

GA75 ... GAF2050 contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC operated		GA75							
	AC / DC operated		GA75	GAF185	GAF300	GAF460	GAF750	GAF1250	GAF1650	GAF250
Standards			IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1							
Rated operational voltage U _e max.			1000 V DC							
DC-1 Utilization category, L/R ≤ 1 ms										
For air temperature close to contactor										
I _e / Rated operational current DC-1										
θ ≤ 40 °C		220 V	120 A	-						
		440 V	100 A	-						
		600 V	75 A	-						
		1000 V	35 A	275 A	500 A	700 A	1050 A	1250 A	1650 A	2050 A
θ ≤ 55 °C		220 V	100 A	-						
		440 V	100 A	-						
		600 V	75 A	-						
		1000 V	35 A	250 A	400 A	600 A	875 A	1040 A	1450 A	1750 A
θ ≤ 70 °C		220 V	85 A	-						
		440 V	85 A	-						
		600 V	75 A	-						
		1000 V	35 A	180 A	325 A	480 A	720 A	875 A	1270 A	1500 A
With conductor cross-sectional area			¹⁾	150 mm ²	300 mm ²	2x 240 mm ²	2x 50x8 mm ²	2x 100x5 mm ²	3x 100x5 mm ²	4x 100x5 mm ²
DC-3 Utilization category, L/R ≤ 2 ms										
I _e / Rated operational current DC-3										
θ ≤ 55 °C		220 V	100 A	-						
		440 V	85 A	-						
DC-5 Utilization category, L/R ≤ 7.5 ms										
I _e / Rated operational current DC-5										
θ ≤ 55 °C		220 V	85 A	-						
		440 V	35 A	-						
Maximum electrical switching frequency			300 cycles/h							

¹⁾ Refer to IEC 60947-1, table 9.

²⁾ For currents above 450 A, use 300 mm² and terminal extension/enlargement pieces (LX300/LW300).

Main pole - Utilization characteristics according to UL / CSA

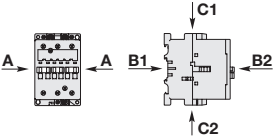
Contactor types	AC operated		GA75							
	AC / DC operated		GA75	GAF185	GAF300	GAF460	GAF750	GAF1250	GAF1650	GAF250
Standards			UL 508, CSA C22.2 N°14		UL 60947-4-1, CSA C22.2 N°60947.4-1					
Maximum operational voltage			1000 V DC							
UL / CSA DC general use rating										
θ ≤ 40 °C		440 V	100 A	-						
		600 V	75 A	250 A	400 A					
		1000 V	35 A	³⁾	400 A	650 A	900 A	1210 A	1650 A	2050 A
Maximum electrical switching frequency			300 cycles/h							

³⁾ On request.

GA75 and GAF75 contactors

Technical data

General technical data

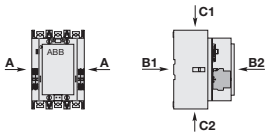
Contactor types	AC operated AC/DC operated	GA75 GAF75
Rated insulation voltage U_i		
acc. to IEC 60947-4-1		1000 V
acc. to UL		600 V
Rated impulse withstand voltage U_{imp}		8 kV
Ambient air temperature close to contactor		
Operation		-40...+70 °C
Storage		-60...+80 °C
Climatic withstand		acc. to IEC 60068-2-30 and 60068-2-11 - UTE C 63-100 specification II
Maximum operating altitude (without derating)		3000 m
Mechanical durability		
Number of operating cycles		10 millions operating cycles (5 millions for GAE75)
Max. switching frequency		3600 cycles/h
Shock withstand		
acc. to IEC 60068-2-27 and EN 60068-2-27		
Mounting position 1		
	Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position
	A	20 g
	B1	10 g closed position / 5 g open position
	B2	15 g
	C1	20 g
	C2	20 g

GAF185 ... GAF2050 contactors

Technical data

General technical data

Contactor types	AC / DC operated	GAF185	GAF300	GAF460	GAF750	GAF1250	GAF1650	GAF2050
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						
Ambient air temperature close to contactor								
Operation		-40 to +70 °C						
Storage		-40 to +70 °C						
Climatic withstand		acc. to IEC 60068-2-30						
Maximum operating altitude (without derating)		3000 m						
Mechanical durability								
Number of operating cycles		5 millions operating cycles					0.5 millions operating cycles	
Max. switching frequency		300 cycles/h					60 cycles/h	
Shock withstand								
acc. to IEC 60068-2-27 and EN 60068-2-27								
Mounting position 1								
Shock direction		1/2 sinusoidal shock for 30 ms: no change in contact position, closed or open position						
A		5 g					-	
B1		5 g					-	
B2		5 g					-	
C1		5 g					-	
C2		5 g					-	



GA75 and GAF75 contactors

Technical data

Magnet system characteristics

Contactor types	AC operated	GA75	
Coil operating limits	AC supply	At $\theta \leq 55^\circ\text{C}$ 0.85...1.1 x U_c	
acc. to IEC 60947-4-1		Please also refer to "Mounting characteristics and conditions for use"	
AC control voltage			
Rated control circuit voltage U_c	at 50 Hz	24...690 V	
	at 60 Hz	24...690 V	
Coil consumption	Average pull-in value	50 Hz	180 VA
		60 Hz	210 VA
	Average holding value	50/60 Hz ¹⁾	190 VA / 180 VA
		50 Hz	18 VA / 5.5 W
		60 Hz	18 VA / 5.5 W
		50/60 Hz ¹⁾	18 VA / 5.5 W
Drop-out voltage		Approx. 40...65 % of U_c	
Operating time			
Between coil energization and:	N.O. contact closing	8...27 ms	
	N.C. contact opening	7...22 ms	
Between coil de-energization and:	N.O. contact opening	4...11 ms	
	N.C. contact closing	7...14 ms	

¹⁾ 50/60 Hz coils: see "Voltage code table".

Magnet system characteristics

Contactor types	AC/DC operated	GAF75
Coil operating limits	AC/DC supply	At $\theta \leq 70^\circ\text{C}$ 0.85 x U_c min ... 1.1 x U_c max
acc. to IEC 60947-4-1		Please also refer to "Mounting characteristics and conditions for use"
AC/DC control voltage		
Rated control circuit voltage U_c		20...250 V AC/DC
Coil consumption	Average pull-in value	210 VA/190 W
	Average holding value	7.5 VA/2.8 W
Drop-out voltage		55 % of U_c min
Coil time constant		
Open	L/R	3 ms
Closed	L/R	15 ms
Operating time		
Between coil energization and:	N.O. contact closing	30...100 ms
	N.C. contact opening	27...95 ms
Between coil de-energization and:	N.O. contact opening	30...110 ms
	N.C. contact closing	35...115 ms

Mounting characteristics and conditions for use

Contactor types	AC operated	GA75
	AC/DC operated	GAF75
Mounting positions		
Control voltage / Ambient temperature		
Mounting positions	1, 1±30°, 2, 3, 4, 5	at $\theta \leq 70^\circ\text{C}$ 0.85 x U_c min ... 1.1 x U_c max (max 55 °C for GA75)
	6	Unauthorized
Mounting distances		The contactors can be assembled side by side
Fixing		
On rail according to IEC 60715, EN 60715		35 x 15 mm or 75 x 25 mm
By screws (not supplied)		2 x M6 screws placed diagonally

GAF185 ... GAF2050 contactors

Technical data

Magnet system characteristics

Contactor types	AC / DC operated	GAF185	GAF300	GAF460	GAF750	GAF1250	GAF1650	GAF2050
Coil operating limits acc. to IEC 60947-4-1	AC or DC supply	At $\theta \leq 70^\circ\text{C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$. Please also refer to "Mounting characteristics and conditions for use"						
AC control voltage 50/60 Hz								
Rated control circuit voltage U_c		48...250 V AC			48...500 V AC		100...250 V AC	
Coil consumption	Average pull-in value	430 VA	470 VA	890 VA	850 VA		1900 VA	
	Average holding value	12 VA / 3.5 W	10 VA / 2.5 W	12 VA / 4 W	12 VA / 4.5 W		48 VA / 17 W	
DC control voltage								
Rated control circuit voltage U_c		20...250 V DC			24...500 V DC		100...250 V DC	
Coil consumption	Average pull-in value	500 W	520 W	990 W	950 W		1700 W	
	Average holding value	2 W	4 W	4 W	4.5 W		16 W	
Drop-out voltage		55 % of $U_c \text{ min}$.						
Dips withstand								
$-20^\circ\text{C} \leq \theta \leq +60^\circ\text{C}$		$\geq 20 \text{ ms}$						
Operating time								
Coil supply between A1 - A2								
Between coil energization and:	N.O. contact closing	30...115 ms			50...120 ms		50...80 ms	
	N.C. contact opening	30...115 ms			50...120 ms		50...80 ms	
Between coil de-energization and:	N.O. contact opening	25...80 ms			33...70 ms		35...55 ms	
	N.C. contact closing	25...80 ms			33...70 ms		35...55 ms	
Control input for PLC's								
Between coil energization and:	N.O. contact closing	-	-	40...60 ms	40...90 ms		40...65 ms	
	N.C. contact opening	-	-	40...60 ms	40...90 ms		40...65 ms	
Between coil de-energization and:	N.O. contact opening	-	-	10...30 ms	10...30 ms		10...30 ms	
	N.C. contact closing	-	-	10...30 ms	10...30 ms		10...30 ms	

Mounting characteristics and conditions for use

Contactor types	AC / DC operated	GAF185	GAF300	GAF460	GAF750	GAF1250	GAF1650	GAF2050
Mounting positions								
Control voltage / Ambient temperature								
Mounting positions	1, $1 \pm 30^\circ$, 2, 3, 4, 5 6	at $\theta \leq 70^\circ\text{C}$		$0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$.				
Mounting distances		Unauthorized						
Mounting distances		The contactors can be assembled side by side						
Fixing								
On rail according to IEC 60715, EN 60715		-						
By screws (not supplied)		4 x M5			4 x M6		4 x M8	

GA75 and GAF75 contactors

Technical data



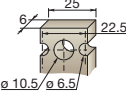
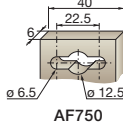
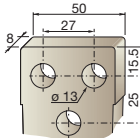
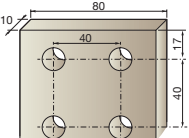
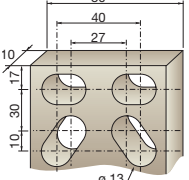





Connecting characteristics

Contactor types	AC operated AC/DC operated	GA75 GAF75
Main terminals		 Screw terminals with single connector (13 x 10 mm)
Connection capacity (min. ... max.)		
Main conductors (poles)		
 Rigid	Solid ($\leq 4 \text{ mm}^2$)	} 1 x 6...50 mm ² 2 x 6...25 mm ²
	Stranded ($\geq 6 \text{ mm}^2$)	
	Flexible with ferrule	1 x 6...35 mm ²
		2 x 6...16 mm ²
	Bars or lugs	L \leq - L $>$ -
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 8...1
Tightening torque	Recommended Max.	4.00 Nm / 35 lb.in 4.50 Nm
Auxiliary conductors (coil terminals)		
	Rigid solid	1 x 1...4 mm ²
		2 x 1...4 mm ²
	Flexible with ferrule	1 x 1...2.5 mm ²
		2 x 0.75...2.5 mm ²
	Lugs	L \leq 8 mm L $>$ 3.7 mm
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...14
Tightening torque	Coil terminals Recommended Max.	1.00 Nm / 9 lb.in 1.20 Nm
Degree of protection		
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529		
Main terminals		IP10
Coil terminals		IP20
Screw terminals		
Main terminals		Delivered in open position, screws of unused terminals must be tightened M6
	Screwdriver type	Flat \varnothing 6.5 / Pozidriv 2
Coil terminals		M3.5
	Screwdriver type	Flat \varnothing 5.5 / Pozidriv 2

GAF185 ... GAF2050 contactors

Technical data

Connecting characteristics

Contactor types	AC / DC operated	GAF185	GAF300	GAF460	GAF750	GAF1250	GAF1650	GAF2050
Main terminals Flat type								
Connection capacity (min. ... max.)								
Main conductors (poles)								
 Rigid with connector	Single for Cu cable	6...185 mm ²	16...240 mm ²	240 mm ²	300 mm ²			
	Single for Al/Cu cable	25...150 mm ²	120...240 mm ²	240 mm ²	300 mm ²			
	Double for Al/Cu cable	-	2 x 95...120 mm ²	2 x 240 mm ²	3 x 185 mm ²			
 Bars or lugs		L ≤ 24 mm	32 mm	47 mm	52 mm		100 mm	
		Ø > 8 mm	10 mm	10 mm	12 mm		12 mm	
Connection capacity acc. to UL/CSA	1 or 2 x	6 - 250 MCM	4 - 500 MCM ¹⁾	2//250 - 500 MCM	3// 2/0 - 500 MCM		1/0 - 750 MCM	
Tightening torque	Recommended	18 Nm / 160 lb.in	28 Nm / 247 lb.in	35 Nm / 310 lb.in	45 Nm / 398 lb.in		45 Nm / 398 lb.in	
	Max.	20 Nm	30 Nm	40 Nm	49 Nm		49 Nm	
Auxiliary conductors (coil terminals)								
 Rigid solid		1 x 1...4 mm ²						
		2 x 1...4 mm ²						
 Flexible with ferrule		1 x 0.75...2.5 mm ²						
		2 x 0.75...2.5 mm ²						
 Lugs		L ≤ 8 mm						
		L > 3.7 mm						
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14						
Tightening torque	Recommended	1.00 Nm / 9 lb.in						
	Max.	1.20 Nm						
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		M8	M10	M10	M12			
		Screws and bolts						
Coil terminals (delivered in open position)		M3.5						
	Screwdriver type	Flat Ø 5.5 mm / Pozidriv 2						

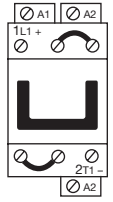
¹⁾ With LW110 enlargement piece: see "Accessories".

GA75 ... GAF2050 contactors

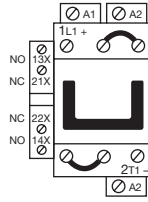
Terminal marking and positioning

GA(F)75 contactors - AC operated, AC/DC operated

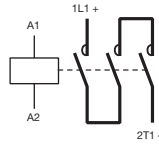
Standard devices without addition of auxiliary contacts



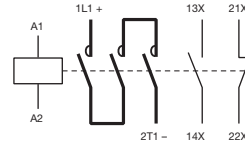
GA(F)75-10-00



GA(F)75-10-11

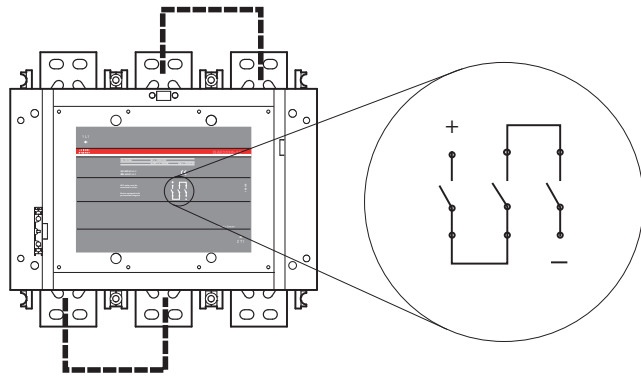


GA(F)75-10-00



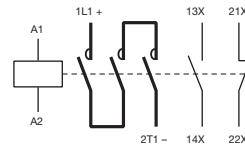
GA(F)75-10-11

GAF185 ... GAF2050 contactors - AC / DC operated



Connection bars are sold separately

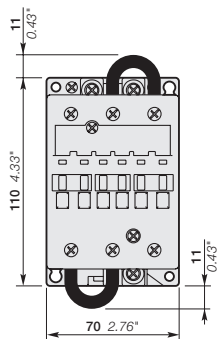
GAF185 ... GAF2050-10-11



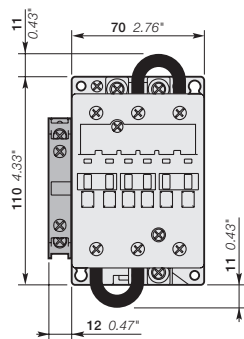
GAF185 ... GAF2050-10-11

GA(F)75 1-pole contactor

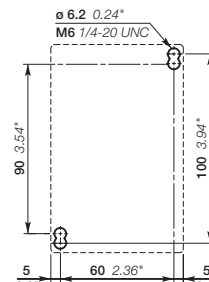
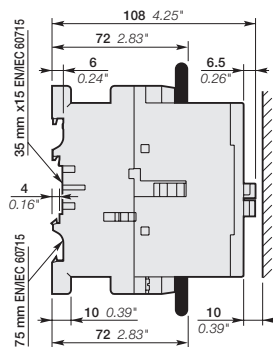
Main dimensions mm, inches



GA(F)75-10-00



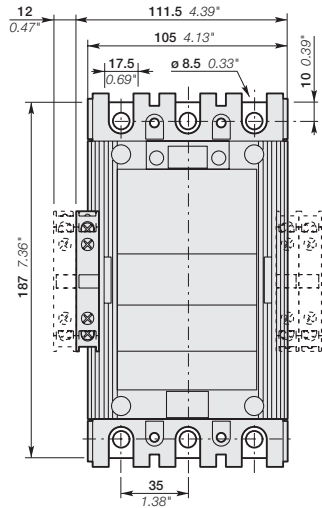
GA(F)75-10-11



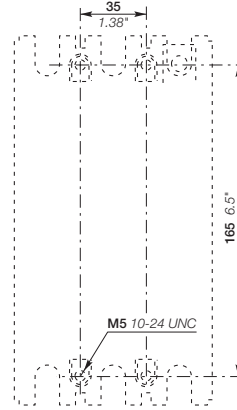
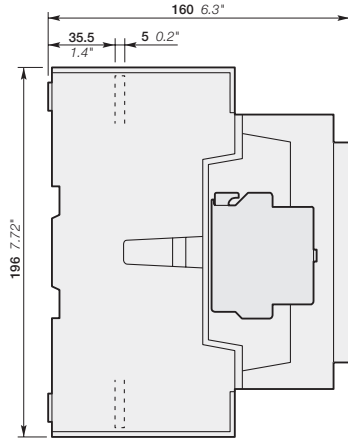
GA(F)75

GAF185, GAF300 3-pole contactor

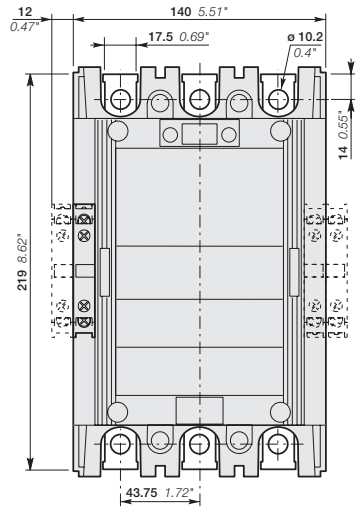
Main dimensions mm, inches



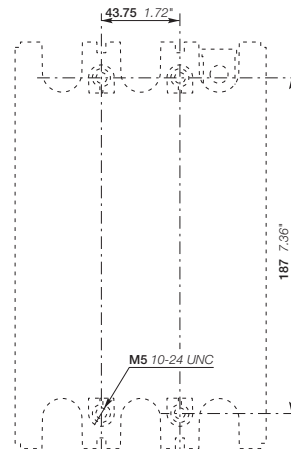
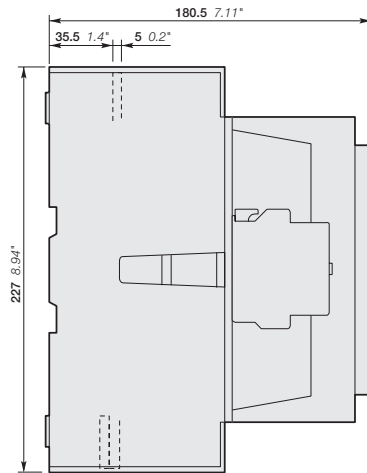
GAF185-30-11



GAF185-30-11



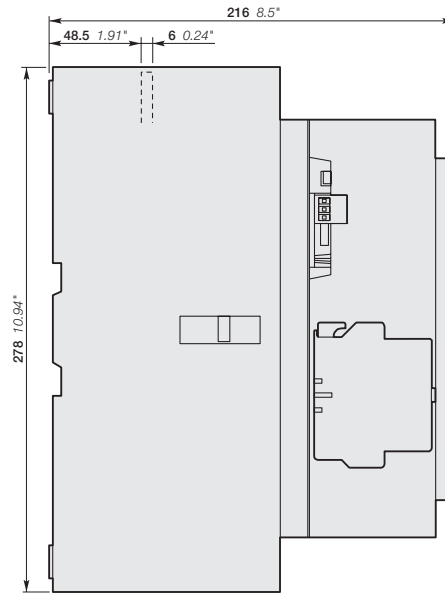
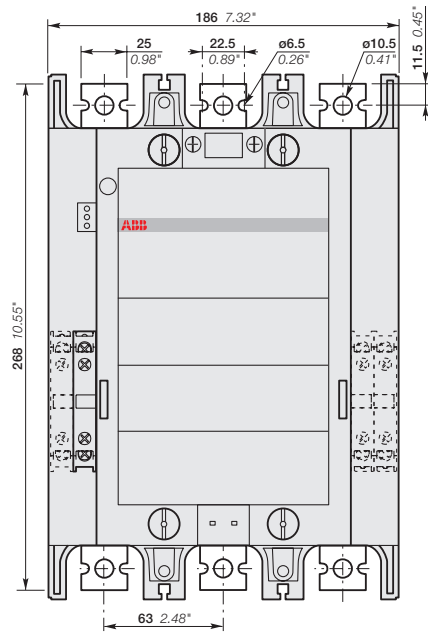
GAF300-30-11



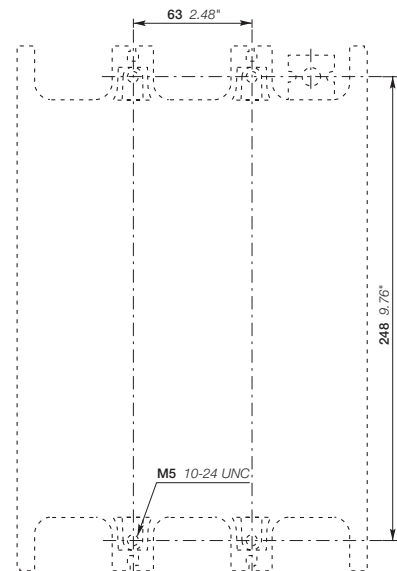
GAF300-30-11

GAF460 3-pole contactor

Main dimensions mm, inches



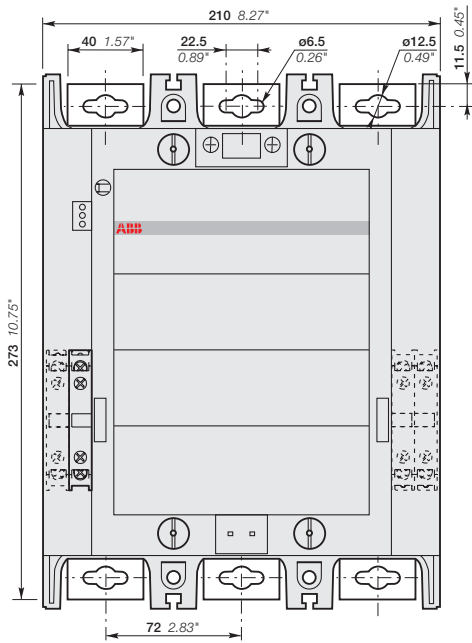
GAF460-30-11



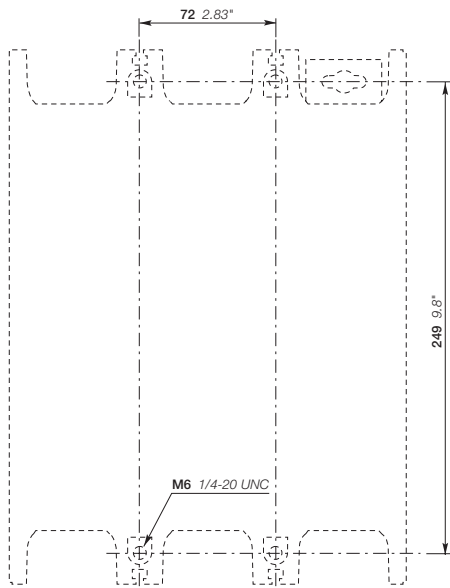
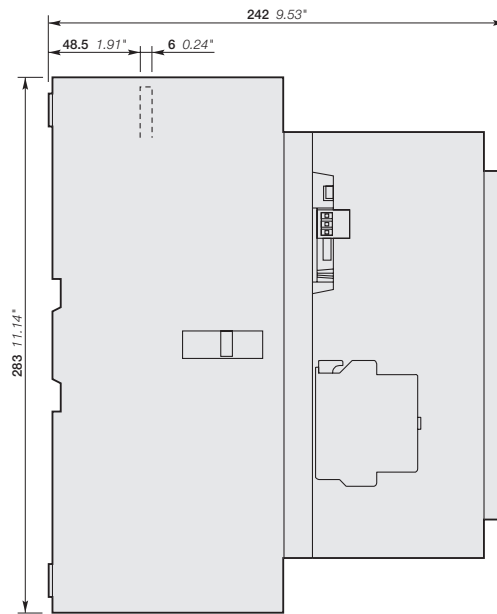
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GAF750 3-pole contactor

Main dimensions mm, inches

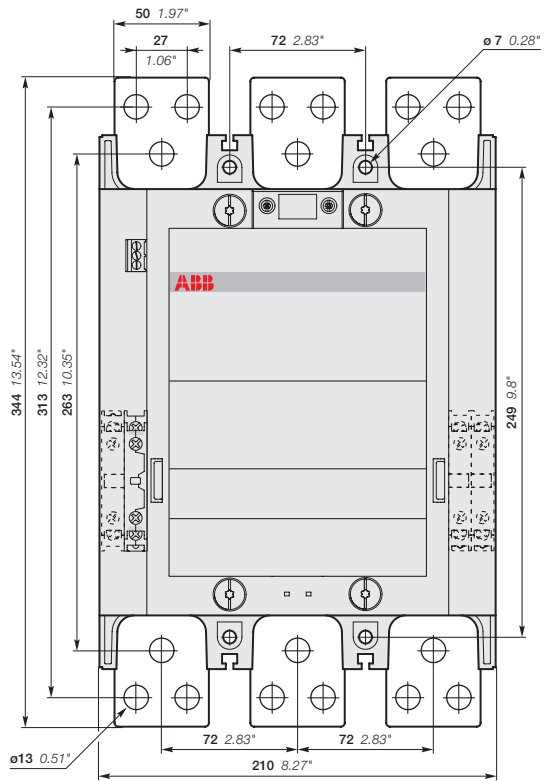


GAF750-30-11

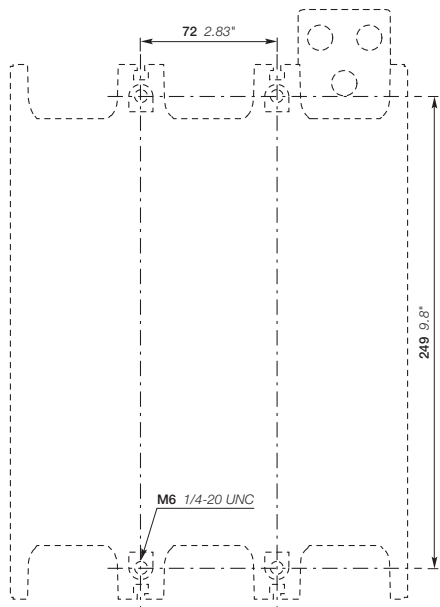
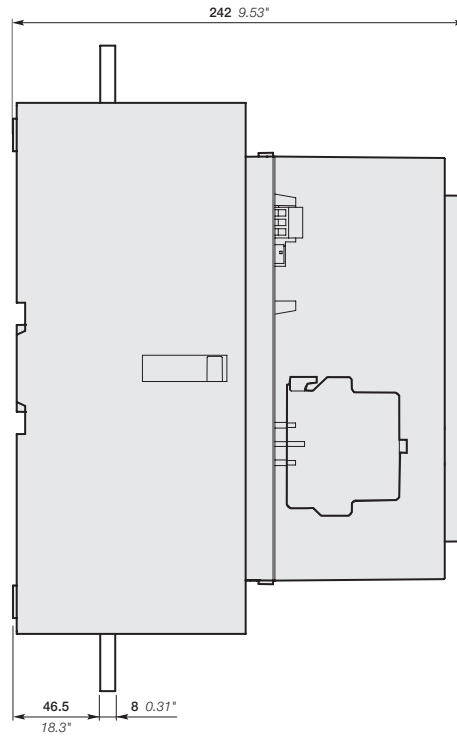


GAF1250 3-pole contactor

Main dimensions mm, inches

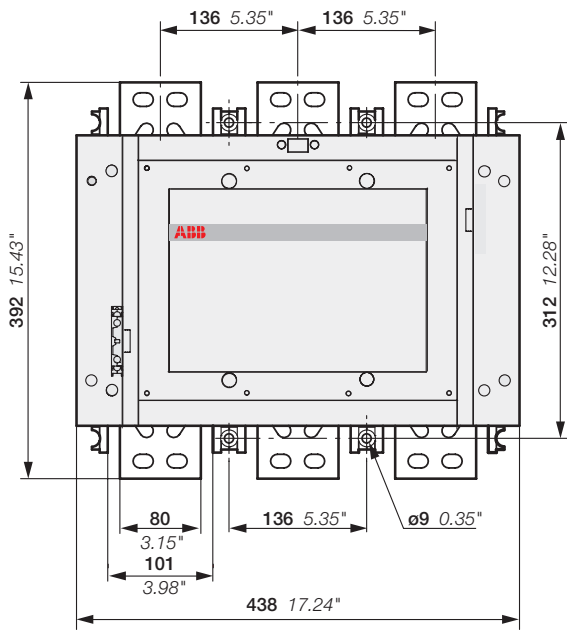
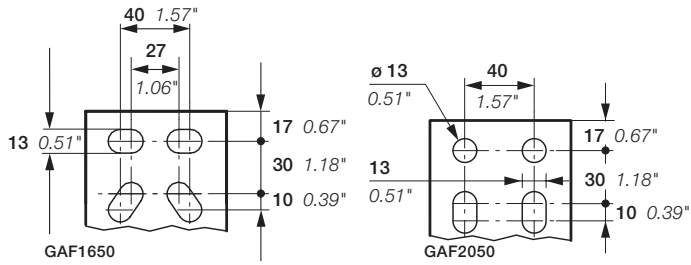


GAF1250-30-11

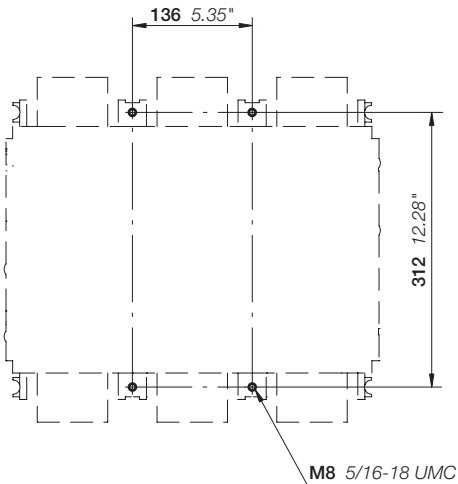
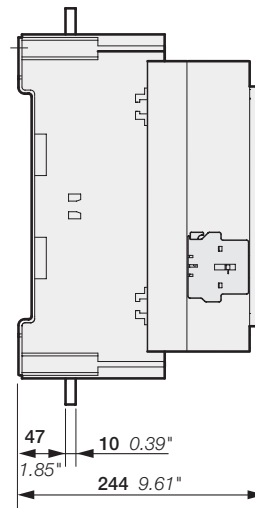


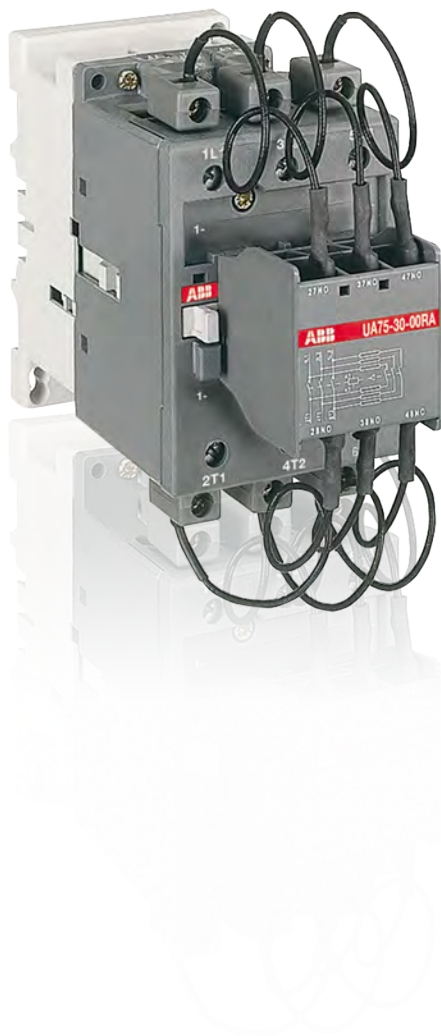
GAF1650, GAF2050 3-pole contactor

Main dimensions mm, inches



GAF1650, GAF2050-30-11





Contactors for capacitor switching

[Overview](#) 4/250

[UA16..RA up to UA110..RA - Unlimited peak current \$\hat{I}\$](#)

Ordering details	4/252
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[UA16 up to UA110 - Peak current \$\hat{I} \leq 100\$ times the rms current](#)

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[AF 3-pole contactors for capacitor switching - Selection table](#) 4/271

Contactors for capacitor switching

AC-6b utilization category according to IEC 60947-4-1

Capacitor transient conditions

In Low Voltage industrial installations, capacitors are mainly used for reactive energy correction (raising the power factor). When these capacitors are energized, overcurrents of high amplitude and high frequencies (3 to 15 kHz) occur during the transient period (1 to 2 ms).

The amplitude of these current peaks, also known as "inrush current peaks", depends on the following factors:

- The network inductances.
- The transformer power and short-circuit voltage.
- The type of power factor correction.

There are 2 types of power factor correction: fixed or automatic.

4

Fixed power factor correction consists of inserting, in parallel on the network, a capacitor bank whose total power is provided by the assembly of capacitors of identical or different ratings.

The bank is energized by a contactor that simultaneously supplies all the capacitors (a single step).

The inrush current peak, in the case of fixed correction, can reach 30 times the nominal current of the capacitor bank.

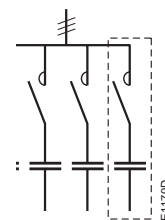


Single-step capacitor bank scheme
Use the AF... contactor ranges.

An automatic power factor correction system, on the other hand, consists of several capacitor banks of identical or different ratings (several steps), energized separately according to the value of the power factor to be corrected.

An electronic device automatically determines the power of the steps to be energized and activates the relevant contactors.

The inrush current peak, in the case of automatic correction, depends on the power of the steps already on duty, and can reach 100 times the nominal current of the step to be energized.



Multi-step capacitor bank scheme
Use the UA... or UA..RA contactor ranges.

Steady state condition data

The presence of harmonics and the network's voltage tolerance lead to a current, estimated to be 1.3 times the nominal current I_n of the capacitor, permanently circulating in the circuit.

Taking into account the manufacturing tolerances, the exact power of a capacitor can reach 1.15 times its nominal power.

Standard IEC 60831-1 Edition 2002 specifies that the capacitor must therefore have a maximum thermal current I_T of:

$$I_T = 1.3 \times 1.15 \times I_n = 1.5 \times I_n$$

Consequences for the contactors

To avoid malfunctions (welding of main poles, abnormal temperature rise, etc.), contactors for capacitor bank switching must be sized to withstand:

- **A permanent current that can reach 1.5 times the nominal current of the capacitor bank.**
- **The short but high peak current on pole closing** (maximum permissible peak current \hat{I}).

Contactor selection tool for capacitor switching

In a given application, if the user does not know the value of the inrush current peak, this value can be approximately calculated using the formulas given on the pages **"Calculation and dimensioning"**.

Alternatively by the **CAPCAL** selection tool, available on the ABB Website:

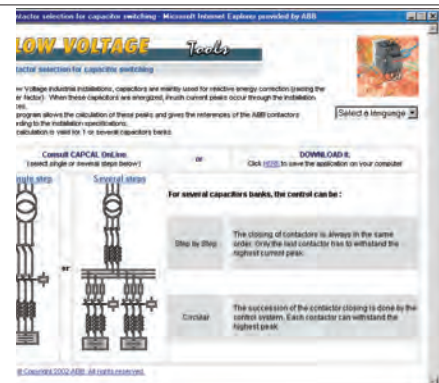
www.abb.com/lowvoltage

right hand side menu

search: **"Online product selection tools"**

select: **"Contactors: AC-6b capacitor switching"**

This program allows the calculation of these peaks and gives the references of the ABB contactors according to the installation specifications. This calculation is valid for one or several capacitor banks.



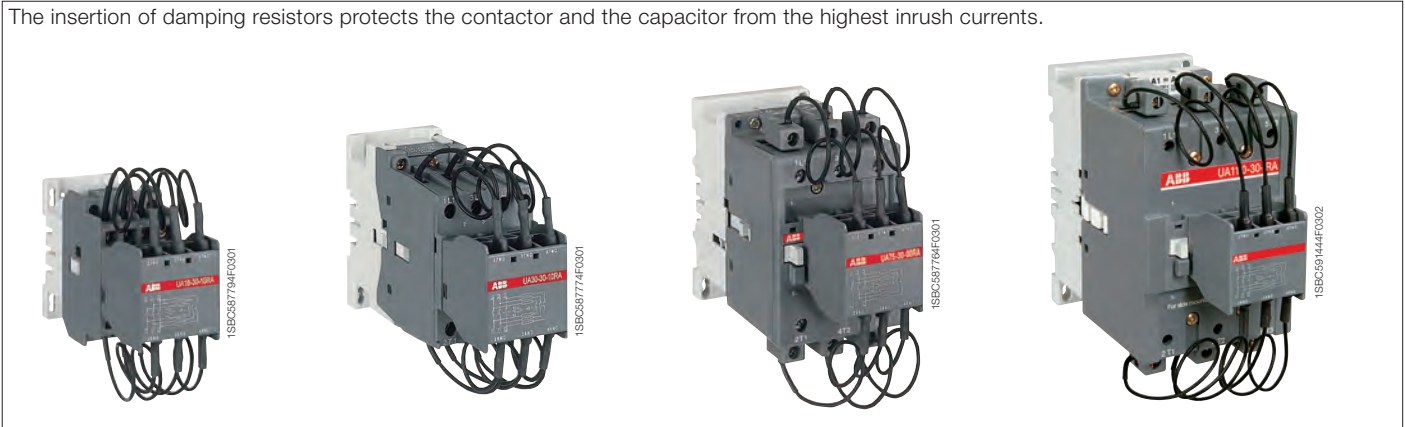
Contactors for capacitor switching

The ABB solutions

ABB offers 2 contactor versions according to the value of the inrush current peak and the power of the capacitor bank.

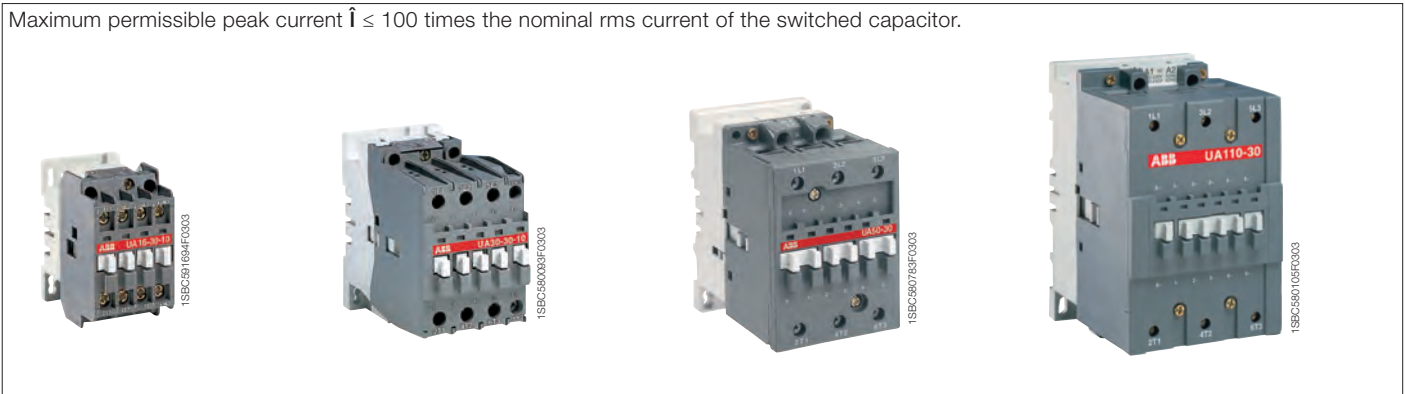
UA..RA contactors for capacitor switching (UA16..RA to UA110..RA) with insertion of damping resistors

The insertion of damping resistors protects the contactor and the capacitor from the highest inrush currents.



UA contactors for capacitor switching (UA16 to UA110)

Maximum permissible peak current $\hat{I} \leq 100$ times the nominal rms current of the switched capacitor.



UA16..RA ... UA30..RA 3-pole contactors for capacitor switching 12.5 to 30 kvar - Unlimited peak current \hat{I} AC operated



UA16-30-10RA

1SBC387794F0301



UA30-30-10RA

1SBC38774F0301

Description

UA..RA contactors for capacitor switching can be used for installations in which the peak current far exceeds 100 times nominal rms current. The contactors are delivered complete with their damping resistors and must be used without additional inductances.

The capacitors must be discharged (maximum residual voltage at terminals ≤ 50 V) before being re-energized when the contactors are making.

These contactors are of the block type design with:

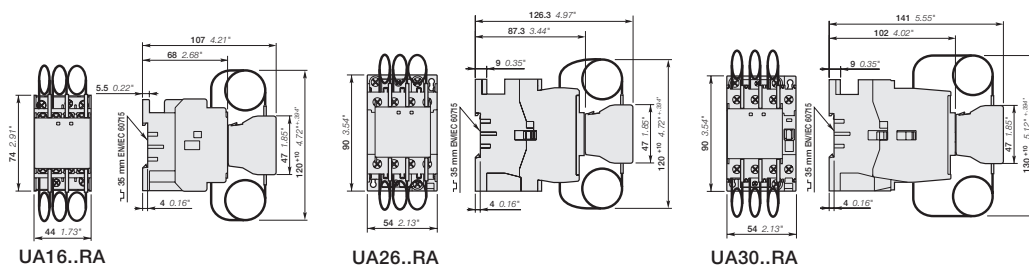
- 3 main poles and 1 built-in auxiliary contact
- the UA..RA contactors are fitted with a special front-mounted block, which ensures the serial insertion of 3 damping resistors into the circuit to limit the current peak on energization of the capacitor bank
- their connection also ensures capacitor precharging in order to limit the second current peak occurring upon making of the main poles
- the insertion of resistors allows to damp the highest current peak of the capacitor when switching on, whatever its level.
- control circuit: AC operated
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

IEC	UL/CSA	Rated control circuit voltage $U_c^{1)}$		Auxiliary contacts fitted	Catalog number	Global code	Weight
Rated operational power $\theta \leq 40^\circ\text{C}$ 400 V AC-6b kvar	Rated operational power $\theta \leq 40^\circ\text{C}$ 480 V kvar	V 50 Hz	V 60 Hz				Pkg (1 pce) kg
12.5	16	24	24	1 0	UA16-30-10-RA-81	1SBL181024R8110	0.460
		48	48	1 0	UA16-30-10-RA-83	1SBL181024R8310	0.460
		110	110...120	1 0	UA16-30-10-RA-84	1SBL181024R8410	0.460
		220...230	230...240	1 0	UA16-30-10-RA-80	1SBL181024R8010	0.460
		230...240	240...260	1 0	UA16-30-10-RA-88	1SBL181024R8810	0.460
		380...400	400...415	1 0	UA16-30-10-RA-85	1SBL181024R8510	0.460
		400...415	415...440	1 0	UA16-30-10-RA-86	1SBL181024R8610	0.460
		22	22	24	24	1 0	UA26-30-10-RA-81
48	48			1 0	UA26-30-10-RA-83	1SBL241024R8310	0.710
110	110...120			1 0	UA26-30-10-RA-84	1SBL241024R8410	0.710
220...230	230...240			1 0	UA26-30-10-RA-80	1SBL241024R8010	0.710
230...240	240...260			1 0	UA26-30-10-RA-88	1SBL241024R8810	0.710
380...400	400...415			1 0	UA26-30-10-RA-85	1SBL241024R8510	0.710
400...415	415...440			1 0	UA26-30-10-RA-86	1SBL241024R8610	0.710
30	28			24	24	1 0	UA30-30-10-RA-81
		48	48	1 0	UA30-30-10-RA-83	1SBL281024R8310	0.810
		110	110...120	1 0	UA30-30-10-RA-84	1SBL281024R8410	0.810
		220...230	230...240	1 0	UA30-30-10-RA-80	1SBL281024R8010	0.810
		230...240	240...260	1 0	UA30-30-10-RA-88	1SBL281024R8810	0.810
		380...400	400...415	1 0	UA30-30-10-RA-85	1SBL281024R8510	0.810
		400...415	415...440	1 0	UA30-30-10-RA-86	1SBL281024R8610	0.810

¹⁾ Other control voltages see voltage code table.

Main dimensions mm, inches



UA50..RA ... UA75..RA 3-pole contactors for capacitor switching 40 to 60 kvar - Unlimited peak current \hat{I} AC operated



UA75-30-00 RA

Description

UA..RA contactors for capacitor switching can be used for installations in which the peak current far exceeds 100 times nominal rms current. The contactors are delivered complete with their damping resistors and must be used without additional inductances.

The capacitors must be discharged (maximum residual voltage at terminals ≤ 50 V) before being re-energized when the contactors are making.

These contactors are of the block type design with:

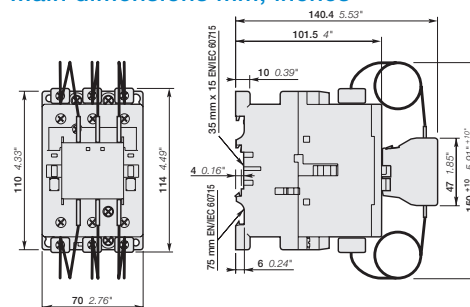
- 3 main poles
- the UA..RA contactors are fitted with a special front-mounted block, which ensures the serial insertion of 3 damping resistors into the circuit to limit the current peak on energization of the capacitor bank
 - their connection also ensures capacitor precharging in order to limit the second current peak occurring upon making of the main poles
 - the insertion of resistors allows to damp the highest current peak of the capacitor when switching on, whatever its level.
- control circuit: AC operated
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

IEC Rated operational power $\theta \leq 40$ °C 400 V AC-6b kvar	UL/CSA Rated operational power $\theta \leq 40$ °C 480 V kvar	Rated control circuit voltage $U_c^{(1)}$		Auxiliary contacts fitted / /	Catalog number	Global code	Weight Pkg (1 pce) kg		
		V 50 Hz	V 60 Hz						
40	50	24	24	0 0	UA50-30-00-RA-81	1SBL351024R8100	1.350		
		48	48	0 0	UA50-30-00-RA-83	1SBL351024R8300	1.350		
		110	110...120	0 0	UA50-30-00-RA-84	1SBL351024R8400	1.350		
		220...230	230...240	0 0	UA50-30-00-RA-80	1SBL351024R8000	1.350		
		230...240	240...260	0 0	UA50-30-00-RA-88	1SBL351024R8800	1.350		
		380...400	400...415	0 0	UA50-30-00-RA-85	1SBL351024R8500	1.350		
		400...415	415...440	0 0	UA50-30-00-RA-86	1SBL351024R8600	1.350		
		50	55	24	24	0 0	UA63-30-00-RA-81	1SBL371024R8100	1.350
50	55	48	48	0 0	UA63-30-00-RA-83	1SBL371024R8300	1.350		
		110	110...120	0 0	UA63-30-00-RA-84	1SBL371024R8400	1.350		
		220...230	230...240	0 0	UA63-30-00-RA-80	1SBL371024R8000	1.350		
		230...240	240...260	0 0	UA63-30-00-RA-88	1SBL371024R8800	1.350		
		380...400	400...415	0 0	UA63-30-00-RA-85	1SBL371024R8500	1.350		
		400...415	415...440	0 0	UA63-30-00-RA-86	1SBL371024R8600	1.350		
		60	64	24	24	0 0	UA75-30-00-RA-81	1SBL411024R8100	1.350
		60	64	48	48	0 0	UA75-30-00-RA-83	1SBL411024R8300	1.350
110	110...120			0 0	UA75-30-00-RA-84	1SBL411024R8400	1.350		
220...230	230...240			0 0	UA75-30-00-RA-80	1SBL411024R8000	1.350		
230...240	240...260			0 0	UA75-30-00-RA-88	1SBL411024R8800	1.350		
380...400	400...415			0 0	UA75-30-00-RA-85	1SBL411024R8500	1.350		
400...415	415...440			0 0	UA75-30-00-RA-86	1SBL411024R8600	1.350		

¹⁾ Other control voltages see voltage code table.

Main dimensions mm, inches



UA50..RA, UA63..RA, UA75..RA

UA95..RA ... UA110..RA 3-pole contactors for capacitor switching 70 to 80 kvar - Unlimited peak current \hat{I} AC operated



UA110-30-00 RA

Description

UA..RA contactors for capacitor switching can be used for installations in which the peak current far exceeds 100 times nominal rms current. The contactors are delivered complete with their damping resistors and must be used without additional inductances.

The capacitors must be discharged (maximum residual voltage at terminals ≤ 50 V) before being re-energized when the contactors are making.

These contactors are of the block type design with:

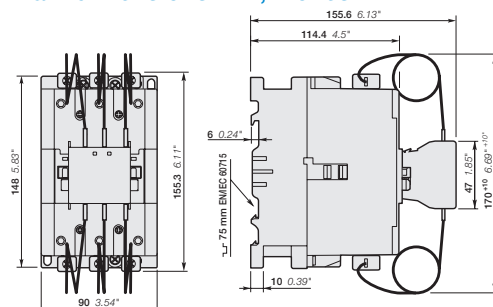
- 3 main poles
- the UA..RA contactors are fitted with a special front-mounted block, which ensures the serial insertion of 3 damping resistors into the circuit to limit the current peak on energization of the capacitor bank
 - their connection also ensures capacitor precharging in order to limit the second current peak occurring upon making of the main poles
 - the insertion of resistors allows to damp the highest current peak of the capacitor when switching on, whatever its level.
- control circuit: AC operated
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

IEC Rated operational power $\theta \leq 40^\circ\text{C}$ 400 V AC-6b	UL/CSA Rated operational power $\theta \leq 40^\circ\text{C}$ 480 V	Rated control circuit voltage $U_c^{1)}$		Auxiliary contacts fitted 	Catalog number	Global code	Weight Pkg (1 pce) kg
		V 50 Hz	V 60 Hz				
70	80	24	24	0 0	UA95-30-00-RA-81	1SFL431024R8100	2,000
		48	48	0 0	UA95-30-00-RA-83	1SFL431024R8300	2,000
		110	110...120	0 0	UA95-30-00-RA-84	1SFL431024R8400	2,000
		220...230	230...240	0 0	UA95-30-00-RA-80	1SFL431024R8000	2,000
		230...240	240...260	0 0	UA95-30-00-RA-88	1SFL431024R8800	2,000
		380...400	400...415	0 0	UA95-30-00-RA-85	1SFL431024R8500	2,000
		400...415	415...440	0 0	UA95-30-00-RA-86	1SFL431024R8600	2,000
80	95	24	24	0 0	UA110-30-00-RA-81	1SFL451024R8100	2,000
		48	48	0 0	UA110-30-00-RA-83	1SFL451024R8300	2,000
		110	110...120	0 0	UA110-30-00-RA-84	1SFL451024R8400	2,000
		220...230	230...240	0 0	UA110-30-00-RA-80	1SFL451024R8000	2,000
		230...240	240...260	0 0	UA110-30-00-RA-88	1SFL451024R8800	2,000
		380...400	400...415	0 0	UA110-30-00-RA-85	1SFL451024R8500	2,000
		400...415	415...440	0 0	UA110-30-00-RA-86	1SFL451024R8600	2,000

¹⁾ Other control voltages see voltage code table.

Main dimensions mm, inches







UA95..RA, UA100..RA

UA..RA 3-pole contactors for capacitor switching

Unlimited peak current \hat{I}

Main accessory fitting details

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor types	Main poles		Available auxiliary contacts		Front-mounted accessories	Side-mounted accessories
					Auxiliary contact blocks	Auxiliary contact blocks
					1-pole CA5-..	2-pole CAL...
UA16-30-10RA	3	0	1	0	-	1 x CAL5-11
UA26-30-10RA	3	0	1	0	-	1 to 2 x CAL5-11
UA30-30-10RA	3	0	1	0	1 x CA5-...	+ 1 to 2 x CAL5-11
UA50-30-00RA	3	0	0	0	1 to 2 x CA5-...	+ 1 to 2 x CAL5-11
UA63-30-00RA	3	0	0	0		
UA75-30-00RA	3	0	0	0		
UA95-30-00RA	3	0	0	0	1 to 2 x CA5-...	+ 1 to 2 x CAL18-11
UA110-30-00RA	3	0	0	0		

UA16..RA ... UA110..RA 3-pole contactors for capacitor switching

Unlimited peak current \hat{I}

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC operated	UA16..RA	UA26..RA	UA30..RA	UA50..RA	UA63..RA	UA75..RA	UA95..RA	UA110..RA	
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1								
Rated operational voltage U_e max.		690 V								
Rated frequency (without derating)		50 / 60 Hz								
AC-6b Utilization category										
Rated operational power AC-6b¹⁾										
For air temperature close to contactor	$\theta \leq 40^\circ\text{C}$	230-240 V	8 kvar	12.5 kvar	16 kvar	25 kvar	30 kvar	35 kvar	40 kvar	45 kvar
		400-415 V	12.5 kvar	22 kvar	30 kvar	40 kvar	50 kvar	60 kvar	70 kvar	80 kvar
	$\theta \leq 55^\circ\text{C}$	440 V	15 kvar	24 kvar	32 kvar	50 kvar	55 kvar	65 kvar	75 kvar	85 kvar
		500-550 V	18 kvar	30 kvar	34 kvar	55 kvar	65 kvar	75 kvar	85 kvar	95 kvar
	$\theta \leq 70^\circ\text{C}$	690 V	22 kvar	35 kvar	45 kvar	72 kvar	80 kvar	100 kvar	120 kvar	130 kvar
		230-240 V	7.5 kvar	11.5 kvar	16 kvar	24 kvar	27 kvar	30 kvar	35 kvar	40 kvar
		400-415 V	12.5 kvar	20 kvar	27.5 kvar	40 kvar	45 kvar	50 kvar	60 kvar	70 kvar
		440 V	13 kvar	20 kvar	30 kvar	43 kvar	48 kvar	53 kvar	65 kvar	75 kvar
		500-550 V	16 kvar	25 kvar	34 kvar	50 kvar	60 kvar	65 kvar	75 kvar	82 kvar
		690 V	21 kvar	31 kvar	45 kvar	65 kvar	75 kvar	80 kvar	105 kvar	110 kvar
		230-240 V	6 kvar	9 kvar	11 kvar	20 kvar	23 kvar	25 kvar	30 kvar	35 kvar
		400-415 V	10 kvar	15.5 kvar	19.5 kvar	35 kvar	39 kvar	41 kvar	53 kvar	60 kvar
		440 V	11 kvar	17 kvar	20.5 kvar	37 kvar	42.5 kvar	45 kvar	58 kvar	70 kvar
		500-550 V	12.5 kvar	20 kvar	25 kvar	46 kvar	50 kvar	55 kvar	70 kvar	78 kvar
		690 V	17 kvar	26 kvar	32 kvar	60 kvar	65 kvar	70 kvar	85 kvar	100 kvar
Max. permissible peak current \hat{I}		Unlimited								
Short-circuit protection device for contactors gG type fuse ²⁾		80 A	125 A	200 A				250 A		
Max. electrical switching frequency		240 cycles/h								
Electrical durability AC-6b	$U_e \leq 440\text{ V}$	250 000 operating cycles								
	$500\text{ V} \leq U_e \leq 690\text{ V}$	100 000 operating cycles								

¹⁾ For 220 V and 380 V, multiply by 0.9 the rated values at 230 V and 400 V respectively.

Example: 50 kvar / 400 V corresponding to $0.9 \times 50 = 45 \text{ kvar}/380 \text{ V}$.

²⁾ The fuse ratings given represent the maximum ratings ensuring type 1 coordination according to the definition of standard IEC 60947-4-1.

Main pole - Utilization characteristics according to UL / CSA

Contactor types	AC operated	UA16..RA	UA26..RA	UA30..RA	UA50..RA	UA63..RA	UA75..RA	UA95..RA	UA110..RA	
Power - 60 Hz										
For air temperature close to contactor	$\theta \leq 40^\circ\text{C}$	240 V	8 kvar	11 kvar	14 kvar	25 kvar	27.5 kvar	32 kvar	40 kvar	45 kvar
		480 V	16 kvar	22 kvar	28 kvar	50 kvar	55 kvar	64 kvar	80 kvar	95 kvar
		600 V	20 kvar	27 kvar	35 kvar	62 kvar	70 kvar	80 kvar	100 kvar	120 kvar
Max. permissible peak Current \hat{I}		Unlimited								

Operating principle

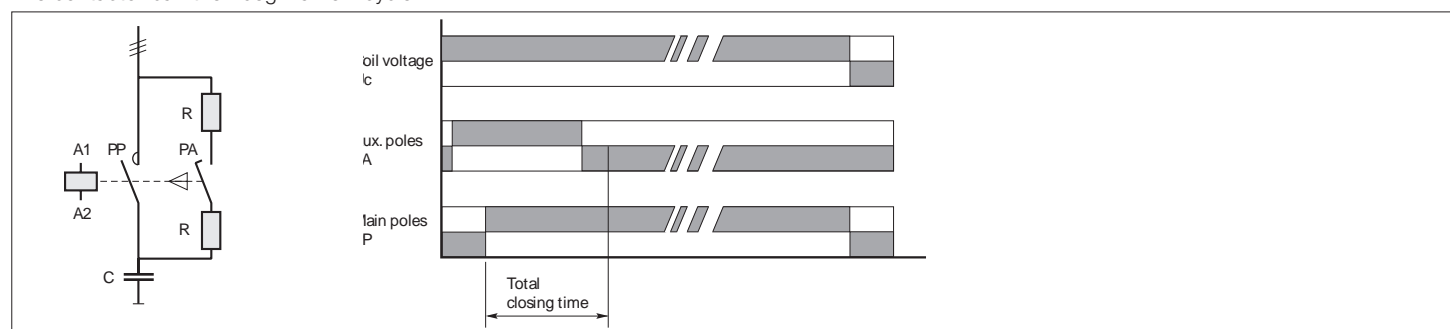
The front-mounted block mechanism of the UA..RA contactors ensures:

- early making of the auxiliary "PA" poles with respect to the main "PP" poles
- automatic return to the open position of the auxiliary "PA" poles after the main poles are closed.

When the coil is energized, the early making auxiliary poles connect the capacitor to the network via the set of 3 resistors. The damping resistors attenuate the first current peak and the second inrush current when the main contacts begin to make. Once the main poles are in the closed position, the auxiliary poles automatically break.

When the coil is de-energized, the main poles break ensuring the breaking of the capacitor bank.

The contactor can then begin a new cycle.









The insertion of resistors allows to damp the highest current peak of the capacitor when switching on, whatever its level.

UA16..RA ... UA110..RA 3-pole contactors for capacitor switching

Unlimited peak current \hat{I}

Technical data

Connecting characteristics

Contactor types	AC operated	UA16..RA	UA26..RA	UA30..RA	UA50..RA UA63..RA UA75..RA	UA95..RA UA110..RA
Connection capacity (min. ... max.)						
Main conductors (poles)						
 Rigid	Solid ($\leq 4 \text{ mm}^2$)	1 x 1...4 mm ²	1.5...6 mm ²	2.5...16 mm ²	6...50 mm ²	10...95 mm ²
	Stranded ($\geq 6 \text{ mm}^2$)	2 x -	-	2.5...16 + 2.5...6 mm ²	6...25 + 6...16 mm ²	6...35 mm ²
 Flexible with ferrule		1 x 0.75...2.5 mm ²	1.5...4 mm ²	2.5...10 mm ²	6...35 mm ²	10...70 mm ²
		2 x -	-	2.5...10 + 2.5...4 mm ²	6...16 + 6...10 mm ²	6...35 mm ²
 Bars or lugs		L \leq 7.7 mm	10 mm	-	-	-
		L $>$ 3.7 mm	4.2 mm	-	-	-
Connection capacity acc. to UL/CSA		1 or 2 x AWG 18...10	AWG 12...8	AWG 8...4	AWG 8...1	AWG 6...2/0
Tightening torque						
	Recommended	1 Nm / 9 lb.in	1.7 Nm / 15 lb.in	2.3 Nm / 20 lb.in	4 Nm / 35 lb.in	8 Nm / 53 lb.in
	Max.	1.2 Nm	2.2 Nm	2.6 Nm	4.5 Nm	9 Nm
Auxiliary conductors (built-in auxiliary terminals + coil terminals)						
 Rigid solid		1 x 1...4 mm ²				0.75...2.5 mm ²
		2 x 1...4 mm ²				0.75...2.5 mm ²
 Flexible with ferrule		1 x 0.75...2.5 mm ²			1...2.5 mm ²	0.75...2.5 mm ²
		2 x 0.75...2.5 mm ²				
 Lugs	Coil terminals	L \leq 8 mm				
		L $>$ 3.7 mm				
	Built-in auxiliary terminals	L \leq 7.7 mm	10 mm	8 mm	-	-
		L $>$ 3.7 mm	4.2 mm	3.7 mm	-	-
Connection capacity acc. to UL/CSA		1 or 2 x AWG 18...14				
Tightening torque						
	Coil terminals					
	Recommended	1 Nm / 9 lb.in				
	Max.	1.2 Nm				
	Built-in auxiliary terminals					
	Recommended	1 Nm / 9 lb.in				
	Max.	1.2 Nm				
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529						
Main terminals			IP20	IP10		
Coil terminals			IP20			
Built-in auxiliary terminals			IP20			
Screw terminals			Delivered in open position, screws of unused terminals must be tightened			
Main terminals			M 3.5	M 4	M 5	M 6
	Screwdriver type		Flat \varnothing 5.5 / Pozidriv 2		Flat \varnothing 6.5 / Pozidriv 2	
Coil terminals			M 3.5			
	Screwdriver type		Flat \varnothing 5.5 / Pozidriv 2			
Built-in auxiliary terminals			M 3.5	M 4	M 3.5	
	Screwdriver type		Flat \varnothing 5.5 / Pozidriv 2			

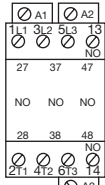
Note: Other technical characteristics are the same as those of standard A contactors.

UA..RA contactors

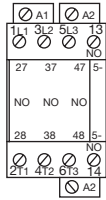
Terminal marking and positioning

UA..RA contactors - AC operated

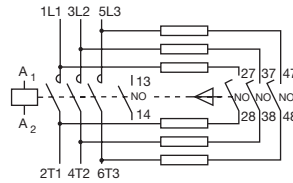
Standard devices without addition of auxiliary contacts



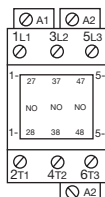
UA16-30-10 RA
UA26-30-10 RA



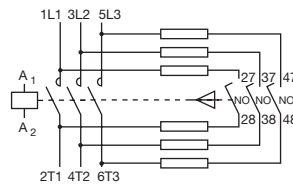
UA30-30-10 RA



UA16 ... 30-30-10 RA



UA50 ... 110-30-00 RA

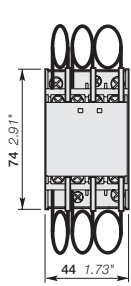


UA50 ... 110-30-00 RA

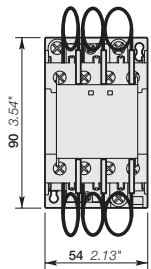
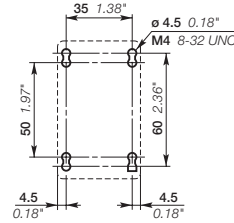
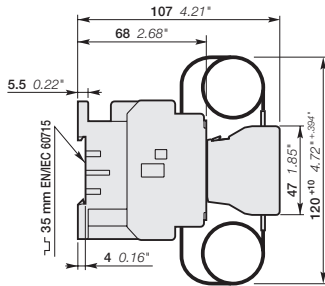
UA..RA 3-pole contactors for capacitor switching

Unlimited peak current \hat{I}

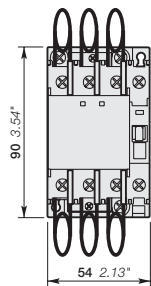
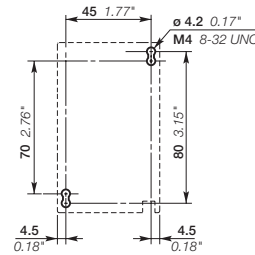
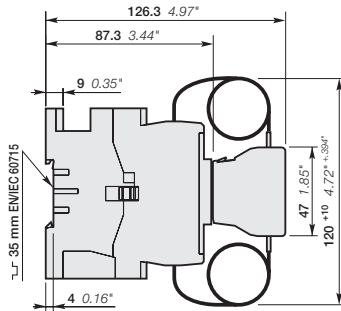
Main dimensions mm, inches



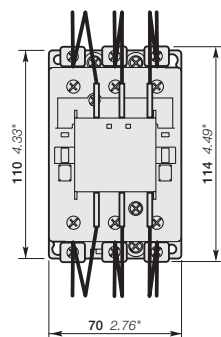
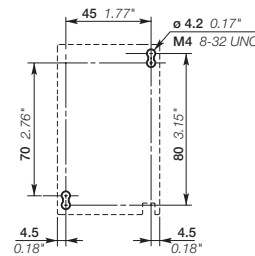
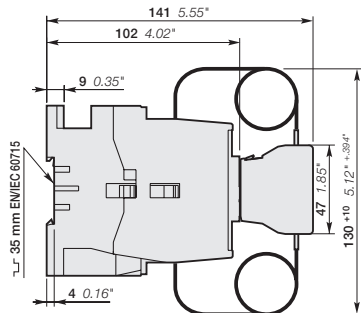
UA16..RA



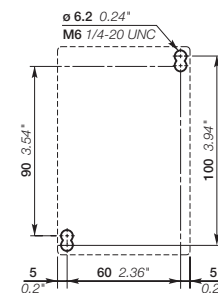
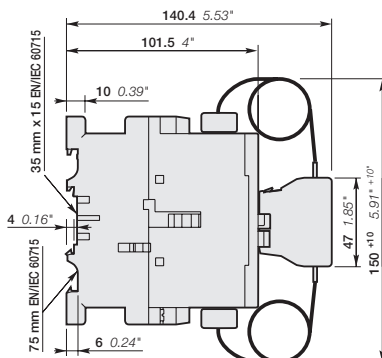
UA26..RA



UA30..RA



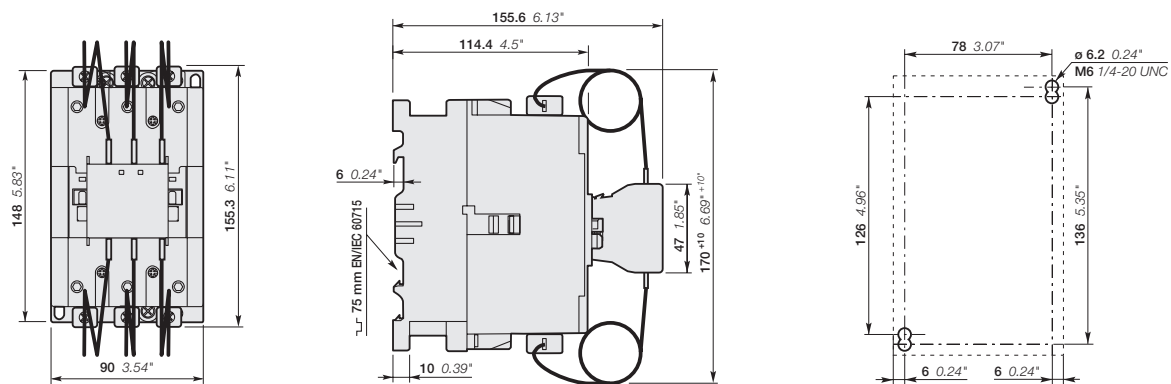
UA50..RA, UA63..RA, UA75..RA



UA..RA 3-pole contactors for capacitor switching

Unlimited peak current \hat{I}

Main dimensions mm, inches



UA95..RA, UA110..RA

UA16 ... UA30 3-pole contactors for capacitor switching

12.5 to 27.5 kvar - Peak current $\hat{I} \leq 100$ times the rms current

AC operated



UA16-30-10



UA30-30-10

Description

UA contactors can be used for the switching of capacitor banks whose inrush current peaks are less than or equal to 100 times nominal rms current.

The capacitors must be discharged (maximum residual voltage at terminals ≤ 50 V) before being re-energized when the contactors are making.

These contactors are of the block type design with:

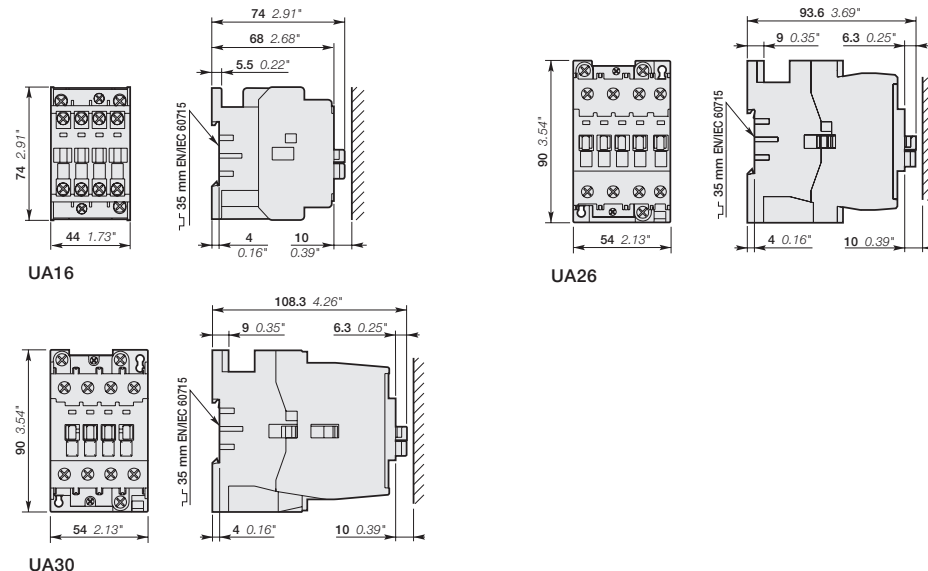
- 3 main poles and 1 built-in auxiliary contact
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

IEC Rated operational power $\theta \leq 40^\circ\text{C}$ 400 V AC-6b	Max peak current \hat{I}	UL/CSA Rated operational power $\theta \leq 40^\circ\text{C}$ 480 V	Rated control circuit voltage $U_c^{(1)}$		Auxiliary contacts fitted 	Catalog number	Global code	Weight Pkg (1 pce) kg
			V 50 Hz	V 60 Hz				
kvar 12.5	kA 1.8	kvar -	24	24	1 0	UA16-30-10-81	1SBL181022R8110	0.340
			48	48	1 0	UA16-30-10-83	1SBL181022R8310	0.340
			110	110...120	1 0	UA16-30-10-84	1SBL181022R8410	0.340
			220...230	230...240	1 0	UA16-30-10-80	1SBL181022R8010	0.340
			230...240	240...260	1 0	UA16-30-10-88	1SBL181022R8810	0.340
			380...400	400...415	1 0	UA16-30-10-85	1SBL181022R8510	0.340
			400...415	415...440	1 0	UA16-30-10-86	1SBL181022R8610	0.340
			20	3	25	24	24	1 0
48	48	1 0				UA26-30-10-83	1SBL241022R8310	0.600
110	110...120	1 0				UA26-30-10-84	1SBL241022R8410	0.600
220...230	230...240	1 0				UA26-30-10-80	1SBL241022R8010	0.600
230...240	240...260	1 0				UA26-30-10-88	1SBL241022R8810	0.600
380...400	400...415	1 0				UA26-30-10-85	1SBL241022R8510	0.600
400...415	415...440	1 0				UA26-30-10-86	1SBL241022R8610	0.600
27.5	3.5	32				24	24	1 0
			48	48	1 0	UA30-30-10-83	1SBL281022R8310	0.710
			110	110...120	1 0	UA30-30-10-84	1SBL281022R8410	0.710
			220...230	230...240	1 0	UA30-30-10-80	1SBL281022R8010	0.710
			230...240	240...260	1 0	UA30-30-10-88	1SBL281022R8810	0.710
			380...400	400...415	1 0	UA30-30-10-85	1SBL281022R8510	0.710
			400...415	415...440	1 0	UA30-30-10-86	1SBL281022R8610	0.710

¹⁾ Other control voltages see voltage code table.

Main dimensions mm, inches



UA50 ... UA75 3-pole contactors for capacitor switching

33 to 50 kvar - Peak current $\hat{I} \leq 100$ times the rms current

AC operated



UA50-30-00

Description

UA contactors can be used for the switching of capacitor banks whose inrush current peaks are less than or equal to 100 times nominal rms current.

The capacitors must be discharged (maximum residual voltage at terminals ≤ 50 V) before being re-energized when the contactors are making.

These contactors are of the block type design with:

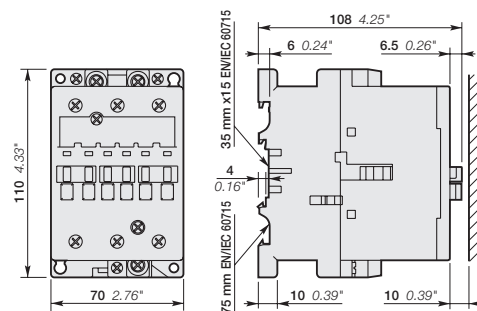
- 3 main poles
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

IEC Rated operational power $\theta \leq 40^\circ\text{C}$ 400 V AC-6b kvar	Max peak current \hat{I} kA	UL/CSA Rated operational power $\theta \leq 40^\circ\text{C}$ 480 V kvar	Rated control circuit voltage $U_c^{(1)}$		Auxiliary contacts fitted 	Catalog number	Global code	Weight Pkg (1 pce) kg
			V 50 Hz	V 60 Hz				
33	5	40	24	24	0 0	UA50-30-00-81	1SBL351022R8100	1.160
			48	48	0 0	UA50-30-00-83	1SBL351022R8300	1.160
			110	110...120	0 0	UA50-30-00-84	1SBL351022R8400	1.160
			220...230	230...240	0 0	UA50-30-00-80	1SBL351022R8000	1.160
			230...240	240...260	0 0	UA50-30-00-88	1SBL351022R8800	1.160
			380...400	400...415	0 0	UA50-30-00-85	1SBL351022R8500	1.160
			400...415	415...440	0 0	UA50-30-00-86	1SBL351022R8600	1.160
45	6.5	-	24	24	0 0	UA63-30-00-81	1SBL371022R8100	1.160
			48	48	0 0	UA63-30-00-83	1SBL371022R8300	1.160
			110	110...120	0 0	UA63-30-00-84	1SBL371022R8400	1.160
			220...230	230...240	0 0	UA63-30-00-80	1SBL371022R8000	1.160
			230...240	240...260	0 0	UA63-30-00-88	1SBL371022R8800	1.160
			380...400	400...415	0 0	UA63-30-00-85	1SBL371022R8500	1.160
			400...415	415...440	0 0	UA63-30-00-86	1SBL371022R8600	1.160
50	7.5	55	24	24	0 0	UA75-30-00-81	1SBL411022R8100	1.160
			48	48	0 0	UA75-30-00-83	1SBL411022R8300	1.160
			110	110...120	0 0	UA75-30-00-84	1SBL411022R8400	1.160
			220...230	230...240	0 0	UA75-30-00-80	1SBL411022R8000	1.160
			230...240	240...260	0 0	UA75-30-00-88	1SBL411022R8800	1.160
			380...400	400...415	0 0	UA75-30-00-85	1SBL411022R8500	1.160
			400...415	415...440	0 0	UA75-30-00-86	1SBL411022R8600	1.160

¹⁾ Other control voltages see voltage code table.

Main dimensions mm, inches



UA50, UA63, UA75

UA50 ... UA75 3-pole contactors for capacitor switching

33 to 50 kvar - Peak current $\hat{I} < 100$ Times the rms current

AC operated - with 1 N.O. + 1 N.C. auxiliary contacts



UA50-30-11

Description

UA contactors can be used for the switching of capacitor banks whose inrush current peaks are less than or equal to 100 times nominal rms current.

The capacitors must be discharged (maximum residual voltage at terminals ≤ 50 V) before being re-energized when the contactors are making.

These contactors are of the block type design with:

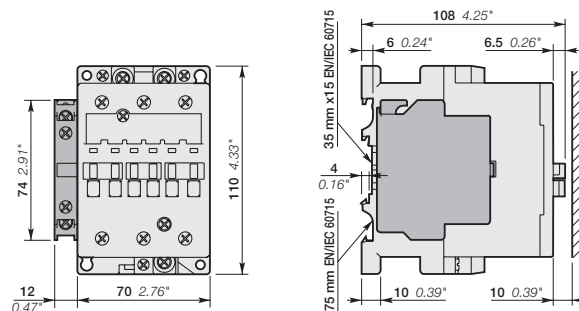
- 3 main poles
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

IEC Rated operational power $\theta \leq 40^\circ\text{C}$ 400 V AC-6b kvar	Max peak current \hat{I} kA	UL/CSA Rated operational power $\theta \leq 40^\circ\text{C}$ 400 V kvar	Rated control circuit voltage $U_c^{(1)}$		Auxiliary contacts fitted 	Catalog number	Global code	Weight Pkg (1 pce) kg
			V 50 Hz	V 60 Hz				
33	5	40	24	24	1 1	UA50-30-11-81	1SBL351022R8111	1,200
			48	48	1 1	UA50-30-11-83	1SBL351022R8311	1,200
			110	110...120	1 1	UA50-30-11-84	1SBL351022R8411	1,200
			220...230	230...240	1 1	UA50-30-11-80	1SBL351022R8011	1,200
			230...240	240...260	1 1	UA50-30-11-88	1SBL351022R8811	1,200
			380...400	400...415	1 1	UA50-30-11-85	1SBL351022R8511	1,200
			400...415	415...440	1 1	UA50-30-11-86	1SBL351022R8611	1,200
45	6.5	-	24	24	1 1	UA63-30-11-81	1SBL371022R8111	1,200
			48	48	1 1	UA63-30-11-83	1SBL371022R8311	1,200
			110	110...120	1 1	UA63-30-11-84	1SBL371022R8411	1,200
			220...230	230...240	1 1	UA63-30-11-80	1SBL371022R8011	1,200
			230...240	240...260	1 1	UA63-30-11-88	1SBL371022R8811	1,200
			380...400	400...415	1 1	UA63-30-11-85	1SBL371022R8511	1,200
			400...415	415...440	1 1	UA63-30-11-86	1SBL371022R8611	1,200
50	7.5	55	24	24	1 1	UA75-30-11-81	1SBL411022R8111	1,200
			48	48	1 1	UA75-30-11-83	1SBL411022R8311	1,200
			110	110...120	1 1	UA75-30-11-84	1SBL411022R8411	1,200
			220...230	230...240	1 1	UA75-30-11-80	1SBL411022R8011	1,200
			230...240	240...260	1 1	UA75-30-11-88	1SBL411022R8811	1,200
			380...400	400...415	1 1	UA75-30-11-85	1SBL411022R8511	1,200
			400...415	415...440	1 1	UA75-30-11-86	1SBL411022R8611	1,200

¹⁾ Other control voltages see voltage code table.

Main dimensions mm, inches



UA50, UA63, UA75 with 1 N.O. + 1 N.C. auxiliary contacts

UA95 ... UA110 3-pole contactors for capacitor switching 65 to 75 kvar - Peak current $\hat{I} \leq 100$ times the rms current AC operated



1SBC59070DF003

Description


UA contactors can be used for the switching of capacitor banks whose inrush current peaks are less or equal to 100 times nominal rms current.

The capacitors must be discharged (maximum residual voltage at terminals ≤ 50 V) before being re-energized when the contactors are making.

These contactors are of the block type design with:

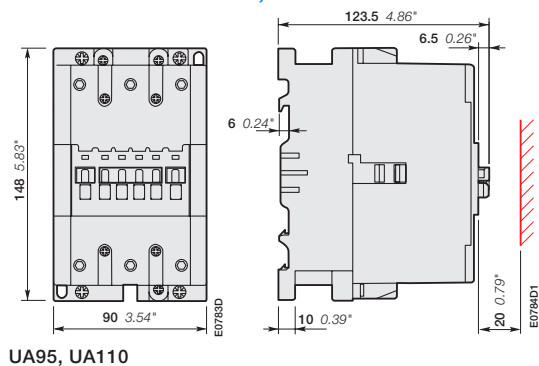
- 3 main poles
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

IEC Rated operational power $\theta \leq 40^\circ\text{C}$ 400 V AC-6b kvar	Max peak current \hat{i} kA	UL/CSA Rated operational power $\theta \leq 40^\circ\text{C}$ 480 V kvar	Rated control circuit voltage $U_c^{1)}$		Auxiliary contacts fitted 	Catalog number	Global code	Weight Pkg (1 pce) kg
			V 50 Hz	V 60 Hz				
65	9.3	70	24	24	0 0	UA95-30-00-81	1SFL431022R8100	2.000
			48	48	0 0	UA95-30-00-83	1SFL431022R8300	2.000
			110	110...120	0 0	UA95-30-00-84	1SFL431022R8400	2.000
			220...230	230...240	0 0	UA95-30-00-80	1SFL431022R8000	2.000
			230...240	240...260	0 0	UA95-30-00-88	1SFL431022R8800	2.000
			380...400	400...415	0 0	UA95-30-00-85	1SFL431022R8500	2.000
			400...415	415...440	0 0	UA95-30-00-86	1SFL431022R8600	2.000
			75	10.5	80	24	24	0 0
48	48	0 0	UA110-30-00-83			1SFL451022R8300	2.000	
110	110...120	0 0	UA110-30-00-84			1SFL451022R8400	2.000	
220...230	230...240	0 0	UA110-30-00-80			1SFL451022R8000	2.000	
230...240	240...260	0 0	UA110-30-00-87			1SFL451022R8800	2.000	
380...400	400...415	0 0	UA110-30-00-85			1SFL451022R8500	2.000	
400...415	415...440	0 0	UA110-30-00-86			1SFL451022R8600	2.000	

¹⁾ Other control voltages see voltage code table.

Main dimensions mm, inches



UA95 ... UA110 3-pole contactors for capacitor switching

65 to 75 kvar - Peak current $\hat{I} < 100$ times the rms current
 AC operated with 1 N.O. + 1 N.C. auxiliary contacts



UA110-30-11

Description

UA contactors can be used for the switching of capacitor banks whose inrush current peaks are less or equal to 100 times nominal rms current.

The capacitors must be discharged (maximum residual voltage at terminals ≤ 50 V) before being re-energized when the contactors are making.

These contactors are of the block type design with:

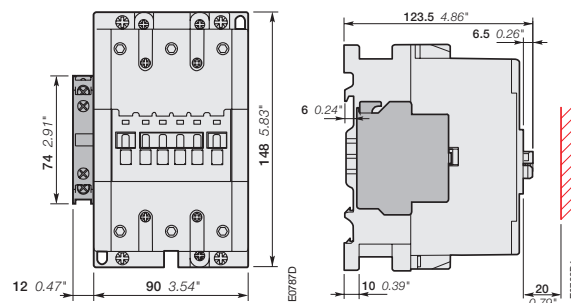
- 3 main poles
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories

Ordering details

IEC Rated operational power AC-6b $\theta \leq 40^\circ\text{C}$ 400 V kvar	Max peak current \hat{I} kA	UL/CSA Rated operational power 40 °C 400 V kvar	Rated control circuit voltage $U_c^{(1)}$		Auxiliary contacts fitted 	Catalog number	Global code	Weight Pkg (1 pce) kg
			V 50 Hz	V 60 Hz				
65	9.3	70	24	24	1 1	UA95-30-11-81	1SFL431022R8111	2.040
			48	48	1 1	UA95-30-11-83	1SFL431022R8311	2.040
			110	110...120	1 1	UA95-30-11-84	1SFL431022R8411	2.040
			220...230	230...240	1 1	UA95-30-11-80	1SFL431022R8011	2.040
			230...240	240...260	1 1	UA95-30-11-88	1SFL431022R8811	2.040
			380...400	400...415	1 1	UA95-30-11-85	1SFL431022R8511	2.040
			400...415	415...440	1 1	UA95-30-11-86	1SFL431022R8611	2.040
75	10.5	80	24	24	1 1	UA110-30-11-81	1SFL451022R8111	2.040
			48	48	1 1	UA110-30-11-83	1SFL451022R8311	2.040
			110	110...120	1 1	UA110-30-11-84	1SFL451022R8411	2.040
			220...230	230...240	1 1	UA110-30-11-80	1SFL451022R8011	2.040
			230...240	240...260	1 1	UA110-30-11-88	1SFL451022R8811	2.040
			380...400	400...415	1 1	UA110-30-11-85	1SFL451022R8511	2.040
			400...415	415...440	1 1	UA110-30-11-86	1SFL451022R8611	2.040

¹⁾ Other control voltages see voltage code table.

Main dimensions mm, inches



UA95, UA110

UA... 3-pole contactors for capacitor switching

Peak current $\hat{I} \leq 100$ times the rms current

Main accessory fitting details

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor types	Main poles		Available auxiliary contacts		Front-mounted accessories Auxiliary contact blocks		Pneumatic timer	Side-mounted accessories Auxiliary contact blocks
					1-pole CA5-..	4-pole CA5-..	TP.. A	2-pole CAL...
UA16-30-10	3	0	1	0	1 to 4 x CA5-..	or 1 x CA5-.. (4-pole)	or 1 x TP.. A	+ 1 to 2 x CAL5-11
UA26-30-10	3	0	1	0	1 to 4 x CA5-..	or 1 x CA5-.. (4-pole)	or 1 x TP.. A	+ 1 to 2 x CAL5-11
UA30-30-10	3	0	1	0	1 to 5 x CA5-..	or 1 x CA5-.. (4-pole) + 1 x 1-pole CA5-..	or 1 x TP.. A + 1 x CA5-.. (1-pole)	+ 1 to 2 x CAL5-11
UA50-30-00	3	0	0	0	1 to 6 x CA5-..	or 1 x CA5-.. (4-pole) + 2 x 1-pole CA5-..	or 1 x TP.. A + 2 x CA5-.. (1-pole)	+ 1 to 2 x CAL5-11
UA63-30-00	3	0	0	0				
UA75-30-00	3	0	0	0				
UA95-30-00	3	0	0	0	1 to 6 x CA5-..	or 1 x CA5-.. (4-pole) + 2 x 1-pole CA5-..	-	+ 1 to 2 x CAL18-11
UA110-30-00	3	0	0	0				

4

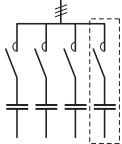
UA16 ... UA110 3-pole contactors for capacitor switching

Peak current $\hat{I} \leq 100$ times the rms current

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC operated	UA16	UA26	UA30	UA50	UA63	UA75	UA95	UA110	
Standards		IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1								
Rated operational voltage U_e max.		690 V								
Rated frequency (without derating)		50 / 60 Hz								
AC-6b Utilization category										
Rated operational power AC-6b ¹⁾										
For air temperature close to contactor	$\theta \leq 40^\circ\text{C}$	230-240 V	7.5 kvar	12 kvar	16 kvar	20 kvar	25 kvar	30 kvar	35 kvar	40 kvar
		400-415 V	12.5 kvar	20 kvar	27.5 kvar	33 kvar	45 kvar	50 kvar	65 kvar	75 kvar
		440 V	13.7 kvar	22 kvar	30 kvar	36 kvar	50 kvar	55 kvar	65 kvar	75 kvar
		500-550 V	15.5 kvar	22 kvar	34 kvar	40 kvar	50 kvar	62 kvar	70 kvar	80 kvar
		690 V	21.5 kvar	30 kvar	45 kvar	55 kvar	70 kvar	75 kvar	80 kvar	90 kvar
	$\theta \leq 55^\circ\text{C}$	230-240 V	6.7 kvar	11 kvar	16 kvar	20 kvar	25 kvar	30 kvar	35 kvar	40 kvar
		400-415 V	11.7 kvar	18.5 kvar	27.5 kvar	33 kvar	43 kvar	50 kvar	65 kvar	70 kvar
		440 V	13 kvar	20 kvar	30 kvar	36 kvar	48 kvar	53 kvar	65 kvar	75 kvar
		500-550 V	14.7 kvar	22 kvar	34 kvar	40 kvar	50 kvar	62 kvar	70 kvar	80 kvar
		690 V	20 kvar	30 kvar	45 kvar	55 kvar	70 kvar	75 kvar	80 kvar	90 kvar
	$\theta \leq 70^\circ\text{C}$	230-240 V	6 kvar	8.5 kvar	11 kvar	19 kvar	21 kvar	22 kvar	30 kvar	35 kvar
		400-415 V	10 kvar	14.5 kvar	19 kvar	32 kvar	37 kvar	39 kvar	55 kvar	65 kvar
		440 V	11 kvar	16 kvar	20 kvar	35 kvar	41 kvar	43 kvar	55 kvar	70 kvar
		500-550 V	12.5 kvar	19.5 kvar	23.5 kvar	40 kvar	45 kvar	47.5 kvar	60 kvar	75 kvar
		690 V	17 kvar	25 kvar	32 kvar	52 kvar	60 kvar	65 kvar	70 kvar	85 kvar
Max. permissible peak current \hat{I}		$U_e \leq 500$ V	1.8 kA	3 kA	3.5 kA	5 kA	6.5 kA	7.5 kA	9.3 kA	10.5 kA
		$U_e > 500$ V	1.6 kA	2.7 kA	3.1 kA	4.5 kA	5.8 kA	6.75 kA	8 kA	9 kA
Short-circuit protection device for contactors		gG type fuse sized 1.5...1.8 I_n of the capacitor								
Max. electrical switching frequency		240 cycles/h								
Electrical durability AC-6b	$U_e \leq 690$ V	100 000 operating cycles								



Multi-step capacitor bank scheme

¹⁾ For 220 V and 380 V, multiply by 0.9 the rated values at 230 V and 400 V respectively.
Example: 50 kvar / 400 V corresponding to 0.9 x 50 = 45 kvar/380 V.

If, in an application, the current peak is greater than the maximum peak current \hat{I} specified in the tables above, select a higher rating, refer to the UA..RA contactors, or add inductances. (see application guide "Contactors for capacitor switching").

Main pole - Utilization characteristics according to UL / CSA

Contactor types	AC operated	UA16	UA26	UA30	UA50	UA63	UA75	UA95	UA110	
Power - 60 Hz										
For air temperature close to contactor	$\theta \leq 40^\circ\text{C}$	240 V	-	12.5 kvar	16 kvar	20 kvar	-	27.5 kvar	35 kvar	40 kvar
		480 V	-	25 kvar	32 kvar	40 kvar	-	55 kvar	70 kvar	80 kvar
		600 V	-	30 kvar	40 kvar	50 kvar	-	70 kvar	75 kvar	85 kvar










If, in an application, the current peak is greater than the maximum peak current \hat{I} specified in the tables above, select a higher rating, refer to the UA..RA contactors, or add inductances. (see application guide "Contactors for capacitor switching").

UA16 ... UA110 3-pole contactors for capacitor switching

Peak current $\hat{I} \leq 100$ times the rms current

Technical data

Connecting characteristics

Contactor types		AC operated	UA16	UA26	UA30	UA50 UA63 UA75	UA95 UA110
Connection capacity (min. ... max.)							
Main conductors (poles)							
	Rigid	Solid ($\leq 4 \text{ mm}^2$)	1 x 1...4 mm ²	1.5...6 mm ²	2.5...16 mm ²	6...50 mm ²	10...95 mm ²
		Stranded ($\geq 6 \text{ mm}^2$)	2 x 1...4 mm ²	1.5...6 mm ²	2.5...16 mm ²	6...25 mm ²	6...35 mm ²
	Flexible with ferrule		1 x 0.75...2.5 mm ²	0.75...4 mm ²	2.5...10 mm ²	6...35 mm ²	10...70 mm ²
	Bars or lugs		2 x 0.75...2.5 mm ²	0.75...4 mm ²	2.5...10 mm ²	6...16 mm ²	6...35 mm ²
			L \leq 7.7 mm	10 mm	-	-	-
			L $>$ 3.7 mm	4.2 mm	-	-	-
			1 or 2 x	AWG 18...10	AWG 12...8	AWG 8...4	AWG 6...2/0
Connection capacity acc. to UL/CSA							
Tightening torque		Recommended	1 Nm / 9 lb.in	1.7 Nm / 15 lb.in	2.3 Nm / 20 lb.in	4 Nm / 35 lb.in	8 Nm / 71 lb.in
		Max.	1.2 Nm	2.2 Nm	2.6 Nm	4.5 Nm	9 Nm
Auxiliary conductors (built-in auxiliary terminals + coil terminals)							
	Rigid solid		1 x 1...4 mm ²				0.75...2.5 mm ²
			2 x 1...4 mm ²				0.75...2.5 mm ²
	Flexible with ferrule		1 x 0.75...2.5 mm ²			1...2.5 mm ²	0.75...2.5 mm ²
			2 x 0.75...2.5 mm ²				
	Lugs	Coil terminals	L \leq 8 mm				
			L $>$ 3.7 mm				
		Built-in auxiliary terminals	L \leq 7.7 mm	10 mm	8 mm	-	-
			L $>$ 3.7 mm	4.2 mm	3.7 mm	-	-
Connection capacity acc. to UL/CSA			AWG 18...14				
Tightening torque							
Coil terminals		Recommended	1 Nm / 9 lb.in				
		Max.	1.2 Nm				
Built-in auxiliary terminals		Recommended	1 Nm / 9 lb.in				
		Max.	1.2 Nm				
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529							
Main terminals			IP20			IP10	
Coil terminals			IP20			-	-
Built-in auxiliary terminals			IP20			-	-
Screw terminals Delivered in open position, screws of unused terminals must be tightened							
Main terminals			M3.5	M4	M5	M6	M8
		Screwdriver type	Flat \varnothing 5.5 / Pozidriv 2		Flat \varnothing 6.5 / Pozidriv 2		Hexagon socket (s = 4 mm)
Coil terminals			M3.5				
		Screwdriver type	Flat \varnothing 5.5 / Pozidriv 2				
Built-in auxiliary terminals			M3.5	M4	M3.5	-	-
		Screwdriver type	Flat \varnothing 5.5 / Pozidriv 2			-	-

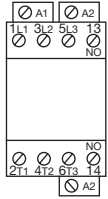
Note: Other technical characteristics are the same as those of standard A contactors.

UA... contactors

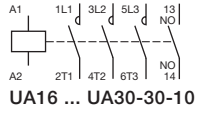
Terminal marking and positioning

UA... contactors - AC operated

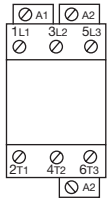
Standard devices without addition of auxiliary contacts



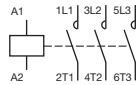
UA16 ... UA30-30-10



UA16 ... UA30-30-10

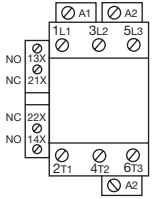


UA50 ... UA110-30-00

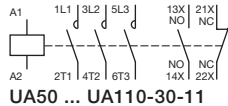


UA50 ... UA110-30-00

Standard devices with factory mounted auxiliary contacts



UA50 ... UA110-30-11

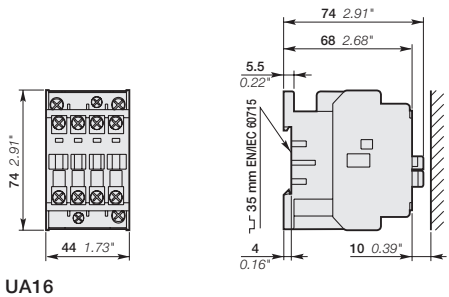


UA50 ... UA110-30-11

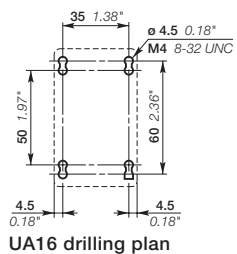
UA.. 3-pole contactors for capacitor switching

Main dimensions mm, inches

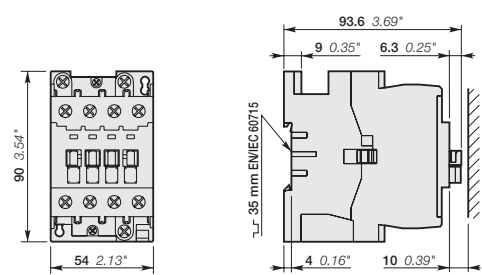
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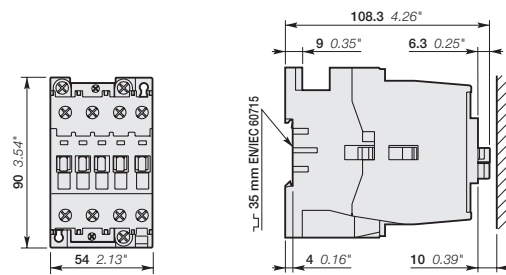
UA16



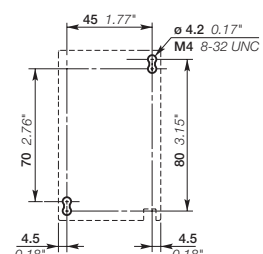
UA16 drilling plan



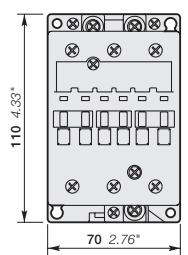
UA26



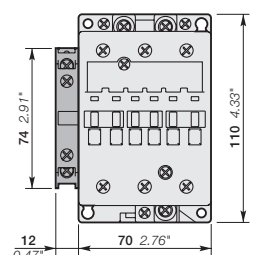
UA30



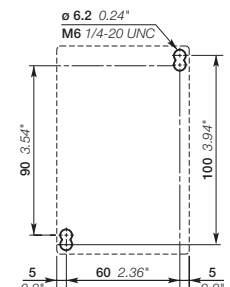
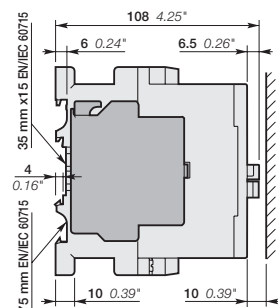
UA26, UA30 drilling plan



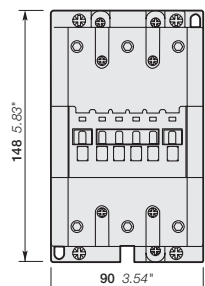
UA50, UA63, UA75-30-00



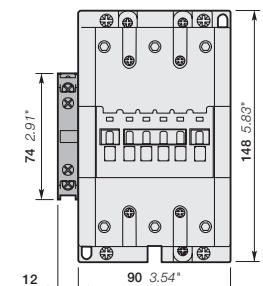
UA50, UA63, UA75-30-11



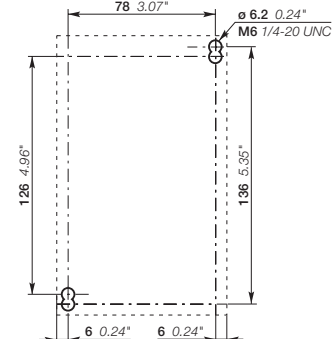
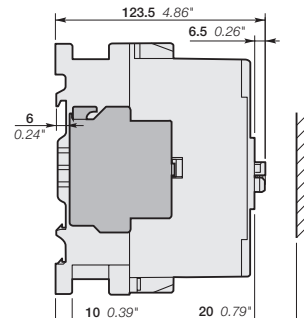
Drilling plan



UA95, UA110-30-00



UA95, UA110-30-11



Drilling plan

AF 3-pole contactors for capacitor switching

Single step - Peak current $\hat{I} \leq 30$ times the rms current

Description

The AF116 ... AF1650 3-pole contactors are suited for capacitor bank switching for the peak current and power values in the table below. The capacitors must be discharged (maximum residual voltage at terminals ≤ 50 V) before being re-energized when the contactors are making. In this conditions, electrical durability of contactors is equal to 100 000 operating cycles.

AF116 ... AF370 3-pole contactors

Contactor types	AF116	AF140	AF146	AF190	AF205	AF265	AF305	AF370			
AC-6b Utilization category											
For air temperature close to contactor											
Rated operational power AC-6b											
 Single-step capacitor bank scheme	$\theta \leq 40$ °C	230-240 V	40 kvar	45 kvar	50 kvar	60 kvar	75 kvar	85 kvar	100 kvar	110 kvar	
		400-415 V	75 kvar	85 kvar	90 kvar	110 kvar	130 kvar	145 kvar	165 kvar	180 kvar	200 kvar
		440 V	75 kvar	90 kvar	93 kvar	115 kvar	135 kvar	155 kvar	180 kvar	200 kvar	240 kvar
	$\theta \leq 55$ °C	500-550 V	83 kvar	95 kvar	110 kvar	140 kvar	160 kvar	180 kvar	210 kvar	240 kvar	280 kvar
		690 V	80 kvar	95 kvar	110 kvar	135 kvar	170 kvar	200 kvar	240 kvar	280 kvar	320 kvar
		1000 V	-	-	100 kvar	140 kvar	150 kvar	155 kvar	160 kvar	170 kvar	180 kvar
	$\theta \leq 70$ °C	230-240 V	40 kvar	45 kvar	50 kvar	60 kvar	75 kvar	85 kvar	100 kvar	110 kvar	120 kvar
		400-415 V	70 kvar	85 kvar	90 kvar	110 kvar	130 kvar	145 kvar	165 kvar	180 kvar	200 kvar
		440 V	75 kvar	90 kvar	93 kvar	115 kvar	135 kvar	155 kvar	180 kvar	200 kvar	240 kvar
		500-550 V	83 kvar	95 kvar	110 kvar	135 kvar	160 kvar	180 kvar	210 kvar	240 kvar	280 kvar
		690 V	80 kvar	95 kvar	110 kvar	135 kvar	170 kvar	200 kvar	240 kvar	280 kvar	320 kvar
		1000 V	-	-	100 kvar	140 kvar	150 kvar	155 kvar	160 kvar	170 kvar	180 kvar
	Max. permissible peak current I		Ue \leq 500 V	4 kA	4 kA	4 kA	5 kA	6.5 kA	8 kA	8 kA	8 kA

AF400 ... AF1650 3-pole contactors

Contactor types	AF400	AF460	AF580	AF750	AF1350	AF1650			
AC-6b Utilization category									
For air temperature close to contactor									
Rated operational power AC-6b									
 Single-step capacitor bank scheme	$\theta \leq 40$ °C	230-240 V	120 kvar	140 kvar	170 kvar	220 kvar	250 kvar	300 kvar	
		400-415 V	210 kvar	240 kvar	285 kvar	400 kvar	450 kvar	500 kvar	500 kvar
		440 V	220 kvar	260 kvar	300 kvar	410 kvar	500 kvar	550 kvar	550 kvar
	$\theta \leq 55$ °C	500-550 V	260 kvar	325 kvar	350 kvar	490 kvar	550 kvar	600 kvar	600 kvar
		690 V	300 kvar	325 kvar	440 kvar	600 kvar	650 kvar	800 kvar	800 kvar
		1000 V	250 kvar	300 kvar	350 kvar	450 kvar	-	-	-
	$\theta \leq 70$ °C	230-240 V	120 kvar	140 kvar	170 kvar	220 kvar	250 kvar	300 kvar	300 kvar
		400-415 V	210 kvar	240 kvar	285 kvar	400 kvar	450 kvar	500 kvar	500 kvar
		440 V	220 kvar	260 kvar	300 kvar	410 kvar	500 kvar	550 kvar	550 kvar
		500-550 V	260 kvar	325 kvar	350 kvar	480 kvar	550 kvar	600 kvar	600 kvar
		690 V	300 kvar	325 kvar	440 kvar	600 kvar	650 kvar	800 kvar	800 kvar
		1000 V	250 kvar	300 kvar	350 kvar	450 kvar	-	-	-
	Max. permissible peak current I		Ue \leq 500 V	10 kA	10 kA	12 kA	12 kA	18 kA	20 kA

Other contactor application data

Contactor selection

Control of three-phase slip-ring motors	4/274
Autotransformer starters	4/276
Three-phase transformer switching	4/277
Lighting circuit switching	4/279
Parallel connection of main poles	4/288
Temporary or intermittent duty	4/289

Influence of the length of conductors used in contactor

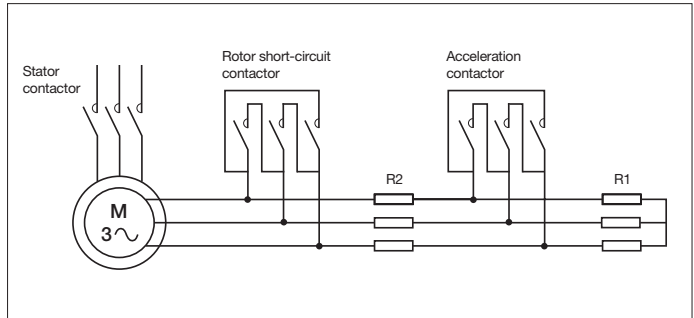
control circuit	4/291
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Control of three-phase slip-ring motors

Contactor selection

Example of a three-stroke starter

- The first stroke corresponds to energization of the motor by the stator contactor: all the resistances are operational in the rotor circuit
- At the second stroke, the acceleration contactor short-circuits the first resistance stack
- At the third stroke, the rotor short-circuit contactor is activated by eliminating the last resistance stack, thus completing the starting period.



Contactor types			AF116	AF140	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1350	AF1650	
Load factor	15 %	le / AC-2	A	220	335	360	425	530	625	750	850	950	1150	1500	1720	2100
	25 %	le / AC-2	A	185	270	300	350	440	515	620	680	780	975	1250	1430	1750
	40 %	le / AC-2	A	150	215	250	300	370	430	515	580	650	800	1050	1200	1470
	60 %	le / AC-2	A	135	180	220	255	315	370	430	480	550	700	900	1030	1250
S7 acc. to IEC 60034-1: periodical continuous duty with electrical breaking			A	116	140	190	210	265	305	370	400	460	580	750	860	1050

Contactors		AF116	AF140	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1350	AF1650
Rated operational current le / AC-1 for air temperature near the contactor ≤ 60 °C (AF116-AF370) ≤ 55 °C (AF400-AF1650)	A	145	175	250	300	350	400	500	500	600	700	800	1150	1450

Contactor types			AF116	AF140	AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1350	AF1650	
Load factor	15 %	le / AC-2	A	330	540	580	750	830	950	1050	1200	1400	1650	1900	2400	2800
	25 %	le / AC-2	A	300	490	530	650	725	830	915	1050	1250	1450	1650	2100	2500
	40 %	le / AC-2	A	260	425	460	575	630	720	800	950	1100	1300	1450	1850	2200
	60 %	le / AC-2	A	230	375	400	500	575	650	700	810	975	1150	1300	1650	1950
S7 acc. to IEC 60034-1: periodical continuous duty with electrical breaking			A	200	300	350	380	480	550	640	700	840	980	1150	1500	1800
Rated operational rotor voltage:																
- Maximum values for starting and breaking	V		2200 (2600 in star connection)				3000 (3600 in star connection)									
- Maximum values for starting and electrical braking	V		690 (730 in star connection)													

Autotransformer starters

Contactor selection

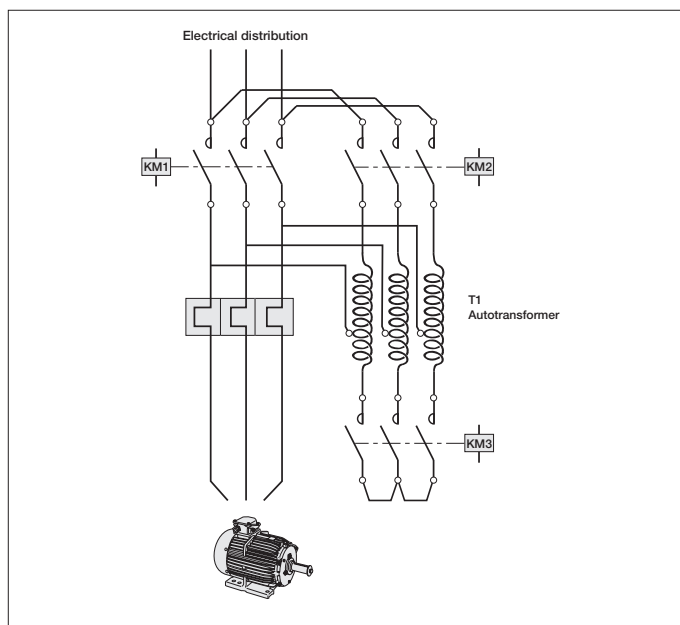
General

An autotransformer starter allows to start a squirrel cage motor with a reduced starting current due to the reduced voltage within the accelerating duration.

Unlike the star-delta wiring, this autotransformer starting method needs three wires and three terminals on the motor.

At the starting period, the motor is wired to the autotransformer taps: the star contactor "KM3" and the autotransformer contactor "KM2" are closed, the motor is under reduced voltage. Consequently, the torque is reduced as the square of the applied voltage. The autotransformers are generally equipped of three taps at each phase in order to adapt the starting parameters to the field requirements.

When the motor reaches 80...95 % of its nominal speed, the star contactor opens. Then, the line contactor "KM1" is making and the autotransformer contactor is opening. This starting process is done without any network interruption.



Selection Table (I_d starting current / I_n nominal current < 8 - Acceleration time \leq 20s - 30 cycles / h max.)

kW motor ratings 50/60 Hz

220/240 V	380/400 V	415 V	440 V	690 V	Contactors					
					KM1 line	KM2 autotransformer taps:				KM3 star
					90 %	80 %	70 %	60 %		
4	7.5	7.5	7.5	9	AF16	AF16	AF12	AF09	AF09	AF09
6.5	11	11	11	15	AF26	AF26	AF16	AF16	AF09	AF16
11	18.5	18.5	18.5	22	AF38	AF30	AF26	AF26	AF16	AF26
15	22	30	30	30	AF52	AF52	AF38	AF30	AF26	AF30
18.5	30	37	37	37	AF65	AF52	AF40	AF30	AF26	AF38
22	37	45	45	45	AF80	AF65	AF52	AF40	AF30	AF40
25	45	55	55	55	AF96	AF80	AF65	AF52	AF38	AF52
30	55	55	75	55	AF116	AF116	AF80	AF65	AF52	AF65
37	75	75	90	75	AF140	AF140	AF96	AF80	AF65	AF65
45	75	75	90	90	AF146	AF140	AF96	AF80	AF65	AF65
55	90	90	110	132	AF190	AF146	AF116	AF96	AF65	AF80
55	110	110	132	160	AF205	AF190	AF140	AF116	AF80	AF96
75	132	132	160	200	AF265	AF265	AF190	AF140	AF96	AF116
90	160	160	160	250	AF305	AF265	AF205	AF190	AF116	AF140
110	200	200	200	315	AF370	AF370	AF265	AF190	AF140	AF190
132	250	250	250	355	AF460	AF400	AF305	AF265	AF190	AF205
160	315	355	355	500	AF580	AF580	AF400	AF305	AF205	AF305
220	400	425	450	600	AF750	AF750	AF580	AF400	AF305	AF400
257	475	500	560	900	AF1350	AF750	AF580	AF460	AF400	AF460
315	560	600	670	1000	AF1650	AF1350	AF750	AF580	AF460	AF580

Three-phase transformer switching

Contactors selection

AC-6a Utilization category according to IEC 60947-4-1

General

Switching the primary of 3-phase transformers, on energization of the transformer, is characterized by high current peaks due to the magnetization phenomena.

Selection Table

The tables below show the operational ratings for:

- current peaks up to 20 to 30 times the transformer nominal current
- maximum switching frequency of 60 operating cycles per hour
- air ambient temperature ≤ 40 °C.

AC / DC operated contactors	AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96
Operational power at Ue: 50/60 Hz - according to AC-6a											
220 / 240 V kVA	4	5	6	10	13	14	15	19	21	23	25
380 / 400 V kVA	7	8	10	17	22	25	26	33	36	39	44
415 / 440 V kVA	8	9	11	18	24	27	28.5	36	40	43	48
500 V kVA	9	11	13	22	28	32	34.5	43	48	52	57
660 / 690 V kVA	12.5	14	18	29	37	43	45.5	57	64	68	75
Max. permissible I _{peak}	A	350	400	500	800	1000	1200	1250	1550	1750	2100

AC / DC operated contactors	AF116	AF140	AF190	AF205	AF265	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650
Operational power at Ue: 50/60 Hz - according to AC-6a													
220 / 240 V kVA	26	30	42	45	55	63	76	95	100	110	130	160	190
380 / 400 V kVA	46	52	73	75	94	108	132	165	170	190	240	275	350
415 / 440 V kVA	50	57	80	80	103	118	144	180	190	210	270	325	390
500 V kVA	60	68	96	100	124	143	173	220	230	250	320	–	–
660 / 690 V kVA	80	90	127	130	164	188	228	290	300	310	410	–	–
Max. permissible I _{peak}	A	2100	2400	3300	3500	4300	4900	6000	7700	8400	9300	12000	–

Lighting circuit switching

Contactor selection



AF09-40-00



AF80-40-00

General

Contactor selection criteria for control of lighting circuits are as follows:

- type, power rating and number of lamps,
- connection mode,
- current values on closing and in steady state,
- power factor,
- presence or not of correction capacitors.

Lighting circuits

In a given circuit, the number and power rating of lamps are defined and cannot result in overload. Only short-circuit protection has to be provided. J fuses or modular circuit-breakers will be chosen for this purpose. The lamps have very specific technical data, according to their construction type.

- Incandescent lamps have a very high current on closing: more than 15 times nominal current. They do not introduce a large phase displacement between current and voltage.
- Fluorescent tubes are equipped with a ballast whose purpose is two-fold: contribute to ignition and limit current to nominal value once steady state is reached. This ballast is a reactor that considerably lowers the power factor. It may or may not be compensated.

Selection Tables - Lighting Contactors

Amp rating	Number of poles	Electrically held	Mechanically held ¹⁾
20	4	AF09-40-00-□□	AF09L-40-00-□□
20	8	AF09-80-00-□□	AF09L-80-00-□□
20	12	AF09-120-00-□□	AF09L-120-00-□□
30	4	AF16-40-00-□□	AF16L-40-00-□□
30	8	AF16-80-00-□□	AF16L-80-00-□□
30	12	AF16-120-00-□□	AF16L-120-00-□□
45	4	AF26-40-00-□□	AF26L-40-00-□□
45	8	AF26-80-00-□□	AF26L-80-00-□□
45	12	AF26-120-00-□□	AF26L-120-00-□□
50	4	AF38-40-00-□□	AF38L-40-00-□□
65	3	AF40-30-00-□□	AF40L-30-00-□□
80	3	AF52-30-00-□□	AF52L-30-00-□□
90	3	AF65-30-00-□□	AF65L-30-00-□□
105	3	AF80-30-00-□□	AF80L-30-00-□□
115	3	AF96-30-00-□□	AF96L-30-00-□□
160	3	AF116-30-11-□□	
200	3	AF140-30-11-□□	
250	3	AF190-30-11-□□	
300	3	AF205-30-11-□□	
400	3	AF265-30-11-□□	

¹⁾ See accessories section for mechanical latch technical data.

Coil voltages and codes

Voltage (V) 50/60Hz	Voltage Code : □ □
24 ... 60	11
48 ... 130	12
100 ... 250	13
250 ... 500	14

Lighting circuit switching

Contactor selection AF09 ... AF146 3-pole contactors

Selection table

3-pole AC / DC operated contactors			AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96	AF116	AF140	AF146
Lamp characteristics			Maximum permissible number of lamps per phase													
W	A	μF														

Incandescent and halogen lamps

according to AC-5b

Voltage: 220/240 V AC

60	0.27	-	64	72	77	103	129	148	177	207	233	259	277	430	519	541
100	0.45	-	38	43	46	62	77	89	106	124	140	155	166	258	311	324
200	0.91	-	19	21	23	30	38	44	52	61	69	77	82	127	154	160
300	1.37	-	12	14	15	20	25	29	35	41	46	51	54	85	102	107
500	2.28	-	7	8	9	12	15	17	21	24	27	30	33	51	61	64
1000	4.55	-	3	4	4	6	7	8	10	12	13	15	16	25	31	32

Fluorescent lamps without compensation - Fluorescent lamps with electronic starter

according to AC-5a

Voltage: 220/240 V AC

20	0.38	-	46	51	55	73	84	92	126	147	157	184	210	305	368	384
40	0.45	-	38	43	46	62	71	77	106	124	133	155	177	258	311	324
65	0.70	-	25	27	30	40	45	50	68	80	85	100	114	166	200	209
80	0.80	-	21	24	26	35	40	43	60	70	75	87	100	145	175	183
100	1.15	-	15	16	18	24	27	30	41	48	52	60	69	101	122	127
110	1.20	-	14	16	17	23	26	29	40	46	50	58	66	97	117	122

Fluorescent lamps with parallel compensation

according to AC-5a

Voltage: 220/240 V AC

20	0.18	5	53	53	53	155	168	176	266	309	325	388	444	644	778	811
40	0.26	5	53	53	53	107	123	134	184	215	230	269	307	446	538	562
65	0.42	7	37	37	37	66	76	83	114	133	142	166	190	276	333	348
80	0.52	7	33	37	37	53	61	67	92	107	115	134	153	223	269	281
100	0.65	16	16	16	16	43	49	53	73	86	92	107	123	178	215	225
110	0.70	18	14	14	14	40	45	49	68	80	85	100	114	166	200	209

Fluorescent lamps in dual mounting

according to AC-5a

Voltage: 220/240 V AC

2 x 20	2 x 0.14	-	62	69	75	100	114	125	171	200	214	250	285	414	500	521
2 x 40	2 x 0.25	-	35	39	42	56	64	70	96	112	120	140	160	232	280	292
2 x 65	2 x 0.40	-	21	24	26	35	40	43	60	70	75	87	100	145	175	183
2 x 80	2 x 0.48	-	18	20	21	29	33	36	50	58	62	72	83	121	146	152
2 x 100	2 x 0.60	-	14	16	17	23	26	29	40	46	50	58	66	97	117	122
2 x 110	2 x 0.65	-	13	15	16	21	24	26	36	43	46	53	61	89	108	112

Compact fluorescent lamps

according to AC-5a

Voltage: 220/240 V AC

5	0.045	-	388	433	466	622	711	777	1066	1244	1333	1555	1777	2578	3111	3244
7	0.075	-	233	260	280	373	426	466	640	746	800	933	1066	1547	1867	1947
11	0.105	-	166	185	200	266	304	333	457	533	571	666	761	1105	1333	1390
15	0.135	-	129	144	155	207	237	259	355	414	444	518	592	859	1037	1081
20	0.160	-	109	121	131	175	200	218	300	350	375	437	500	725	875	913
23	0.180	-	97	108	116	155	177	194	266	311	333	388	444	644	778	811

Lighting circuit switching

Contactors selection AF190 ... AF2650 3-pole contactors

Selection table

3-pole AC / DC operated contactors			AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
Lamp characteristics			Maximum permissible number of lamps per phase													
W	A	μF														

Incandescent and halogen lamps

according to AC-5b

Voltage: 220/240 V AC

60	0.27	-	704	759	981	1130	1370	1481	1704	2148	2778	3009	3250	3972	4935	6380
100	0.45	-	422	456	589	678	822	889	1022	1289	1667	1806	1950	2383	2961	3828
200	0.91	-	209	225	291	335	407	440	505	637	824	893	964	1179	1464	1893
300	1.37	-	139	150	193	223	270	292	336	423	547	593	641	783	973	1257
500	2.28	-	83	90	116	134	162	175	202	254	329	356	385	470	584	755
1000	4.55	-	42	45	58	67	81	88	101	127	165	179	193	236	293	379

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Fluorescent lamps without compensation - Fluorescent lamps with electronic starter

according to AC-5a

Voltage: 220/240 V AC

20	0.38	-	500	539	697	803	974	1053	1211	1526	1974	2138	2309	2822	3507	4533
40	0.45	-	422	456	589	678	822	889	1022	1289	1667	1806	1950	2383	2961	3828
65	0.70	-	271	293	379	436	529	571	657	829	1071	1161	1254	1532	1904	2461
80	0.80	-	238	256	331	381	463	500	575	725	938	1016	1097	1341	1666	2153
100	1.15	-	165	178	230	265	322	348	400	504	652	707	763	933	1159	1498
110	1.20	-	158	171	221	254	308	333	383	483	625	677	731	894	1110	1435

Fluorescent lamps with parallel compensation

according to AC-5a

Voltage: 220/240 V AC

20	0.18	5	1056	1139	1472	1694	2056	2222	2556	3222	4167	4514	4875	5958	7403	9569
40	0.26	5	731	788	1019	1173	1423	1538	1769	2231	2885	3125	3375	4125	5125	6625
65	0.42	7	452	488	631	726	881	952	1095	1381	1786	1935	2089	2554	3173	4101
80	0.52	7	365	394	510	587	712	769	885	1115	1442	1563	1688	2063	2563	3313
100	0.65	16	292	315	408	469	569	615	708	892	1154	1250	1350	1650	2050	2650
110	0.70	18	271	293	379	436	529	571	657	829	1071	1161	1254	1532	1904	2461

Fluorescent lamps in dual mounting

according to AC-5a

Voltage: 220/240 V AC

2 x 20	2 x 0.14	-	679	732	946	1089	1321	1429	1643	2071	2679	2902	3134	3830	4759	6152
2 x 40	2 x 0.25	-	380	410	530	610	740	800	920	1160	1500	1625	1755	2145	2665	3445
2 x 65	2 x 0.40	-	238	256	331	381	463	500	575	725	938	1016	1097	1341	1666	2153
2 x 80	2 x 0.48	-	198	214	276	318	385	417	479	604	781	846	914	1117	1388	1794
2 x 100	2 x 0.60	-	158	171	221	254	308	333	383	483	625	677	731	894	1110	1435
2 x 110	2 x 0.65	-	146	158	204	235	285	308	354	446	577	625	675	825	1025	1325

Compact fluorescent lamps

according to AC-5a

Voltage: 220/240 V AC

5	0.045	-	4222	4556	5889	6778	8222	8889	10222	12889	16667	18056	19500	23833	29611	38278
7	0.075	-	2533	2733	3533	4067	4933	5333	6133	7733	10000	10833	11700	14300	17767	22967
11	0.105	-	1810	1952	2524	2905	3524	3810	4381	5524	7143	7738	8357	10214	12690	16405
15	0.135	-	1407	1519	1963	2259	2741	2963	3407	4296	5556	6019	6500	7944	9870	12759
20	0.160	-	1188	1281	1656	1906	2313	2500	2875	3625	4688	5078	5484	6703	8328	10766
23	0.180	-	1056	1139	1472	1694	2056	2222	2556	3222	4167	4514	4875	5958	7403	9569

Lighting circuit switching

Contactor selection AF09 ... AF146 3-pole contactors

Selection table

3-pole AC / DC operated contactors			AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96	AF116	AF140	AF146
Lamp characteristics			Maximum permissible number of lamps per phase													
W	A	μF														

Low pressure sodium vapour lamps without compensation

Voltage: 220/240 V AC

35	1.4	-	9	10	12	15	15	16	23	31	35	39	42	70	85	89
55	1.4	-	9	10	12	15	15	16	23	31	35	39	42	70	85	89
90	2.1	-	6	7	8	10	10	10	15	20	23	26	28	47	57	59
135	3.1	-	4	4	5	6	7	7	10	14	15	17	19	32	38	40
180	3.1	-	4	4	5	6	7	7	10	14	15	17	19	32	38	40

Low pressure sodium vapour lamps with parallel compensation

Voltage: 220/240 V AC

35	0.6	20	12	12	12	35	36	38	55	73	81	91	100	164	198	207
55	0.6	20	12	12	12	35	36	38	55	73	81	91	100	164	198	207
90	0.9	25	10	10	10	23	24	25	36	48	55	61	66	110	132	138
135	0.9	45	5	5	5	18	18	19	34	34	36	57	59	110	132	138
180	0.9	45	5	5	5	18	18	19	34	34	36	57	59	110	132	138

High pressure sodium vapour lamps without compensation

Voltage: 220/240 V AC

150	1.8	-	7	8	9	11	12	12	18	24	27	30	33	45	54	57
250	3.0	-	4	5	5	7	7	7	11	14	16	18	20	27	33	34
400	4.4	-	3	3	3	4	5	5	7	10	11	12	13	18	22	23
600	6.2	-	2	2	2	3	3	3	5	7	7	8	9	13	16	16
1000	10.3	-	1	1	1	2	2	2	3	4	4	5	5	8	10	10

High pressure sodium vapour lamps with parallel compensation

Voltage: 220/240 V AC

150	1.0	20	12	12	12	21	22	23	33	43	49	55	60	93	112	117
250	1.5	36	7	7	7	14	14	15	22	29	33	36	40	62	75	78
400	2.5	48	5	5	5	8	8	9	13	17	19	22	24	37	45	47
600	3.3	65	3	3	3	6	6	6	10	13	15	16	18	28	34	35
1000	6.2	100	2	2	2	3	3	3	5	7	7	8	9	15	18	19

High pressure mercury vapour lamps without compensation

Voltage: 220/240 V AC

50	0.60	-	22	25	28	35	36	38	55	73	82	91	100	152	190	214
80	0.80	-	16	18	21	26	27	28	41	55	61	68	75	114	143	160
125	1.15	-	11	13	14	18	19	20	28	38	43	47	52	79	99	112
250	2.15	-	6	6	7	9	10	10	15	20	23	25	27	42	53	60
400	3.25	-	4	4	5	6	6	7	10	13	15	16	18	28	35	39
700	5.40	-	2	2	3	3	4	4	6	8	9	10	11	17	21	24
1000	7.50	-	1	2	2	2	2	3	4	5	6	7	8	12	15	17

Voltage: 380/415 V AC

2000	8.00	-	1	1	2	2	2	2	4	5	6	6	7	11	14	16
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High pressure mercury vapour lamps with compensation

Voltage: 220/240 V AC

50	0.28	7	36	36	36	75	78	82	117	157	176	196	214	326	407	458
80	0.43	8	31	31	31	48	51	53	76	102	115	127	139	212	265	298
125	0.66	10	20	22	25	31	33	34	50	66	75	83	90	138	173	194
250	1.28	18	10	11	13	16	17	17	25	34	38	42	46	71	89	100
400	2.05	25	6	7	8	10	10	11	16	21	24	26	29	44	56	63
700	3.55	40	3	4	4	5	6	6	9	12	13	15	16	26	32	36
1000	4.83	60	2	3	3	4	4	4	6	9	10	11	12	19	24	27

Voltage: 380/415 V AC

2000	5.45	35	2	2	3	3	4	4	6	8	9	10	11	17	21	24
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Lighting circuit switching

Contactors selection AF190 ... AF2650 3-pole contactors

Selection table

3-pole AC / DC operated contactors			AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
Lamp characteristics			Maximum permissible number of lamps per phase													
W	A	µF														

Low pressure sodium vapour lamps without compensation

Voltage: 220/240 V AC

35	1.4	-	115	124	161	185	225	243	279	352	455	493	533	651	809	1046
55	1.4	-	115	124	161	185	225	243	279	352	455	493	533	651	809	1046
90	2.1	-	77	83	107	123	150	162	186	235	304	329	355	434	539	697
135	3.1	-	52	56	73	84	101	110	126	159	206	223	241	294	365	472
180	3.1	-	52	56	73	84	101	110	126	159	206	223	241	294	365	472

Low pressure sodium vapour lamps with parallel compensation

Voltage: 220/240 V AC

35	0.6	20	269	290	375	432	524	567	652	822	1063	1151	1243	1519	1888	2440
55	0.6	20	269	290	375	432	524	567	652	822	1063	1151	1243	1519	1888	2440
90	0.9	25	179	194	250	288	349	378	434	548	708	767	829	1013	1258	1627
135	0.9	45	179	194	250	288	349	378	434	548	708	767	829	1013	1258	1627
180	0.9	45	179	194	250	288	349	378	434	548	708	767	829	1013	1258	1627

High pressure sodium vapour lamps without compensation

Voltage: 220/240 V AC

150	1.8	-	74	80	103	119	144	156	179	226	292	313	338	413	513	663
250	3.0	-	44	48	62	71	86	93	107	135	175	188	203	248	308	398
400	4.4	-	30	33	42	49	59	64	73	92	119	128	138	169	210	271
600	6.2	-	21	23	30	34	42	45	52	65	85	91	98	120	149	192
1000	10.3	-	13	14	18	21	25	27	31	39	51	55	59	72	90	116

High pressure sodium vapour lamps with parallel compensation

Voltage: 220/240 V AC

150	1.0	20	152	164	212	244	296	320	368	464	600	625	675	825	1025	1325
250	1.5	36	101	109	141	163	197	213	245	309	400	417	450	550	683	883
400	2.5	48	61	66	85	98	118	128	147	186	240	250	270	330	410	530
600	3.3	65	46	50	64	74	90	97	112	141	182	189	205	250	311	402
1000	6.2	100	25	26	34	39	48	52	59	75	97	101	109	133	165	214

High pressure mercury vapour lamps without compensation

Voltage: 220/240 V AC

50	0.60	-	261	333	380	475	570	570	665	760	998	1188	1283	1568	1948	2518
80	0.80	-	196	249	285	356	428	428	499	570	748	891	962	1176	1461	1888
125	1.15	-	136	173	198	248	297	297	347	397	520	620	669	818	1016	1313
250	2.15	-	73	93	106	133	159	159	186	212	278	331	358	437	543	703
400	3.25	-	48	61	70	88	105	105	123	140	184	219	237	289	360	465
700	5.40	-	29	37	42	53	63	63	74	84	111	132	143	174	216	280
1000	7.50	-	21	27	30	38	46	46	53	61	80	95	103	125	156	201

Voltage: 380/415 V AC

2000	8.00	-	20	25	29	36	43	43	50	57	75	89	96	118	146	189
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High pressure mercury vapour lamps with compensation

Voltage: 220/240 V AC

50	0.28	7	560	713	814	1018	1221	1221	1425	1629	2138	2545	2748	3359	4173	5395
80	0.43	8	365	464	530	663	795	795	928	1060	1392	1657	1790	2187	2717	3513
125	0.66	10	238	302	345	432	518	518	605	691	907	1080	1166	1425	1770	2289
250	1.28	18	122	156	178	223	267	267	312	356	468	557	601	735	913	1180
400	2.05	25	76	97	111	139	167	167	195	222	292	348	375	459	570	737
700	3.55	40	44	56	64	80	96	96	112	128	169	201	217	265	329	425
1000	4.83	60	32	41	47	59	71	71	83	94	124	148	159	195	242	313

Voltage: 380/415 V AC

2000	5.45	35	29	37	42	52	63	63	73	84	110	131	141	173	214	277
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Lighting circuit switching

Contactor selection AF09 ... AF146 3-pole contactors

Selection table

3-pole AC / DC operated contactors			AF09	AF12	AF16	AF26	AF30	AF38	AF40	AF52	AF65	AF80	AF96	AF116	AF140	AF146
Lamp characteristics			Maximum permissible number of lamps per phase													
W	A	μF														

Metal halide vapour lamps without compensation

Voltage: 220/240 V AC

250	3	-	4	5	5	7	7	7	11	14	16	18	20	27	33	38
400	4	-	3	3	4	5	5	5	8	11	12	13	15	20	25	28
1000	9.5	-	1	1	1	2	2	2	3	4	5	5	6	8	11	12
2000	16.5	-	0	0	1	1	1	1	2	2	3	3	3	5	6	7

Voltage: 380/415 V AC

2000	10.5	-	1	1	1	2	2	2	3	4	4	5	5	8	10	11
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Metal halide vapour lamps with compensation

Voltage: 220/240 V AC

250	1.32	33	7	7	7	15	16	17	25	33	37	41	45	69	86	97
400	2.22	45	5	5	5	9	9	10	14	19	22	24	27	41	51	58
1000	5.14	85	2	2	3	4	4	4	6	8	9	10	11	18	22	25
2000	11.5	148	1	1	1	1	1	2	2	3	4	4	5	8	10	11

Voltage: 380/415 V AC

2000	6.10	60	2	2	2	3	3	3	5	7	8	9	9	15	19	21
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Lighting circuit switching

Contactor selection AF190 ... AF2650 3-pole contactors

Selection table

3-pole AC / DC operated contactors			AF190	AF205	AF265	AF305	AF370	AF400	AF460	AF580	AF750	AF1250	AF1350	AF1650	AF2050	AF2650
Lamp characteristics			Maximum permissible number of lamps per phase													
W	A	μF														

Metal halide vapour lamps without compensation

Voltage: 220/240 V AC

250	3	-	46	58	67	83	100	100	117	133	175	208	225	275	342	442
400	4	-	34	44	50	63	75	75	88	100	131	156	169	206	256	331
1000	9.5	-	14	18	21	26	32	32	37	42	55	66	71	87	108	139
2000	16.5	-	8	11	12	15	18	18	21	24	32	38	41	50	62	80

Voltage: 380/415 V AC

2000	10.5	-	13	17	19	24	29	29	33	38	50	60	64	79	98	126
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Metal halide vapour lamps with compensation

Voltage: 220/240 V AC

250	1.32	33	119	151	173	216	259	259	302	345	453	540	583	713	885	1144
400	2.22	45	71	90	103	128	154	154	180	205	270	321	347	424	526	680
1000	5.14	85	30	39	44	55	67	67	78	89	116	139	150	183	227	294
2000	11.5	148	14	17	20	25	30	30	35	40	52	62	67	82	102	131

Voltage: 380/415 V AC

2000	6.10	60	26	33	37	47	56	56	65	75	98	117	126	154	192	248
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Lighting circuit switching

Contactor selection AF09 ... AF370 4-pole contactors

Selection table

4-pole AC / DC operated contactors			AF09	AF16	AF26	AF38	AF40	AF52	AF80	AF116	AF140	AF190	AF205	AF265	AF305	AF370
Lamp characteristics			Maximum permissible number of lamps per phase													
W	A	µF														

Incandescent and halogen lamps

according to AC-5b

Voltage: 220/240 V AC

60	0.27	-	64	77	103	114	177	207	259	430	519	704	759	981	1130	1370
100	0.45	-	38	46	62	68	106	124	155	258	311	422	456	589	678	822
200	0.91	-	19	23	30	34	52	61	77	127	154	209	225	291	335	407
300	1.37	-	12	15	20	22	35	41	51	85	102	139	150	193	223	270
500	2.28	-	7	9	12	13	21	24	30	51	61	83	90	116	134	162
1000	4.55	-	3	4	6	6	10	12	15	25	31	42	45	58	67	81

Fluorescent lamps without compensation - Fluorescent lamps with electronic starter

according to AC-5a

Voltage: 220/240 V AC

20	0.38	-	46	55	73	81	126	147	184	305	368	500	539	697	803	974
40	0.45	-	38	46	62	68	106	124	155	258	311	422	456	589	678	822
65	0.70	-	25	30	40	44	68	80	100	166	200	271	293	379	436	529
80	0.80	-	21	26	35	38	60	70	87	145	175	238	256	331	381	463
100	1.15	-	15	18	24	26	41	48	60	101	122	165	178	230	265	322
110	1.20	-	14	17	23	25	40	46	58	97	117	158	171	221	254	308

Fluorescent lamps with parallel compensation

according to AC-5a

Voltage: 220/240 V AC

20	0.18	5	53	53	110	110	266	309	309	644	778	1056	1139	1472	1694	2056
40	0.26	5	53	53	107	110	184	215	269	446	538	731	788	1019	1173	1423
65	0.42	7	37	37	66	73	114	133	166	276	333	452	488	631	726	881
80	0.52	7	33	37	53	59	92	107	134	223	269	365	394	510	587	712
100	0.65	16	16	16	34	34	73	86	96	178	215	292	315	408	469	569
110	0.70	18	14	14	30	30	68	80	86	166	200	271	293	379	436	529

Fluorescent lamps in dual mounting

according to AC-5a

Voltage: 220/240 V AC

2 x 20	2 x 0.14	-	62	75	100	110	171	200	250	414	500	679	732	946	1089	1321
2 x 40	2 x 0.25	-	35	42	56	62	96	112	140	232	280	380	410	530	610	740
2 x 65	2 x 0.40	-	21	26	35	38	60	70	87	145	175	238	256	331	381	463
2 x 80	2 x 0.48	-	18	21	29	32	50	58	72	121	146	198	214	276	318	385
2 x 100	2 x 0.60	-	14	17	23	25	40	46	58	97	117	158	171	221	254	308
2 x 110	2 x 0.65	-	13	16	21	23	36	43	53	89	108	146	158	204	235	285

Compact fluorescent lamps

according to AC-5a

Voltage: 220/240 V AC

5	0.045	-	388	466	622	688	1066	1244	1555	2578	3111	4222	4556	5889	6778	8222
7	0.075	-	233	280	373	413	640	746	933	1547	1867	2533	2733	3533	4067	4933
11	0.105	-	166	200	266	295	457	533	666	1105	1333	1810	1952	2524	2905	3524
15	0.135	-	129	155	207	229	355	414	518	859	1037	1407	1519	1963	2259	2741
20	0.160	-	109	131	175	193	300	350	437	725	875	1188	1281	1656	1906	2313
23	0.180	-	97	116	155	172	266	311	388	644	778	1056	1139	1472	1694	2056

Low pressure sodium vapour lamps without compensation

Voltage: 220/240 V AC

35	1.4	-	9	12	15	16	23	31	39	70	85	115	124	161	185	225
55	1.4	-	9	12	15	16	23	31	39	70	85	115	124	161	185	225
90	2.1	-	6	8	10	10	15	20	26	47	57	77	83	107	123	150
135	3.1	-	4	5	6	7	10	14	17	32	38	52	56	73	84	101
180	3.1	-	4	5	6	7	10	14	17	32	38	52	56	73	84	101

Low pressure sodium vapour lamps with parallel compensation

Voltage: 220/240 V AC

35	0.6	20	12	12	27	27	55	73	77	164	198	269	290	375	432	524
55	0.6	20	12	12	27	27	55	73	77	164	198	269	290	375	432	524
90	0.9	25	10	10	22	22	36	48	61	110	132	179	194	250	288	349
135	0.9	45	5	5	12	12	34	34	34	110	132	179	194	250	288	349
180	0.9	45	5	5	12	12	34	34	34	110	132	179	194	250	288	349

Lighting circuit switching

Contactors selection AF09 ... AF370 4-pole contactors

Selection table

4-pole AC / DC operated contactors			AF09	AF16	AF26	AF38	AF40	AF52	AF80	AF116	AF140	AF190	AF205	AF265	AF305	AF370
Lamp characteristics			Maximum permissible number of lamps per phase													
W	A	µF														

High pressure sodium vapour lamps without compensation

Voltage: 220/240 V AC

150	1.8	-	7	9	11	12	18	24	30	45	54	74	80	103	119	144
250	3.0	-	4	5	7	7	11	14	18	27	33	44	48	62	71	86
400	4.4	-	3	3	4	5	7	10	12	18	22	30	33	42	49	59
600	6.2	-	2	2	3	3	5	7	8	13	16	21	23	30	34	42
1000	10.3	-	1	1	2	2	3	4	5	8	10	13	14	18	21	25

High pressure sodium vapour lamps with parallel compensation

Voltage: 220/240 V AC

150	1.0	20	12	12	21	23	33	43	55	93	112	152	164	212	244	296
250	1.5	36	7	7	14	15	22	29	36	62	75	101	109	141	163	197
400	2.5	48	5	5	8	9	13	17	22	37	45	61	66	85	98	118
600	3.3	65	3	3	6	6	10	13	16	28	34	46	50	64	74	90
1000	6.2	100	2	2	3	3	5	7	8	15	18	25	26	34	39	48

High pressure mercury vapour lamps without compensation

Voltage: 220/240 V AC

50	0.60	-	22	28	35	38	55	73	91	152	190	261	333	380	475	570
80	0.80	-	16	21	26	28	41	55	68	114	143	196	249	285	356	428
125	1.15	-	11	14	18	20	28	38	47	79	99	136	173	198	248	297
250	2.15	-	6	7	9	10	15	20	25	42	53	73	93	106	133	159
400	3.25	-	4	5	6	7	10	13	16	28	35	48	61	70	88	105
700	5.40	-	2	3	3	4	6	8	10	17	21	29	37	42	53	63
1000	7.50	-	1	2	2	3	4	5	7	12	15	21	27	30	38	46

Voltage: 380/415 V AC

2000	8	-	1	2	2	2	4	5	6	11	14	20	25	29	36	43
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High pressure mercury vapour lamps with compensation

Voltage: 220/240 V AC

50	0.28	7	36	36	75	79	117	157	196	326	407	560	713	814	1018	1221
80	0.43	8	31	31	48	53	76	102	127	212	265	365	464	530	663	795
125	0.66	10	20	25	31	34	50	66	83	138	173	238	302	345	432	518
250	1.28	18	10	13	16	17	25	34	42	71	89	122	156	178	223	267
400	2.05	25	6	8	10	11	16	21	26	44	56	76	97	111	139	167
700	3.55	40	3	4	5	6	9	12	15	26	32	44	56	64	80	96
1000	4.83	60	2	3	4	4	6	9	11	19	24	32	41	47	59	71

Voltage: 380/415 V AC

2000	5.45	35	2	3	3	4	6	8	10	17	21	29	37	42	52	63
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Metal halide vapour lamps without compensation

Voltage: 220/240 V AC

250	3	-	4	5	7	7	11	14	18	27	33	46	58	67	83	100
400	4	-	3	4	5	5	8	11	13	20	25	34	44	50	63	75
1000	9.5	-	1	1	2	2	3	4	5	8	11	14	18	21	26	32
2000	16.5	-	0	1	1	1	2	2	3	5	6	8	11	12	15	18

Voltage: 380/415 V AC

2000	10.5	-	1	1	2	2	3	4	5	8	10	13	17	19	24	29
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Metal halide vapour lamps with compensation

Voltage: 220/240 V AC

250	1.32	33	7	7	15	16	25	33	41	69	86	119	151	173	216	259
400	2.22	45	5	5	9	10	14	19	24	41	51	71	90	103	128	154
1000	5.14	85	2	3	4	4	6	8	10	18	22	30	39	44	55	67
2000	11.5	148	1	1	1	2	2	3	4	8	10	14	17	20	25	30

Voltage: 380/415 V AC

2000	6.10	60	2	2	3	3	5	7	9	15	19	26	33	37	47	56
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Parallel connection of main poles

General

Purpose: Increasing the AC resistive load by wiring connection of main poles in parallel.

Remarks:

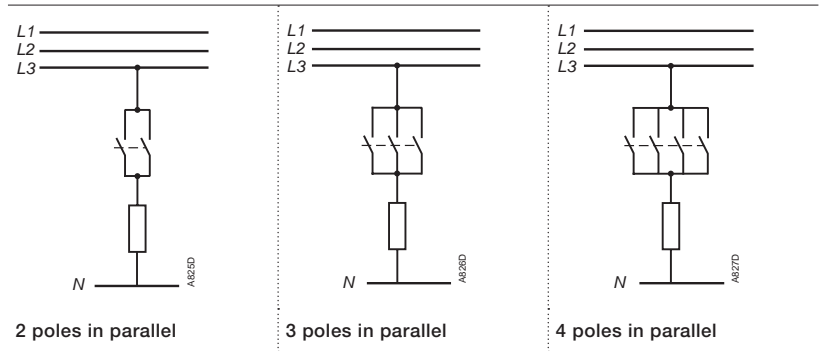
- Parallel connection of main poles to increase the DC resistive load is not acceptable
- Parallel connection of main poles does not increase the breaking capacity.

The table below shows the uprating factor for $I_e / AC-1$ max. in relation to the number of poles wired connected in parallel and for a maximum switching frequency.

Note: The poles can be connected in parallel via following connecting strips. See details and permissible current in "Accessory" part.

- LP, LH, LY and LF for parallel connection of 2 or 3 poles
- LG for parallel connection of 4 poles.

4



Contactors

Factor to be applied to the rated operational current $I_e / AC-1$ to obtain the permissible current $I_e / AC-1$ with "n" poles in parallel

AC operated	DC operated	Cycles / h			
3-pole contactors					
AF09 ... AF96	AF09 ... AF96	600	1.6	2.2	-
AF116 ... AF1250	AF116 ... AF1250	300	1.6	2.2	-
AF1350 ... AF2650	AF1350 ... AF2650	30	1.6	2.2	-
4-pole contactors					
AF09 ... AF38	AF09 ... AF38	600	1.6	2.2	2.6
A45 ... A75					
AF45 ... AF75	AE45 ... AE75 TAE45 ... TAE75 AF45 ... AF75	300	1.6	2.2	2.6
EK	EK	300	1.6	2.2	2.8

Temporary or intermittent duty

Utilization of contactors for temporary / intermittent duty

The table below shows the factor (known as "On-load factor") to be applied to the rated operational current $I_e / AC-1$ to obtain the permissible operational current $I_e / AC-1$ in relation to the switching frequency and the current flow time per cycle.

Operating cycles per hour	1	2	3	6	12	20	30	60	120	
Preferred classes acc. to IEC 60947-4-1	1	–	3	–	12	–	30	–	120	
Current flow time per cycle	Factors applicable to $I_e / AC-1$									
5 s	5.2	5	4.9	4.7	4.3	4.0	3.7	3.4	2.8	
10 s	3.8	3.7	3.6	3.4	3.1	3.0	2.8	2.6	2.2	
20 s	2.8	2.7	2.7	2.6	2.5	2.4	2.2	2.0	1.5	
30 s	2.4	2.3	2.3	2.2	2.1	2.1	1.9	1.7	–	
40 s	2.2	2.1	2.1	2.0	1.9	1.9	1.7	1.5	–	
60 s	1.9	1.8	1.8	1.8	1.7	1.7	1.5	–	–	

Example:

AF09 contactor (intermittent duty, resistive load)

Rated operational current $I_e / AC-1$ at 60 °C

(see "Technical data: main pole utilization characteristics") 25 A

Switching frequency 2 operating cycles/h

Current flow time per cycle 20 s

Factor to be applied to the current $I_e / AC-1$ 2.7

Permissible current: $2.7 \times 25 = 67$ A

Temporary or intermittent duty

Utilization of contactors for temporary / intermittent duty

The table below shows the factor (known as "On-load factor") to be applied to the rated operational current $I_e / AC-1$ to obtain the permissible operational current $I_e / AC-1$ in relation to the switching frequency and the current flow time per cycle.

Operating cycles per hour	1	2	3	6	12	20	30	60	120
Preferred classes acc. to IEC 60947-4-1	1	-	3	-	12	-	30	-	120
Current flow time per cycle	Factors applicable to $I_e / AC-1$								
5 s	5.2	5	4.9	4.7	4.3	4.0	3.7	3.4	2.8
10 s	3.8	3.7	3.6	3.4	3.1	3.0	2.8	2.6	2.2
20 s	2.8	2.7	2.7	2.6	2.5	2.4	2.2	2.0	1.5
30 s	2.4	2.3	2.3	2.2	2.1	2.1	1.9	1.7	-
40 s	2.2	2.1	2.1	2.0	1.9	1.9	1.7	1.5	-
60 s	1.9	1.8	1.8	1.8	1.7	1.7	1.5	-	-

Example:

AF09 contactor (intermittent duty, resistive load)

Rated operational current $I_e / AC-1$ at 60 °C

(see "Technical data: main pole utilization characteristics") 25 A

Switching frequency 2 operating cycles/h

Current flow time per cycle 20 s

Factor to be applied to the current $I_e / AC-1$ 2.7

Permissible current: $2.7 \times 25 = 67$ A

Influence of the length of conductors used in contactor control circuit



AF40-30-00



AF370-30-11

Under certain conditions the excessive length of the control circuit conductors may prevent the contactor from carrying out closing and opening orders.

- **no closing:** due to excessive voltage drop (in AC or DC)
- **no opening:** due to excessive capacitance (in AC).

Contactor Closing (contactor with AC or DC operated coil).

The voltage drop is due to the pull-in current (pull-in power) and to the resistance of the control circuit conductors.

The table and graph below can be used to determine **the single length of line feeders** (distance between the control device and the contactor coil) in relation to:

- the coil pull-in consumption.
- the supply voltage.
- the connecting wire cross-sectional area.

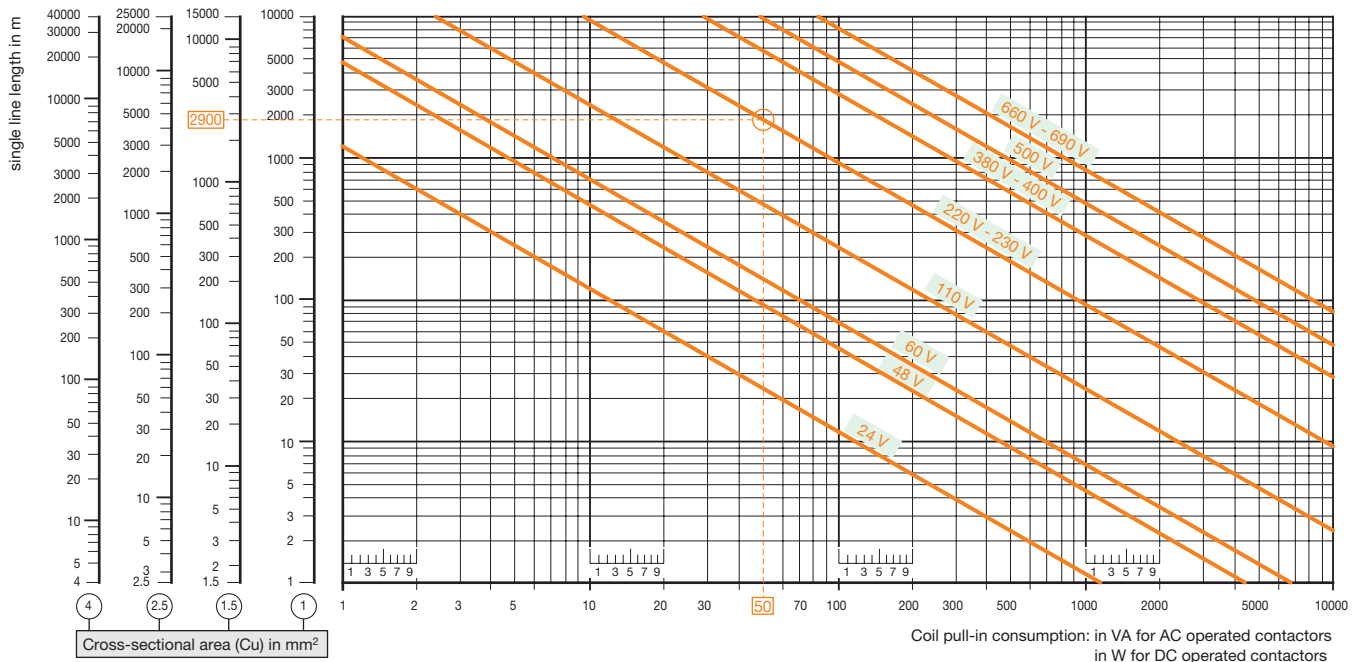
The graph has been drawn for a max. line voltage drop of 5 %.

Coil pull-in consumption (average value)

3-pole contactors	AC control supply	DC control supply	4-pole contactors	AC control supply	DC control supply
	50/60 Hz			50/60 Hz	
AF09, AF12, AF16, AF26, AF30, AF38	50 VA	50 W	AF09, AF16, AF26, AF38	50 VA	50 W
AF09Z, AF12Z, AF16Z, AF26Z, AF30Z, AF38Z	20 VA	20 W	AF09Z, AF16Z, AF26Z, AF38Z	20 W	20 W
AF40, AF52, AF65	25 VA	25 W	AF40, AF52, AF80	40 VA	40 W
AF80, AF96	40 VA	40 W	AF116, AF140	185 VA	170 W
AF116, AF140, AF146	180 VA	170 W	AF190, AF205	190 VA	180 W
AF190, AF205	195 VA	185 W	AF265, AF305, AF370	405 VA	445 W
AF265, AF305, AF370	405 VA	465 W			
AF400, AF460	1005 VA	960 W			
AF580, AF750, AF1250	940 VA	900 W			
AF1350, AF1650, AF2050, AF2650	2450 VA	2290 W			

Permissible single length for the control circuit conductors on contactor closing:

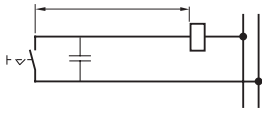
Depending on the coil pull-in power consumption on the supply voltage and on the control circuit conductor cross-sectional area.



Example **AF09 contactor**: Coil voltage: 230 V 50 Hz, contactor coil pull-in power consumption: 50 VA, control circuit conductor cross-sectional area: Cu 1.5 mm². Max. permissible length: 2900 m.

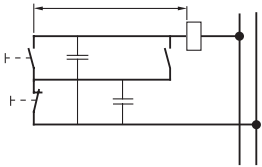
Influence of the length of conductors used in contactor control circuit

Single control line length



Wiring diagram A

Via maintained pushbutton and 2-core cable (with a capacity of 0.2 μF/km, for example).



Wiring diagram B

Via momentary pushbutton plus hold-in contact and 3-core cable (with a capacity of 2 x 0.2 = 0.4 μF/km, for example).

Contactor Opening (contactor with AC operated coil)

Under certain conditions, an **AC operated** contactor does not open when the control circuit is de-energized.

This is due to a critical capacity of the excessively long control circuit line and the type of contactor coil control layout (see diagrams A and B opposite). This may be caused by the following factors:

- high control voltage
- low coil holding consumption
- low contactor drop-out voltage (according to IEC 60947-4-1: 0.2 to 0.75 x U_c).

If lines longer than those indicated are required, the following measures must be taken:

- select a contactor with a higher rating
- select a lower control voltage
- connect "R_p" resistance in parallel with the contactor coil:

$$R_p = \frac{10^3}{C} \quad (\text{with } C \text{ in } \mu\text{F})$$

The table and graph below can be used to determine the **single length of line feeders** (distance between the control device and the contactor coil) in relation to:

- the coil holding consumption VA
- the supply voltage
- the capacity in μF/km (depending on the control layout).

Wiring diagrams **A** and **B** opposite show two supply and coil control wiring examples.

Coil holding consumption (average value)

3-pole contactors

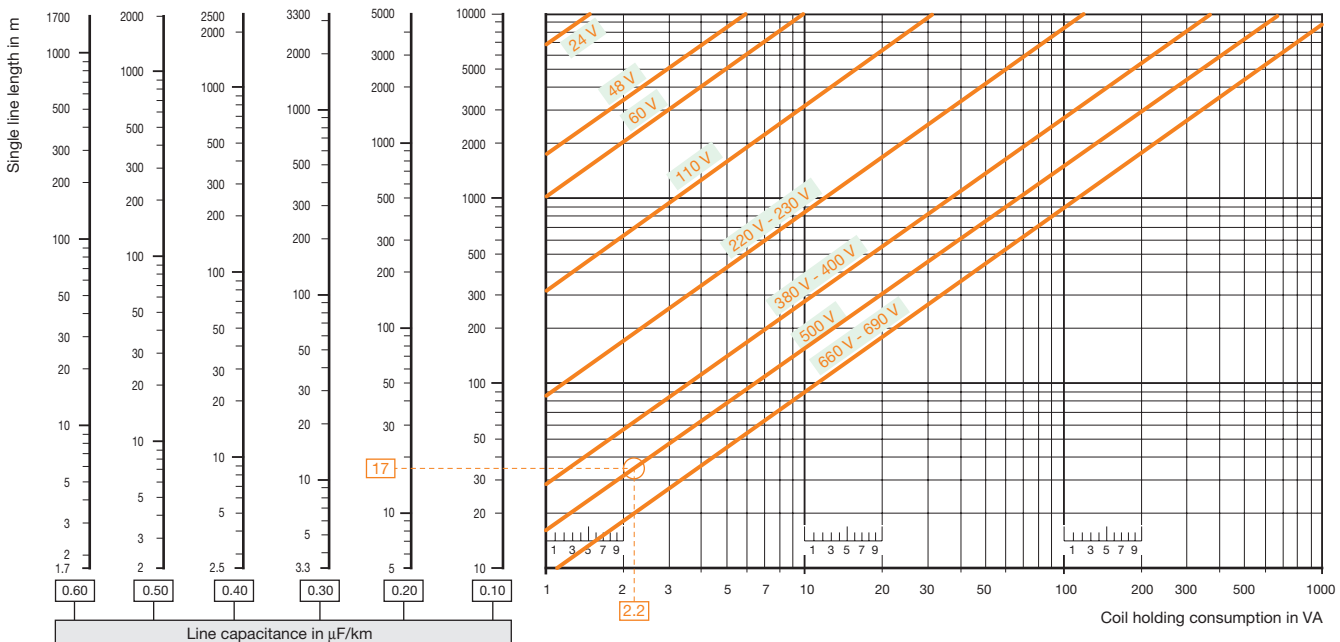
3-pole contactors	AC control supply 50/60 Hz
AF09, AF12, AF16, AF26, AF30, AF38	2.2 VA
AF09Z, AF12Z, AF16Z, AF26Z, AF30Z, AF38Z	1.7 VA
AF40, AF52, AF65, AF80, AF96	4 VA
AF116, AF140, AF146	8.9 VA
AF190, AF205	9.3 VA
AF265, AF305, AF370	16.6 VA
AF400, AF460, AF580, AF750, AF1250	12 VA
AF1350, AF1650, AF2050, AF2650	48 VA

4-pole contactors

4-pole contactors	AC control supply 50/60 Hz
AF09, AF16, AF26, AF38	2.2 VA
AF09Z, AF16Z, AF26Z, AF38Z	1.7 VA
AF40, AF52, AF80	4 VA
AF116, AF140, AF190, AF205	8 VA
AF265, AF305, AF370	16 VA

Permissible single length for the control circuit conductors on contactor opening:

Depending on the coil holding power consumption, on the supply voltage and on the control circuit conductor capacity.



Example **AF16 contactor**: Coil voltage U_c = 500 V, 50 Hz, 2.2 VA contactor coil holding consumption, control type: diagram A, via maintained pushbutton, and 2-core cable with a capacity of 0.2 μF/km. Max. permissible length: 17 m.



NF 4-pole and 8-pole contactor relays

Ordering details 4-pole contactor relays

NF	AC / DC operated	4/296
NFZ	AC / DC operated - low consumption	4/297
Main accessories		4/298

Ordering details 8-pole contactor relays

NF	AC / DC operated	4/300
NFZ	AC / DC operated - low consumption	4/301
Main accessories		4/302

Technical data	4/304
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Terminal marking and positioning	4/308
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Main dimensions	4/310
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NF 4-pole contactor relays

AC / DC operated



NF22E

1BSC01104F0014

Description

NF contactor relays are used for switching auxiliary and control circuits.

These contactor relays are of the block type design with:

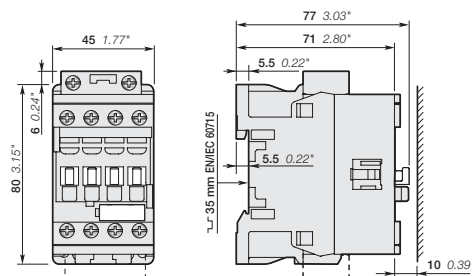
- 4 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
 - can manage large control voltage variations
 - only 4 control voltage ranges covering 24...500 V 50/60 Hz and 20...500 V DC
 - reduced panel energy consumption
 - very distinct closing and opening
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories

Ordering details

Number of contacts	Rated control circuit voltage Uc min. ... Uc max.		Catalog number	Weight Pkg (1 pce) kg
	V 50/60 Hz	V DC		
	24...60		NF22E-41	0.27
	24...60	20...60 ¹⁾	NF22E-11	0.27
	48...130	48...130	NF22E-12	0.27
	100...250	100...250	NF22E-13	0.27
	250...500	250...500	NF22E-14	0.31
	24...60		NF31E-41	0.27
	24...60	20...60 ¹⁾	NF31E-11	0.27
	48...130	48...130	NF31E-12	0.27
	100...250	100...250	NF31E-13	0.27
	250...500	250...500	NF31E-14	0.31
	24...60		NF40E-41	0.27
	24...60	20...60 ¹⁾	NF40E-11	0.27
	48...130	48...130	NF40E-12	0.27
	100...250	100...250	NF40E-13	0.27
	250...500	250...500	NF40E-14	0.31

¹⁾ NF.E-11 May not suitable for all PLC application. Refer to manufacturing specifications.

Main dimensions mm, inches



NF22E, NF31E, NF40E

NFZ 4-pole contactor relays

AC / DC operated - low consumption



NFZ22E

Description

NFZ contactor relays are used for switching auxiliary and control circuits.

These contactor relays are of the block type design with:

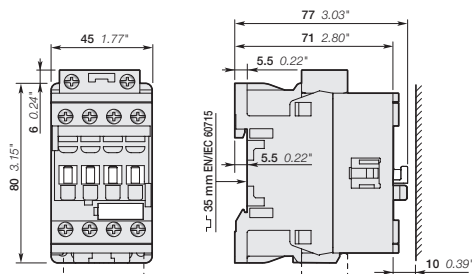
- 4 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
 - can manage large control voltage variations
 - only 4 control voltage ranges covering 24...250 V 50/60 Hz and 12...250 V DC
 - allow direct control by PLC-output ≥ 24 V DC 500 mA
 - reduced panel energy consumption
 - very distinct closing and opening
 - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

Number of contacts	Rated control circuit voltage Uc min. ... Uc max.		Catalog number	Weight Pkg (1 pce) kg
	V 50/60 Hz	V DC		
	-	12...20	NFZ22E-20	0.31
	24...60	20...60	NFZ22E-21	0.31
	48...130	48...130	NFZ22E-22	0.31
	100...250	100...250	NFZ22E-23	0.31
	-	12...20	NFZ31E-20	0.31
	24...60	20...60	NFZ31E-21	0.31
	48...130	48...130	NFZ31E-22	0.31
	100...250	100...250	NFZ31E-23	0.31
	-	12...20	NFZ40E-20	0.31
	24...60	20...60	NFZ40E-21	0.31
	48...130	48...130	NFZ40E-22	0.31
	100...250	100...250	NFZ40E-23	0.31

Note: Only NFZ contactor relays with DC control voltage 12...20 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.

Main dimensions mm, inches

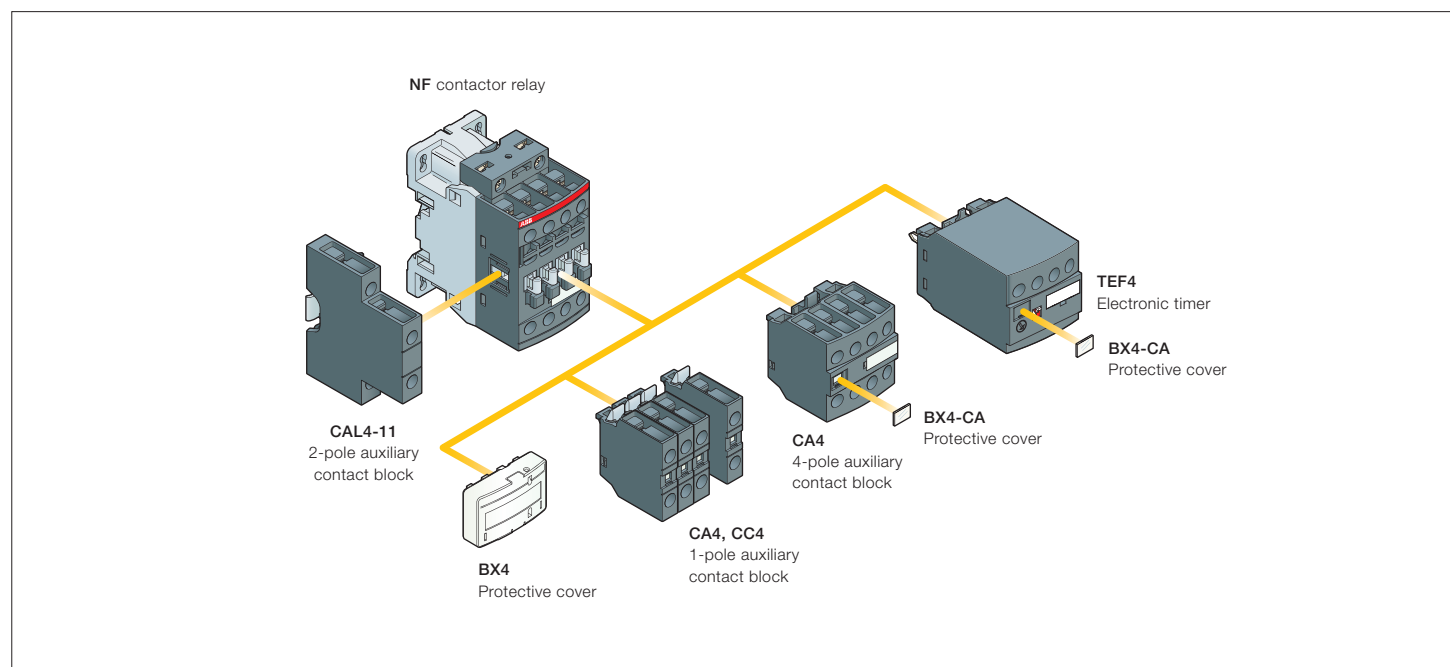


NFZ22E, NFZ31E, NFZ40E

NF 4-pole contactor relays

Main accessories

Contactor relays and main accessories (other accessories available)



Main accessory fitting details

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor relay types	Main poles	Front-mounted accessories			Electronic timer		Side-mounted accessories	
		Auxiliary contact blocks				Left side	Right side	
		1-pole CA4 1-pole CC4	4-pole CA4		TEF4	2-pole CAL4-11		
Max. add-on N.C. auxiliary contacts: 3 N.C. max. on positions 1, 2, 3, 4 and 2 N.C. max. on positions 1 ±30°, 5								
NF	2 2 E 3 1 E	4 max.	or 1	or 1	+ 1	-		
		2 max.	-	or 1	+ 1	+ 1		
Max. add-on N.C. auxiliary contacts: 4 N.C. max. on positions 1, 2, 3, 4 and 3 N.C. max. on positions 1 ±30°, 5								
NF	4 0 E	4 max.	or 1	or 1	+ 1	-		
		2 max.	-	or 1	+ 1	+ 1		

NF 4-pole contactor relays

Main accessories



CA4-10



CA4-22N



CAL4-11



TEF4-ON



LDC4



BX4



BX4-CA

Ordering details¹⁾

For contactor relays	Auxiliary contacts	Catalog number	Pkg qty	Weight (1 pce)
				kg

Front-mounted instantaneous auxiliary contact blocks

4-pole NF	1 0	- -	CA4-10	1	0.02
	0 1	- -	CA4-01	1	0.02
	4 0	- -	CA4-40N	1	0.06
	3 1	- -	CA4-31N	1	0.06
	2 2	- -	CA4-22N	1	0.06
NF..40E	1 3	- -	CA4-13N	1	0.06
	0 4	- -	CA4-04N	1	0.06

Front-mounted auxiliary contact blocks with N.O. leading contact and N.C. lagging contact

4-pole NF	- -	1 0	CC4-10	1	0.02
	- -	0 1	CC4-01	1	0.02

Side-mounted instantaneous auxiliary contact blocks

NF	1 1	- -	CAL4-11	1	0.04
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For contactors	Time delay range selected by switch	Delay type	Auxiliary contacts	Catalog number	Pkg qty	Weight (1 pce)
						kg

Electronic timers

NF	0.1...1 s	ON-delay	1 1	TEF4-ON	1	0.07
	1...10 s 10...100 s	OFF-delay	1 1	TEF4-OFF	1	0.07

Note: Rated control circuit voltage U_c 24...240 V 50/60 Hz or DC.

Additional coil terminal block

NF	LDC4	10	0.01
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Protective covers

All 1-stack contactor relays	BX4	10	0.01
4-pole CA4 auxiliary contact blocks and TEF4 electronic timer	BX4-CA	50	0.01

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

NF 8-pole contactor relays

AC / DC operated



NF44E

4



NF33/11



NF51/11

Description

NF contactor relays are used for switching auxiliary and control circuits.

These contactor relays are of the block type design with:

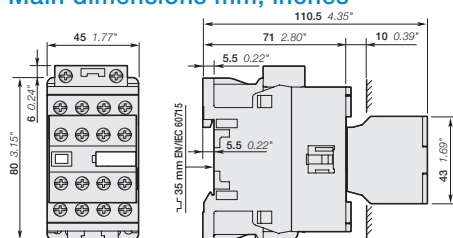
- 8 poles with a permanently fixed 4-pole auxiliary contact block. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol) except for NF33/11 and NF51/11 variants
- overlapping of lagging / leading contacts for NF33/11 and NF51/11 variants
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
 - can manage large control voltage variations
 - only 4 coils to cover control voltages between 24...500 V 50/60 Hz and 20...500 V DC
 - reduced panel energy consumption
 - very distinct closing and opening
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

Number of contacts	Rated control circuit voltage		Catalog number	Global code	Weight	
	1st stack	2nd stack				Uc min. ... Uc max.
			V 50/60 Hz	V DC	Pkg (1 pce) kg	
8-pole contactor relays						
	24...60	-	1)	NF44E-41	1SBH137001R4144	0.320
	48...130	48...130		NF44E-12	1SBH137001R1244	0.320
	100...250	100...250		NF44E-13	1SBH137001R1344	0.320
	250...500	250...500		NF44E-14	1SBH137001R1444	0.360
	24...60	-	1)	NF53E-41	1SBH137001R4153	0.320
	48...130	48...130		NF53E-12	1SBH137001R1253	0.320
	100...250	100...250		NF53E-13	1SBH137001R1353	0.320
	250...500	250...500		NF53E-14	1SBH137001R1453	0.360
	24...60	-	1)	NF62E-41	1SBH137001R4162	0.320
	48...130	48...130		NF62E-12	1SBH137001R1262	0.320
	100...250	100...250		NF62E-13	1SBH137001R1362	0.320
	250...500	250...500		NF62E-14	1SBH137001R1462	0.360
	24...60	-	1)	NF71E-41	1SBH137001R4171	0.320
	48...130	48...130		NF71E-12	1SBH137001R1271	0.320
	100...250	100...250		NF71E-13	1SBH137001R1371	0.320
	250...500	250...500		NF71E-14	1SBH137001R1471	0.360
	24...60	-	1)	NF80E-41	1SBH137001R4180	0.320
	48...130	48...130		NF80E-12	1SBH137001R1280	0.320
	100...250	100...250		NF80E-13	1SBH137001R1380	0.320
	250...500	250...500		NF80E-14	1SBH137001R1480	0.360
8-pole contactor relays with overlapping of lagging / leading contacts						
	24...60	-	1)	NF33/11-41	1SBH137001R4139	0.320
	48...130	48...130		NF33/11-12	1SBH137001R1239	0.320
	100...250	100...250		NF33/11-13	1SBH137001R1339	0.320
	250...500	250...500		NF33/11-14	1SBH137001R1439	0.320
	24...60	-	1)	NF51/11-41	1SBH137001R4159	0.320
	48...130	48...130		NF51/11-12	1SBH137001R1259	0.320
	100...250	100...250		NF51/11-13	1SBH137001R1359	0.320
	250...500	250...500		NF51/11-14	1SBH137001R1459	0.320

1) For 24...60 V 50/60 Hz - 20...60 V DC, use NF..-21.

Main dimensions mm, inches



NF44E, NF53E, NF62E, NF71E, NF80E, NF33/11, NF51/11

NFZ 8-pole contactor relays

AC / DC operated



NFZ44E

1SBC101029V0014



NFZ33/11

1SBC101042V0014



NFZ51/11

1SBC101043V0014

Description

NFZ contactor relays are used for switching auxiliary and control circuits.

These contactor relays are of the block type design with:

- 8 poles with a permanently fixed 4-pole auxiliary contact block. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol) except for NFZ33/11 and NFZ51/11 variants
- overlapping of lagging / leading contacts for NFZ33/11 and NFZ51/11 variants
- control circuit: AC or DC operated with electronic coil interface accepting a wide control voltage range (e.g. 100...250 V AC and DC)
 - can manage large control voltage variations
 - only 4 coils to cover control voltages between 24 ... 250 V 50/60 Hz and 12 ... 250 V DC
 - allow direct control by PLC-output ≥ 24 V DC 500 mA
 - reduced panel energy consumption
 - very distinct closing and opening
 - can withstand short voltage dips and voltage sags (SEMI F47-0706 conditions of use on request).
- built-in surge suppression
- add-on auxiliary contact blocks for side mounting and a wide range of accessories.

Ordering details

Number of contacts		Rated control circuit voltage		Catalog number	Global code	Weight Pkg (1 pce) kg
1st stack	2nd stack	Uc min. ... Uc max.	V 50/60 Hz			

8-pole contactor relays

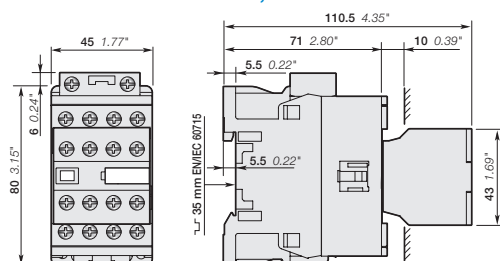
Terminal diagram	Uc min. ... Uc max.	V 50/60 Hz	V DC	Catalog number	Global code	Weight (kg)
	-	12...20	12...20	NFZ44E-20	1SBH136001R2044	0.360
	24...60	20...60	20...60	NFZ44E-21	1SBH136001R2144	0.360
	48...130	48...130	48...130	NFZ44E-22	1SBH136001R2244	0.360
	100...250	100...250	100...250	NFZ44E-23	1SBH136001R2344	0.360
	-	12...20	12...20	NFZ53E-20	1SBH136001R2053	0.360
	24...60	20...60	20...60	NFZ53E-21	1SBH136001R2153	0.360
	48...130	48...130	48...130	NFZ53E-22	1SBH136001R2253	0.360
	100...250	100...250	100...250	NFZ53E-23	1SBH136001R2353	0.360
	-	12...20	12...20	NFZ62E-20	1SBH136001R2062	0.360
	24...60	20...60	20...60	NFZ62E-21	1SBH136001R2162	0.360
	48...130	48...130	48...130	NFZ62E-22	1SBH136001R2262	0.360
	100...250	100...250	100...250	NFZ62E-23	1SBH136001R2362	0.360
	-	12...20	12...20	NFZ71E-20	1SBH136001R2071	0.360
	24...60	20...60	20...60	NFZ71E-21	1SBH136001R2171	0.360
	48...130	48...130	48...130	NFZ71E-22	1SBH136001R2271	0.360
	100...250	100...250	100...250	NFZ71E-23	1SBH136001R2371	0.360
	-	12...20	12...20	NFZ80E-20	1SBH136001R2080	0.360
	24...60	20...60	20...60	NFZ80E-21	1SBH136001R2180	0.360
	48...130	48...130	48...130	NFZ80E-22	1SBH136001R2280	0.360
	100...250	100...250	100...250	NFZ80E-23	1SBH136001R2380	0.360

8-pole contactor relays with overlapping of lagging / leading contacts

Terminal diagram	Uc min. ... Uc max.	V 50/60 Hz	V DC	Catalog number	Global code	Weight (kg)
	-	12...20	12...20	NFZ33/11-20	1SBH136001R2039	0.360
	24...60	20...60	20...60	NFZ33/11-21	1SBH136001R2139	0.360
	48...130	48...130	48...130	NFZ33/11-22	1SBH136001R2239	0.360
	100...250	100...250	100...250	NFZ33/11-23	1SBH136001R2339	0.360
	-	12...20	12...20	NFZ51/11-20	1SBH136001R2059	0.360
	24...60	20...60	20...60	NFZ51/11-21	1SBH136001R2159	0.360
	48...130	48...130	48...130	NFZ51/11-22	1SBH136001R2259	0.360
	100...250	100...250	100...250	NFZ51/11-23	1SBH136001R2359	0.360

Note: Only NFZ contactor relays with DC control voltage 12...20 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole

Main dimensions mm, inches



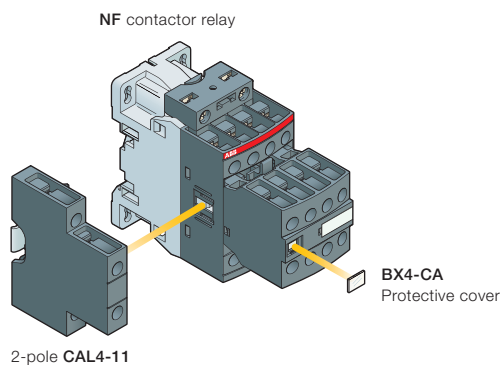
NFZ44E, NFZ53E, NFZ62E, NFZ71E, NFZ80E, NFZ33/11, NFZ51/11

NF 8-pole contactor relays

Main accessories

Contactor relays and main accessories (other accessories available)

4



Main accessory fitting details

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor relay types	Main poles	Front-mounted accessories			Side-mounted accessories	
		Auxiliary contact blocks			Auxiliary contact blocks	
		1-pole CA4	4-pole CA4	Left side	Right side	
		1-pole CC4		2-pole CAL4-11		
NF	4 4 E 5 3 E 6 2 E 7 1 E 8 0 E	-	-	+	1	

NF 8-pole contactor relays

Main accessories



CAL4-11



LDC4



BX4-CA

Ordering details¹⁾

For contactor relays	Auxiliary contacts		Catalog number	Pkg qty	Weight (1 pce)
	Y Y	Y Y			kg

Side-mounted instantaneous auxiliary contact blocks

NF	1 1	- -	CAL4-11	1	0.04
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Additional coil terminal block

NF			LDC4	10	0.01
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Protective covers

NF			BX4-CA	50	0.01
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¹⁾ For more information, refer to "Accessories" section.

NF contactor relays


Technical data

Contact utilization characteristics according to UL / CSA

Contactor relay types	AC / DC operated	NF
Standards		UL 508, CSA C22.2 N°14
Max. operational voltage		600 V AC, 600 V DC
Pilot duty		A600, Q600
AC thermal rated current		10 A
AC maximum volt-ampere making		7200 VA
AC maximum volt-ampere breaking		720 VA
DC thermal rated current		2.5 A
DC maximum volt-ampere making-breaking		69 VA

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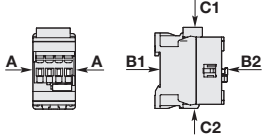
Contact utilization characteristics according to IEC

Contactor relay types	AC / DC operated	NF
Standards		IEC 60947-1 / 60947-5-1 and EN 60947-1 / 60947-5-1
Rated operational voltage U _e max.		690 V
Rated frequency (without derating)		50 / 60 Hz
Conventional free-air thermal current I _{th} @ ≤ 40 °C		16 A
le / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A
	220-240 V 50/60 Hz	4 A
	400-440 V 50/60 Hz	3 A
	500 V 50/60 Hz	2 A
	690 V 50/60 Hz	2 A
Rated making capacity AC-15		10 x I _e AC-15 acc. to IEC 60947-5-1
Rated breaking capacity AC-15		10 x I _e AC-15 acc. to IEC 60947-5-1
le / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	6 A / 144 W
	48 V DC	2.8 A / 134 W
	72 V DC	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.27 A / 60 W
	250 V DC	0.27 A / 68 W
	400 V DC	0.15 A / 60 W
	500 V DC	0.13 A / 65 W
	600 V DC	0.1 A / 60 W
Short-circuit protection device gG type fuse		10 A
Rated short-time withstand current I _{cw}	for 1.0 s	100 A
	for 0.1 s	140 A
Minimum switching capacity with failure rate acc. to IEC 60947-5-4		12 V / 3 mA
Non-overlapping time between N.O. and N.C. contacts		≥ 2 ms
Power dissipation per pole at 6 A		0.1 W
Max. electrical switching frequency	AC-15	1200 cycles/h
	DC-13	900 cycles/h
Mechanically linked contacts acc. to annex L of IEC 60947-5-1		Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts (CA4, CAL4 aux. contact blocks) are mechanically linked contacts.

NF contactor relays

Technical data

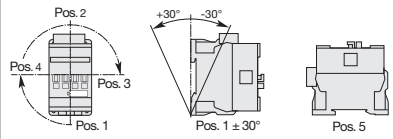
General technical data

Contactor relay types	AC / DC operated	NF
Rated insulation voltage U_i acc. to IEC 60947-5-1 acc. to UL / CSA		690 V 600 V
Rated impulse withstand voltage U_{imp}		6 kV
Electromagnetic compatibility		Devices complying with IEC 60947-1 / EN 60947-1 - Environment A
Ambient air temperature close to contactor relay Operation in free air Storage		-40...+70 °C -60...+80 °C
Climatic withstand		Category B according to IEC 60947-1 Annex Q
Maximum operating altitude (without derating)		3000 m
Mechanical durability Number of operating cycles Max. switching frequency		20 millions operating cycles 6000 cycles/h
Shock withstand acc. to IEC 60068-2-27 and EN 60068-2-27 Mounting position 1	Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position
	A	30 g
	B1	25 g closed position / 5 g open position
	B2	15 g
	C1	25 g
	C2	25 g
Vibration withstand acc. to IEC 60068-2-6		5...300 Hz 4 g closed position / 2 g open position

Magnet system characteristics

Contactor relay types	AC / DC operated	NF
Coil operating limits acc. to IEC 60947-5-1	AC supply	At $\theta \leq 60$ °C $0.85 \times U_c \text{ min...} 1.1 \times U_c \text{ max.}$ At $\theta \leq 70$ °C $0.85 \times U_c \text{ min...} U_c \text{ max.}$
	DC supply	At $\theta \leq 60$ °C $0.85 \times U_c \text{ min...} 1.1 \times U_c \text{ max.}$ At $\theta \leq 70$ °C (AF) $0.85 \times U_c \text{ min...} U_c \text{ max.}$ - (NFZ) $0.85 \times U_c \text{ min...} 1.1 \times U_c \text{ max.}$
AC control voltage 50/60 Hz Rated control circuit voltage U_c Coil consumption	Average pull-in value Average holding value	24...500 V AC (NF) 50 VA - (NFZ) 16 VA (NF) 2.2 VA / 2 W - (NFZ) 1.7 VA / 1.5 W
DC control voltage Rated control circuit voltage U_c Coil consumption	Average pull-in value Average holding value	12...500 V DC (NF) 50 W - (NFZ) 12...16 W (NF) 2 W - (NFZ) 1.7 W
PLC-output control Drop-out voltage Voltage sag immunity acc. to SEMI F47-0706		(NFZ) ≥ 500 mA 24 V DC ≤ 60 % of $U_c \text{ min.}$ (NFZ) conditions of use on request
Dips withstand -20 °C $\leq \theta \leq$ +60 °C		(NFZ) 22 ms average for $U_c \geq 24$ V 50/60 Hz or $U_c \geq 20$ V DC
Operating time Between coil energization and:	N.O. contact closing N.C. contact opening	40...95 ms 38...90 ms
Between coil de-energization and:	N.O. contact opening N.C. contact closing	11...95 ms 13...98 ms








Mounting characteristics

Contactor relay types	AC / DC operated	NF
Mounting positions		
	Max. add-on N.C. auxiliary contacts: see accessory fitting details for a NF contactor relay	
Mounting distances	The contactor relays can be assembled side by side.	
Fixing On rail according to IEC 60715, EN 60715 By screws (not supplied)	35 x 7.5 mm or 35 x 15 mm 2 x M4 screws placed diagonally	

NF contactor relays

Technical data


Connecting characteristics

Contactor relay types	AC / DC operated	NF
Main terminals		 Screw terminals with cable clamp
Connection capacity (min. ... max.)		
Pole and coil terminals		
 Rigid	1 x	1...2.5 mm ²
 Rigid	2 x	1...2.5 mm ²
 Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²
 Flexible with non insulated ferrule	2 x	0.75...2.5 mm ²
 Flexible with insulated ferrule	1 x	0.75...2.5 mm ²
 Flexible with insulated ferrule	2 x	0.75...1.5 mm ²
 Lugs	L <	8 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14
Stripping length		10 mm
Tightening torque		
Pole terminals		1.2 Nm / 11 lb.in
Coil terminals		1.2 Nm / 11 lb.in
Degree of protection		
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529		
All terminals		IP20
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 contacts for safety circuits



Definitions from Standards

Mechanically linked contact elements , IEC 60947-5-1, Annex L 3.0 (known as "forced contacts", "positively activated contacts" or "linked contacts").

Combination of "n" Make contact element(s) and "m" Break contact element(s) designed in such a way that they cannot be in closed position simultaneously.

One control circuit device may have more than one group of mechanically linked contact elements.


Mirror contact. (Project of amendment of IEC 60947-4-1, Annex F 2.1)

Normally closed auxiliary contact (N.C.) which cannot be in closed position simultaneously with the normally open (N.O.) main contact.

Mechanically Linked Contacts Elements for Control Relays

The tables below are giving the recommended association between contactor relays offering mechanically linked auxiliary contacts according to IEC 60947-5-1, Annex L (2000).

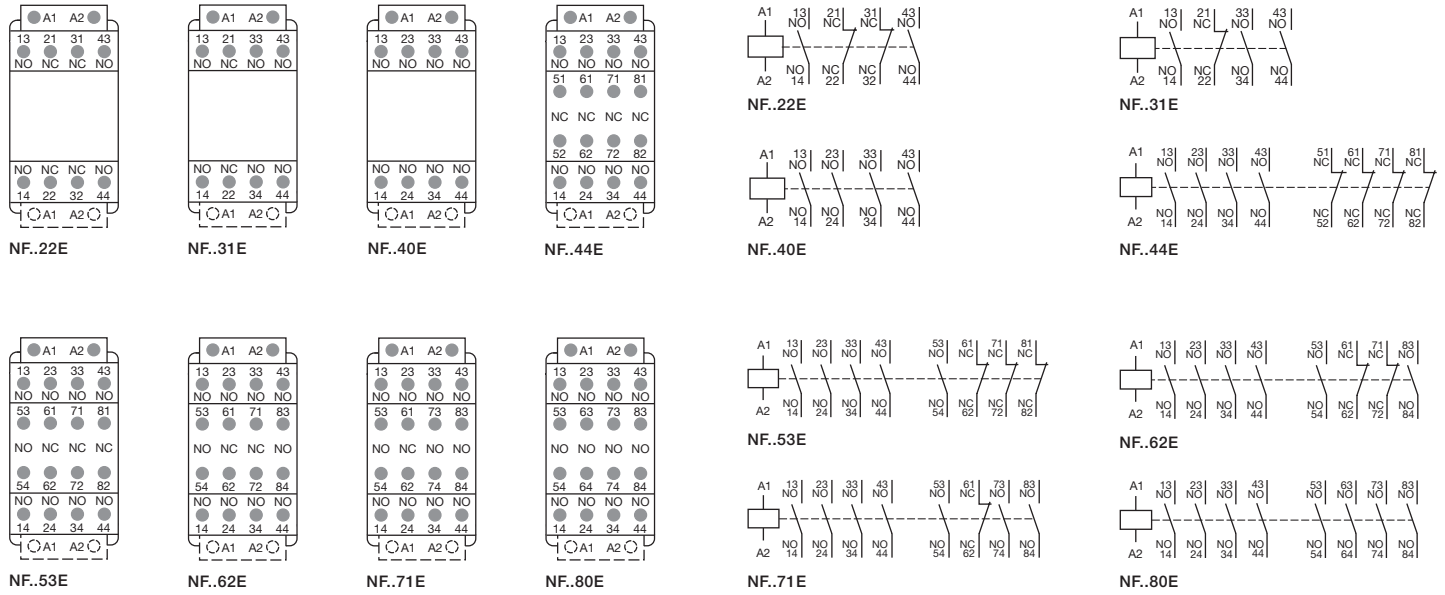
4-pole and 8-pole NF... control relays

Contactor Relays	Built-in Auxiliary Contacts 	
Type		
NF 22 E	2	2
NF 31 E	3	1
NF 44 E	4	4
NF 53 E	5	3
NF 62 E	6	2
NF 71 E	7	1

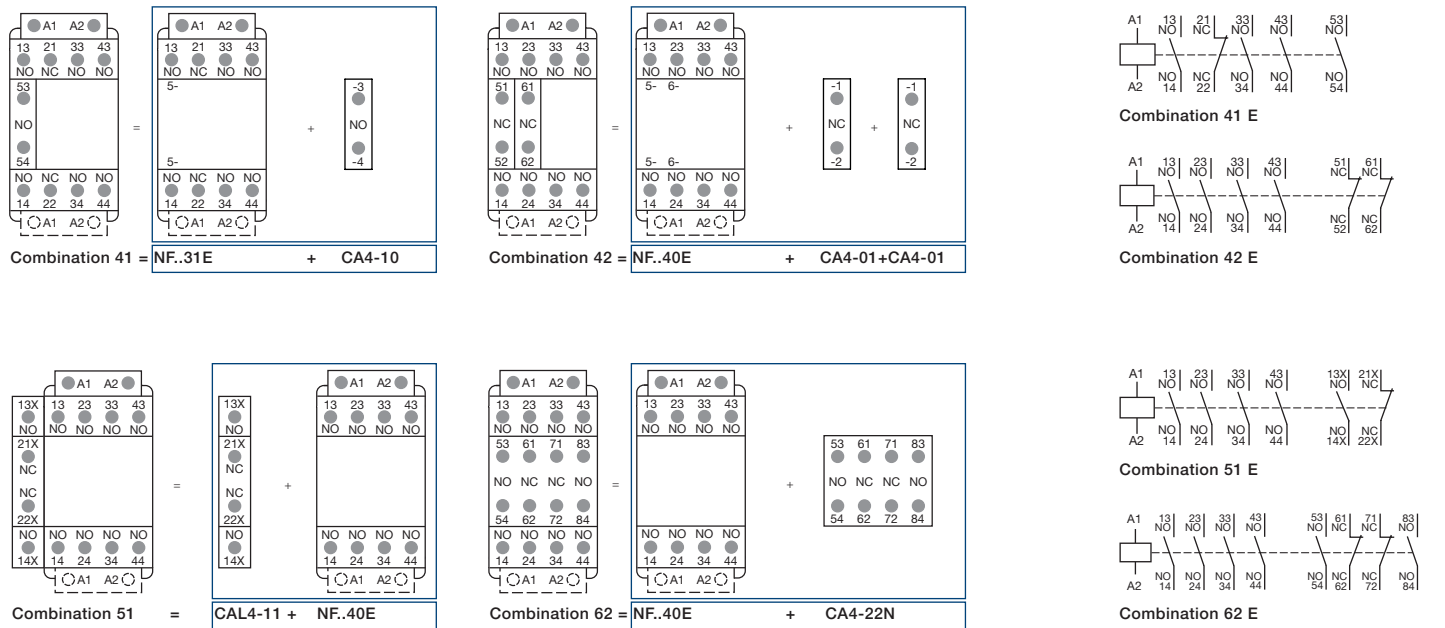
NF contactor relays

Terminal marking and positioning

Standard devices without addition of auxiliary contacts



Other possible contact combinations with auxiliary contacts added by the user

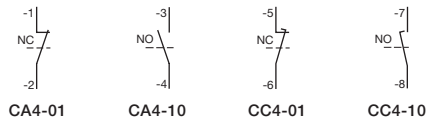


Note: Only NFZ contactor relays with DC control voltage 12...20 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole

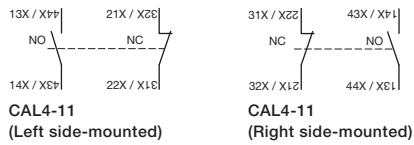
NF add-on auxiliary contacts

Terminal marking and positioning

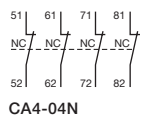
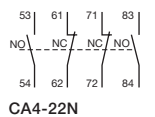
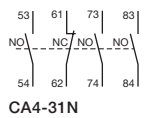
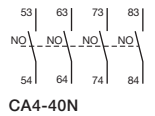
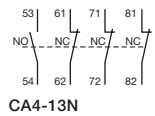
1-pole auxiliary contacts



2-pole auxiliary contacts



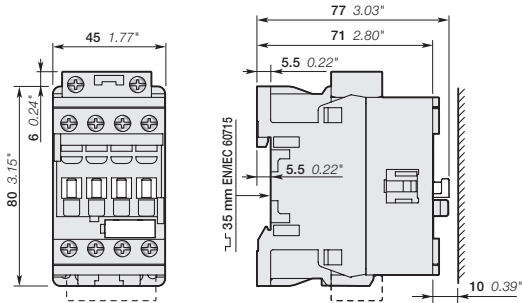
4-pole auxiliary contacts



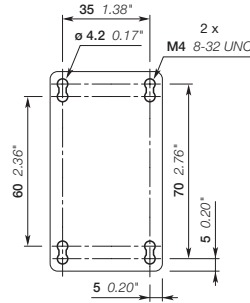
NF contactor relays

Main dimensions mm, inches

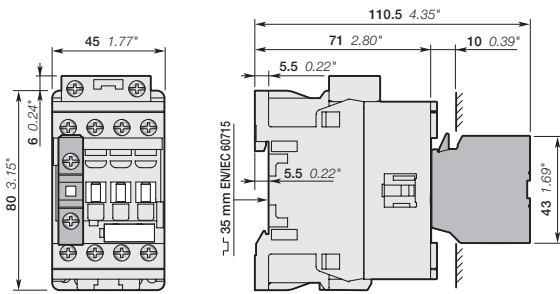
4



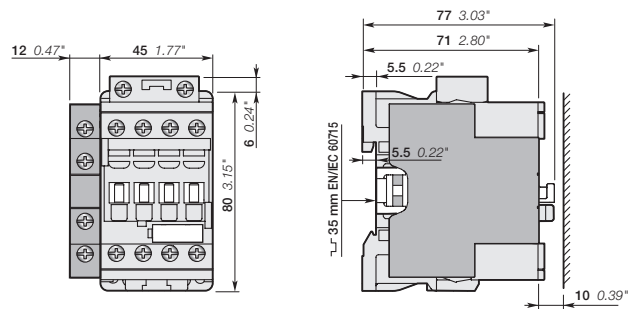
NF..22E, NF..31E, NF..40E



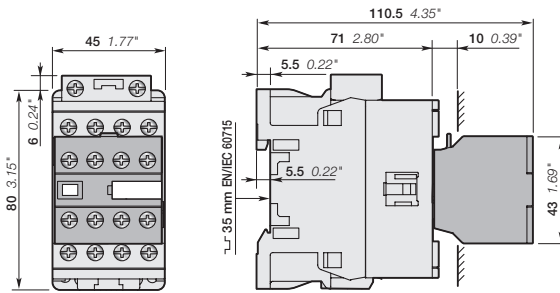
NF



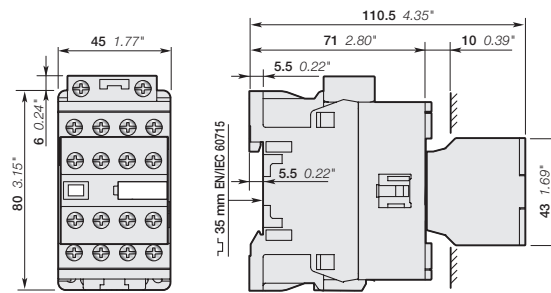
NF..22E, NF..31E, NF..40E
+ CA4, CC4 1-pole auxiliary contact block



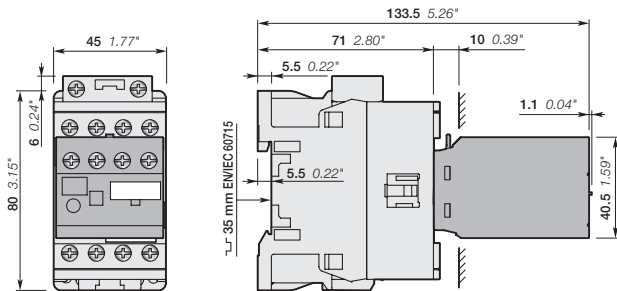
NF..22E, NF..31E, NF..40E
+ CAL4-11 2-pole auxiliary contact block



NF..22E, NF..31E, NF..40E
+ CA4 4-pole auxiliary contact block



NF..44E, NF..53E, NF..62E, NF..71E, NF..80E



NF..22E, NF..31E, NF..40E
+ TEF4 electronic timer

Note: Contactor relay lateral distance to grounded component 2 mm 0.08" min.

Notes

A series of horizontal dotted lines for taking notes, spanning most of the page width.

Accessories for AF09 ... AF2650 3-pole contactors, AF09 ... AF370 4-pole contactors and NF contactor relays

Auxiliary contact blocks	4/314
Electronic timers	4/327
Interlocks	4/330
Impulse contact blocks	4/332
Interface relay	4/334
Mechanical latching units	4/236
Other accessories	4/238
Terminal shrouds	4/340
Connections	4/342
Terminal connecting strips and shorting bars	4/343
Connection accessories for starting solutions	4/344
Connection sets for star-delta starter	4/345
Connection bars	4/346
Mounting plates	4/347
Adapter plates	4/348
Contactor coils, main contact sets and arc chutes	4/349

Auxiliary contact blocks for AF09 ... AF96 contactors and NF contactor relays



CA4-10



CAL4-11



CA4-22E



CAT4-11E

4

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 front mounting:

- CA4 1 or 4-pole block, with instantaneous N.O., N.C. contacts
- CC4 1-pole block, with N.O. leading contact or N.C. lagging contact
- CAT4 2-pole block, with instantaneous N.O. + N.C. contacts and A1 / A2 coil terminal connection on front face

Select the 4-pole auxiliary contact blocks CA4-..E, CA4-..M, CA4-..U or CA4-..N type, according to the contactor or contactor relay type for compliance with the standard requirements (see "Terminal marking and positioning").

Types of auxiliary contact blocks for side mounting:

- CAL4 2-pole block, with instantaneous N.O. + N.C. contacts

For clipping onto the right- and/or left-hand side of the 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	Catalog number	Pkg qty	Weight (1 pce)
				kg

Front-mounted instantaneous auxiliary contact blocks

AF09 ... AF96 4-pole NF	1 0 - -	CA4-10	1	0.02
	0 1 - -	CA4-01	1	0.02
AF09 ... AF16...30-10	2 2 - -	CA4-22M	1	0.06
	3 1 - -	CA4-31M	1	0.06
	1 3 - -	CA4-13M	1	0.06
	0 4 - -	CA4-04M	1	0.06
AF26 ... AF96...30-00	2 2 - -	CA4-22E	1	0.06
AF09 ... AF38...40-00	3 1 - -	CA4-31E	1	0.06
AF09 ... AF38...22-00	4 0 - -	CA4-40E	1	0.06
AF26 ... AF96...30-00	0 4 - -	CA4-04E	1	0.06
AF09 ... AF16...40-00				
AF09 ... AF16...30-01	2 2 - -	CA4-22U	1	0.06
	3 1 - -	CA4-31U	1	0.06
	4 0 - -	CA4-40U	1	0.06
4-pole NF	2 2 - -	CA4-22N	1	0.06
	3 1 - -	CA4-31N	1	0.06
	4 0 - -	CA4-40N	1	0.06
	1 3 - -	CA4-13N	1	0.06
NF..40E	0 4 - -	CA4-04N	1	0.06

Front-mounted auxiliary contact blocks with N.O. leading contact and N.C. lagging contact

AF09 ... AF96 4-pole NF	- - 1 0	CC4-10	1	0.02
	- - 0 1	CC4-01	1	0.02

Side-mounted instantaneous auxiliary contact blocks

AF09 ... AF96, NF	1 1 - -	CAL4-11	1	0.04
-------------------	---------	---------	---	------

Front-mounted instantaneous auxiliary contact and A1/A2 coil terminal blocks

AF09 ... AF16...30-10	1 1 - -	CAT4-11M	1	0.04
AF26 ... AF65...30-00	1 1 - -	CAT4-11E	1	0.04
AF09 ... AF38...40-00				
AF09 ... AF38...22-00				
AF09 ... AF16...30-01	1 1 - -	CAT4-11U	1	0.04

¹⁾ For each contactor or contactor relay type, refer to "Accessory fitting details" table.
Note: CAT4 not suitable for AF..Z contactors with DC control voltage 12...20 V DC.

Auxiliary contact blocks for AF09 ... AF96 contactors and NF contactor relays

Technical data





Contact utilization characteristics according to UL / CSA

Types	1-pole CA4, 1-pole CC4, 4-pole CA4, 2-pole CAT4, 2-pole CAL4
Standards	UL 508, CSA C22.2 N°14
Max. operational voltage	600 V AC, 600 V DC
Pilot duty	A600, Q600
AC thermal rated current	10 A
AC maximum volt-ampere making	7200 VA
AC maximum volt-ampere breaking	720 VA
DC thermal rated current	2.5 A
DC maximum volt-ampere making-breaking	69 VA

Contact utilization characteristics according to IEC

Types	1-pole CA4, 1-pole CC4, 4-pole CA4, 2-pole CAT4, 2-pole CAL4																				
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																				
Conventional thermal current I_{th} - $\theta \leq 40$ °C	16 A																				
Rated frequency (without derating)	50/60 Hz																				
I_e / Rated operational current AC-15 acc. to IEC 60947-5-1	<table border="0"> <tr> <td>24-127 V 50/60 Hz</td> <td>6 A</td> </tr> <tr> <td>220-240 V 50/60 Hz</td> <td>4 A</td> </tr> <tr> <td>400-440 V 50/60 Hz</td> <td>3 A</td> </tr> <tr> <td>500 V 50/60 Hz</td> <td>2 A</td> </tr> <tr> <td>690 V 50/60 Hz</td> <td>2 A</td> </tr> </table>	24-127 V 50/60 Hz	6 A	220-240 V 50/60 Hz	4 A	400-440 V 50/60 Hz	3 A	500 V 50/60 Hz	2 A	690 V 50/60 Hz	2 A										
24-127 V 50/60 Hz	6 A																				
220-240 V 50/60 Hz	4 A																				
400-440 V 50/60 Hz	3 A																				
500 V 50/60 Hz	2 A																				
690 V 50/60 Hz	2 A																				
Making capacity 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	<table border="0"> <tr> <td>24 V DC</td> <td>6 A / 144 W</td> </tr> <tr> <td>48 V DC</td> <td>2.8 A / 134 W</td> </tr> <tr> <td>72 V DC</td> <td>1 A / 72 W</td> </tr> <tr> <td>110 V DC</td> <td>0.55 A / 60 W</td> </tr> <tr> <td>125 V DC</td> <td>0.55 A / 69 W</td> </tr> <tr> <td>220 V DC</td> <td>0.27 A / 60 W</td> </tr> <tr> <td>250 V DC</td> <td>0.27 A / 68 W</td> </tr> <tr> <td>400 V DC</td> <td>0.15 A / 60 W</td> </tr> <tr> <td>500 V DC</td> <td>0.13 A / 65 W</td> </tr> <tr> <td>600 V DC</td> <td>0.1 A / 60 W</td> </tr> </table>	24 V DC	6 A / 144 W	48 V DC	2.8 A / 134 W	72 V DC	1 A / 72 W	110 V DC	0.55 A / 60 W	125 V DC	0.55 A / 69 W	220 V DC	0.27 A / 60 W	250 V DC	0.27 A / 68 W	400 V DC	0.15 A / 60 W	500 V DC	0.13 A / 65 W	600 V DC	0.1 A / 60 W
24 V DC	6 A / 144 W																				
48 V DC	2.8 A / 134 W																				
72 V DC	1 A / 72 W																				
110 V DC	0.55 A / 60 W																				
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220 V DC	0.27 A / 60 W																				
250 V DC	0.27 A / 68 W																				
400 V DC	0.15 A / 60 W																				
500 V DC	0.13 A / 65 W																				
600 V DC	0.1 A / 60 W																				
Short-circuit protection device gG type fuse	10 A																				
Rated short-time withstand current I_{cw} $\theta = 40$ °C	<table border="0"> <tr> <td>for 1.0 s</td> <td>100 A</td> </tr> <tr> <td>for 0.1 s</td> <td>140 A</td> </tr> </table>	for 1.0 s	100 A	for 0.1 s	140 A																
for 1.0 s	100 A																				
for 0.1 s	140 A																				
Minimum switching capacity with failure rate acc. to IEC 60947-5-4	12 V / 3 mA																				
Power dissipation per pole at 6 A	10 ⁻⁷																				
Power dissipation per pole at 6 A	0.1 W																				
Mechanical durability	<table border="0"> <tr> <td>Number of operating cycles</td> <td>10 millions operating cycles</td> </tr> <tr> <td>Max. switching frequency</td> <td>3600 cycles/h</td> </tr> </table>	Number of operating cycles	10 millions operating cycles	Max. switching frequency	3600 cycles/h																
Number of operating cycles	10 millions operating cycles																				
Max. switching frequency	3600 cycles/h																				
Max. electrical switching frequency	<table border="0"> <tr> <td>AC-15</td> <td>1200 cycles/h</td> </tr> <tr> <td>DC-13</td> <td>900 cycles/h</td> </tr> </table>	AC-15	1200 cycles/h	DC-13	900 cycles/h																
AC-15	1200 cycles/h																				
DC-13	900 cycles/h																				
Mechanically linked contacts acc. to annex L of IEC 60947-5-1	Additional N.O. or N.C. auxiliary contacts (CA4, CAL4, CAT4) are mechanically linked contacts																				
Mirror contacts acc. to annex F of IEC 60947-4-1	Additional N.C. auxiliary contacts (CA4, CAL4, CAT4) are mirror contacts																				

Connecting characteristics

Types	1-pole CA4, 1-pole CC4, 4-pole CA4, 2-pole CAT4, 2-pole CAL4				
Connection capacity (min. ... max.)					
 Rigid solid	<table border="0"> <tr> <td>1 x</td> <td>1...2.5 mm²</td> </tr> <tr> <td>2 x</td> <td>1...2.5 mm²</td> </tr> </table>	1 x	1...2.5 mm ²	2 x	1...2.5 mm ²
1 x	1...2.5 mm ²				
2 x	1...2.5 mm ²				
 Flexible with non insulated ferrule	<table border="0"> <tr> <td>1 x</td> <td>0.75...2.5 mm²</td> </tr> <tr> <td>2 x</td> <td>0.75...2.5 mm²</td> </tr> </table>	1 x	0.75...2.5 mm ²	2 x	0.75...2.5 mm ²
1 x	0.75...2.5 mm ²				
2 x	0.75...2.5 mm ²				
 Flexible with insulated ferrule	<table border="0"> <tr> <td>1 x</td> <td>0.75...2.5 mm²</td> </tr> <tr> <td>2 x</td> <td>0.75...1.5 mm²</td> </tr> </table>	1 x	0.75...2.5 mm ²	2 x	0.75...1.5 mm ²
1 x	0.75...2.5 mm ²				
2 x	0.75...1.5 mm ²				
 Lugs	L < 8 mm				
Connection capacity acc. to UL/CSA	1 or 2 x AWG 18...14				
Stripping length	10 mm				
Tightening torque	1.2 Nm / 11 lb.in				
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529	IP20				
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 severe industrial environments for AF09 ... AF96 contactors and NF contactor relays



CE5-10W

Description



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

Types of auxiliary contact blocks for front mounting:

- CE5 1-pole block, instantaneous with N.O. contact or N.C. contact, available in 2 IP degrees
 - CE5 D with built-in microswitch IP40, degree of protection (IP20 on terminals)
 - CE5 W with built-in microswitch IP67, degree of protection (IP20 on terminals).

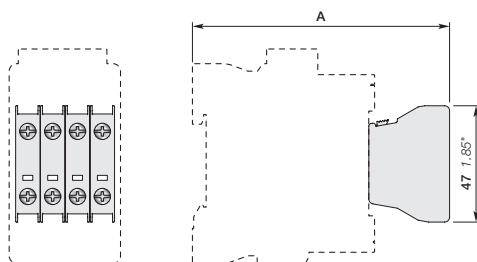
The auxiliary contact blocks are equipped with screw type connecting terminals delivered open, protected against accidental direct contact and bear the corresponding function marking.

Ordering details¹⁾

For contactors	Auxiliary contacts		Catalog number	Pkg qty	Weight (1 pce) kg
					
AF09 ... AF96	1	-	CE5-10D0.1	1	0.02
NF	-	1	CE5-01D0.1	1	0.02
	1	-	CE5-10D2	1	0.02
	-	1	CE5-01D2	1	0.02
	1	-	CE5-10W0.1	1	0.02
	-	1	CE5-01W0.1	1	0.02
	1	-	CE5-10W2	1	0.02
	-	1	CE5-01W2	1	0.02

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

Main dimensions mm, inches



1-pole CE5 on	A
AF09 ... AF16...-30-xx 1 stack AF09, AF16...-40/22-00 NF.E 1-stack	103.5 mm / 4.07"
AF26 ... AF38...-30-00	112.5 mm / 4.43"
AF26, AF38...-40/22-00	127.5 mm / 5.02"
AF40 ... AF65-30-00	137 mm / 5.39"
AF40 ... AF65-40/22-00	140 mm / 5.51"
AF80 ... AF96-30-00	142 mm / 5.59"
AF80-40/22-00	142 mm / 5.59"

Auxiliary contact blocks for severe industrial environments

Technical data

Types	Front mounted 1-pole CE5-..0.1	1-pole CE5-..2
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Contact utilization characteristics according to IEC

Standards	IEC 60947-5-1 and EN 60947-5-1	
Rated insulation voltage Ui acc. to IEC 60947-5-1	250 V	
Rated operational voltage Ue max.	125 V	250 V
Conventional thermal current Ith - $\theta \leq 40$ °C	0.1 A	2 A
Rated frequency (without derating)	50 / 60 Hz	
Ie / Rated operational current acc. to IEC 60947-5-1	AC-14	AC-15
	24-127 V 50/60 Hz 0.1 A	2 A
	220-240 V 50/60 Hz -	2 A
Making capacity	6 x Ie AC-14 acc. to IEC 60947-5-1	10 x Ie AC-15 acc. to IEC 60947-5-1
Breaking capacity	6 x Ie AC-14 acc. to IEC 60947-5-1	10 x Ie AC-15 acc. to IEC 60947-5-1
Ie / Rated operational current DC-12 acc. to IEC 60947-5-1	24 V DC 0.1 A	2 A
	48 V DC 0.1 A	1 A
	72 V DC 0.1 A	0.3 A
	110 V DC 0.1 A	0.2 A
	125 V DC -	0.2 A
	220 V DC -	0.1 A
Short-circuit protection device FF type fuse ¹⁾	0.1 A	10 A
Minimum switching capacity		
AF09 ... AF38 contactors with failure rate acc. to IEC 60947-5-4	3 V / 1 mA -	17 V / 1 mA ≤ 10 -7
Mechanical durability		
Number of operating cycles	5 millions for CE5-..D0.1 2.5 millions for CE5-..W0.1	5 millions for CE5-..D2 2.5 millions for CE5-..W2
Max. switching frequency	3600 cycles/h	
Electrical durability		
Number of operating cycles	2.5 millions for CE5-..D0.1 0.7 millions for CE5-..W0.1	1 million for CE5-..D2 0.3 millions for CE5-..W2
Max. electrical switching frequency	AC-14 1200 cycles/h	
	AC-15 1200 cycles/h	
	DC-12 900 cycles/h	

Contact utilization characteristics according to UL / CSA

Standards	UL 508, CSA C22.2 N°14	
Max. operational voltage	125 V AC / 110 V DC	250 V AC / 220 V DC
Pilot duty		
AC thermal rated current	0.1 A	2 A

Connecting characteristics

Connection capacity (min. ... max.)		
 Rigid solid	1 x	1...4 mm ²
	2 x	1...4 mm ²
 Flexible with ferrule	1 x	0.75...2.5 mm ²
	2 x	0.75...2.5 mm ²
 Lugs	L \leq	7.7 mm
	L $>$	3.7 mm
Connecting capacity acc. to UL / CSA	1 or 2 x	AWG 18...14
Tightening torque		1 Nm
Degree of protection	Terminals	IP20
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529	Microswitches	IP40 for CE5-..D0.1 IP67 for CE5-..W0.1
		IP40 for CE5-..D2 IP67 for CE5-..W2
Screw terminals	Delivered in open position, screws of unused terminals must be tightened	
All terminals	M3.5	
Screwdriver type	Flat \varnothing 5.5 / Pozidriv 2	

¹⁾ HRC fuses for very fast action (6.3 x 32 mm size).

Auxiliary contact blocks for severe industrial environments

For AF contactors

Main accessory fitting details

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.


Contactor types	Main poles	Built-in auxiliary contacts	Front-mounted accessories			Side-mounted accessories	
			Auxiliary contact blocks	Electrical and mechanical interlock set (Between 2 contactors)	Auxiliary contact blocks	Left side	Right side
			1-pole CE5	1-pole CA4 1-pole CC4	VEM4	2-pole CAL4-11	
3-pole contactors AF09 ... AF38							
			Max. N.C. built-in and add-on N.C. auxiliary contacts (CA4, CC4, CAL4, VEM4): 2 max. with 1 CE5, none with 2 CE5 on positions 1, 2, 3, 4				
AF09 ... AF16	3 0	0 1	1	+ 3 max.	-	+ 1	-
AF09 ... AF16	3 0	1 0	2	+ 2 max.	-	-	-
AF26 ... AF38	3 0	0 0	1	+ 3 max.	-	+ 1	-
			1	+ 1 max.	-	+ 1	+ 1
			1	+ 2 max.	+ 1	+ 1	-
			Max. N.C. built-in or add-on N.C. auxiliary contacts (CA4, CC4, CAL4, VEM4): 1 max. with 1 CE5 on positions 1 ±30°, 5				
AF09 ... AF16	3 0	0 1	1	+ 3 max.	-	-	-
AF09 ... AF16	3 0	1 0	1	+ 3 max.	-	+ 1	-
AF26 ... AF38	3 0	0 0	1	+ 2 max.	+ 1	-	-
			Max. add-on N.C. auxiliary contacts (CA4, CC4, CAL4): 4 max. with 1 CE5, 2 max. with 2 CE5 on positions 1, 1 ±30°, 2, 3, 4, 5				
AF40 ... AF96	3 0	0 0	2	+ 2 max.	-	+ 1	+ 1
			1	+ 3 max.	-	+ 1	+ 1
4-pole contactors AF09 ... AF80							
			Max. add-on N.C. auxiliary contacts (CA4, CC4, CAL4, VEM4): 2 max. with 1 CE5, none with 2 CE5 on positions 1, 2, 3, 4				
AF09, AF16	4 0	0 0	2	+ 2 max.	-	-	-
			1	+ 3 max.	-	+ 1	-
			1	+ 1 max.	-	+ 1	+ 1
			1	+ 2 max.	+ 1	+ 1	-
			Max. add-on N.C. auxiliary contacts (CA4, CC4, CAL4, VEM4): 1 max. with 1 CE5 on positions 1, 2, 3, 4				
AF26, AF38	4 0	0 0	1	+ 3 max.	-	+ 1	-
			1	+ 2 max.	+ 1	-	-
AF09, AF16 AF26, AF38	2 2	0 0	1	+ 3 max.	-	+ 1	-
			Max. add-on N.C. auxiliary contacts (CA4, CC4, CAL4, VEM4): 1 max. with 1 CE5 on positions 1 ±30°, 5				
AF09, AF16	4 0	0 0	1	+ 3 max.	-	+ 1	-
			1	+ 2 max.	+ 1	-	-
			No add-on N.C. auxiliary contacts on positions 1 ±30°, 5				
AF26, AF38	4 0	0 0	1	+ 3 max.	-	-	-
AF09, AF16	2 2	0 0					
AF26, AF38	2 2	0 0					
			Max. add-on N.C. auxiliary contacts (CA4, CC4, CAL4): 4 max. with 1 CE5, 2 max. with 2 CE5 on positions 1, 1 ±30°, 2, 3, 4, 5				
AF40 ... AF80	4 0	0 0	2	+ 2 max.	-	+ 1	+ 1
			1	+ 3 max.	-	+ 1	+ 1
			No add-on N.C. auxiliary contacts on positions 1, 1 ±30°, 2, 3, 4, 5				
AF40, AF80	2 2	0 0	1	+ 3 max.	-	-	-

Auxiliary contact blocks for severe industrial environments

For NF contactor relays

Main accessory fitting details

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

Contactor relay types	Main poles 		Front-mounted accessories			Side-mounted accessories		
			Auxiliary contact blocks			Auxiliary contact blocks		
			1-pole CE5	1-pole CA4 1-pole CC4		Left side 2-pole CAL4-11	Right side	
Max. add-on N.C. auxiliary contacts (CA4, CC4, CAL4): 1 max. with 1 CE5 on positions 1, 2, 3, 4								
NF	2 2 3 1	E E	1	+ 3 max.	-	+ 1	-	
Max. add-on N.C. auxiliary contacts (CA4, CC4, CAL4): 2 max. with 1 CE5, none with 2 CE5 on positions 1, 2, 3, 4								
NF	4 0	E	2	+ 2 max.	-	-	-	
			1	+ 3 max.	-	+ 1	-	
			1	+ 1 max.	-	+ 1	+ 1	
Max. add-on N.C. auxiliary contacts (CA4, CC4): none with 1 CE5 on positions 1 ±30°, 5								
NF	2 2 3 1	E E	1	+ 3 max.	-	-	-	
Max. add-on N.C. auxiliary contacts (CA4, CC4, CAL4): 1 max. with 1 CE5 on positions 1 ±30°, 5								
NF	4 0	E	1	+ 3 max.	-	+ 1	-	

Auxiliary contact blocks for AF116 ... AF2650 contactors



1SFC101071V0001

CAL19-11

4



1SFC101082V0001

CAL18-11

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 AF116 ... AF2650 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 details¹⁾

For contactors	Auxiliary contacts	Catalog number	Pkg qty	Weight (1 pce)
				kg
Side-mounted instantaneous auxiliary contact blocks				
AF116 ... AF370	1 1	CAL19-11	2	0,04
	1 1	CAL19-11B	2	0,04
AF400 ... AF2650	1 1	CAL18-11	2	0,05
	1 1	CAL18-11B	2	0,05

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

Auxiliary contact blocks for AF116 ... AF2650 contactors

Technical data

Types	CAL18	CAL19
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



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	

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} - $\theta \leq 40^\circ\text{C}$	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	6 A / 144 W	3 A / 72 W
	48 V DC	2.8 A / 134 W	1.5 A / 72 W
	72 V DC	1 A / 72 W	1 A / 72 W
	110 V DC	0.55 A / 60 W	0.55 A / 60 W
	125 V DC	0.55 A / 69 W	0.55 A / 69 W
	220 V DC	0.3 A / 66 W	0.3 A / 69 W
	250 V DC	0.3 A / 75 W	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	
$\theta = 40^\circ\text{C}$	for 0.1 s	140 A	
Minimum switching capacity	24 V / 50 mA (0.5 million of operating cycles) : 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	3 millions (A/AF400 ... AF750)	5 millions operating cycles
	Max. switching frequency	0.5 million (AF1250 ... AF2050)	
Max. electrical switching frequency	AC-15	3600 cycles/h	300 cycles/h
	DC-13	1200 cycles/h	300 cycles/h
		900 cycles/h	300 cycles/h
Mechanically linked contacts acc. to annex L of IEC 60947-5-1	N.O. or N.C. auxiliary contacts are mechanically linked contacts		
Mirror contacts acc. to annex F of IEC 60947-4-1	N.C. auxiliary contacts are mirror contacts		

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 non insulated ferrule	1 x	0.75...2.5 mm ²
 Flexible with non insulated ferrule	2 x	0.75...2.5 mm ²
 Flexible with insulated ferrule	1 x	0.75...2.5 mm ²
 Flexible with insulated ferrule	2 x	0.75...2.5 mm ²
 Lugs	L ≤	8 mm
	L >	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 AF116 ... AF2650 contactors for severe industrial environments



CEL18

1SFC101083V0001

Description

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



Types of auxiliary contact blocks for side mounting:

- CEL18 1-pole block, with built-in microswitch IP67 degree of protection (IP20 on terminals). Instantaneous N.O. or N.C. contact.

For clipping onto the right- and/or left-hand side of the 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 details¹⁾

For contactors	Auxiliary contacts		Catalog number	Pkg qty	Weight (1 pce)
					kg
Side-mounting instantaneous auxiliary contact blocks					
AF116...AF370	1	0	CEL19-10	1	0.04
	0	1	CEL19-01	1	0.04
AF400 ... AF2650	1	0	CEL18-10	1	0.05
	0	1	CEL18-01	1	0.05

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

Auxiliary contact blocks for AF116 ... AF2650 contactors for severe industrial environments

Technical data

Types	CEL18, CEL19
-------	--------------




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	250 V		
Rated operational voltage U_e max.	125 V		
Conventional thermal current I_{th} - $\theta \leq 40$ °C	0.1 A		
I_e / Rated operational current AC-14	24-127 V 50/60 Hz	0.1 A	
acc. to IEC 60947-5-1			
Making capacity acc. to IEC 60947-5-1	6 x I_e AC-14		
Breaking capacity acc. to IEC 60947-5-1	6 x I_e AC-14		
I_e / Rated operational current DC-12	24 V DC	0.1 A	
acc. to IEC 60947-5-1			
		48 V DC	0.1 A
		72 V DC	0.1 A
		110 V DC	0.1 A
	220 V DC	-	
Short-circuit protection device	0.1 A (FF type fuses) ¹⁾		
Minimum switching capacity	3 V / 1 mA		
with failure rate acc. to IEC 60947-5-4			
Mechanical durability	Number of operating cycles	1 million ²⁾	
	Max. switching frequency	1200 cycles/h ²⁾	
Electrical durability	Number of operating cycles	0.7 millions ²⁾	
	Max. switching frequency	AC-14, AC15 1200 cycles/h ²⁾	
		DC-12 900 cycles/h ²⁾	
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	125 V
Pilot duty	
AC thermal rated current	0.1 A

Connecting characteristics

Connection capacity (min. ... max.)		
 Rigid solid	1 x	1...4 mm ²
 Flexible with ferrule	2 x	1...4 mm ²
	1 x	0.75...2.5 mm ²
	2 x	0.75...2.5 mm ²
 Lugs	L ≤	7.7 mm
	l >	3.7 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18...14
Tightening torque		1 Nm
Degree of protection	Terminals	IP20
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529	Microswitches	IP67
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	

¹⁾ or HRC fuses for very fast action (6.3 x 32 mm size).

²⁾ For CEL19, please consult us.

Auxiliary contact blocks for AF09 ... AF96 contactors and NF contactor relays

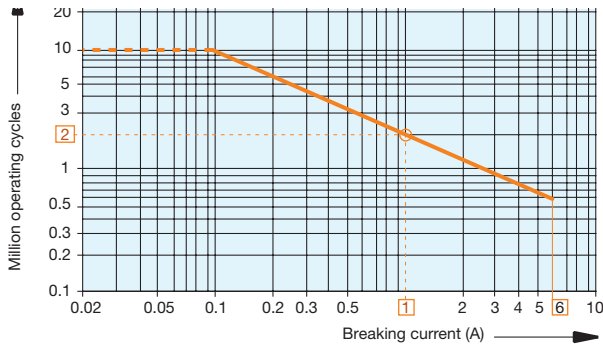
Electrical durability

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 .

These curves represent the electrical durability of the built-in or 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.

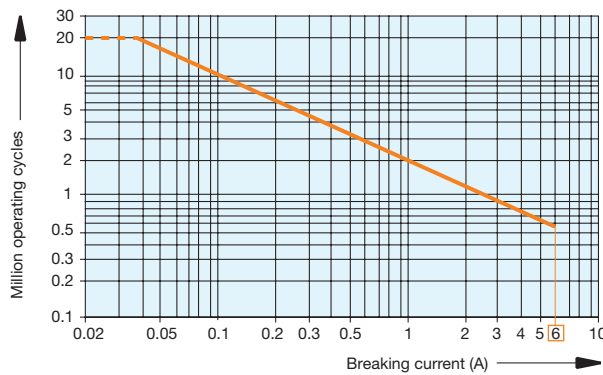


- AF09 ... AF96 contactor built-in auxiliary contacts
- 1-pole and 4-pole CA4, 2-pole CAT4, 1-pole CC4, 2-pole CAL4 add-on auxiliary contacts.

Example:

Breaking current = 1 A

On the opposite curve at intersection "O" 1 A the corresponding value for the electrical durability is approximately 2 millions operating cycles.

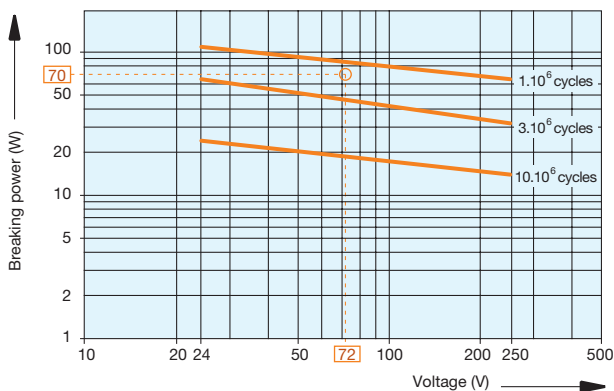


NF contactor relays.

(For add on auxiliary contacts see curve above).

Electrical durability for DC-13 utilization category

DC-13 utilization category according to IEC 60947-5-1 / EN 60947-5-1: making and breaking current I_e and U_e .



- AF09 ... AF96 contactor built-in auxiliary contacts
- 1-pole and 4-pole CA4, 2-pole CAT4, 1-pole CC4,
- 2-pole CAL4 add-on auxiliary contacts,
- NF contactor relays.

Example:

Control of DC electro-magnet:

U_e voltage = 72 V DC and breaking power = 70 W.

On the opposite curve at intersection "O" 72 V / 70 W the corresponding value for the electrical durability is approximately 2 millions operating cycles.

Auxiliary contacts for AF116 ... AF2650 contactors

Electrical durability

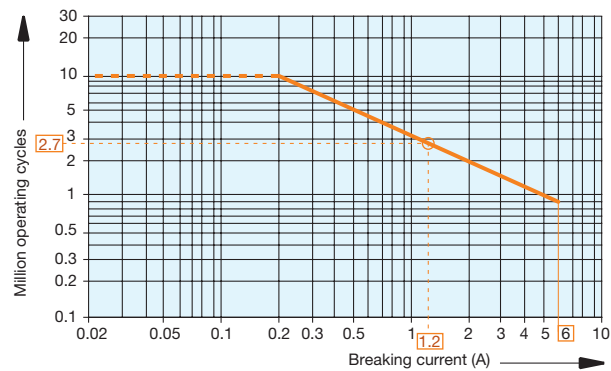
Electrical durability for AC-15 utilization category

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

These 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.



- AF116 ... AF2650 contactors auxiliary contacts
- 2-pole CAL18 and CAL19 add-on auxiliary contacts

Example:

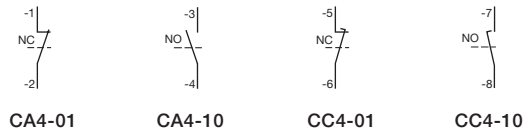
Breaking current = 1.2 A

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

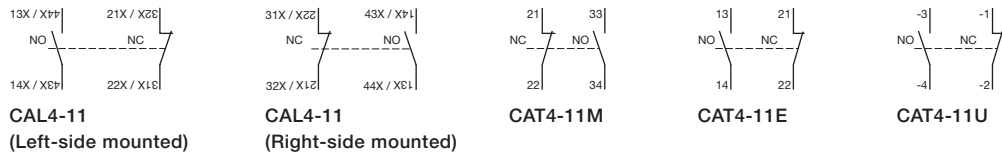
Terminal marking and positioning

1-pole auxiliary contacts

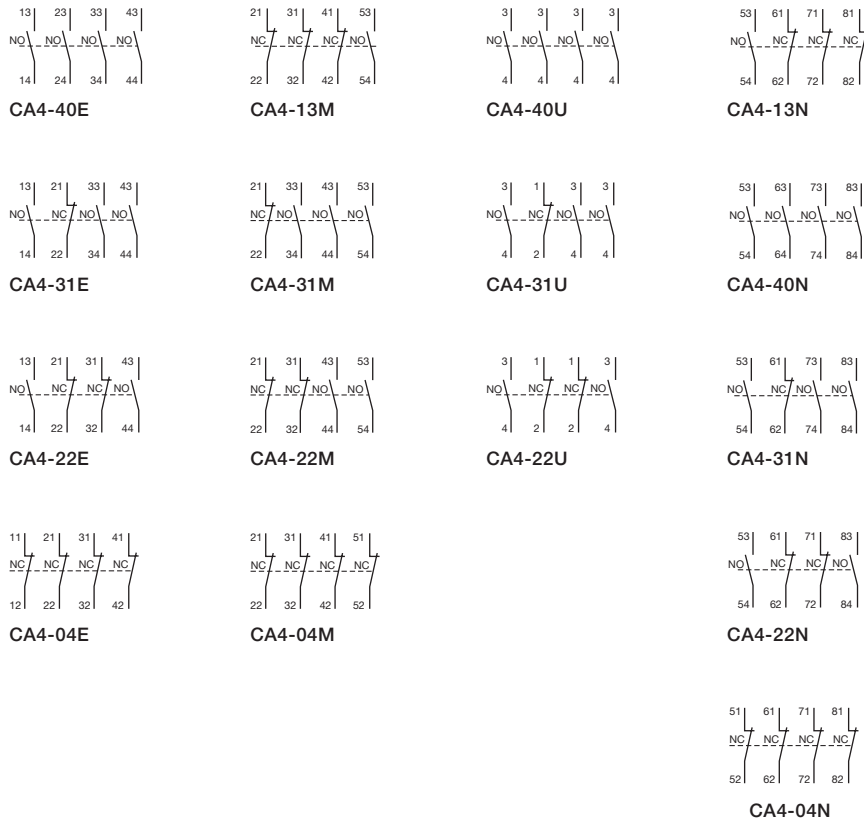


2-pole auxiliary contacts

4



4-pole auxiliary contacts



Electronic timers



TEF4-ON

1BSC10000AV0014



TEF4-OFF

1BSC100012V0014

Description

TEF4 frontal electronic timers are used for realizing timing function and are available in ON-delay and OFF-delay versions.

Compact solution in cabinet compared to separate timers

TEF4 electronic timers are front-mounted and locked on AF contactors or NF contactor relays. A mechanical indicator allows to show the state of the contactor.

Safe and cost-reduced wiring

TEF4 electronic timers are supplied by a direct plug-in parallel connection to the coil terminals A1 - A2 of the contactor or contactor relay. A varistor is integrated on the timer to offer a built-in protection against surges in the contactor coil.

Available for a wide control voltage range 24...240 V AC/DC

TEF4-ON or TEF4-OFF allow time-delayed functions up to 100 s in 3 distinct time ranges, independently of the control system. The time delay ranges are selected by a switch and the time delay can be adjusted by means of a rotary switch. The timing function is activated by closing or opening the device on which the timer is mounted. The OFF-delay version operates without additional control supply.

Ordering details

For contactors, and contactor relays	Time delay range selected by switch	Delay type	Rated control circuit voltage U_c	Auxiliary contacts	Catalog number	Weight Pkg (1 pce) kg
			V 50/60 Hz or DC			
AF09 ... AF96	0.1...1 s	ON-delay	24...240	1 1	TEF4-ON	0.065
NF	1...10 s 10...100 s	OFF-delay	24...240	1 1	TEF4-OFF	0.065

Electronic timers

Technical data

Contact utilization characteristics according to IEC

Types	TEF4-ON	TEF4-OFF
Standards	IEC 60947-5-1 and EN 60947-5-1	
Rated insulation voltage U_i acc. to IEC 60947-5-1	400 V	
Rated impulse withstand voltage U_{imp}	4 kV	
Rated operational voltage U_e max.	240 V	
Rated frequency (without derating)	50 / 60 Hz	
Conventional thermal current $I_{th} - \theta \leq 40^\circ\text{C}$	5 A	
I_e / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V 50/60 Hz 220-240 V 50/60 Hz	3 A 1.5 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	1 A / 24 W
Short-circuit protection device gG type fuse	6 A	
Rated short-time withstand current I_{cw} $\theta = 40^\circ\text{C}$	for 1.0 s for 0.1 s	8 A 8 A
Minimum switching capacity with failure rate acc. to IEC 60947-5-4	24 V DC	12 V / 3 mA 10^{-7}
Power dissipation per pole at 3 A	0.1 W	
Function diagram	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>ON-delay</p> </div> <div style="text-align: center;"> <p>OFF-delay</p> </div> </div> <p>Bistable relay inside. Before use, once apply U_c then switch it off in order to initialize position of the contacts.</p>	
Control circuit voltage		
AC control voltage	Rated control circuit voltage U_c 50/60 Hz	24...240 V AC 1.5 mA RMS
DC control voltage	Rated control circuit voltage U_c Average consumption	24...240 V DC 1.5 mA 1 mA
Rated frequency limits	50 / 60 Hz	
Supply voltage range	0.85...1.1 x U_c (at $\theta \leq 70^\circ\text{C}$)	
Overvoltage protection	Varistor included	
Time delay range (t) selected by switch	0.1...1 s 1...10 s 10...100 s	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
On-load reiteration accuracy under constant conditions	$\leq 1\%$	
Minimum ON period	0.1 s	
Recovery time	0.15 s	1 s 0.1 s
Ambient air temperature	Operation Storage	-25 °C ... +70 °C -40 °C ... +80 °C
Climatic withstand	Category B according to IEC 60947-1 Annex Q	
Maximum operating altitude	2000 m	
Mounting positions	Mounting positions 1, 1 +/- 30°, 2, 3, 4, 5	
Shock withstand	1/2 sinusoidal shock for 11 ms: no change in contact position	
acc. to IEC 60068-2-27 and EN 60068-2-27 (Mounting position 1)	Same as contactor or contactor relay	
Vibration withstand	5...300 Hz	
acc. to IEC 60068-2-6	3 g closed position / 2 g open position	
Mechanical durability		
Number of operating cycles	5 millions operating cycles	
Max. switching frequency	3600 cycles/h	
Max. electrical switching frequency	AC-15 DC-13	1200 cycles/h 900 cycles/h








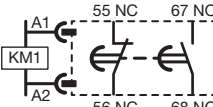

Electronic timers

Technical data

Contact utilization characteristics according to UL / CSA

Types	TEF4-ON	TEF4-OFF
Standards	UL 508, CSA C22.2 N°14	
Rated insulation voltage U_i acc. to UL / CSA	300 V	
Max. operational voltage	240 V	
Pilot duty	B300, R300	
AC thermal rated current	5 A	
AC maximum volt-ampere making	3600 VA	
AC maximum volt-ampere breaking	360 VA	
DC thermal rated current	1 A	
DC maximum volt-ampere making-breaking	28 VA	

Connecting characteristics

Connection capacity (min. ... max.)		
 Rigid solid	1 x	1...2.5 mm ²
 Rigid solid	2 x	1...2.5 mm ²
 Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²
 Flexible with non insulated ferrule	2 x	0.75...2.5 mm ²
 Flexible with insulated ferrule	1 x	0.75...2.5 mm ²
 Flexible with insulated ferrule	2 x	0.75...1.5 mm ²
 Lugs	L ≤	8 mm
	L >	3.7 mm
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...14
Stripping length		10 mm
Tightening torque		1.2 N.m / 11 lb.in
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529		IP20
Screw terminals		Delivered in open position, screws of unused terminals should be tightened
All terminals		M3.5
Screwdriver type		Flat Ø 5.5 / Pozidriv 2
Terminal Marking		

Interlocks



VM4

1SBC10001000014

Mechanical interlock units

Description

The VM mechanical interlock units are designed for the interlocking of two AF contactors. When mounted between two contactors, the VM mechanical interlock unit prevents one of the contactors from closing as long as the other contactor is closed.

The mechanical interlock units VM4 and VM96-4 include 2 fixing clips (BB4).

Ordering details

For contactors	Mounting	Catalog number	Pkg qty	Weight (1 pce) kg
Mechanical interlock units for two contactors mounted side by side				
AF09 ... AF30...-30-..		VM4	10	0.01
AF09 ... AF38...-40-00				
AF40 ... AF96		VM96-4	10	0.01
For same size contactors:		VM19	1	0.06
AF116 ... AF140				
AF190, AF205				
AF265 ... AF370				
AF116 ... AF140 and AF190, AF205		VM140/190	1	0.09
AF190, AF205 and AF265 ... AF370		VM205/265	1	0.09
AF400 ... AF1250	PN.. mounting plate to be ordered separately	VM750H	1	0.20
AF1350 ... AF2650	Plate included	VM1650H	1	6.00
Mechanical interlock units for two contactors mounted one above the other				
AF400 ... AF1250	Additional plate (not supplied)	VM750V	1	0.20



VM19

1SBC101035V0014

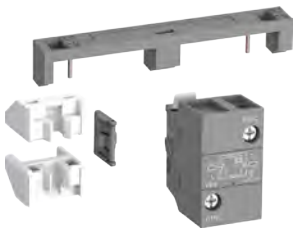
Mechanical and electrical interlock sets

Description

VM4 mechanical and electrical interlock set for the interlocking of two AF contactors.

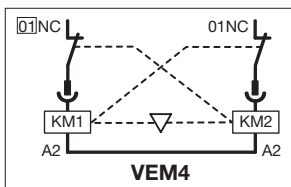
VM4 set includes a mechanical interlock unit VM4 with 2 fixing clips (BB4) and a VE4 electrical interlock block with A2-A2 connection.

Fixing the electrical interlock block to the contactor front face connects the 2 built-in N.C. interlocking contacts with the two coils. VE4 block must be used with A2-A2 connection to respect the electrical connection diagram.



VM4

1SBC100011V0014



Ordering details

For contactors	Auxiliary contacts	Catalog number	Pkg qty	Weight (1 pce) kg
Mechanical and electrical interlock set				
For same size contactors:	0 2	VM4	1	0.04
AF09 ... AF16...-30-..				
AF26 ... AF38...-30-00				
AF09, AF16...-40-00				
AF26, AF38...-40-00				
Fixing clips				
AF09 ... AF38		BB4	50	0.01



BB4

1SBC100013V0014

Note: VEM4 not suitable for AF..Z contactors with DC control voltage 12...20 V DC.

Interlocks

Technical data

Mechanical interlock unit

Types		VM4, VM96	VM19 ... VM750	VM1650H
Mechanical durability	Number of operating cycles	5 millions operating cycles	1 million operating cycles	500 000 operating cycles
	Max. mechanical switching frequency	1800 cycles/h	300 cycles/h	

Mechanical and electrical interlock set








Contact utilization characteristics according to UL / CSA

Types	VEM4
Standards	UL 508, CSA C22.2 N°14
Max. operational voltage	500 V AC, 500 V DC

Contact utilization characteristics according to IEC

Types	VEM4
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 control circuit voltage U_c	
AC 50/60 Hz control voltage	24...500 V AC
DC control voltage	20...500 V DC
Conventional thermal current I_{th} - $\theta \leq 40^\circ\text{C}$	16 A
Mechanical durability	
Number of operating cycles	5 millions operating cycles
Max. mechanical switching frequency	1800 cycles/h
Electrical durability	
Max. electrical switching frequency	1200 cycles/h

Connecting characteristics

Types	VEM4
Connection capacity (min. ... max.)	
 Rigid solid	1 x 1...2.5 mm ²
 Flexible with ferrule	2 x 1...2.5 mm ²
 Flexible with ferrule	1 x 0.75...2.5 mm ²
 Flexible with ferrule	2 x 0.75...2.5 mm ²
 Flexible with insulated ferrule	1 x 0.75...2.5 mm ²
 Flexible with insulated ferrule	2 x 0.75...1.5 mm ²
 Lugs	L < 8 mm
Connection capacity acc. to UL / CSA	1 or 2 x AWG 18...14
Stripping length	10 mm
Tightening torque	1.2 Nm / 11 lb.in
Degree of protection	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

Impulse contact blocks



CB5

Description



Impulse contact blocks are designed for use in enclosures, in association with an adjustable mechanical pushbutton. Two types are available:

- CB5-10: N.O. contact with a black actuator ("ON" function)
- CB5-01: N.C. contact with a light grey actuator ("OFF" function)

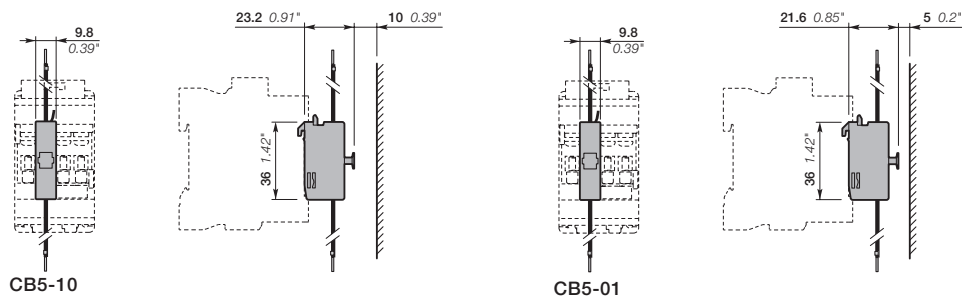
These blocks are equipped with 2 connecting leads 0.5 mm² with end, approximately 18 cm long.

Mounting: Clipped onto the front face of the contactors.

Ordering details

For contactors	Contacts		Catalog number	Pkg qty	Weight (1 pce) kg
					
AF09 ... AF96	1	-	CB5-10	1	0.012
	-	1	CB5-01	1	0.012

Main dimensions mm, inches



Notes

A series of horizontal dotted lines for taking notes, spanning the width of the page.

RA4 interface relays



RA4

1SBN01065V0014

Description

RA4 interface relay is designed to receive 24 V DC signals delivered by PLC's or other sources with a low output power and to restore them with sufficient power to operate the coils of the relevant AF09 ... AF96 contactors or the NF contactor relays. RA4 interface relay is made up of a miniature electromechanical relay equipped with a N.O. contact and with a low consumption 24 V DC coil.

The interface relay coil is controlled by the PLC while the N.O. contact ensures switching of the power contactor.

Coil switching gives rise to overvoltages which have adverse effects on the electronic devices, insulators and, more generally, on component lifetime. The RA4 is protected from surge thanks to the built-in surge protection of AF09 ... AF96. Furthermore, the RA4 is protected against relay pole reversal by a diode inserted between the E1 and E2 input terminals.

Connection

The "E1+" and "E2-" input terminals must be connected, according to their polarity, to the PLC output.

The RA4 is equipped with two terminal pads for connection to the A1 and A2 terminals of the contactor coil.

This coil is supplied between the A0 and A2 terminals of the RA4.

Mounting

Remove the coil terminal block from the contactor and clip the interface relay without any screwing operation.

Ordering details

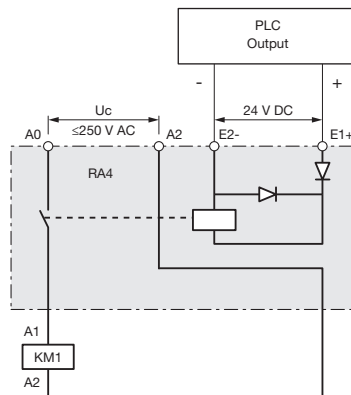
For contactors ¹⁾	Coil voltages ²⁾	Rated control circuit voltage U _c	Catalog number	Global code	Pkg qty	Weight (1 pce)
	V AC 50/60 Hz	V DC				kg
AF09 ... AF96	24 ... 250	24	AF-RA4	1SBN060100R1000	1	0.040
NF			AF-RA4-T ³⁾	1SBN060100T1000	10	0.040

¹⁾ LDC4 additional terminal blocks and CAT4 auxiliary contact blocks not suitable with RA4.

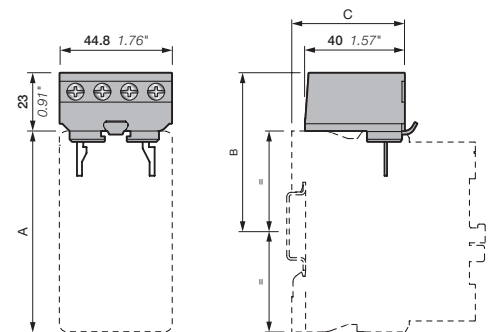
²⁾ Main use with contactor coils 41, 11, 12, 13.

³⁾ On request. Please contact your ABB local sales organization

Wiring diagram



Main dimensions mm, inches



RA4 mounted on	AF09 ... AF38	AF40 ... AF96
A	80 mm / 3.15"	119.5 mm / 4.70"
B	63 mm / 2.48"	83 mm / 3.27"
C	45 mm / 1.77"	40 mm / 1.57"





RA4 interface relays

Technical data

Utilization characteristics according to IEC

Type	RA4	
Standards	IEC 60947 5-1	
Rated insulation voltage U_i acc. to IEC 60947 5-1	250 V AC 50/60 Hz	
Ambient air temperature		
In free air operation	at $U_c = 24$ V DC (between E1 and E2)	-25 ... +70 °C
Storage	from 0.85 to 1.1 x U_c	-25 ... +60 °C -40 ... +70 °C
Climatic withstand	Category B according to IEC 60947-1 Annex Q	
Maximum operating altitude	≤3000 m	
Mounting positions	Mounting positions 1, 1 ±30°, 2, 3, 4, 5	

Connecting characteristics

Connection capacity (min. ... max.)		
 Rigid solid	1 x	1 ... 2.5 mm ²
	2 x	1 ... 2.5 mm ²
 Flexible with non insulated ferrule	1 x	0.75 ... 2.5 mm ²
	2 x	0.75 ... 2.5 mm ²
 Flexible with insulated ferrule	1 x	0.75 ... 2.5 mm ²
	2 x	0.75 ... 1.5 mm ²
 Lugs	L <	8 mm
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 18 ... 14
Stripping length	10 mm	
Tightening torque	1.2 Nm / 11 lb.in	
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529	IP20 protection against direct contact in acc. with EN 50274 RA4 wired and mounted on the associated contactor	
Screw terminals	Delivered in open position	
All terminals	M3.5	
Screwdriver type	Flat Ø 5.5 / Pozidriv 2	

Working data

Surge suppression	Included inside AF built-in surge protection	
For interface relay coil		
Protection against polarity reversal between terminals E1 and E2	Diode	
Interface relay operating time	Closing and drop-out ≤10 ms	
Total operating time		
interface relay + contactor (1)		
Between energization and:	N.O. contact closing	42 ... 95 ms (AF09 ... AF38, NF) 44 ... 105 ms (AF40 ... AF96)
	N.C. contact opening	40 ... 90 ms (AF09 ... AF38, NF) 40 ... 100 ms (AF40 ... AF96)
Between de-energization and:	N.O. contact opening	15 ... 57 ms (AF09 ... AF38, NF) 21 ... 107 ms (AF40 ... AF96)
	N.C. contact closing	17 ... 60 ms (AF09 ... AF38, NF) 23 ... 112 ms (AF40 ... AF96)

(1) For contactor coils 41, 11, 12, 13.

Electrical input data

Control voltage (E1 and E2 terminals) U_c		
Rated value	24 V DC	
Max. range at ambient temperature 20 °C	19 ... 30 V DC	
Max. consumption for $U_c = 24$ V DC, $\theta = 20$ °C	0.3 W	
"0" status (relay open)	for U_c	≤2.4 V DC
	for I_c	<1 mA
"1" status (relay closed)	for U_c	≥19 V DC
Max. short supply interruption immunity time	2 ms	

Electrical output data

Switching voltage (A0 and A2 terminals)	≤250 V AC
Electrical durability	
Switching frequency	600 cycles/h
Number of operating cycles	2 million operating cycles

Mechanical latching unit



WA4

1SBN040100R1014

Description

The WA4 mechanical latching unit for AF09 ... AF96 contactors and NF contactor relays ensures that the contactor or contactor relay remains switched on even if there is a lack or a failure of voltage. Standard contactors can be easily converted into compact latched contactors.

The WA4 block contains a mechanical latching device with electromagnetic impulse unlatching (AC or DC) or manual unlatching.

Operation

After closing, the contactor continues to be held in the closed position by the latching mechanism should the supply voltage fail at the contactor coil terminals.

Contactor opening can be controlled:

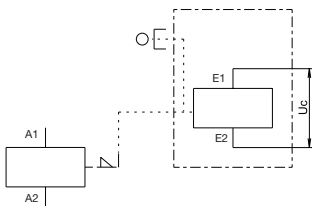
- electrically by an impulse (AC or DC) on the WA4 block coil (the coil is not designed to be permanently energized)
- manually by pressing the pushbutton on the front face of the WA4 block.

Mounting

The WA4 block is clipped onto the front face of the 1-stack contactor where it takes up two slots in central position (see fig. below).

The two other slots may accept CA4 single pole auxiliary contacts (1 block on each side of the mechanical latch).

Additional CAL4 can be fitted on the side of the contactor in respect to the total number of built-in or additional N.O. and N.C. auxiliary contacts as described in the accessory fitting details part of each contactor type.



Wiring diagram

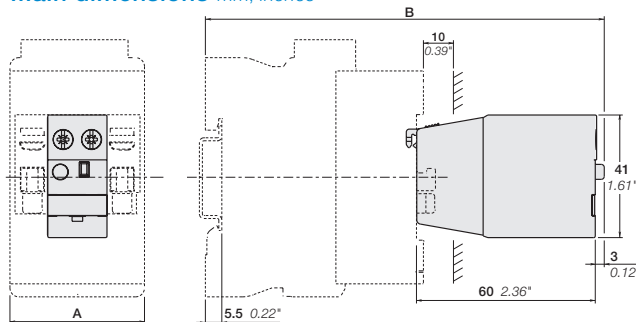
Ordering details

For contactors and contactor relays	Rated control circuit voltage U _c		Catalog number	Global code	Pkg qty	Weight (1 pce) kg
	V AC 50/60 Hz	V DC				
AF09 ... AF65, NF 1-stack	24...60	24...60	WA4-11	1SBN040100R1011	1	0.080
	48...130	48...130	WA4-12	1SBN040100R1012	1	0.080
	100...250	100...250	WA4-13	1SBN040100R1013	1	0.080
	250...500	250...500	WA4-14	1SBN040100R1014	1	0.080
AF80, AF96	24...60	24...60	WA4-96-11	1SBN040200R1011	1	0.080
	48...130	48...130	WA4-96-12	1SBN040200R1012	1	0.080
	100...250	100...250	WA4-96-13	1SBN040200R1013	1	0.080
	250...500	250...500	WA4-96-14	1SBN040200R1014	1	0.080

Mechanical latching unit for 24 V DC - 500 mA PLC control

AF09 ... AF38, NF 1-stack	–	24	WA4-10	1SBN040100R1010	1	0.080
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Main dimensions mm, inches



WA4 + AF09 ... AF96, NF 1-stack








For contactors and contactor relays	A mm in.	B mm in.
AF09 ... 16(Z)-30-...	45 1.77"	133.5 5.25"
AF09 ... 16(Z)-40/22-00 NF(Z)		
AF26 ... 38(Z)-30-00	45 1.77"	142.5 5.61"
AF26 ... 38(Z)-40/22-00	45 1.77"	157.5 6.20"
AF40 ... 65-30-00	55 2.16"	167 6.57"
AF40-40/22-00	70 2.75"	170 6.70"
AF52-40-00	70 2.75"	170 6.70"
AF80, 96-30-00	70 2.75"	172 6.77"
AF80-40/22-00	90 3.54"	172 6.77"

Mechanical latching unit

Technical data

Types	WA4, WA4-96	WA4
Coil voltage code	11, 12, 13, 14	10
Standards	IEC 60947-4-1	
Rated insulation voltage Ui acc. to IEC 60947-1	690 V AC	
Coil operating limits acc. to IEC 60947-4-1	AC supply At $\theta \leq 70\text{ °C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$	–
	DC supply At $\theta \leq 70\text{ °C}$ $0.85 \times U_c \text{ min} \dots 1.1 \times U_c \text{ max}$	At $\theta \leq 70\text{ °C}$ $0.85 \times U_c \dots 1.1 \times U_c$
Control circuit voltage		
AC control voltage 50/60 Hz		
Rated control circuit voltage U_c	24 ... 500 V AC 50/60 Hz	–
Coil consumption	Average pull-in value 15 ... 100 VA	–
DC control voltage 50/60 Hz		
Rated control circuit voltage U_c	24 ... 500 V DC	24 V DC
Coil consumption	Average pull-in value 15 ... 100 W	12 W
Max. electrical impulse time		
On AC control supply (with load factor 1.6%)	4 s	–
On DC control supply (with load factor 1.6%)	4 s	–
Min. electrical impulse time		
For latching, energizing of the contactor coil	120 ms	
For unlatching, energizing of the mechanical latching unit coil	50 ms	
Operating time		
On contactor closing (latching) between coil energization and:		
N.O. contact closing	No difference with the operation of a contactor without mechanical latching unit	
N.C. contact opening	No difference with the operation of a contactor without mechanical latching unit	
On contactor opening (unlatching) between mechanical latching unit coil energization and:		
N.O. contact opening	8 ... 15 ms	
N.C. contact closing	10 ... 17 ms	
Ambient air temperature		
Operation	-25 ... +70 °C	
Storage	-60 ... +80 °C	
Climatic withstand	Category B according to IEC 60947-1 Annex Q	
Max. operating altitude	≤ 3000 m	
Mounting positions	Mounting positions 1, 1+/- 30°, 2, 3, 4, 5	
Mechanical durability	AF09 ... AF38, NF: 1 million operating cycles AF40 ... AF65: 0.5 million operating cycles AF80, AF96: 0.2 million operating cycles	
Max. switching frequency with on-load factor of 1.6%	cycles/h	600

Connecting characteristics

Connection capacity (min. ... max.)		
 Rigid solid	1 x	1 ... 2.5 mm ²
 Rigid solid	2 x	1 ... 2.5 mm ²
 Flexible with non insulated ferrule	1 x	0.75 ... 2.5 mm ²
 Flexible with non insulated ferrule	2 x	0.75 ... 2.5 mm ²
 Flexible with insulated ferrule	1 x	0.75 ... 2.5 mm ²
 Flexible with insulated ferrule	2 x	0.75 ... 1.5 mm ²
 Lugs	L <	8 mm
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18 ... 14
Stripping length	10 mm	
Tightening torque	1.2 Nm / 11 lb.in	
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529	IP20	
Screw terminals All terminals	Delivered in open position M3.5	
Screwdriver type	Flat Ø 5.5 / Pozidriv 2	

Other accessories



LDC4



BX4



BX4-CA



BA4



BA5-50

Ordering details

For contactors

For contactors	Catalog number	Pkg qty	Weight (1 pce) kg
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Additional coil terminal blocks

Additional coil terminal blocks for a bottom access to the coil terminals of contactors or contactor relays.

AF09 ... AF96, NF	LDC4	10	0.01
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Protective covers

Sealable and transparent protective covers BX4 and non-removable BX4-CA to protect the devices against accidental contact.

AF09 ... AF96 1-stack contactors and NF contactor relays	BX4	10	0.01
4-pole CA4, 2-pole CAT4 auxiliary contact blocks and TEF4 electronic timer	BX4-CA	50	0.01

Note: BX4 produced since 13045 (day 045 - year 2013) are suitable for AF40 ... AF96.

Function markers AF09 ... AF370

Box of 16 blank cards (16 markers by card) printable on HTP500 thermal transfer printer and AMS 500 marking table to identify your contactors, overload relays or manual motor starters.

Marker dimensions: 7 x 20 mm (.276" x .787").

AF09 ... AF370 contactors, TF thermal overload relays, EF electronic overload relays and MS116, MS132 manual motor starters	BA4	16	0.01
AMS 500 support plate for 8 BA4	SPRC 1	1	0.22
HTP500 support plate	HTP500-BA4	1	0.29

Function markers AF400 ... AF2650

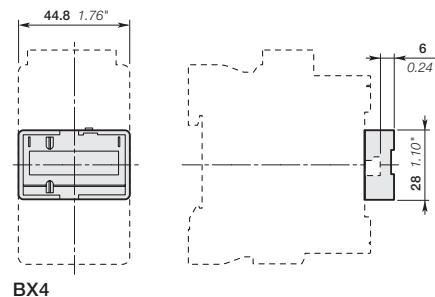
Set of 50 function markers designed to be clipped onto the front face of devices. Details can be added to these markers using a ball point pen, indelible felt-tip pen or pentel white.

Self-adhesive labels (not supplied) can also be added to them.

Marker dimensions: 7 x 19 mm (.276" x .748").

AF400 ... AF2650 and accessories	BA5-50	1	0.02
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Main dimensions mm, inches



Other accessories



BP38-4



BDT4
For AF09 ... AF65, NF



BDT4
For AF80 ... AF96

Ordering details

For contactors	Catalog number	Pkg qty	Weight (1 pce) kg
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Mounting pieces

Mounting piece for replacing installed contactors fixed by screws by AF contactors.

From contactor	To contactor			
A26 ... A40, AL26 ... AL40	AF09 ... AF38	BP38-4	10	0.01
A40 ... A75, AE50 ... AE75, AF50 ... AF75	AF40 ... AF65	BP65-4	10	0.01
A95, A110, AE95, AE110, AF95, AF110	AF80 ... AF96	BP96-4	10	0.01

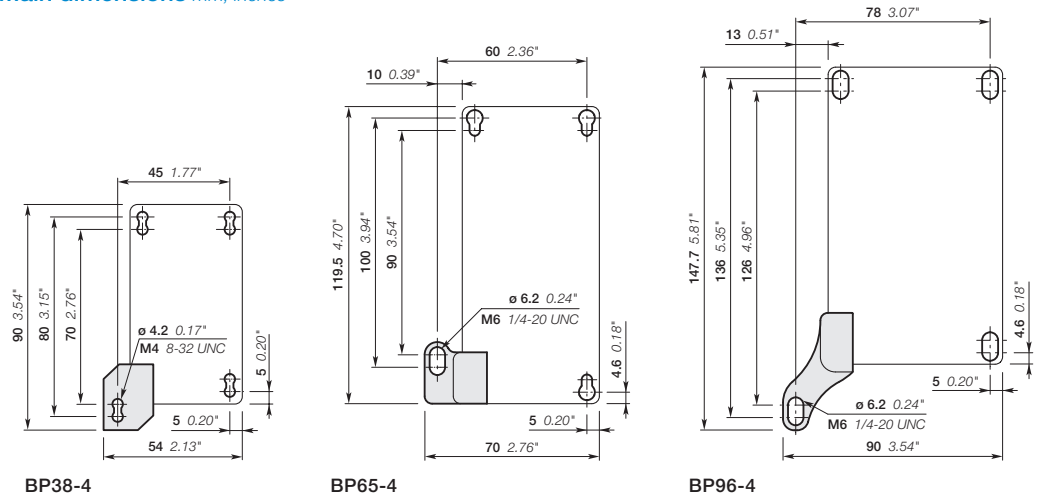
Test block

BDT4 test block is suitable for switching on contactor off-load.

Marking on the block indicates the contactor type to fit with.

AF09 ... AF96, NF	BDT4	10	0.02
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Main dimensions mm, inches



Terminal shrouds



LT140-30L

1SFC101038V0001

Description

Main terminal protection for AF116 ... AF1250 contactors.

The auxiliary contact blocks and coils are designed to provide an IP 20 degree of protection.

The main terminals, equipped with compression lugs or cable clamps, can be protected against accidental direct contact after wiring (EN 50274) by the addition of terminal shrouds (see table below).

Ordering details

For contactors

Catalog number

Pkg
qty

Weight
(1 pce)
kg

3-pole contactors

AF116 ... AF140, with compression lugs	LT140-30L	2	0.07
AF190, AF205, with cable clamps	LT205-30C	2	0.05
AF190, AF205, with compression lugs	LT205-30L	2	0.22
AF190, AF205, with shorting bar or between contactor OL relay	LT205-30Y	1	0.05
AF265 ... AF370, with cable clamps	LT370-30C	2	0.04
AF265 ... AF370, with compression lugs	LT370-30L	2	0.28
AF265 ... AF370, with shorting bar or between contactor and OL relay	LT370-30Y	1	0.08
AF265 ... AF370, for use with extending cable clamps, ATK300/2	LT370-30D	1	0.15
AF400, AF460 with cable clamps	LT460-AC	2	0.10
AF400, AF460 with compression lugs	LT460-AL	2	0.80
AF580, AF750 with cable clamps	LT750-AC	2	0.12
AF580, AF1250 with compression lugs	LT750-AL	2	0.83
4-pole contactors			
AF116 ... AF140, with compression lugs	LT140-40L	2	0.09
AF190 ... AF205, with cable clamps	LT205-40C	2	0.04
AF190 ... AF205, with compression lugs	LT205-40L	2	0.14
AF265 ... AF370, with cable clamps	LT370-40C	2	0.04
AF265 ... AF370, with compression lugs	LT370-40L	2	0.17



LT370-30C

1SFC101041V0001



LT460-AC

1SFC101088V0001

Additional terminal blocks



LD38-4

1SBC100388V0014

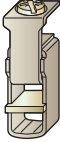






Description

The LD terminal block is designed to increase the connecting capacity of 3-pole AF26 ... AF38 contactors on which it is fitted and for preparation of the wiring before final connection to the contactor. LD38-4 blocks are 3-pole terminal blocks with tunnel terminals.

Ordering details

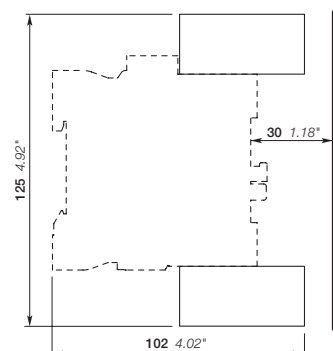
For contactors	Catalog number	Pkg qty	Weight (1 pce) kg
AF26 ... AF38	LD38-4	2	0.07

Technical data

Types	LD38-4
Rated insulation voltage U_i	
acc. to IEC 60947-4-1	690 V
acc. to UL / CSA	600 V
Main terminals	 <p>Screw terminals with double connector 2 x (7 width x 5.8/9.2 depth)</p>
Connection capacity (min. ... max.)	
 Rigid Solid ($\leq 4 \text{ mm}^2$)  Rigid Stranded ($\geq 6 \text{ mm}^2$)	1x 2.5...25 mm ² 1x 2.5...25 mm ² + 1x 2.5...16mm ²
 Flexible with non insulated ferrule	1x 2.5...16 mm ²
 Flexible with insulated ferrule	1x 2.5...16mm ² + 1x 2.5...10mm ²
 Flexible with insulated ferrule	1x 2.5...16mm ²
 Flexible with insulated ferrule	1x 2.5...16mm ² + 1x 2.5...10mm ²
Connection capacity acc. to UL / CSA	1x AWG 8-4 2x AWG 8-6
Stripping length	14 mm
Tightening torque	2.5 Nm / 22 lb.in
Degree of protection	
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529	IP20
Screw terminals	Delivered in closed position, screws of unused terminals must be tightened
Main terminals	M5
Screwdriver type	Flat $\varnothing 6.5$ / Pozidriv 2

Note: The utilization of LD38-4 additional terminal blocks does not allow the use of BER and BEY connection sets.

Main dimensions mm, inches





1SFC101060V0001

LW140

Terminal enlargements

Description

Enlargement pieces designed to increase the width of the contactor terminal pads in order to allow larger connections to be mounted.

Ordering details

For contactors	Dimensions		Catalog number	Pkg qty	Weight (1 pce) kg
	hole Ø mm	bar mm			
3-pole contactors					
AF116 ... AF140	6.5	13 x 3	LW140	1	0.12
AF190, AF205	10.5	17.5 x 5	LW205	1	0.26
AF265 ... AF370	10.5	20 x 5	LW370	1	0.34
AF400, AF460	10.5	25 x 5	LW460	1	0.73
AF580, AF750	13	40 x 6	LW750	1	1.23
AF1250	13	50 x 10	LW1250	1	2.00
4-pole contactors					
AF190 ... AF205	10.5	20 x 5	LW205-40	1	0.31
AF265 ... AF370	10.5	25 x 5	LW370-40	1	0.54



1SFC101049V0001

LX140

Terminal extension

Description

Extension pieces designed to extend the main terminals of contactors for combined mounting of contactors and connection sets.

Ordering details

For contactors	Dimensions		Catalog number	Pkg qty	Weight (1 pce) kg
	hole Ø mm	bar mm			
AF116 ... AF140	6.5	13 x 3	LX140	1	0.072
AF190, AF205	8.5	17.5 x 5	LX205	1	0.180
AF265 ... AF370	10.5	20 x 5	LX370	1	0.234
AF400, AF460	10.5	25 x 5	LX460	1	0.500
AF580, AF750	13	40 x 6	LX750	1	0.850



1SFC101073V0001

LL146-30

Connection sockets

Description

Connection socket can be used to replace built-in cable clamps in AF116 ... AF140.

Ordering details

For contactors	Catalog number	Pkg qty	Weight (1 pce) kg
3-pole contactors			
AF116 ... AF140	LL146-30	6	0.10
4-pole contactors			
AF116 ... AF140	LL146-40	8	0.13
AF190 ... AF205	LL205-40	2	0.22
AF265 ... AF370	LL370-40	2	0.23



1SFC101049V0001

LD146-30

Connection module

Description

Connection module can be fixed on AF116 ... AF140 delivered with bar terminals.

Ordering details

For contactors	Catalog number	Pkg qty	Weight (1 pce) kg
3-pole contactors			
AF116 ... AF140	LD146-30	2	0.17
4-pole contactors			
AF116 ... AF140	LD146-40	2	0.23

Terminal connecting strips and shorting bars



LY16-4



LY185



LH38-4



LF16-4



LG16-4

Description

Parallel and series connection of 3-pole contactors:

- To obtain a star point (3 parallel-connected poles)
- To connect poles in parallel and thus increase the AC load passing through the flow path made up of the parallel-connected poles: LP, LY.
The relevant cable cross-sectional area may limit the maximum permissible current. Consult information in table below
- To connect poles in series and thus increase the DC load controlled by the poles: LP, LY (only LY16-4 and LY38-4 secable strips).

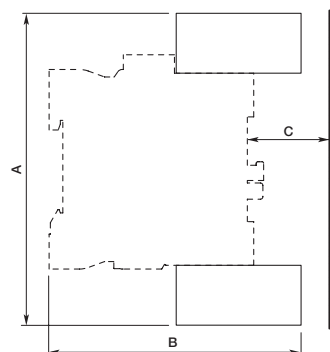
Types	for connection of "n" poles	with terminal	insulated
LP	n = 2	no	no ¹⁾
LY	n = 2 (secable LY16-4, LY38-4 connecting strips) n = 3	no	yes yes ¹⁾

¹⁾ LP460 ... LP750, LY185 ... LY750 not insulated. Use terminal shrouds.

Ordering details

For contactors	max. nominal continuous current with "n" poles				Cable cross-sectional area	Catalog number	Pkg qty	Weight (1 pce)
	in parallel		in series					
	2 poles	3 poles	4 poles	2 poles				
	A				mm ² / AWG			kg
AF09	30	33	-	25	6 / 10	LY16-4	10	0.01
AF12	32	36	-	27				
AF16	34	40	-	30				
AF26	50	60	-	45	10 / 8	LY38-4	10	0.01
AF116 ... AF140	-	240	-	-	-	LY140	1	0.06
AF190, AF205	-	400	-	-	-	LY185	1	0.20
AF265 ... AF370	-	670	-	-	-	LY300	1	0.30
AF400, AF460	-	1000	-	-	-	LY460	1	0.45
AF580, AF750	-	1650	-	-	-	LY750	1	0.80
AF190, AF205	300	-	-	-	-	LP185	2	0.30
AF265 ... AF370	475	-	-	-	-	LP300	2	0.40
AF400, AF460	725	-	-	-	-	LP460	2	0.55
AF580, AF750	1200	-	-	-	-	LP750	2	0.95
AF09	45	-	-	-	10 / 8	LH38-4	2	0.01
AF12	50	-	-	-	10 / 8			
AF16	54	-	-	-	16 / 6			
AF26	81	-	-	-	25 / 4			
AF30, AF38	91	-	-	-	25 / 4			
AF09	-	62	-	-	16 / 6	LF16-4	2	0.02
AF12	-	70	-	-	25 / 4			
AF16	-	75	-	-	25 / 4			
AF26	-	112	-	-	35 / 2	LF38-4	2	0.04
AF30, AF38	-	125	-	-	50 / 1			
AF09	-	-	70	-	25 / 4	LG16-4	2	0.03
AF12	-	-	78	-	25 / 4			
AF16	-	-	84	-	25 / 4			

Main dimensions mm, inches



Type	For contactors	Dimensions					
		A		B		C	
		mm	inch	mm	inch	mm	inch
LH38-4	AF09 ... AF16	111.20	4.38"	83	3.27"	22	0.87"
	AF26 ... AF38	114	4.49"	86	3.39"	16	0.63"
LF16-4	AF09 ... AF16	121	4.76"	87	3.43"	23	0.91"
LF38-4	AF26 ... AF38	135.20	5.32"	103	4.06"	31	1.22"
LG16-4	AF09 ... AF16	124.20	4.89"	87	3.43"	23	0.91"

Connection accessories for starting solutions



BEA16-4

1SBC100014V0014

Connecting links with manual motor starters

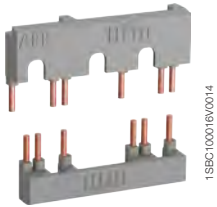
Description

The BEA insulated 3-pole connecting links are used to connect AF09 ... AF65 contactors with the MS116, MS132 or MS165 manual motor starters.

The BEA insulated 3-pole connecting links ensure the electrical and mechanical connection between the contactor and the associated manual motor starter.

Ordering details

For 3-pole contactors	Manual motor starter	Catalog number	Pkg qty	Weight (1 pce) kg
AF09 ... AF16	MS116-0.16 ... MS116-25, MS132-0.16 ... MS132-25	BEA16-4	10	0.03
AF26 ... AF38	MS116-0.16 ... MS116-16, MS132-0.16 ... MS132-10	BEA26-4	10	0.03
	MS116-20 ... MS116-32, MS132-12 ... MS132-32	BEA38-4	10	0.03
AF40 ... AF65	MS165-16 ... MS165-65	BEA65-4	1	0.09



BER16-4

1SBC100016V0014

Connection sets for reversing contactors

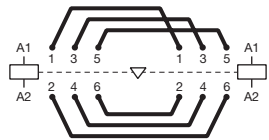
Description

The BER and BEM connection sets are used to connect the main poles of two 3-pole contactors mounted side by side.

The BER connection sets are made up of 1 upstream and 1 downstream connections.

The BEM connection sets are made up of 3 upstream and 3 downstream connections.

BER and BEM connection sets are insulated and made of solid copper bars.



BER, BEM
Reversing connections

Ordering details

For 3-pole contactors	Catalog number	Pkg qty	Weight (1 pce) kg
AF09 ... AF16	BER16-4	1	0.045
AF26 ... AF38	BER38-4	1	0.100
AF40 ... AF65	BER65-4	1	0.175
AF80, AF96	BER96-4	1	0.250
AF116 ... AF140	BER140-4	1	0.615
AF190, AF205	BER205-4	1	1.237
AF265 ... AF370	BER370-4	1	2.140
AF400, AF460	BEM460-30	1	4.400
AF580, AF750	BEM750-30	1	7.300



BEP140-30

1SFC101052V0001

Phase to phase connections

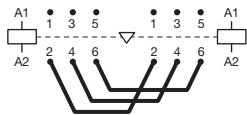
Description

The BEP and BES connection sets are used to connect phase to phase the main poles of two 3 contactors mounted side by side.

The BEP connection sets are made up of 1 upstream or downstream connections.

The BES connection sets are made up of 3 upstream or downstream connections.

BEP and BES connection sets are insulated and made of solid copper bars.

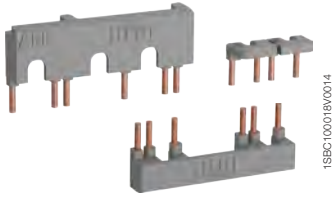


BEP, BES
Phase to phase connections

Ordering details

For 3-pole contactors	Catalog number	Pkg qty	Weight (1 pce) kg
3-pole contactors			
AF116 ... AF140	BEP140-30	1	0.32
AF190, AF205	BEP205-30	1	0.53
AF265 ... AF370	BEP370-30	1	0.93
AF400, AF460	BES460	1	2.20
AF580, AF750	BES750	1	3.70
4-pole contactors			
AF116 ... AF140	BEP140-30	1	0.42
AF190 ... AF205	BEP205-30	1	0.71
AF265 ... AF370	BEP370-30	1	1.23

Connection sets for star-delta starter



BEY16-4

1SBC100018V0014

Description

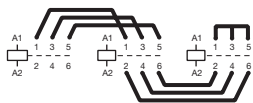
The BEY and BED connection sets are used to connect the main poles of the Line, Delta and Star contactors of a star-delta starter.

The connection sets are made up of:

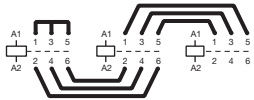
- Line contactor/delta contactor:
 - BEY: upstream phase-to-phase connection
 - BED: upstream connection in parallel
- Delta contactor/star contactor: downstream connection in parallel
- Star contactor: star point upstream
- Insulated, solid copper bar

Ordering details

For 3-pole line, delta and star contactors	Interlock unit between delta and star contactors	Catalog number	Pkg qty	Weight (1 pce) kg
AF09 ... AF16	With or without VM4 or VEM4	BEY16-4	1	0.05
AF26 ... AF38	With or without VM4 or VEM4	BEY38-4	1	0.11
AF40 ... AF65	With or without VM96-4	BEY65-4	1	0.20
AF80, AF96	With or without VM96-4	BEY96-4	1	0.25
AF116 ... AF140	With or without VM19	BEY140-4	1	1.04
AF190 ... AF205 (line and delta) AF140 (star)	With or without VM140/190	BEY190-4	1	1.15
AF190, AF205	With or without VM19	BEY205-4	1	1.21
AF265 ... AF370 (line and delta) AF190 ... AF205 (star)	With or without VM205/265	BEY265-4	1	2.02
AF265 ... AF370	With or without VM19	BEY370-4	1	2.11
AF400 ... AF460	With or without VM750H	BED460	1	4.70
AF580 ... AF750 (line and delta) AF400 ... AF460 (star)	With or without VM750H	BED580	1	6.30
AF580 ... AF750	With or without VM750H	BED750	1	7.70



AF09 ... AF370
Line-delta-star connection



AF400 ... AF750
Star-delta-line connection

Connection bars



BEA140/XT2

1SFC101061V0001



BEA205/T4

1SFC101064V0001



BEA370/T5

1SFC101065V0001

4

Connection bars between contactors and MCCB

Description

Connection between contactors/starters and moulded case circuit breakers.

These connection sets are solid copper bars.

Ordering details

For contactors	MCCB	Catalog number	Pkg qty	Weight (1 pce)
				kg

Vertical assembly

AF116 ... AF140	XT2	BEA140/XT2	1	0.06
AF116 ... AF140	XT4	BEA140/XT4	1	0.07
AF190, AF205	XT4	BEA205/XT4	1	0.20
AF190, AF205	T4	BEA205/T4	1	0.19
AF265 ... AF370	T5	BEA370/T5	1	0.35
AF400 ... AF750	T6	BEA750/T6	1	0.41
AF400 ... AF750	T5	BEA750/T5	1	0.41

Vertical assembly with control wire terminals (also suitable when using busbar kits for starter combinations)

AF400 ... AF750	T5	BEA750D/T5	1	0.72
AF400 ... AF750	T6	BEA750D/T6	1	0.72

Horizontal assembly (also suitable when using busbar kits for starter combinations)

AF400, AF460	T4	BEA460H/T4	1	2.45
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Connection bars between contactors and switch fuse

Description

Connection between contactors/starters and moulded case circuit breakers.

These connection sets are solid copper bars.

Ordering details

For contactors	Switch fuse	Catalog number	Pkg qty	Weight (1 pce)
				kg

Vertical assembly

AF400, AF460	OESA400	BEF460/OESA400	1	0.34
AF460 ... AF750	OESA630 to OESA800	BEF750/OESA800	1	0.74

Horizontal assembly

AF400, AF460	OESA400...LR	OESA460H/OESA400	1	1.25
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Mounting plates



PN460

1SFC10108700001

Description

Mounting plates with fixing holes for the specified contactors and overload relays.

Ordering details

For contactors		For overload relays	Catalog number	Pkg qty	Weight (1 pce)
					kg

Mounting plates for direct on line starters

AF400, AF460		EF460	PN460-11	1	2.12
AF580, AF750		EF750	PN750-11	1	2.50

For two contactors side by side with space for mechanical interlock		For one or two overload relays	Catalog number	Pkg qty	Weight (1 pce)
					kg

Mounting plates for mechanical interlocked contactors, reversing starters and two speed starters for double windings

AF400, AF460		EF460	PN460-21	1	3.49
AF580, AF750		EF750	PN750-21	1	4.23

For main and delta contactors	For star contactor ¹⁾	For overload relays	Catalog number	Pkg qty	Weight (1 pce)
					kg

Mounting plates for star-delta starters and two speed starters for single windings

AF400, AF460	AF400	EF460	PN460-41	1	5.31
AF580, AF750	AF400 ... AF580	EF750	PN750-41	1	6.32

¹⁾ Space for mechanical interlock included.

Adapter plates



15FC101048/0001

PR146-1

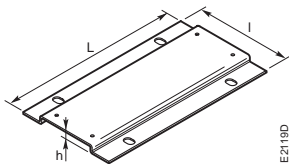
Description

Adapter plates with fixing holes for replacing installed contactors.

Ordering details

From contactors	To contactor	Catalog number	Pkg qty	Weight (1 pce)
				kg
A95, AF95, A110, AF110	AF116, AF140	PR146-1	1	0.30
EH150, EH160, EH175, EH210, EG160	AF190, AF205	PR210-1	1	0.44
EH250, EH260, EH300	AF265, AF305, AF370	PR300-1	1	0.56
EH370, EH550, EG315	AF400, AF460, AF580	PR460-1	1	0.90
EH700, EH800	AF750	PR750-1	1	0.50
OKYM150, OKYM175	AF190	PR185-2	1	0.50
OKYM200, OKYM250	AF265, AF305, AF370	PR300-2	1	0.50
OKYM315	AF400, AF460	PR400-2	1	0.82
OKYM400	AF400, AF460	PR460-2	1	0.80
OKYM500	AF580	PR580-2	1	0.70
EH550, EG630, OKYM630	AF580, AF750	PR750-2	1	1.10

4



E2118D

Dimensions (mm)

Type of the plate	Dimensions			Fixing holes mm
	L	l	h	
PR146-1	150	90	15	4 x \varnothing 6.5
PR210-1	200	132	11.5	4 x \varnothing 7
PR300-1	200	172	11.5	4 x \varnothing 7
PR460-1	278	198	11.5	4 x \varnothing 7
PR750-1	283	244	11.5	4 x \varnothing 7
PR185-2	202	152	11.2	4 x \varnothing 11
PR300-2	202	152	11.2	4 x \varnothing 11
PR400-2	278	151	11.5	4 x \varnothing 11
PR460-2	278	176	11.5	4 x \varnothing 11
PR580-2	283	176	11.5	4 x \varnothing 11
PR750-2	283	255	11.5	4 x \varnothing 14

Fixing holes according to the plate types

Contactors coils, main contact sets and arc chutes



ZAF1650

1SFC101007FD201

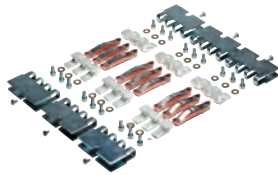
Contactors coils

Ordering details

For contactors	Rated control circuit voltage Uc min. ... Uc max.		Catalog number	Pkg qty	Weight (1 pce) kg
	V 50/60 Hz	V DC			
AF400, AF460	-	24...60	ZAF460-68	1	0.52
	48...130	48...130	ZAF460-69	1	0.52
	100...250	100...250	ZAF460-70	1	0.52
	250...500	250...500	ZAF460-71	1	0.52
AF580 ... AF1250	-	24...60	ZAF750-68	1	1.33
	48...130	48...130	ZAF750-69	1	1.33
	100...250	100...250	ZAF750-70	1	1.33
	250...500	250...500	ZAF750-71	1	1.33
AF1350 ... AF2050	100...250	100...250	ZAF1650-70 ¹⁾	1 set	0.90
			ZP1650 ²⁾	1	0.30
AF2650	100...250	100...250	ZAF2650-70 ¹⁾	1 set	0.90
			ZP2650 ²⁾	1	0.30

¹⁾ One set of two coils.

²⁾ Printed circuit board.



ZL1650

1SFC101009FD201

Main contact sets

Description

The contact sets for 3-pole contactors consists of six fixed contacts, three moving contacts, springs and the required screws.

Ordering details

For contactors	Catalog number	Pkg qty	Weight (1 pce) kg
AF400	ZL400	1	1.320
AF460	ZL460	1	1.320
AF580	ZL580	1	1.840
AF750	ZL750	1	1.840
AF1250	ZL1250	1	1.840
AF1350	ZL1350	1	2.500
AF1650	ZL1650	1	3.500
AF2050	ZL2050	1	3.500
AF2650	ZL2650 ¹⁾	1	1.200

¹⁾ Does not include fixed contacts and screws

Arc chutes

Ordering details

For contactors	Catalog number	Pkg qty	Weight (1 pce) kg
AF400, AF460	ZW460	1	1.380
AF580, AF750, AF1250	ZW750	1	1.500
AF1350, AF1650, AF2050	ZW1650	1	4.000
AF2650	ZW2650	1	4.000

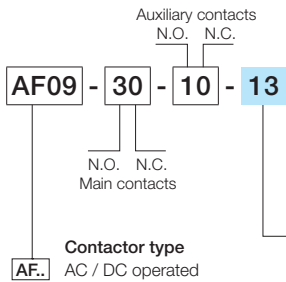
Voltage code table

The below tables indicate the available coil voltages and corresponding digits for order codes. When placing an order, please give the order code. Select a standard contactor from ordering detail pages. Change the **coil voltage code** in the order code according to the table below. Example: for contactor AF400-30-11 and coil 100...250 V 50/60 Hz, the order code is AF400-30-11-70.

AF09 ... AF370 3-pole contactors

AF09 ... AF370 4-pole contactors

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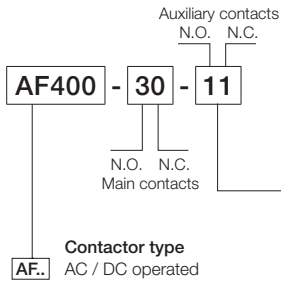
	AC coil code 50/60 Hz	DC coil code
41	24...60 V	-
11	24...60 V	20...60 V
12	48...130 V	48...130 V
13	100...250 V	100...250 V
14	250...500 V	250...500 V

Coil 41: not available for AF116 ... AF370

AF116 ... AF370 3-pole contactors with built-in PLC interface

	AC coil code 50/60 Hz	DC coil code
33	100...250 V	100...250 V
34	250...500 V	250...500 V

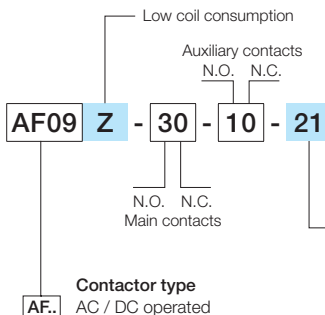
AF400 ... AF2650 3-pole contactors



	AC coil code 50/60 Hz	DC coil code
68	-	24...60 V
69	48...130 V	48...130 V
70	100...250 V	100...250 V
71	250...500 V	250...500 V

Coil 68, 69, 71: not available for AF1350 ... AF2650

AF09 ... AF38 3- and 4-pole contactors - low consumption



	AC coil code 50/60 Hz	DC coil code
20	-	12...20 V
21	24...60 V	20...60 V
22	48...130 V	48...130 V
23	100...250 V	100...250 V

Voltage code table

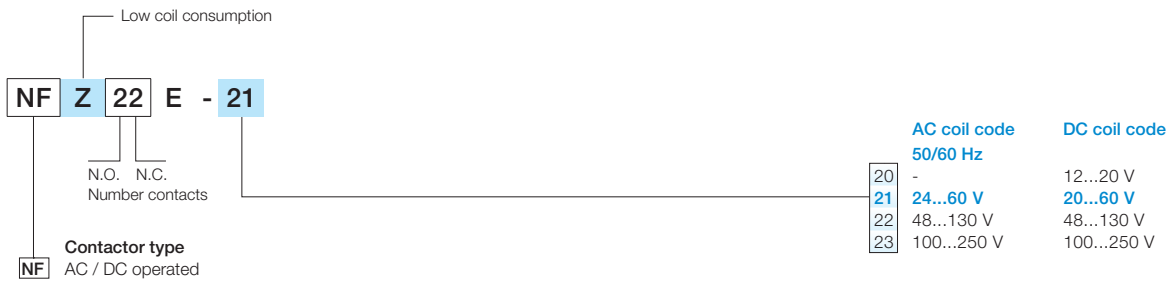
NF contactor relays



NF contactor relays with overlapping of lagging / leading contacts



NF contactor relays - low consumption



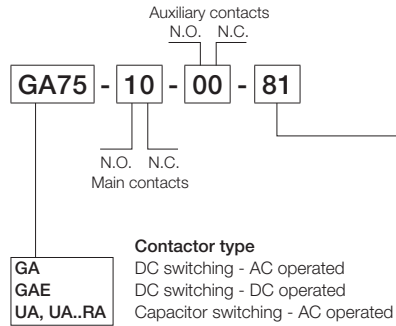
NF contactor relays with overlapping of lagging / leading contacts - low consumption



Voltage code table

UA, UA..RA contactors

GA contactors



4

Contactors: UA, UA..RA, GA

AC coil code

	50 Hz	60 Hz
81	24 V	24 V
16	26 V	28 V
17	28 V	32 V
82	42 V	42 V
20	42 V	48 V
83	48 V	48 V
73	60 V	60 V
74	100 V	100...110 V
26	105 V	110...127 V
84	110 V	110...120 V
89	110...115 V	115...127 V
29	120 V	140 V
30	125...127 V	150 V
34	175 V	208 V
36	190 V	220 V
40	210 V	240 V
80	220...230 V	230...240 V
88	230...240 V	240...260 V
42	230...240 V	277 V
85	380...400 V	400...415 V
86	400...415 V	415...440 V
50	400 V	440 V
51	400...415 V	480 V
87	415...440 V	440...460 V
53	440 V	500 V
55	500 V	600 V
56	550 V	-
58	660...690 V	-
59	-	690 V

Codes in bold for dual frequency coils.

Contactors: GAE

DC coil code

80	12 V
81	24 V
82	42 V
83	48 V
21	50 V
84	60 V
85	75 V
86	110 V
87	125 V
88	220 V
89	240 V
38	250 V

