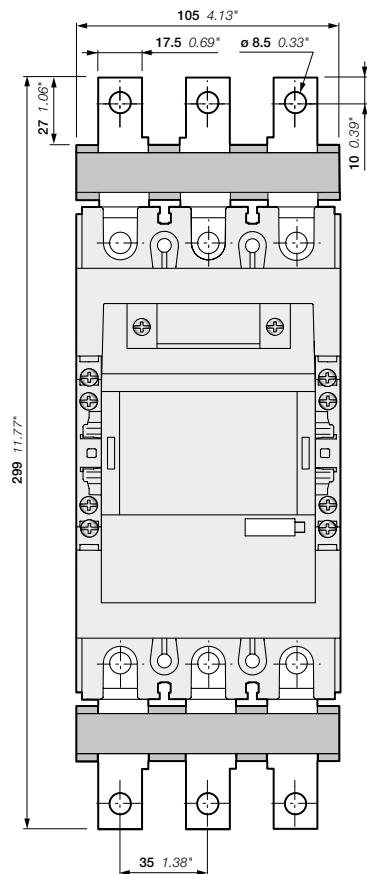
Main dimensions mm, inches



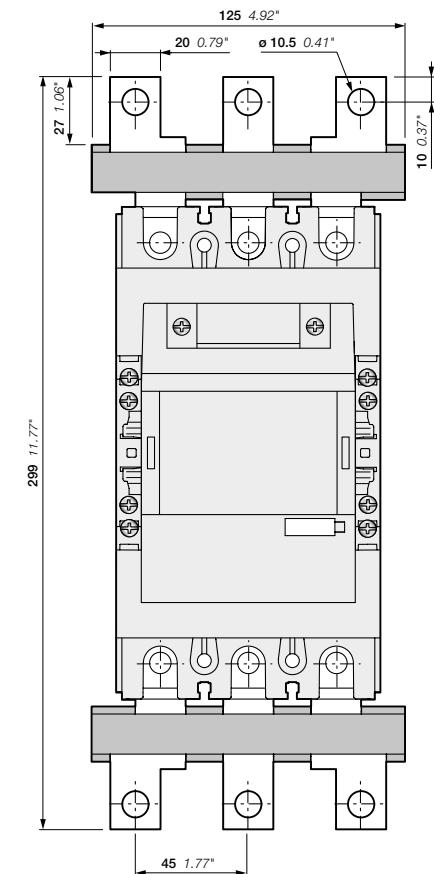
AF190B, AF205B-30-22



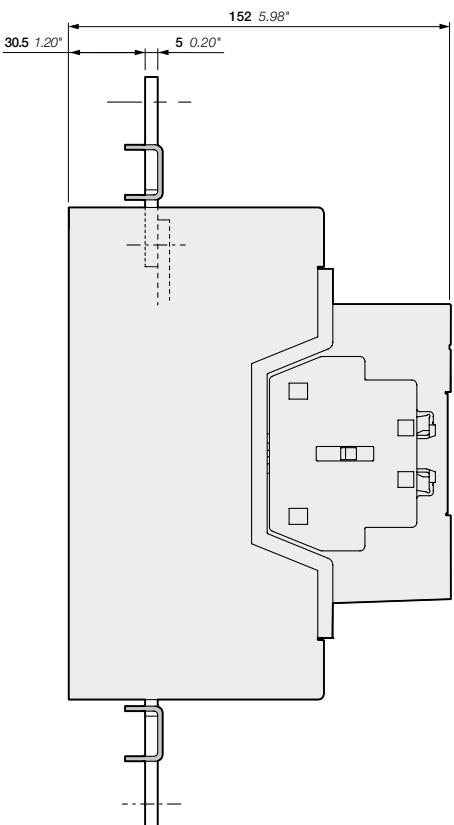
AF190B, AF205B-30-22



AF190B, AF205B-30-22
+ LX205 terminal extension

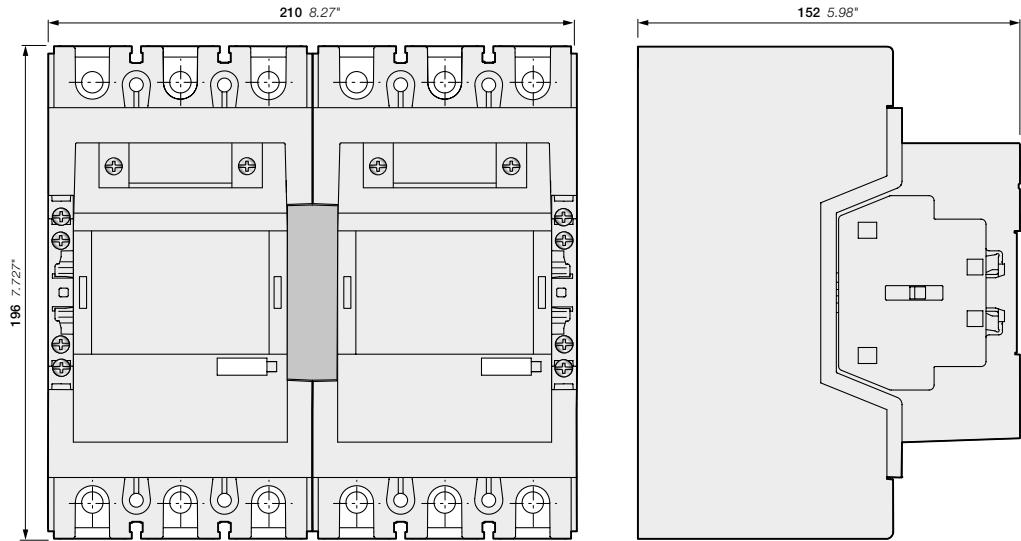


AF190B, AF205B-30-22
+ LW205 terminal enlargement

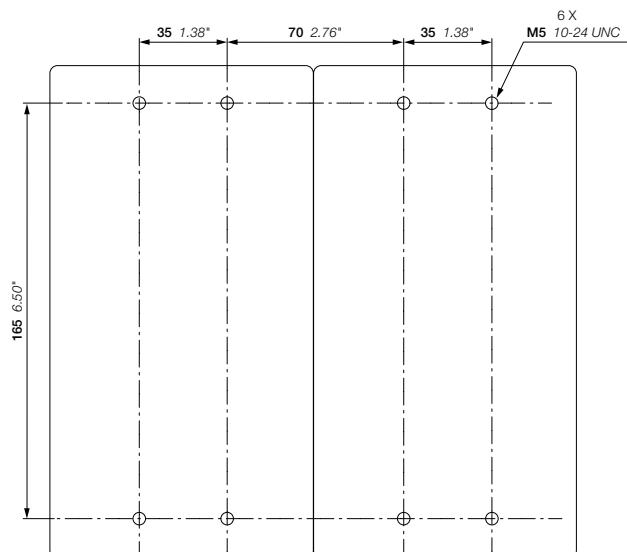


AF190B, AF205B 3-pole contactors

Main dimensions mm, inches



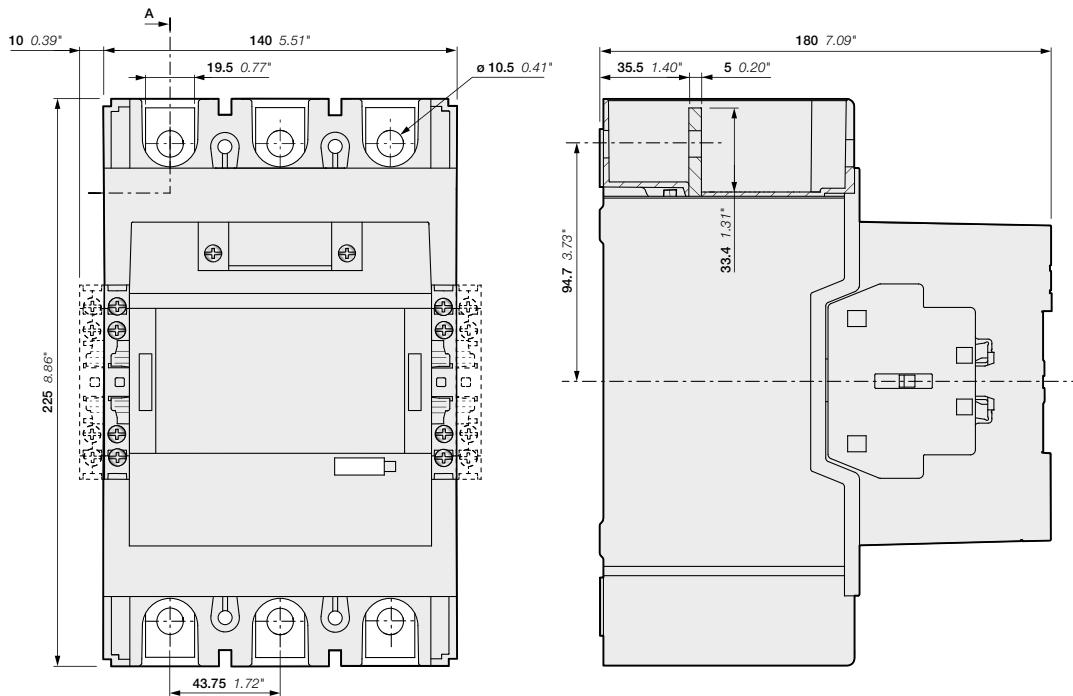
AF190B, AF205B-30-22
+ VM19 mechanical interlocking unit



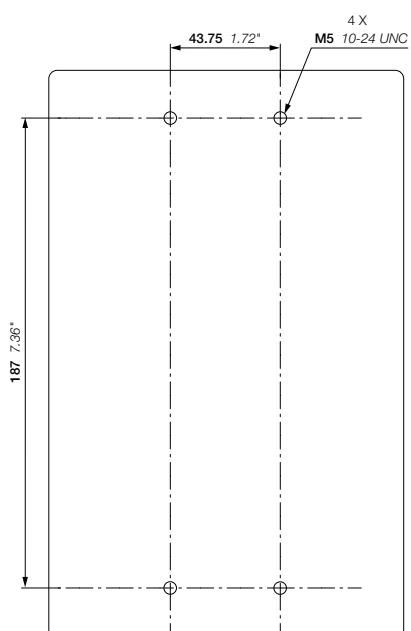
AF190B, AF205B-30-22
+ VM19 mechanical interlocking unit

AF265B, AF305B, AF370B 3-pole contactors

Main dimensions mm, inches



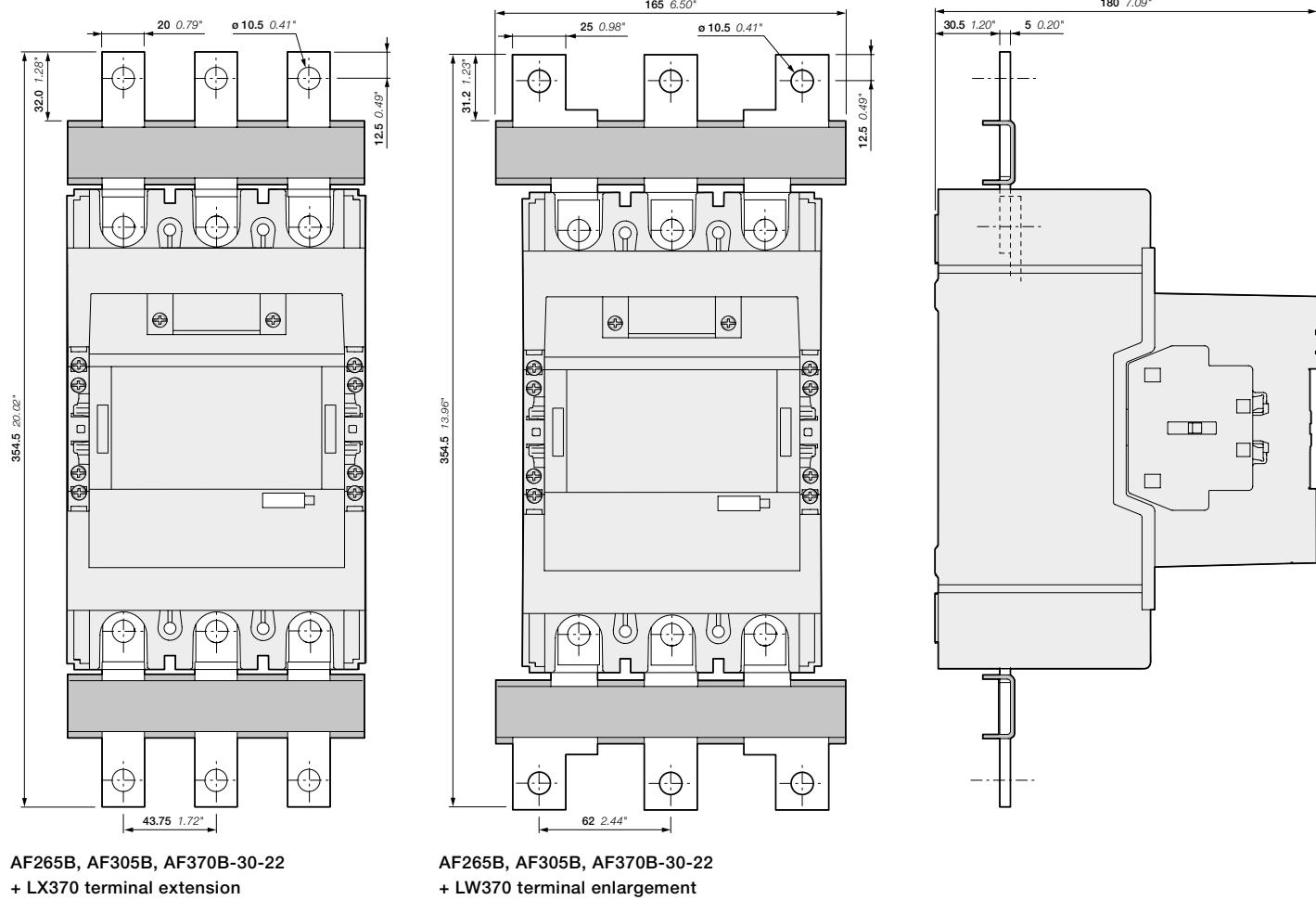
AF265B, AF305B, AF370B-30-22



AF265B, AF305B, AF370B-30-22

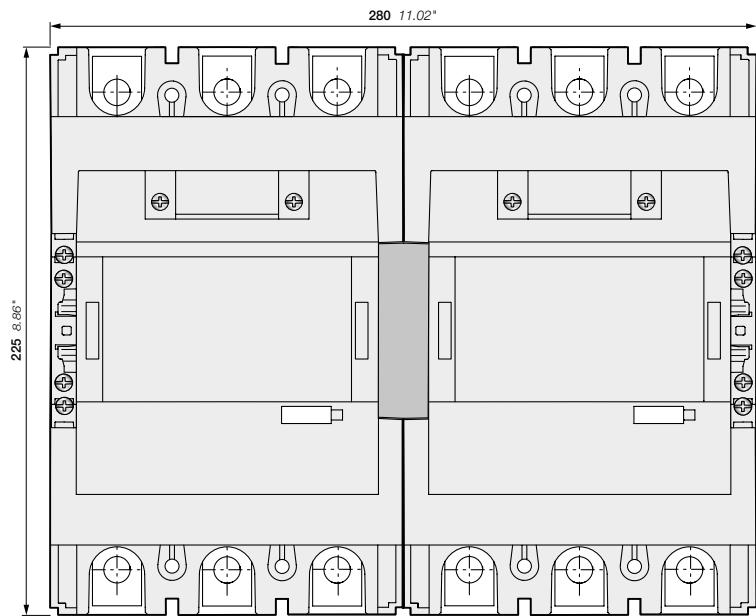
AF265B, AF305B, AF370B 3-pole contactors

Main dimensions mm, inches

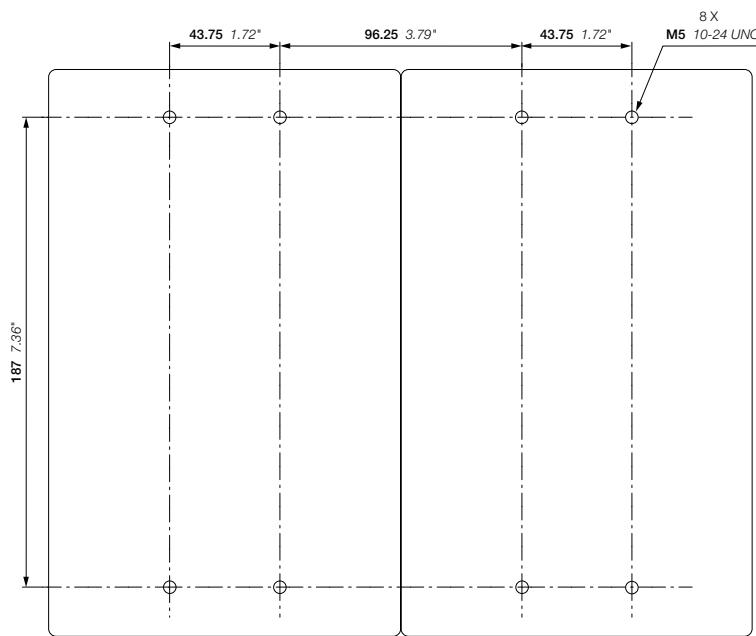


AF265B, AF305B, AF370B 3-pole contactors

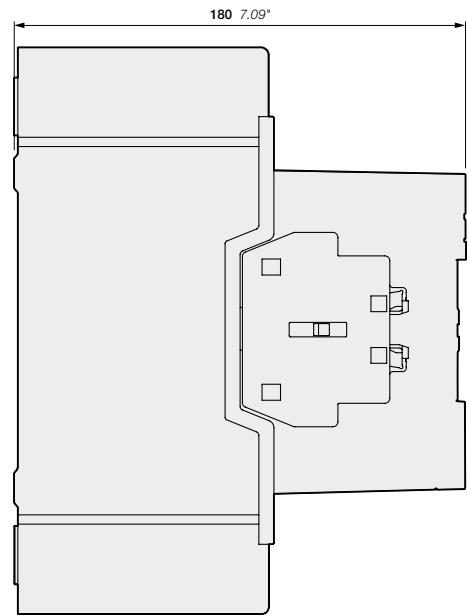
Main dimensions mm, inches



AF265B, AF305B, AF370B-30-22
+ VM19 mechanical interlocking unit



AF265B, AF305B, AF370B-30-22
+ VM19 mechanical interlocking unit



AF116B ... AF140B 4-pole contactors

160 to 200 A AC-1

DC operated - connection with standard ferrules



AF140B-40-22

Description

AF116B ... AF140B 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling power circuits up to 690 V AC and up to 220 V DC. These contactors are of the block type design with 4 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

IEC	UL / CSA	Supply control voltage	Rated control circuit voltage	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
Rated operational current θ ≤ 40 °C AC-1	General use rating	Uc (IEC 60077)	Uc min. ... Uc max. (IEC 60947-4-1)	(1) V DC	(1) V DC		kg
A	A						

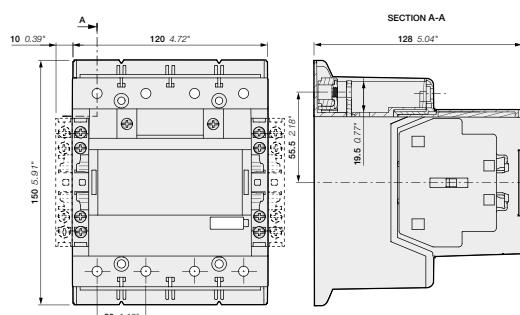
4 N.O. main poles

With bar connections

160	160	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	2 2 2 2 2 2	AF116B-40-22-11 AF116B-40-22-12 AF116B-40-22-13	1SFL427263R1122 1SFL427263R1222 1SFL427263R1322	2.19 2.19 2.19
200	175	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	2 2 2 2 2 2	AF140B-40-22-11 AF140B-40-22-12 AF140B-40-22-13	1SFL447263R1122 1SFL447263R1222 1SFL447263R1322	2.19 2.19 2.19

(1) Other control voltages, see voltage code table.

Main dimensions mm, inches



AF116B, AF140B-40-22

AF116B ... AF140B 4-pole contactors

160 to 200 A AC-1

AC operated - connection with standard ferrules



AF140B-40-22

Description

AF116B ... AF140B 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds.

They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling power circuits up to 690 V AC and up to 220 V DC. These contactors are of the block type design with 4 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max. of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

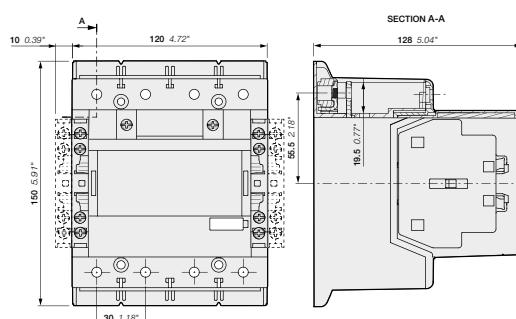
IEC	UL / CSA	Rated control circuit voltage	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational current θ ≤ 40 °C AC-1	General use rating	Uc min. ... Uc max. (IEC 60947-4-1)				Pkg (1 pce)
A	A	V AC 50/60 Hz				kg

4 N.O. main poles

With bar connections

160	160	24...60	2 2	AF116B-40-22-11	1SFL427263R1122	2.19
		48...130	2 2	AF116B-40-22-12	1SFL427263R1222	2.19
		100...250	2 2	AF116B-40-22-13	1SFL427263R1322	2.19
		250...500	2 2	AF116B-40-22-14	1SFL427263R1422	2.19
200	175	24..60	2 2	AF140B-40-22-11	1SFL447263R1122	2.19
		48..130	2 2	AF140B-40-22-12	1SFL447263R1222	2.19
		100..250	2 2	AF140B-40-22-13	1SFL447263R1322	2.19
		250..500	2 2	AF140B-40-22-14	1SFL447263R1422	2.19

Main dimensions mm, inches

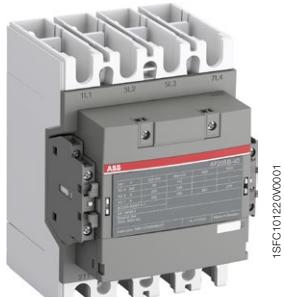


AF116B, AF140B-40-22

AF190B ... AF370B 4-pole contactors

275 to 525 A AC-1

DC operated - connection with standard ferrules

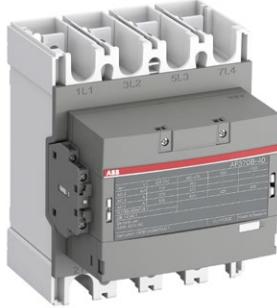


AF205B-40-22

Description

AF190B ... AF370B 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds. They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling power circuits up to 1000 V AC and up to 220 V DC. These contactors are of the block type design with 4 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting a wide DC control voltage range (0.85 Uc min. ... 1.1 Uc max. according to IEC 60947-4-1) including several Uc control voltages (0.7 ... 1.25 Uc according to IEC 60077) used for battery supply
- low coil consumption
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.



AF370B-40-22

Ordering details

IEC	UL / CSA	Supply control voltage	Rated control circuit voltage	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
Rated operational current 0 ≤ 40 °C AC-1	General use rating 600 V AC	Uc (IEC 60077) (1) V DC	Uc min. ... Uc max. (IEC 60947-4-1) (1) V DC				
A	A						kg

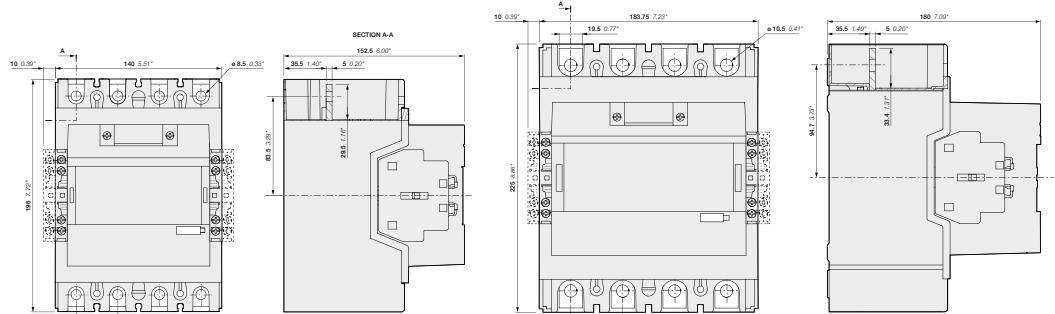
4 N.O. main poles

With bar connections

275	230	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	2 2 2 2 2 2	AF190B-40-22-11 AF190B-40-22-12 AF190B-40-22-13	1SFL487263R1122 1SFL487263R1222 1SFL487263R1322	3.94 3.94 3.94
350	250	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	2 2 2 2 2 2	AF205B-40-22-11 AF205B-40-22-12 AF205B-40-22-13	1SFL527263R1122 1SFL527263R1222 1SFL527263R1322	3.94 3.94 3.94
400	300	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	2 2 2 2 2 2	AF265B-40-22-11 AF265B-40-22-12 AF265B-40-22-13	1SFL547263R1122 1SFL547263R1222 1SFL547263R1322	6.4 6.4 6.4
500	350	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	2 2 2 2 2 2	AF305B-40-22-11 AF305B-40-22-12 AF305B-40-22-13	1SFL587263R1122 1SFL587263R1222 1SFL587263R1322	6.4 6.4 6.4
525	420	24, 33, 48 72, 96, 110 220	20...60 48...130 100...250	2 2 2 2 2 2	AF370B-40-22-11 AF370B-40-22-12 AF370B-40-22-13	1SFL607263R1122 1SFL607263R1222 1SFL607263R1322	6.4 6.4 6.4

(1) Other control voltages, see voltage code table.

Main dimensions mm, inches



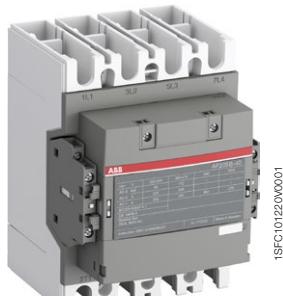
AF190B, AF205B-40-22

AF265B, AF305B, AF370B-40-22

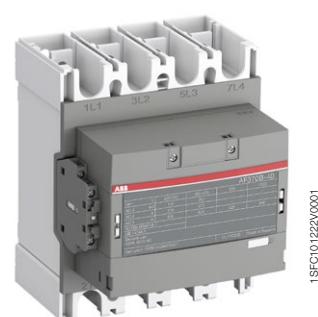
AF190B ... AF370B 4-pole contactors

275 to 525 A AC-1

AC operated - connection with standard ferrules



AF205B-40-22



AF370B-40-22

Description

AF190B ... AF370B 4-pole contactors comply with the latest railway rolling stock standards and allow installation in passengers or driver cabins for trains frequently operating tunnels or undergrounds.

They are mainly used for controlling non-inductive or slightly inductive loads and generally for controlling power circuits up to 690 V AC and up to 220 V DC. These contactors are of the block type design with 4 main poles.

- designed in accordance to the applicable parts of IEC 60077 and EN 50155 standard
- shocks and vibration withstand conforming to IEC 61373 (category 1, class B)
- fire and smoke safety compliance to european standard EN 45545 (HL2 hazard level)
- electronic coil interface accepting sinusoidal AC 50/60 Hz control supplies included inside the wide control voltage range Uc min. ... Uc max of the contactor. Max. permitted control voltage must not be exceeded during voltage fluctuation defined according to IEC 60077 or EN 50155 (see technical data)
- built-in surge suppression
- side by side mounting without restriction from -40 °C up to +70 °C
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

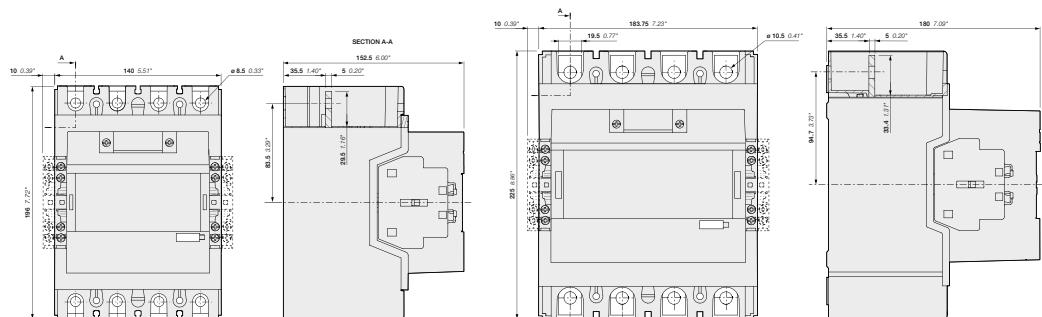
IEC	UL / CSA	Rated control circuit voltage	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
Rated operational current θ ≤ 40 °C	General use rating	Uc min. ... Uc max. (IEC 60947-4-1)				
AC-1 A	A	V AC 50/60 Hz	Y Y			

4 N.O. main poles

With bar connections

275	230	24..60	2 2	AF190B-40-22-11	1SFL487263R1122	3.94
		48..130	2 2	AF190B-40-22-12	1SFL487263R1222	3.94
		100..250	2 2	AF190B-40-22-13	1SFL487263R1322	3.94
		250..500	2 2	AF190B-40-22-14	1SFL487263R1422	3.94
350	250	24..60	2 2	AF205B-40-22-11	1SFL527263R1122	3.94
		48..130	2 2	AF205B-40-22-12	1SFL527263R1222	3.94
		100..250	2 2	AF205B-40-22-13	1SFL527263R1322	3.94
		250..500	2 2	AF205B-40-22-14	1SFL527263R1422	3.94
400	300	24..60	2 2	AF265B-40-22-11	1SFL547263R1122	6.4
		48..130	2 2	AF265B-40-22-12	1SFL547263R1222	6.4
		100..250	2 2	AF265B-40-22-13	1SFL547263R1322	6.4
		250..500	2 2	AF265B-40-22-14	1SFL547263R1422	6.4
500	350	24..60	2 2	AF305B-40-22-11	1SFL587263R1122	6.4
		48..130	2 2	AF305B-40-22-12	1SFL587263R1222	6.4
		100..250	2 2	AF305B-40-22-13	1SFL587263R1322	6.4
		250..500	2 2	AF305B-40-22-14	1SFL587263R1422	6.4
525	420	24..60	2 2	AF370B-40-22-11	1SFL607263R1122	6.4
		48..130	2 2	AF370B-40-22-12	1SFL607263R1222	6.4
		100..250	2 2	AF370B-40-22-13	1SFL607263R1322	6.4
		250..500	2 2	AF370B-40-22-14	1SFL607263R1422	6.4

Main dimensions mm, inches



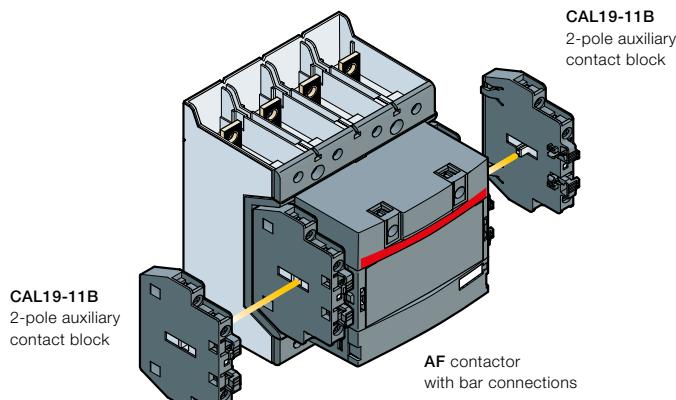
AF190B, AF205B-40-22

AF265B, AF305B, AF370B-40-22

AF116B ... AF370B 4-pole contactors

Main accessories

Main accessories (other accessories available)



Main accessory fitting details

Contactor types	Main poles	Available auxiliary contacts	Side-mounted accessories	
			Auxiliary contact blocks	
			CAL19-11	CAL19-11B
AF116B ... AF370B	4 0	2 2	2 x CAL19-11 included	+ 2 x CAL19-11B

AF116B ... AF370B 4-pole contactors

Main accessories



CAL19-11

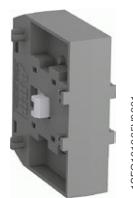
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Ordering details (1)

For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce)
					kg

Side-mounted instantaneous auxiliary contact blocks

AF116B ... AF370B	1st block	1	1	CAL19-11	1SFN010820R1011	2	0.04
	2nd block	1	1	CAL19-11B	1SFN010820R3311	2	0.04



VM19

1SFC101035R0001

Mechanical interlock unit

AF116B ... AF370B	VM19	1SFN030300R1000	1	0.054
AF116B ... AF146B and AF190B, AF205B	VM140/190	1SFN034403R1000	1	0.088
AF190B, AF205B and AF265B ... AF370B	VM205/265	1SFN035203R1000	1	0.09

Note: To mount VM mechanical interlock unit, remove CAL19-11.

Terminal shrouds

AF116B ... AF140B, with compression lugs	LT140-40L	1SFN124203R2000	2	0.09
AF190B ... AF205B, with cable clamps	LT205-40C	1SFN124801R2000	2	0.06
AF190B ... AF205B, with compression lugs	LT205-40L	1SFN124803R2000	2	0.29
AF265B ... AF370B, with cable clamps	LT370-40C	1SFN125401R2000	2	0.04
AF265B ... AF370B, with compression lugs	LT370-40L	1SFN125403R2000	2	0.37

For contactors	Dimensions		Type	Order code	Pkg qty	Weight (1 pce)
	hole Ø mm	bar mm				
						kg

Terminal enlargements

AF190B ... AF205B	10.5	20 x 5	LW205-40	1SFN074807R2000	1	0.306
AF265B ... AF370B	10.5	25 x 5	LW370-40	1SFN075407R2000	1	0.54

(1) For more information, refer to "Accessories" section.

AF116B ... AF370B 4-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AF116B	AF140B	AF190B	AF205B	AF265B	AF305B	AF370B
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)						
Rated operational voltage Ue max.	690 V		1000 V				
Rated frequency (without derating)	50 / 60 Hz						
Conventional free-air thermal current Ith							
acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$	160 A	200 A	275 A	350 A	400 A	500 A	525 A
With conductor cross-sectional area	70 mm ²	95 mm ²	150 mm ²	240 mm ² (2)	240 mm ²	300 mm ² (3)	2x 185 mm ² (3)
AC-1 Utilization category							
For air temperature close to contactor							
Ie / Rated operational current AC-1							
Ue max. ≤ 690 V, 50/60 Hz	$\theta \leq 40^\circ\text{C}$ 160 A	$\theta \leq 60^\circ\text{C}$ 145 A	$\theta \leq 70^\circ\text{C}$ 130 A	$\theta \leq 40^\circ\text{C}$ 200 A	$\theta \leq 60^\circ\text{C}$ 225 A	$\theta \leq 70^\circ\text{C}$ 185 A	$\theta \leq 40^\circ\text{C}$ 250 A
Ue max. ≤ 1000 V, 50/60 Hz	$\theta \leq 60^\circ\text{C}$ - 160 A	$\theta \leq 70^\circ\text{C}$ - 130 A	$\theta \leq 40^\circ\text{C}$ - 160 A	$\theta \leq 60^\circ\text{C}$ - 200 A	$\theta \leq 70^\circ\text{C}$ - 225 A	$\theta \leq 40^\circ\text{C}$ - 185 A	$\theta \leq 60^\circ\text{C}$ - 250 A
With conductor cross-sectional area	70 mm ²	95 mm ²	150 mm ²	240 mm ² (2)	240 mm ²	300 mm ² (3)	2x 185 mm ² (3)
Short-circuit protection device for contactors							
Without thermal overload relay - Motor protection excluded							
Ue ≤ 500 V AC - gG type fuse	200 A	250 A	355 A	400 A	630 A	630 A	630 A
Rated short-time withstand current Icw							
1 s	1300 A	1460 A	1900 A	2050 A	2650 A	3050 A	3700 A
10 s	928 A	1168 A	1520 A	1640 A	2120 A	2440 A	2960 A
30 s	536 A	674 A	878 A	947 A	1224 A	1409 A	1709 A
1 min	379 A	477 A	621 A	670 A	865 A	996 A	1208 A
15 min	160 A	200 A	275 A	350 A	400 A	500 A	525 A
Maximum breaking capacity							
at 440 V	2000 A	3000 A	3300 A	3500 A	3800 A	4600 A	5000 A
at 690 V	-	-	-	-	-	-	-
Power dissipation per pole	Ie / AC-1	12 W	18 W	15 W	25 W	32 W	50 W
Max. electrical switching frequency	AC-1	300 cycles/h					72 W

(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 currents above 275 A use terminal enlargements or terminal extensions.

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

Main pole - Utilization characteristics according to UL / CSA

Contactor types	AF116B	AF140B	AF190B	AF205B	AF265B	AF305B	AF370B
Standards	UL 60947-4-1						
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
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						

AF116B ... AF370B 4-pole contactors

Technical data

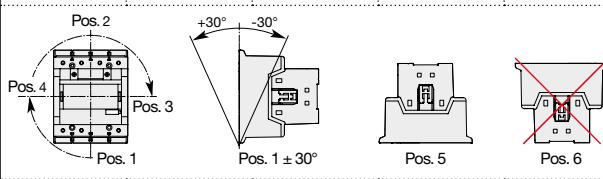
General technical data

Contactor types	AF116B	AF140B	AF190B	AF205B	AF265B	AF305B	AF370B
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 and vibration withstand							
acc to IEC 61373	Category 1, class B						

Magnet system characteristics

Contactor types	AF116B	AF140B	AF190B	AF205B	AF265B	AF305B	AF370B
Coil operating limits							
acc. to IEC 60947-4-1	AC supply At $0 \leq 70^{\circ}\text{C}$ 0.85 x U_c min ... 1.1 x U_c max	DC supply At $0 \leq 70^{\circ}\text{C}$ 0.80 x U_c min ... 1.1 x U_c max					
Rated control circuit voltage U_c	24...500 V AC, 20...500 V DC						
Coil consumption							
DC control voltage							
20...60 V DC	Average pull-in value 210 W	Average holding value 2.5 W	Average pull-in value 205 W	Average holding value 2.5 W	Average pull-in value 400 W	Average holding value 3.5 W	
48...130 V DC	Average pull-in value 130 W	Average holding value 2.5 W	Average pull-in value 130 W	Average holding value 2.5 W	Average pull-in value 360 W	Average holding value 2.5 W	
100...250 V DC	Average pull-in value 135 W	Average holding value 3 W	Average pull-in value 190 W	Average holding value 2.5 W	Average pull-in value 410 W	Average holding value 4.5 W	
250...500 V DC	Average pull-in value 205 W	Average holding value 4 W	Average pull-in value 190 W	Average holding value 4 W	Average pull-in value 600 W	Average holding value 4.7 W	
AC control voltage 50/60 Hz							
24...60 V AC	Average pull-in value 225 VA	Average holding value 5.5 VA	Average pull-in value 165 VA	Average holding value 6 VA	Average pull-in value 475 VA	Average holding value 8.5 VA	
48...130 V AC	Average pull-in value 170 VA	Average holding value 4 VA	Average pull-in value 175 VA	Average holding value 4 VA	Average pull-in value 340 VA	Average holding value 17 VA	
100...250 V AC	Average pull-in value 130 VA	Average holding value 6 VA	Average pull-in value 220 VA	Average holding value 7 VA	Average pull-in value 385 VA	Average holding value 17.5 VA	
250...500 V AC	Average pull-in value 205 VA	Average holding value 16 VA	Average pull-in value 185 VA	Average holding value 16 VA	Average pull-in value 420 VA	Average holding value 21 VA	
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 / 66 V AC 50/60 Hz 48 ... 130 V AC 50/60 Hz / 143 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	55 % of U_c 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		

Mounting characteristics and conditions for use

Contactor types	AF116B	AF140B	AF190B	AF205B	AF265B	AF305B	AF370B
Mounting positions							
							
	Max. add-on N.O. or N.C. auxiliary contacts: see accessory fitting details for 4-pole contactor AF116B ... AF370B						
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 M5						

AF116B ... AF370B 4-pole contactors

Technical data

Connecting characteristics

Contactor types	AC / DC operated	AF116B	AF140B	AF190B	AF205B	AF265B	AF305B	AF370B
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)		1SPN074709R1000, 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		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 AF116B, AF140B

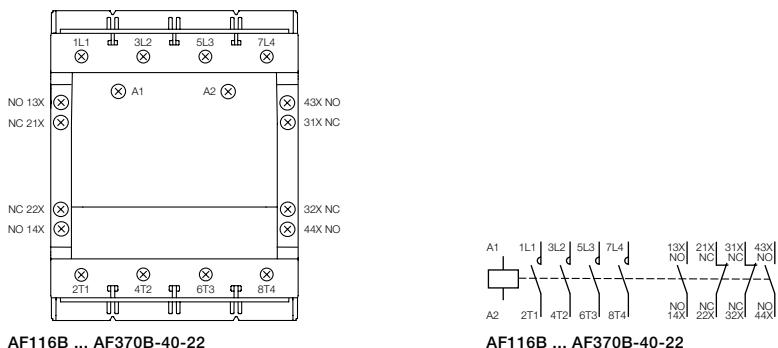
(2) Available in North America only.

AF116B ... AF370B 4-pole contactors

Terminal marking and positioning

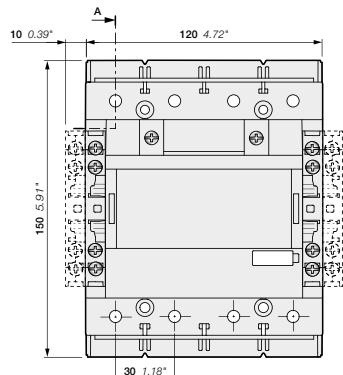
AF116B ... AF370B contactors

Standard devices with factory mounted auxiliary contacts

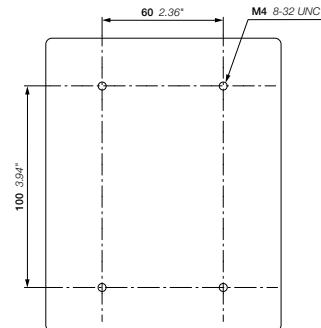
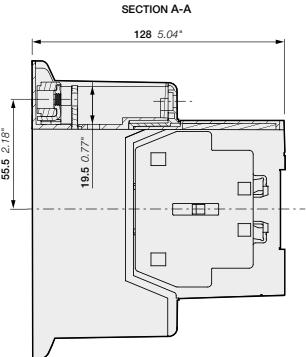


AF116B, AF140B 4-pole contactors

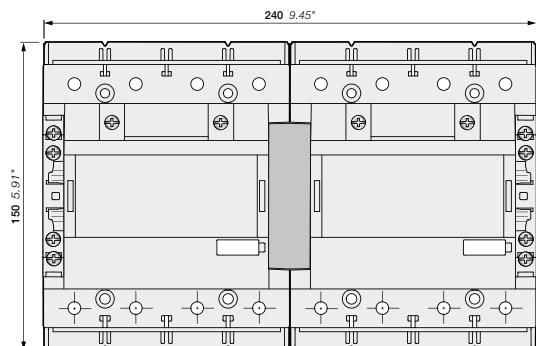
Main dimensions mm, inches



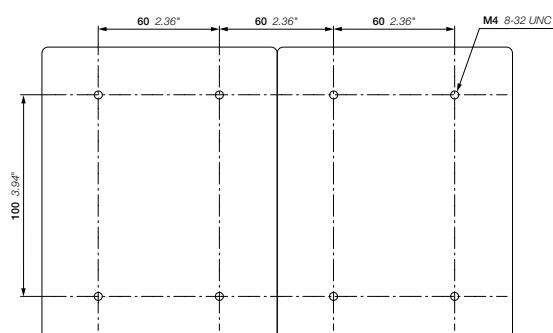
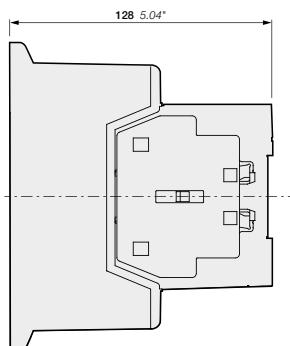
AF116B, AF140B-40-22



AF116B, AF140B-40-22



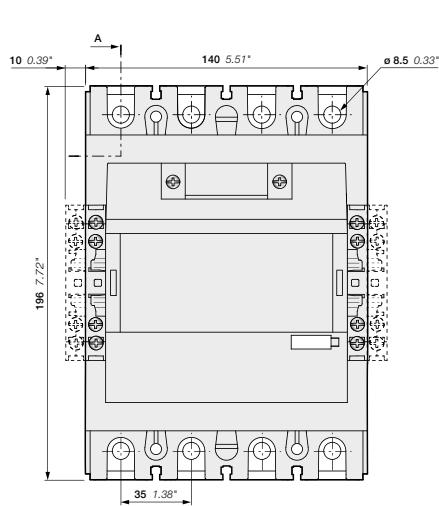
AF116B, AF140B-40-22
+ VM19 mechanical interlocking unit



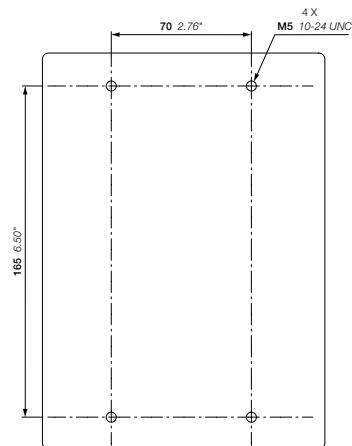
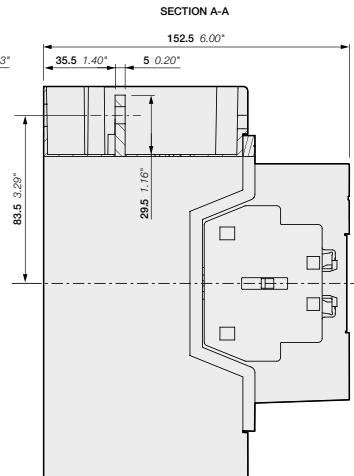
AF116B, AF140B-40-22
+ VM19 mechanical interlocking unit

AF190B, AF205B 4-pole contactors

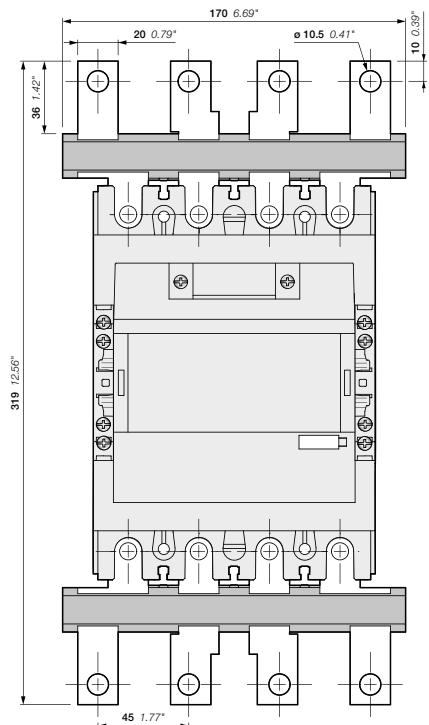
Main dimensions mm, inches



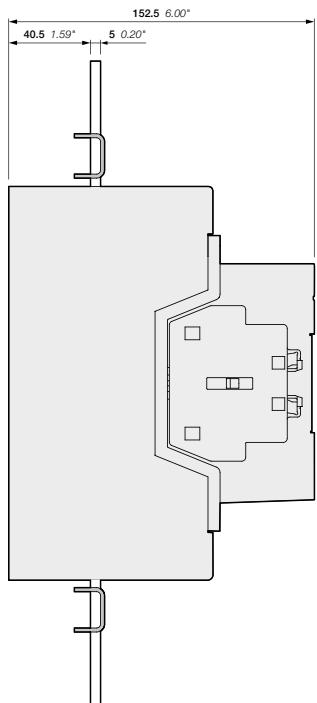
AF190B, AF205B-40-22



AF190B, AF205B-40-22

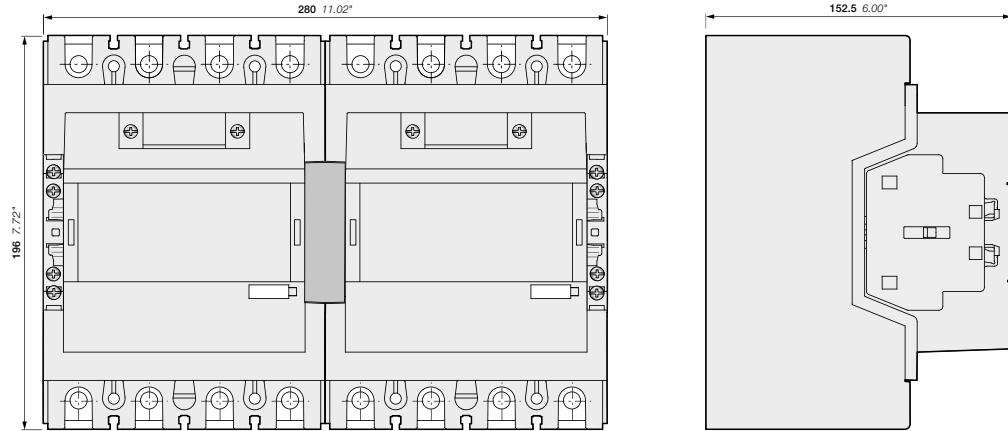


AF190B, AF205B-40-22
+ LW205-40 terminal enlargement

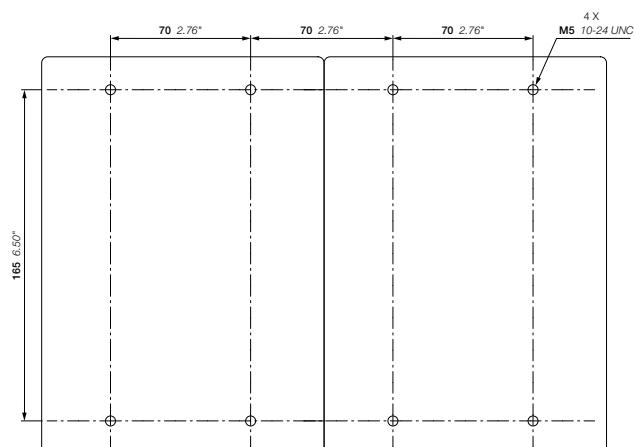


AF190B, AF205B 4-pole contactors

Main dimensions mm, inches



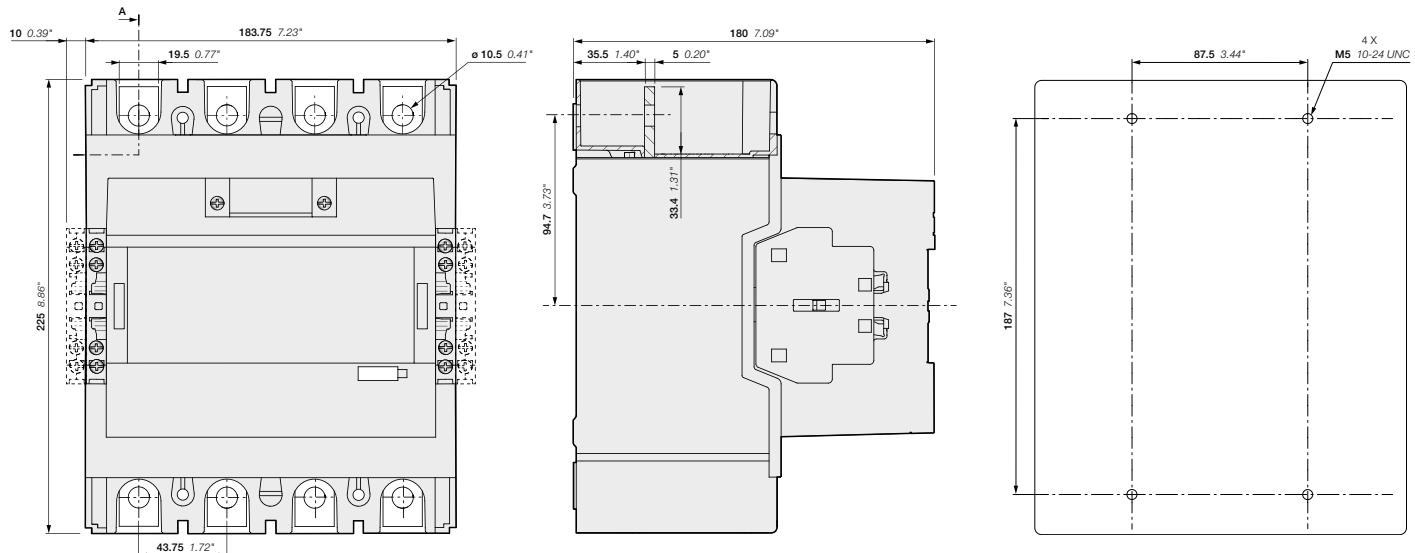
AF190B, AF205B-40-22
+ VM19 mechanical interlocking unit



AF190B, AF205B-40-22
+ VM19 mechanical interlocking unit

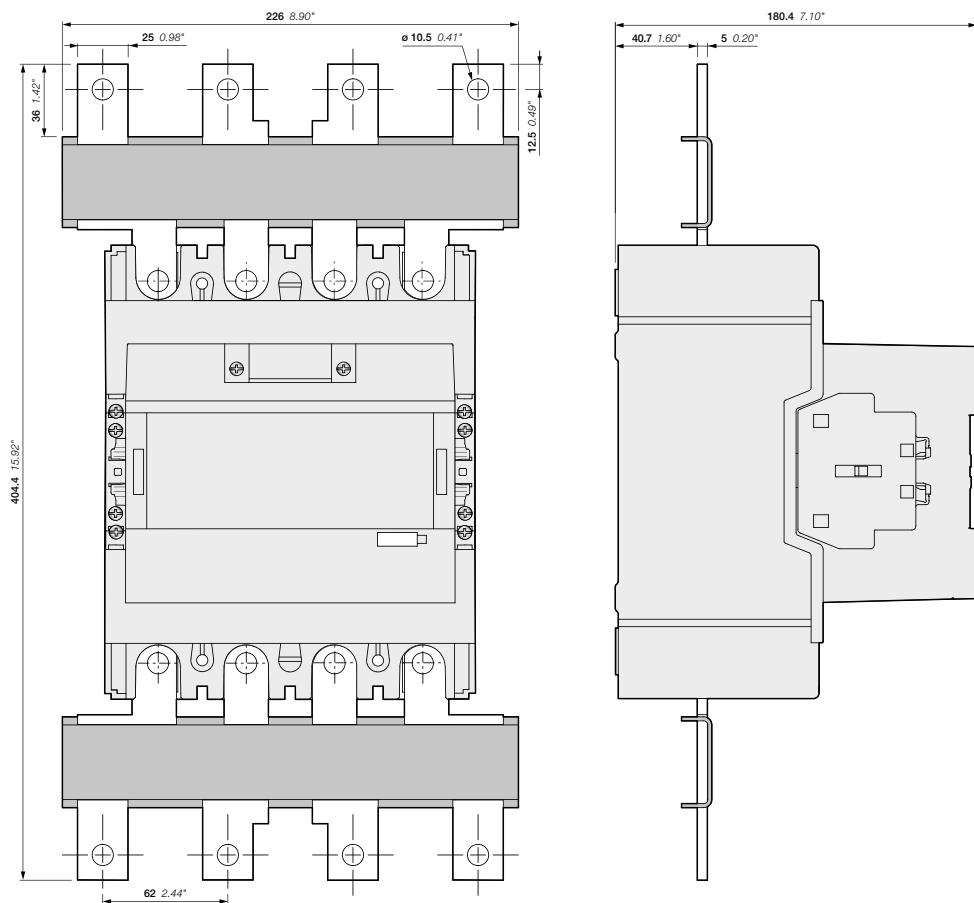
AF265B, AF305B, AF370B 4-pole contactors

Main dimensions mm, inches



AF265B, AF305B, AF370B-40-22

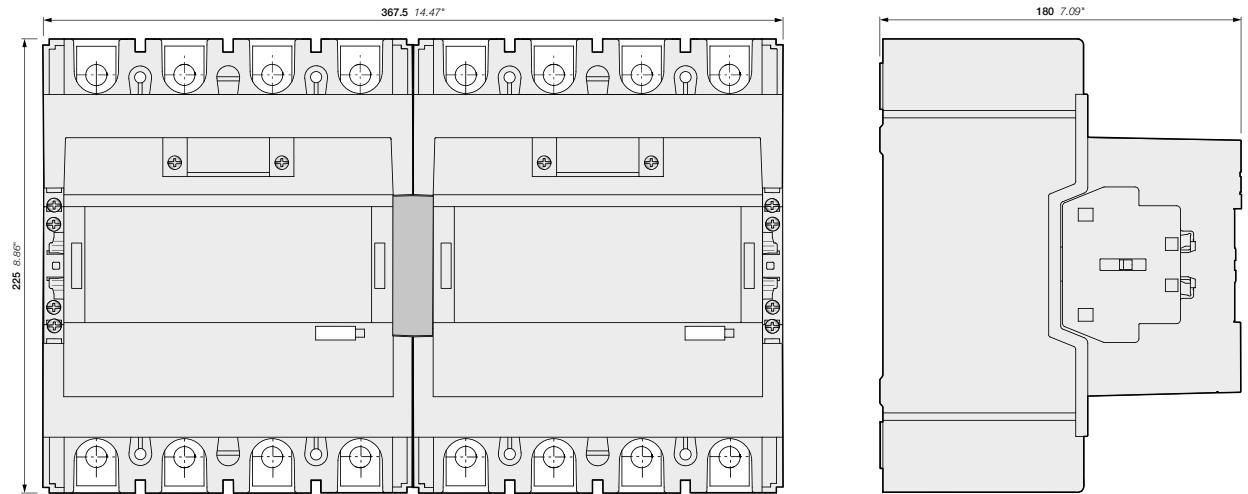
AF265B, AF305B, AF370B-40-22



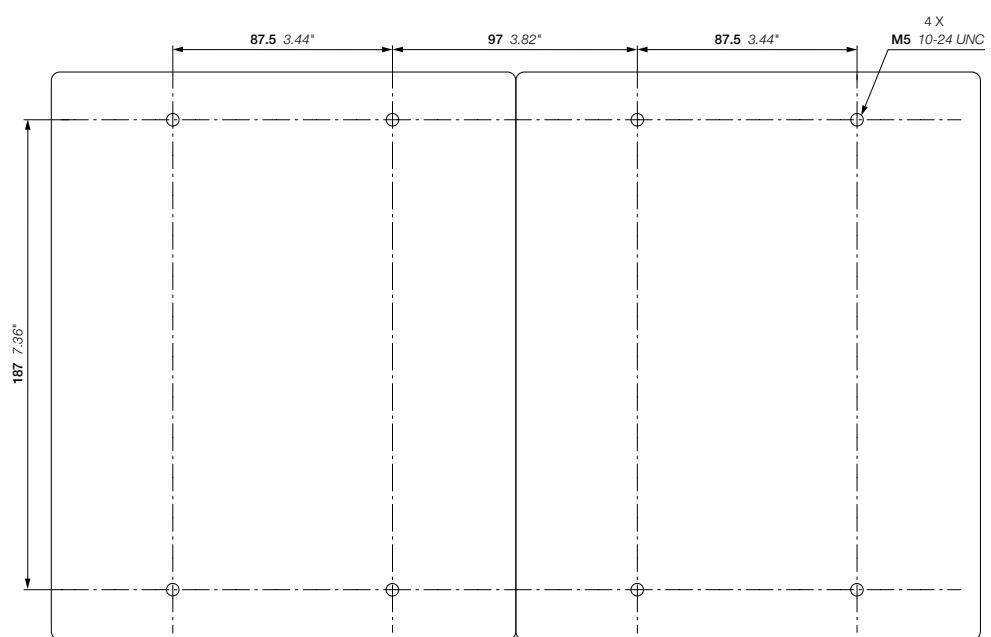
AF265B, AF305B, AF370B-40-22
+ LW370-40 terminal enlargement

AF265B, AF305B, AF370B 4-pole contactors

Main dimensions mm, inches



AF265B, AF305B, AF370B-40-22
+ VM19 mechanical interlocking unit



AF265B, AF305B, AF370B-40-22
+ VM19 mechanical interlocking unit

Auxiliary contact blocks for AF116B ... AF370B contactors



CAL19-11

1SFC101071W0001

Description

The auxiliary contact blocks are used for the operation of auxiliary circuits and control circuits for standard industrial environments.

Types of auxiliary contact blocks for side mounting:

- CAL 2-pole block, with instantaneous N.O. + N.C. contacts.

For clipping onto the right- and/or left-hand side of the contactors.

The CAL ...-11B is a second block for mounting in addition to a first CAL ...-11 block, right- and/or left-hand of the AF116B ... AF370B contactors.

The auxiliary contact blocks are equipped with screw type connecting terminals delivered open, protected against accidental direct contact and bear the corresponding function marking.

Ordering details (1)

For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce)
					kg

Side-mounted instantaneous auxiliary contact blocks

AF116B ... AF370B	1st block	1	1	CAL19-11	1SFN010820R1011	2	0.04
	2nd block	1	1	CAL19-11B	1SFN010820R3311	2	0.04

(1) For each contactor type, refer to "Accessory fitting details" table.

CAL19 Auxiliary contact blocks for AF116B ... AF370B contactors

Connection with standard ferrules

Technical data

Types	CAL19	
Contact utilization characteristics according to IEC		
Standards		IEC 60947-5-1 and EN 60947-5-1
Rated insulation voltage U_i acc. to IEC 60947-5-1		690 V
Rated impulse withstand voltage U_{imp}		6 kV
Rated operational voltage U_e max.		24...690 V AC
Conventional thermal current I_{th} - $\theta \leq 40^\circ C$		16 A
Rated frequency (without derating)		50/60 Hz
I_e / 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
	380-440 V 50/60 Hz	3 A
	500-690 V 50/60 Hz	2 A
Making capacity acc. to IEC 60947-5-1		10 x I_e AC-15
Breaking capacity acc. to IEC 60947-5-1		10 x I_e AC-15
I_e / Rated operational current DC-13		
acc. to IEC 60947-5-1	24 V DC	3 A / 72 W
	48 V DC	1.5 A / 72 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	0.3 A / 69 W
	250 V DC	0.3 A / 75 W
Short-circuit protection device gG type fuse		10 A
Rated short-time withstand current I_{cw}	for 1.0 s	100 A
$\theta = 40^\circ C$	for 0.1 s	140 A
Minimum switching capacity		24 V / 50 mA
with failure rate acc. to IEC 60947-5-4		$\leq 10^{-6}$
Power dissipation per pole at 6 A		0.15 W
Mechanical durability	Number of operating cycles	5 millions operating cycles
	Max. switching frequency	300 cycles/h
Max. electrical switching frequency	AC-15	300 cycles/h
	DC-13	300 cycles/h
Mirror contacts acc. to annex F of IEC 60947-4-1		N.C. auxiliary contacts are mirror contacts

Contact utilization characteristics according to UL / CSA

Standards	UL 508, CSA C22.2 N°14
Max. operational voltage	600 V AC, 250 V DC
Pilot duty	A600, Q300
AC thermal rated current	10 A
AC maximum volt-ampere making	7200 V A
AC maximum volt-ampere breaking	720 V A
DC thermal rated current	2.5 A
DC maximum volt-ampere making-breaking	69 V A

Connecting characteristics

Connection capacity (min. ... max.)		
	Solid / stranded	1 x 1...4 mm ²
	Flexible with non insulated ferrule	2 x 1...4 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> 3.7 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG18...14
Stripping length		9 mm
Tightening torque		1 Nm
Degree of protection		IP20
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529		
Screw terminals		Delivered in open position, screws of unused terminals must be tightened
All terminals		M3.5
Screwdriver type		Flat Ø 5.5 / Pozidriv 2

Auxiliary contact blocks for AF116B ... AF370B contactors

Electrical durability

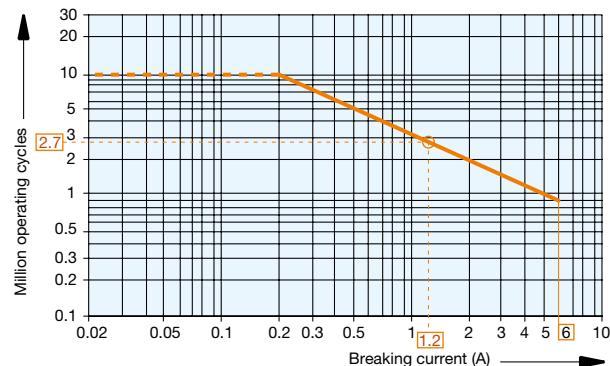
Electrical durability for AC-15 utilization category

AC-15 utilization category according to IEC 60947-5-1 / EN 60947-5-1:

- making current: $10 \times I_e$ with $\cos \varphi = 0.7$ and U_e
- breaking current: I_e with $\cos \varphi = 0.4$ and U_e .

This curves represent the electrical durability of the add-on auxiliary contacts, in relation to the breaking current.

The curves have been drawn for resistive and inductive loads up to 690 V, 40...60 Hz.



- AF116B ... AF370B contactors auxiliary contacts
- 2-pole CAL19 add-on auxiliary contacts

Example:

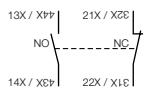
Breaking current = 1.2 A

On the opposite curve at intersection "O" 1.2 A the corresponding value for the electrical durability is approximately 2.7 millions operating cycles.

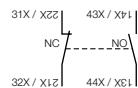
Add-on auxiliary contacts

Terminal marking and positioning

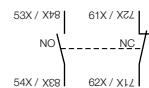
2-pole auxiliary contacts



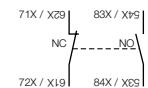
CAL19-11
(Left-side mounted)



CAL19-11
(Right-side mounted)



CAL19-11B
(Left-side mounted)



CAL19-11B
(Right-side mounted)