



Contactors for capacitor switching

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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.

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.

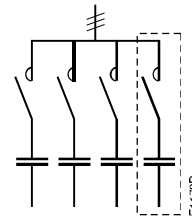


Single-step capacitor bank scheme
Use the A/AF... contactor ranges.

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:

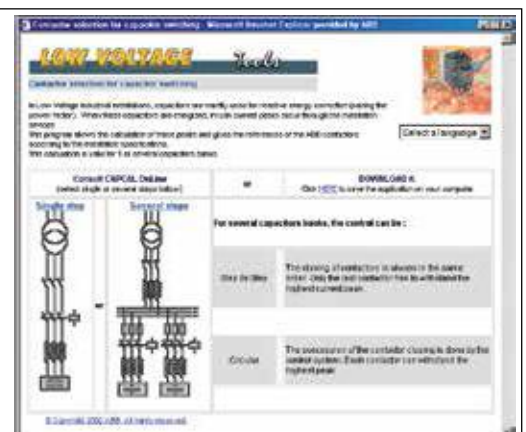
www.abb.com/lowvoltage

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.



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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



UA30-30-10RA

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:

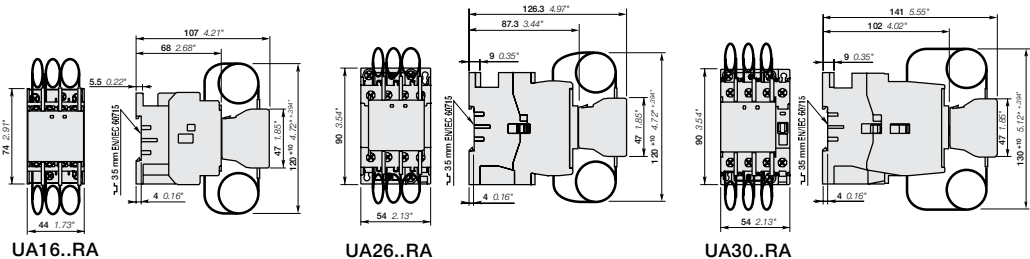
- 3 main poles and 1 built-in auxiliary contact
- the UA..RA contactors are fitted with a special front-mounted block, which ensures the serial insertion of 3 damping resistors into the circuit to limit the current peak on energization of the capacitor bank
- their connection also ensures capacitor precharging 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 Uc		Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce)
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				
12.5	16	24	24	1 0	UA16-30-10RA	1SBL181024R8110	0.460
		48	48	1 0	UA16-30-10RA	1SBL181024R8310	0.460
		110	110...120	1 0	UA16-30-10RA	1SBL181024R8410	0.460
		220...230	230...240	1 0	UA16-30-10RA	1SBL181024R8010	0.460
		230...240	240...260	1 0	UA16-30-10RA	1SBL181024R8810	0.460
		380...400	400...415	1 0	UA16-30-10RA	1SBL181024R8510	0.460
		400...415	415...440	1 0	UA16-30-10RA	1SBL181024R8610	0.460
22	22	24	24	1 0	UA26-30-10RA	1SBL241024R8110	0.710
		48	48	1 0	UA26-30-10RA	1SBL241024R8310	0.710
		110	110...120	1 0	UA26-30-10RA	1SBL241024R8410	0.710
		220...230	230...240	1 0	UA26-30-10RA	1SBL241024R8010	0.710
		230...240	240...260	1 0	UA26-30-10RA	1SBL241024R8810	0.710
		380...400	400...415	1 0	UA26-30-10RA	1SBL241024R8510	0.710
		400...415	415...440	1 0	UA26-30-10RA	1SBL241024R8610	0.710
30	28	24	24	1 0	UA30-30-10RA	1SBL281024R8110	0.810
		48	48	1 0	UA30-30-10RA	1SBL281024R8310	0.810
		110	110...120	1 0	UA30-30-10RA	1SBL281024R8410	0.810
		220...230	230...240	1 0	UA30-30-10RA	1SBL281024R8010	0.810
		230...240	240...260	1 0	UA30-30-10RA	1SBL281024R8810	0.810
		380...400	400...415	1 0	UA30-30-10RA	1SBL281024R8510	0.810
		400...415	415...440	1 0	UA30-30-10RA	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:

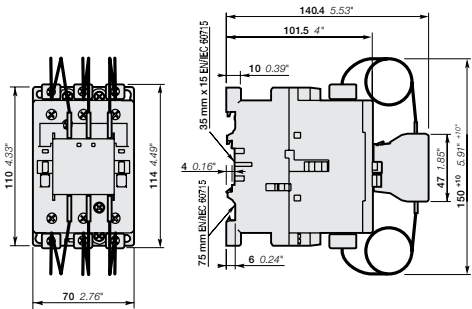
- 3 main poles
- the UA..RA contactors are fitted with a special front-mounted block, which ensures the serial insertion of 3 damping resistors into the circuit to limit the current peak on energization of the capacitor bank
 - their connection also ensures capacitor precharging in order to limit the 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	UL/CSA	Rated control circuit voltage		Auxiliary contacts fitted	Type	Order 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	Uc (1)					Pkg (1 pce) kg
40	50	24	24	0 0	UA50-30-00RA	1SBL351024R8100	1.350
		48	48	0 0	UA50-30-00RA	1SBL351024R8300	1.350
		110	110...120	0 0	UA50-30-00RA	1SBL351024R8400	1.350
		220...230	230...240	0 0	UA50-30-00RA	1SBL351024R8000	1.350
		230...240	240...260	0 0	UA50-30-00RA	1SBL351024R8800	1.350
		380...400	400...415	0 0	UA50-30-00RA	1SBL351024R8500	1.350
		400...415	415...440	0 0	UA50-30-00RA	1SBL351024R8600	1.350
50	55	24	24	0 0	UA63-30-00RA	1SBL371024R8100	1.350
		48	48	0 0	UA63-30-00RA	1SBL371024R8300	1.350
		110	110...120	0 0	UA63-30-00RA	1SBL371024R8400	1.350
		220...230	230...240	0 0	UA63-30-00RA	1SBL371024R8000	1.350
		230...240	240...260	0 0	UA63-30-00RA	1SBL371024R8800	1.350
		380...400	400...415	0 0	UA63-30-00RA	1SBL371024R8500	1.350
		400...415	415...440	0 0	UA63-30-00RA	1SBL371024R8600	1.350
60	64	24	24	0 0	UA75-30-00RA	1SBL411024R8100	1.350
		48	48	0 0	UA75-30-00RA	1SBL411024R8300	1.350
		110	110...120	0 0	UA75-30-00RA	1SBL411024R8400	1.350
		220...230	230...240	0 0	UA75-30-00RA	1SBL411024R8000	1.350
		230...240	240...260	0 0	UA75-30-00RA	1SBL411024R8800	1.350
		380...400	400...415	0 0	UA75-30-00RA	1SBL411024R8500	1.350
		400...415	415...440	0 0	UA75-30-00RA	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:

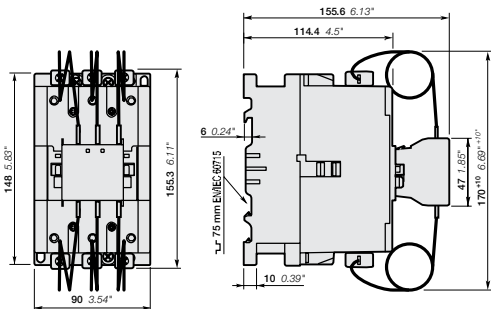
- 3 main poles
- the UA..RA contactors are fitted with a special front-mounted block, which ensures the serial insertion of 3 damping resistors into the circuit to limit the current peak on energization of the capacitor bank
 - their connection also ensures capacitor precharging in order to limit the 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	UL/CSA	Rated control circuit voltage Uc		Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
Rated operational power $\theta \leq 40^{\circ}\text{C}$ 400 V AC-6b	Rated operational power $\theta \leq 40^{\circ}\text{C}$ 480 V	V 50 Hz	V 60 Hz				
70	80	24	24	0 0	UA95-30-00RA	1SFL431024R8100	2.000
		48	48	0 0	UA95-30-00RA	1SFL431024R8300	2.000
		110	110...120	0 0	UA95-30-00RA	1SFL431024R8400	2.000
		220...230	230...240	0 0	UA95-30-00RA	1SFL431024R8000	2.000
		230...240	240...260	0 0	UA95-30-00RA	1SFL431024R8800	2.000
		380...400	400...415	0 0	UA95-30-00RA	1SFL431024R8500	2.000
		400...415	415...440	0 0	UA95-30-00RA	1SFL431024R8600	2.000
80	95	24	24	0 0	UA110-30-00RA	1SFL451024R8100	2.000
		48	48	0 0	UA110-30-00RA	1SFL451024R8300	2.000
		110	110...120	0 0	UA110-30-00RA	1SFL451024R8400	2.000
		220...230	230...240	0 0	UA110-30-00RA	1SFL451024R8000	2.000
		230...240	240...260	0 0	UA110-30-00RA	1SFL451024R8800	2.000
		380...400	400...415	0 0	UA110-30-00RA	1SFL451024R8500	2.000
		400...415	415...440	0 0	UA110-30-00RA	1SFL451024R8600	2.000

(1) Other control voltages see voltage code table.

Main dimensions mm, inches



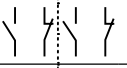
UA95..RA, UA100..RA

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.

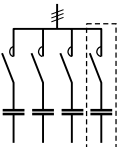
Contactor types	Main poles	Available auxiliary contacts	Front-mounted accessories	Side-mounted accessories
			Auxiliary contact blocks	Auxiliary contact blocks
			1-pole CA5-...	2-pole CAL...
UA16-30-10RA	3 0	1 0	–	1 x CAL5-11
UA26-30-10RA	3 0	1 0	–	1 to 2 x CAL5-11
UA30-30-10RA	3 0	1 0	1 x CA5-...	+ 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-6b										
	For air temperature close to contactor $\theta \leq 40\text{ }^{\circ}\text{C}$	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
		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
		690 V	22 kvar	35 kvar	45 kvar	72 kvar	80 kvar	100 kvar	120 kvar	130 kvar
	$\theta \leq 55\text{ }^{\circ}\text{C}$	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
$\theta \leq 70\text{ }^{\circ}\text{C}$	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 (1)		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) 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 $\theta \leq 40\text{ }^{\circ}\text{C}$	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

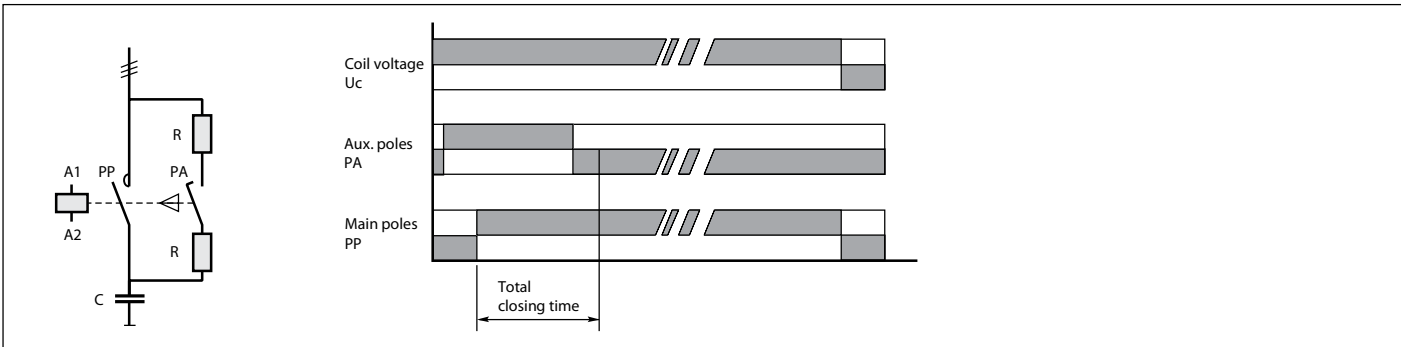
The front-mounted block mechanism of the UA..RA contactors ensures:

- 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
	Bars or lugs		2 x -	-	2.5...10 + 2.5...4 mm ²	6...16 + 6...10 mm ²	6...35 mm ²
	Lugs		L $\leq$ 7.7 mm	10 mm	-	-	-
			I $>$ 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
	Lugs		2 x 0.75...2.5 mm ²				0.75...2.5 mm ²
	Lugs	Coil terminals	L $\leq$ 8 mm				
			I $>$ 3.7 mm				
		Built-in auxiliary terminals	L $\leq$ 7.7 mm	10 mm	8 mm	-	-
			I $>$ 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	M 8
		Screwdriver type	Flat Ø 5.5 / Pozidriv 2		Flat Ø 6.5 / Pozidriv 2		Hexagon socket (s = 4 mm)
Coil terminals			M 3.5				
		Screwdriver type	Flat Ø 5.5 / Pozidriv 2				
Built-in auxiliary terminals			M 3.5	M 4	M 3.5	-	-
		Screwdriver type	Flat Ø 5.5 / Pozidriv 2			-	-

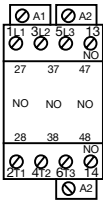
Other technical characteristics are the same as those of standard A contactors.

UA..RA contactors

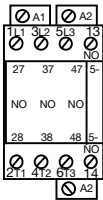
Terminal marking and positioning

UA..RA contactors - AC operated

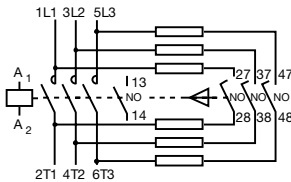
Standard devices without addition of auxiliary contacts



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

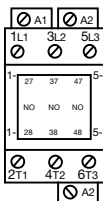


UA30-30-10 RA

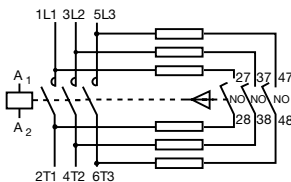


UA16 ... 30-30-10 RA

5



UA50 ... 110-30-00 RA

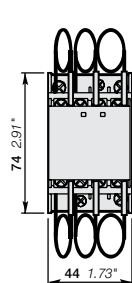


UA50 ... 110-30-00 RA

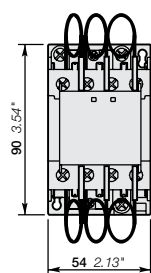
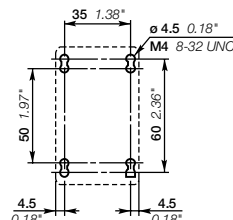
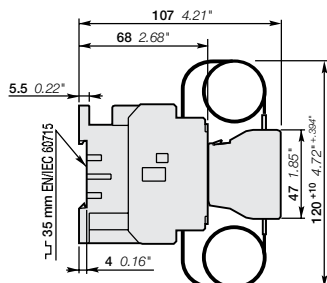
UA..RA 3-pole contactors for capacitor switching

Unlimited peak current $\hat{I}$

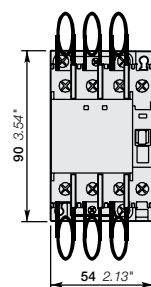
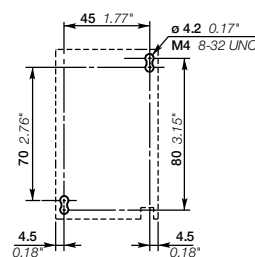
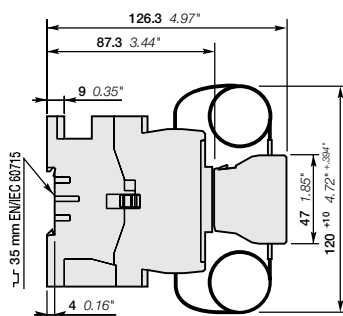
Main dimensions mm, inches



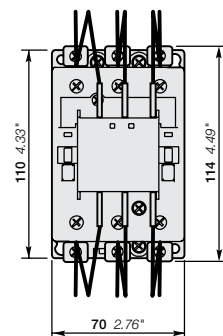
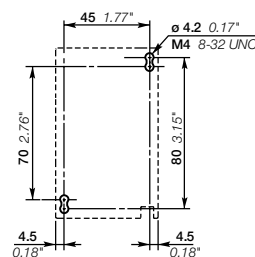
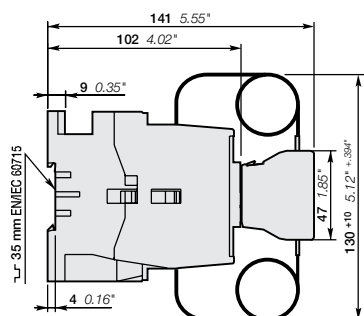
UA16..RA



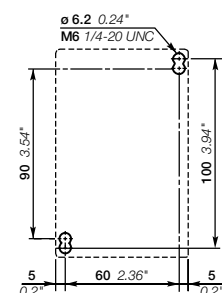
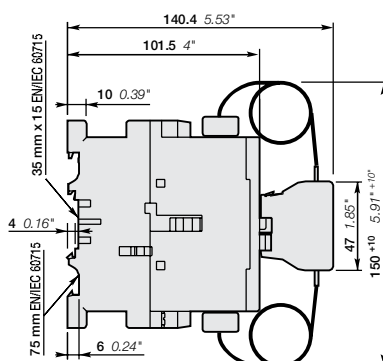
UA26..RA



UA30..RA



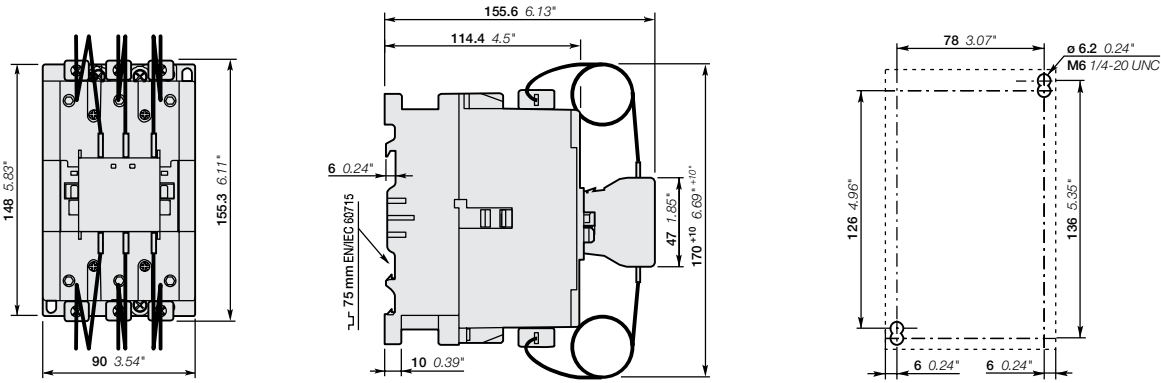
UA50..RA, UA63..RA, UA75..RA



UA..RA 3-pole contactors for capacitor switching

Unlimited peak current $\hat{I}$

Main dimensions mm, inches



UA95..RA, UA110..RA

Handwriting practice lines consisting of multiple sets of three horizontal dotted lines for tracing and writing practice.

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:

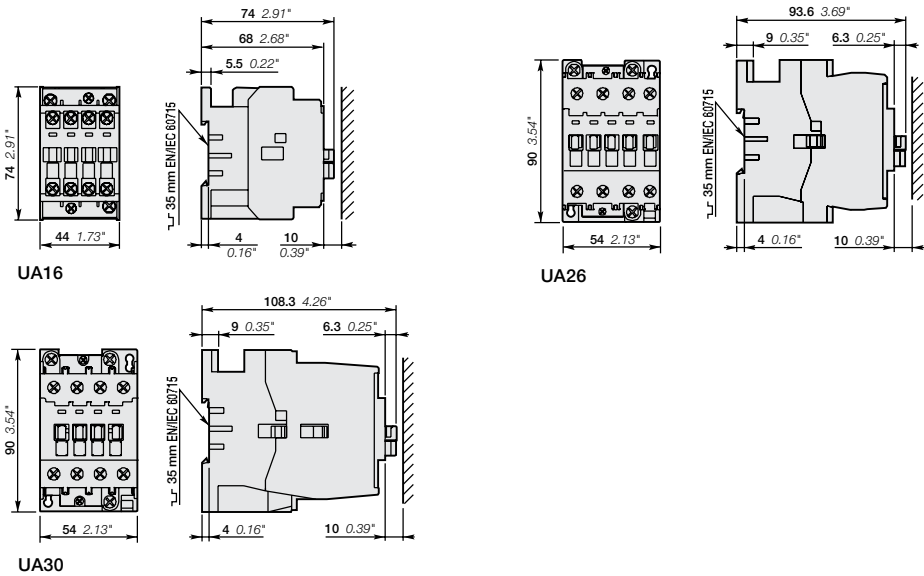
- 3 main poles and 1 built-in auxiliary contact
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

IEC	Max peak current	UL/CSA	Rated control circuit voltage		Auxiliary contacts fitted		Type	Order code	Weight
Rated operational power $\theta \leq 40^{\circ}\text{C}$ 400 V AC-6b		Rated operational power $\theta \leq 40^{\circ}\text{C}$ 480 V	Uc (1)						Pkg (1 pce)
kvar	kA	kvar	V 50 Hz	V 60 Hz					kg
12.5	1.8	-	24	24	1	0	UA16-30-10	1SBL181022R8110	0.340
			48	48	1	0	UA16-30-10	1SBL181022R8310	0.340
			110	110...120	1	0	UA16-30-10	1SBL181022R8410	0.340
			220...230	230...240	1	0	UA16-30-10	1SBL181022R8010	0.340
			230...240	240...260	1	0	UA16-30-10	1SBL181022R8810	0.340
			380...400	400...415	1	0	UA16-30-10	1SBL181022R8510	0.340
			400...415	415...440	1	0	UA16-30-10	1SBL181022R8610	0.340
20	3	25	24	24	1	0	UA26-30-10	1SBL241022R8110	0.600
			48	48	1	0	UA26-30-10	1SBL241022R8310	0.600
			110	110...120	1	0	UA26-30-10	1SBL241022R8410	0.600
			220...230	230...240	1	0	UA26-30-10	1SBL241022R8010	0.600
			230...240	240...260	1	0	UA26-30-10	1SBL241022R8810	0.600
			380...400	400...415	1	0	UA26-30-10	1SBL241022R8510	0.600
			400...415	415...440	1	0	UA26-30-10	1SBL241022R8610	0.600
27.5	3.5	32	24	24	1	0	UA30-30-10	1SBL281022R8110	0.710
			48	48	1	0	UA30-30-10	1SBL281022R8310	0.710
			110	110...120	1	0	UA30-30-10	1SBL281022R8410	0.710
			220...230	230...240	1	0	UA30-30-10	1SBL281022R8010	0.710
			230...240	240...260	1	0	UA30-30-10	1SBL281022R8810	0.710
			380...400	400...415	1	0	UA30-30-10	1SBL281022R8510	0.710
			400...415	415...440	1	0	UA30-30-10	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:

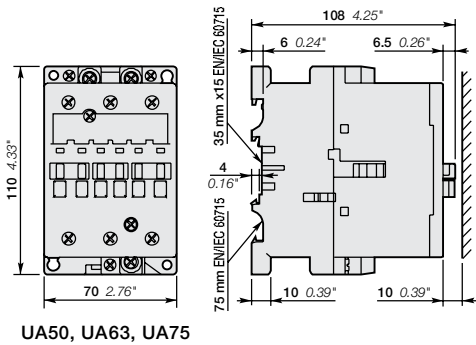
- 3 main poles
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

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

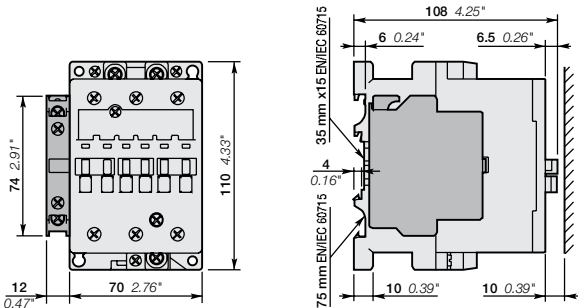
- 3 main poles
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

IEC Rated operational power $\theta \leq 40\text{ }^{\circ}\text{C}$ 400 V AC-6b kvar	Max peak current $\hat{I}$ kA	UL/CSA Rated operational power $\theta \leq 40\text{ }^{\circ}\text{C}$ 400 V kvar	Rated control circuit voltage U_c (1)		Auxiliary contacts fitted 	Type	Order code	Weight Pkg (1 pce) kg
			V 50 Hz	V 60 Hz				
33	5	40	24	24	1 1	UA50-30-11	1SBL351022R8111	1.200
			48	48	1 1	UA50-30-11	1SBL351022R8311	1.200
			110	110...120	1 1	UA50-30-11	1SBL351022R8411	1.200
			220...230	230...240	1 1	UA50-30-11	1SBL351022R8011	1.200
			230...240	240...260	1 1	UA50-30-11	1SBL351022R8811	1.200
			380...400	400...415	1 1	UA50-30-11	1SBL351022R8511	1.200
			400...415	415...440	1 1	UA50-30-11	1SBL351022R8611	1.200
45	6.5	-	24	24	1 1	UA63-30-11	1SBL371022R8111	1.200
			48	48	1 1	UA63-30-11	1SBL371022R8311	1.200
			110	110...120	1 1	UA63-30-11	1SBL371022R8411	1.200
			220...230	230...240	1 1	UA63-30-11	1SBL371022R8011	1.200
			230...240	240...260	1 1	UA63-30-11	1SBL371022R8811	1.200
			380...400	400...415	1 1	UA63-30-11	1SBL371022R8511	1.200
			400...415	415...440	1 1	UA63-30-11	1SBL371022R8611	1.200
50	7.5	55	24	24	1 1	UA75-30-11	1SBL411022R8111	1.200
			48	48	1 1	UA75-30-11	1SBL411022R8311	1.200
			110	110...120	1 1	UA75-30-11	1SBL411022R8411	1.200
			220...230	230...240	1 1	UA75-30-11	1SBL411022R8011	1.200
			230...240	240...260	1 1	UA75-30-11	1SBL411022R8811	1.200
			380...400	400...415	1 1	UA75-30-11	1SBL411022R8511	1.200
			400...415	415...440	1 1	UA75-30-11	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



UA110-30-00

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 discharges (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:

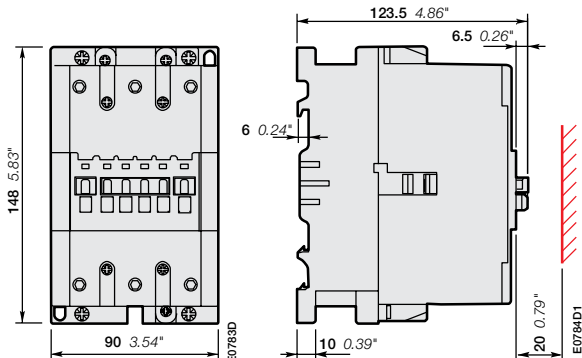
- 3 main poles
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

Ordering details

IEC		UL/CSA	Rated control circuit voltage U_c (1)		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power $\theta \leq 40\text{ }^{\circ}\text{C}$ 400 V AC-6b	Max peak current $\hat{I}$ kA	Rated operational power $\theta \leq 40\text{ }^{\circ}\text{C}$ 480 V kvar	V 50 Hz	V 60 Hz				Pkg (1 pce) kg
65	9.3	70	24	24	0 0	UA95-30-00	1SFL431022R8100	2.000
			48	48	0 0	UA95-30-00	1SFL431022R8300	2.000
			110	110...120	0 0	UA95-30-00	1SFL431022R8400	2.000
			220...230	230...240	0 0	UA95-30-00	1SFL431022R8000	2.000
			230...240	240...260	0 0	UA95-30-00	1SFL431022R8800	2.000
			380...400	400...415	0 0	UA95-30-00	1SFL431022R8500	2.000
			400...415	415...440	0 0	UA95-30-00	1SFL431022R8600	2.000
75	10.5	80	24	24	0 0	UA110-30-00	1SFL451022R8100	2.000
			48	48	0 0	UA110-30-00	1SFL451022R8300	2.000
			110	110...120	0 0	UA110-30-00	1SFL451022R8400	2.000
			220...230	230...240	0 0	UA110-30-00	1SFL451022R8000	2.000
			230...240	240...260	0 0	UA110-30-00	1SFL451022R8800	2.000
			380...400	400...415	0 0	UA110-30-00	1SFL451022R8500	2.000
			400...415	415...440	0 0	UA110-30-00	1SFL451022R8600	2.000

(1) Other control voltages see voltage code table.

Main dimensions mm, inches



UA95, UA110

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 discharges (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:

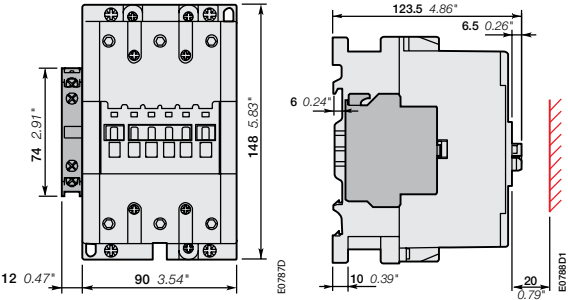
- 3 main poles
- control circuit: AC operated
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories

Ordering details

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

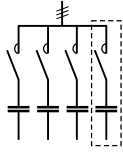
Contactor types	Main poles	Available auxiliary contacts	Front-mounted accessories			Side-mounted accessories	
			Auxiliary contact blocks		Pneumatic timer	Auxiliary contact blocks	
			1-pole CA5-..	4-pole CA5-..	TP.. A	2-pole CAL-..	
UA16-30-10	3	0	1 to 4 x CA5-..	or 1 x CA5-.. (4-pole)	or 1 x TP.. A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

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 Ue max.		690 V									
Rated frequency (without derating)		50 / 60 Hz									
AC-6b Utilization category											
Rated operational power AC-6b (1)											
 Multi-step capacitor bank scheme	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 $\hat{I}$			Ue $\leq$ 500 V	1.8 kA	3 kA	3.5 kA	5 kA	6.5 kA	7.5 kA	9.3 kA	10.5 kA
			Ue > 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 In of the capacitor									
Max. electrical switching frequency		240 cycles/h									
Electrical durability AC-6b		Ue $\leq$ 690 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 $0.9 \times 50 = 45$ 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
			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
	Bars or lugs		L $\leq$ 7.7 mm	10 mm	-	-	-
			I $>$ 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 / 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				0.75...2.5 mm ²
	Lugs	Coil terminals	L $\leq$ 8 mm				
			I $>$ 3.7 mm				
		Built-in auxiliary terminals	L $\leq$ 7.7 mm	10 mm	8 mm	-	-
			I $>$ 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							
Main terminals			Delivered in open position, screws of unused terminals must be tightened				
			M3.5	M4	M5	M6	M8
		Screwdriver type	Flat Ø 5.5 / Pozidriv 2		Flat Ø 6.5 / Pozidriv 2		Hexagon socket (s = 4 mm)
Coil terminals			M3.5				
		Screwdriver type	Flat Ø 5.5 / Pozidriv 2				
Built-in auxiliary terminals			M3.5	M4	M3.5	-	-
		Screwdriver type	Flat Ø 5.5 / Pozidriv 2			-	-

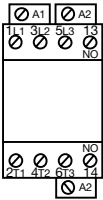
Other technical characteristics are the same as those of standard A contactors.

UA... contactors

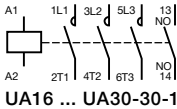
Terminal marking and positioning

UA... contactors - AC operated

Standard devices without addition of auxiliary contacts

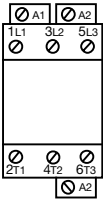


UA16 ... UA30-30-10

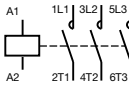


UA16 ... UA30-30-10

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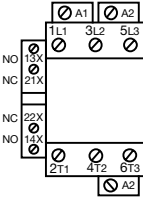


UA50 ... UA110-30-00

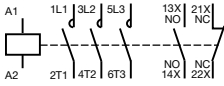


UA50 ... UA110-30-00

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

