

## Accessories for A/AF/BC & AE contactors



CAL5-11



CA5-10

### Auxiliary contact blocks – Standard

Positioning	Maximum number of contact blocks	Contact Description	Catalog number	List price
Front mounting (single pole)	4 blocks: A9 – A26 AE9 – AE30 BC9 – BC30	1 N.O. 1 N.C.	CA5-10 CA5-01	\$ 15
	5 blocks: A30, A40 6 blocks: A45 – A110 AE45 – AE110		1 N.O. Early make 1 N.C. Late break	
Front mounting (4 pole)	1 block: A9 – A26-40-00 A30 – A110 AE9 – AE110 BC9 – BC30	4 N.O. 3 N.O. & 1 N.C. 2 N.O. & 2 N.C. 4 N.C. 2 N.O./2 N.C.⊙	CA5-40E CA5-31E CA5-22E CA5-04E CA5-11/11E	30
	1 block: A9 – A40-30-10 BC9 – BC25-30-10		3 N.O. & 1 N.C. 2 N.O. & 2 N.C. 4 N.C. 2 N.O./2 N.C.⊙	
Side mounting (2 pole)	2 blocks: A9 – A110 1 block: AE9 – AE110	1 N.O. & 1 N.C.	CAL5-11	
	2 blocks: A145 – AF750 2 blocks: A145 – AF750		1 N.O. & 1 N.C. (inside L or R) 1 N.O. & 1 N.C. (outside, L or R)	

### Auxiliary contact blocks – Front mounting, switching low voltage and low current

Positioning	Maximum number of contact blocks	Contact Description	Degree of protection	Catalog number	List price
Front mounting (single pole)	4 blocks: A9 – A26 AE9 – AE30 BC9 – BC30	1 N.O. 1 N.C.	IP40 IP40	CE5-10D0.1 CE5-01D0.1	\$ 38
				1 N.O. 1 N.C.	
Front mounting (single pole)	5 blocks: A30, A40 6 blocks: A45 – A110 AE45 – AE110	1 N.O. 1 N.C.	IP67 IP67	CE5-10W0.1 CE5-01W0.1	42
				1 N.O. 1 N.C.	

⊙ Includes 1 N.O. & 1 N.C. overlapping

# Accessories for A/AF/BC & AE contactors

Across the line  
contactors



TP40DA



VE5-1



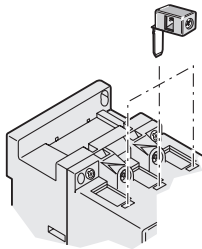
VM300H



LK75-A

LK75-A1

LK110



## Pneumatic timers

Mounting on	Timing range	Contacts		Catalog number	List price
		N.O.	N.C.		
A9 – A75 AE9 – AE75	On delay 0.1 – 40 s	1	1	TP40DA	\$ 108
	On delay 10 – 180 s	1	1	TP180DA	
	Off delay 0.1 – 40 s	1	1	TP40IA	
	Off delay 10 – 180 s	1	1	TP180IA	

## Interlocks for two horizontally mounted contactors – A9 - A110, BC contactors

Feature	Mounting on	Contacts		Catalog number	List price
		N.O.	N.C.		
Mechanical/electrical	A9 – A40	—	2	VE5-1	\$ 45
Mechanical/electrical	A45 – A110	—	2	VE5-2	45
Mechanical	A9 – A40	—	—	VM5-1	21
Mechanical/electrical	BC9 – BC30	—	2	VBC30	27

Note: Use type VE 5-2 for mechanical and electrical interlocking between contactors A40 and A50.

## Interlocks for two horizontally mounted contactors – A95 - AF750 contactors

Feature	Left/Right contactors	Left/Right contactors	Catalog number	List price
Mechanical	A210 – A300	AF400 – AF460	VM300/460H	130
Mechanical	AF400 – AF750	AF400 – AF750	VM750H	150

## Interlocks for two vertically mounted contactors – A95 - AF750 contactors

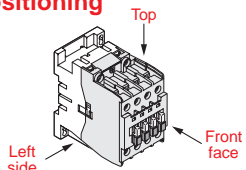
Feature	Top contactor	Bottom Contactor	Catalog number	List price
Mechanical	A210 – A300	AF400 – AF460	VM300/460V	250
Mechanical	AF400 – AF750	AF400 – AF750	VM750V	270

## Auxiliary lead terminals

Connections	Mounting on	Catalog number	List price
Connects from top	A50 – A75	LK75-A1	15
Connects from side	A95 – A110	LK110	23

## Accessories

### Possible accessory combinations for A contactors

Positioning 	Accessories — Front face mounting			Accessories — Side mounting		
	Auxiliary contacts 1 – pole 4 – pole		Pneumatic timers	Auxiliary contacts	Electrical or mechanical interlock <sup>①</sup>	
	CA5-10 or CA5-01	CA5-40 or CA5-22 or CA5-31	TP – D or TP – I	CAL 5-11 CAL5-11B	VE5-1 or VM 5-1	VE 5-2 VM300H VM300/460H VM750H

1 Configurations of accessories are different depending on whether front or side mounted.

Type	Main poles	Built-in auxiliary contacts	Accessories — Front mounting			Accessories — Side mounting	
			Auxiliary contact blocks 1-pole CA5-	4-pole CA5-	TP - A Pneumatic timer block	Auxiliary contact Blocks 2-pole CAL5-11	Interlock units
A9 – A26	– 3 0 – 1 0		1 to 4 CA5- 1-pole blocks	or 1 CA5- 4-pole block	or 1 TP - A block	+ 1 to 2 CAL5-11 blocks	1 V <sup>M</sup> / <sub>E</sub> 5-1 block
A9 – A26	– 3 0 – 0 1 <sup>①</sup>						or + 1 CAL5-11 block
A9 – A26	– 4 0 – 0 0						
A9 – A26	– 2 2 – 0 0 <sup>①</sup>						
A9 – A16	– 3 0 – 2 2		—	—	—	+ 1 to 2 CAL5-11 blocks	or 1 V <sup>M</sup> / <sub>E</sub> 5-1 block
A9 – A26	– 3 0 – 3 2		—	—	—	+ 1 to 2 CAL5-11 blocks	or + 1 CAL5-11 block
A30, A40	– 3 0 – 1 0		1 to 5 CA5- 1-pole blocks	or 1 CA5- 4-pole block + 1 CA5- 1-pole block	or 1 TP - A block + 1 CA5- 1-pole block	+ 1 to 2 CAL5-11 blocks	or 1 V <sup>M</sup> / <sub>E</sub> 5-1 block
A30, A40	– 3 0 – 0 1						or + 1 CAL5-11 block
A30, A40	– 3 0 – 3 2		1 CA5- 1-pole block	—	—	+ 1 to 2 CAL5-11 blocks	or 1 V <sup>M</sup> / <sub>E</sub> 5-1 block + 1 CAL5-11 block
A50 – A75	– 3 0 – 0 0		1 to 6 CA5- 1-pole blocks	or 1 CA5- 4-pole block or + 2 CA5- 1-pole blocks	or 1 TP - A block + 2 CA5- 1-pole blocks	+ 1 to 2 CAL5-11 blocks	or 1 VE5-2 block
A45 – A75	– 4 0 – 0 0						or + 1 CAL5-11 block
A45, A75	– 2 2 – 0 0 <sup>②</sup>						
A95, A110	– 3 0 – 0 0						
A50 – A75	– 3 0 – 2 2		2 CA5- 1-pole blocks	—	—	+ 1 to 2 CAL5-11 blocks	or 1 VE5-2 block + 1 CAL5-11 block
A95, A110	– 3 0 – 2 2						
AE50 – AE75	– 3 0 – 0 0		1 to 6 CA5- 1-pole blocks	or 1 CA5- 4-pole block or + 2 CA5- 1-pole blocks	or 1 TP - A block + 2 CA5- 1-pole blocks	+ 1 CAL5-11 block	or 1 VE5-2 block
AE45 – AE75	– 4 0 – 0 0						
AE45, AE75	– 2 2 – 0 0 <sup>②</sup>						
AE95, AE110	– 3 0 – 0 0						
A50 – A75	– 3 0 – 1 1		1 to 6 CA5- 1-pole blocks	or 1 CA5- 4-pole block or + 2 CA5- 1-pole blocks	or 1 TP - A block + 2 CA5- 1-pole blocks	+ 1 CAL5-11 block	or 1 VE5-2 block
AE50, AE75	– 3 0 – 1 1						
A95, A110	– 3 0 – 1 1						
AE95, AE110	– 3 0 – 1 1						
A145 – AF750	– 3 0 – 0 0		—	—	—	1 to 2 CAL5-11 blocks + 1 to 2 CAL5-11B blocks	1 CAL5-11 block + 1 CAL5-11B block + VM300H or VM300/750H or VM750H interlock

### Contactor mounting configurations (standard from factory)

Auxiliary contacts are mounted on the contactor in the following order:

- Left – 1st
- Right – 2nd
- Top – 3rd (L to R)

<sup>①</sup> In mounting position 5 (see page 1.36), there should be no more than 2 "N.C." front-mounted auxiliary contacts – The CAL 5-11 side-mounted blocks offer additional "N.C." contacts.

<sup>②</sup> Whatever the mounting position (see page 1.36), there should be no more than 2 "N.C." front-mounted auxiliary contacts – The CAL 5-11 side-mounted blocks offer additional "N.C." contacts.

## Accessories

### Auxiliary contact block technical data

#### CA5/CAL5-11/CC5

Types		1-pole CA5, 4-pole CA5 2-pole CAL5-11 and 1-pole CC5	
<b>Standards</b>		IEC 947-5-1 and EN 60947-5-1	
<b>Rated insulation voltage <math>U_i</math></b>			
according to IEC 947-5-1	V	690	
according to UL/CSA	V	600	
<b>Rated operational voltage <math>U_e</math></b>		~ V	
		24 to 690	
<b>Conventional thermal current <math>I_{th}</math></b>		A	
		16	
<b>Rated operational current <math>I_e</math></b>			
in AC-15 acc. to IEC 947-5-1			
24 to 127 V	A	6	
220 to 240 V	A	4	
380 to 440 V	A	3	
500 to 690 V	A	2	
in DC-13 acc. to IEC 947-5-1			
24 V	A	6	
48 V	A	2.8	
72 V	A	1	
125 V	A	0.55	
250 V	A	0.3	
<b>Connecting terminals</b>		M 3.5 (+,-) pozidriv 2 screw with cable clamp	
(delivered in open position. Screws of unused terminals should be tightened).			
<b>Connecting capacity</b>			
• Rigid solid		1 or 2 x mm <sup>2</sup>	1 to 4
• Flexible with cable end		1 x mm <sup>2</sup>	0.75 to 2.5
		2 x mm <sup>2</sup>	0.75 to 2.5
<b>Mechanical durability</b>		cycles	
<b>Max. switching frequency</b>		cycles/h	
		10 million	
		3600	
<b>Electrical durability</b>		See curve below	
<b>Max. switching frequency</b>		cycles/h	
		1200	
<b>Rated making capacity</b>		10 x $I_e$ AC-15	
<b>Rated breaking capacity</b>		10 x $I_e$ AC-15	
<b>Rated short-time withstand current <math>I_{cw}</math></b>		1 s	A
q = 40 °C		0.1 s	A
		100	
		140	
<b>Min. switching capacity</b>		17 V / 5 mA	
<b>Short-circuit protection - gG (gl) fuses</b>		A	
		10	
<b>Power loss per pole at 6 A</b>		W	
		0.15	
<b>Degree of protection</b> according to IEC 529, IEC 144, DIN 40 050 and NFC 20-010		IP 20	

#### Electrical durability

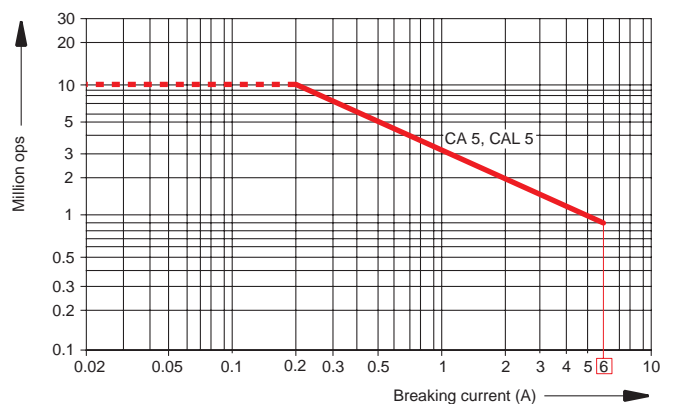
AC-15 according to IEC 947-5-1

making current:  $10 \times I_e$  where  $\cos \varphi = 0.7$  and  $U_e$

breaking current:  $I_e$  where  $\cos \varphi = 0.4$  and  $U_e$

The curves opposite show the electrical durability of the auxiliary contact blocks according to breaking current  $I_e$ .

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



## Accessories

### Auxiliary contact block technical data

#### CE5

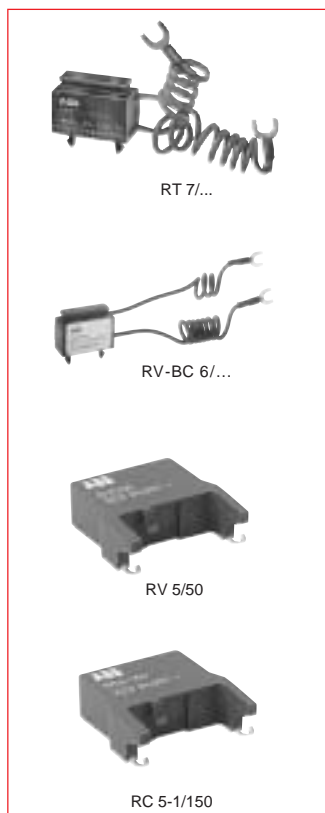
#### Auxiliary contact blocks for switching low level voltage and current

Types		CE5-10D0.1 CE5-01D0.1 CE5-10W0.1 CE5-01W0.1 Version 100 mA	CE5-10DZ CE5-01DZ CE5-10WZ CE5-01WZ Version 2 A
<b>Standards</b>		IEC 947-5-1 and EN 60947-5-1	
<b>Approvals</b>		UL / CSA	
<b>Rated insulation voltage <math>U_i</math></b> according to IEC 947-5-1		V	250
according to UL/CSA		V	125
<b>Rated operational voltage <math>U_e</math></b>		V	125
<b>Rated operational current <math>I_e</math></b> in AC-15 or AC-14 acc. to IEC 947-5-1		A	0.1
in DC-12 acc. to IEC 947-5-1		A	0.1
24 V		A	0.1
60 V		A	0.1
110 V		A	0.1
220 V		A	0.1
<b>Minimal switching</b>		3 V / 1 mA	
<b>Reliability for the minimal switching</b>		10 <sup>-8</sup>	
<b>Connecting terminals</b>		M3.5 (+,-) posidriv 2 screw with cable clamp	
<b>Connecting capacity</b> • Rigid solid		1 ou 2 (1...4) mm <sup>2</sup>	
• Flexible with cable end		1 ou 2 (0.75... 2.5) mm <sup>2</sup>	
<b>Short circuit protection</b>		100 mA	10 A
<b>Degree of protection</b> according to IEC529, IEC 144, DIN 40 050, NFC 20-010		IP 20	
<b>Mounting</b>		Front mounting on contactors: A, AE, TAE9...110, BC, TBC, AF, GA, N, NE KC and TKC with the same limitations than those of CA5-01	
<b>Dimensions</b>		Identical to those of CA5 single pole	

# Accessories

## Surge suppressors for A/AE/BC/EK contactors

Across the line  
contactors



### Surge suppression device

Mounting on	Voltage range	Catalog number	List price
BC9 to BC30	12 – 32 VDC 25 – 65 VDC 50 – 90 VDC 77 – 150 VDC 150 – 264 VDC	RT7/32 RT7/65 RT7/90 RT7/150 RT7/264	\$ 26
	BC9 to BC30	RV-BC6/60 RV-BC6/127 RV-BC6/250 RV-BC6/380	
AE9 to AE110	12 – 32 VDC 25 – 65 VDC 50 – 90 VDC 77 – 150 VDC 150 – 264 VDC	RT5/32 RT5/65 RT5/90 RT5/150 RT5/264	30
	A9 to A110 and AE9 to AE110	RV5/50 RV5/133 RV5/250 RV5/440	
A9 to A40	24 – 50 VAC 50 – 133 VAC 110 – 250 VAC 250 – 440 VAC	RC5-1/50 RC5-1/133 RC5-1/250 RC5-1/440	26
A45 to A300	24 – 50 VAC 50 – 133 VAC 110 – 250 VAC 250 – 440 VAC	RC5-2/50 RC5-2/133 RC5-2/250 RC5-2/440	
EK110 to EK210	24 – 48 VAC 110 – 415 VAC	RC-EH250/48 RC-EH250/415	26
EK370 to EK550	48 – 110VAC	RC-EH800/110	
EK110 to EK550 EK370 to EK550	24 – 125VAC 220 – 600VAC	RC-EH800/110 RC-EH800/600	

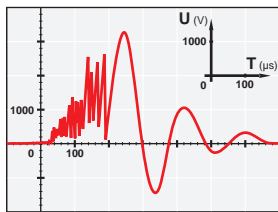
### Technical data

Type	Control circuit	Opening time growth factor	Residual overvoltage or clipping voltage	Remarks	
<b>RT 7 or RT 5 /... transil diode</b> 	32 DC	2.5 to 3	50 V	<b>Advantages</b> <ul style="list-style-type: none"> <li>• Good energy absorption</li> <li>• Unpolarized system</li> <li>• Simple, reliable system</li> </ul> <b>Drawback</b> <ul style="list-style-type: none"> <li>• A certain delay on drop out which does not however reduce contactor breaking capacity.</li> </ul>	
	65 DC		100 V		
	90 DC		150 V		
	150 DC		210 V		
	264 DC		390 V		
<b>Varistor</b> <b>RV-BC 6 /...</b> 	60 DC	1.1 to 1.5	137 V	<b>Advantages</b> <ul style="list-style-type: none"> <li>• High energy absorption: good damping</li> <li>• Unpolarized system</li> </ul> <b>Drawback</b> <ul style="list-style-type: none"> <li>• Clipping as from <math>U_{vdr}^*</math>, thus voltage front up to this point.</li> </ul>	
	127 DC		305 V		
	250 DC		510 V		
	380 DC		730 V		
	<b>RV 5 /...</b> 	50 AC/DC	1.1 to 1.5		132 V
		133 AC/DC			270 V
		250 AC/DC			480 V
440 AC/DC	825 V				
<b>RC 5-1/... or RC 5-2/... RC-EH 300/...</b> 	see table above AC	1.2 to 3	2 to 3 x $U_C$	<b>Advantages</b> <ul style="list-style-type: none"> <li>• Very fast clipping</li> <li>• Attenuation of steep fronts and thus of high frequencies</li> <li>• No operating delays</li> </ul>	
	<b>Varistor + RC</b> <b>RC-EH ...</b> 	800/110 AC/DC	1.1 to 1.5	205 V	<b>Advantages</b> <ul style="list-style-type: none"> <li>• High energy absorption: good damping</li> <li>• Unpolarized system</li> <li>• The RC system damps the voltage front under the <math>U_{vdr}^*</math> threshold.</li> </ul>
800/600 AC		1100 V			

\* $U_{vdr}$  = Varistor operating voltage (voltage dependent resistor), tolerance  $\pm 10\%$

## Accessories

### Surge suppressors for A/AE/BC/EK contactors



#### General

The operation of inductive circuits causes overvoltages, in particular on opening of the contactor coil.

The electromagnetic energy stored by the coil during contactor closing is restored on opening in the form of surges, the slope and amplitude of which may rise to several kilovolts. A number of drawbacks are observed ranging from interference on the electronic devices to breakdown of insulators and even destruction of certain sensitive components.

The graph opposite reproduces the oscillogram showing voltage discharges at the terminals of a 42V/50Hz coil without peak clipping. The coil was switched by 8 series-connected poles of a contactor relay.

Following a burst of discharges with a very steep slope a damped oscillation emerges with a peak value of 3500V.

#### Overvoltage factor

The overvoltage factor  $k$  is defined as the ratio of the maximum overvoltage peak value  $\hat{U}_s$  to the peak value  $\hat{U}_c$  of the coil rated control voltage  $U_c$ :

$$k = \frac{\hat{U}_s \text{ max.}}{\hat{U}_c}$$

in DC:  $k = \frac{\hat{U}_s \text{ max.}}{U_c}$

or in AC:  $k = \frac{\hat{U}_s \text{ max.}}{U_c \cdot 2}$

For example the following is obtained for the above graph:  $k = \frac{3500}{42 \cdot 2} \approx 60$

#### Surge suppressors

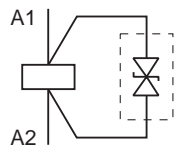
To guard against the harmful effects of these overvoltages, ABB has developed a range of surge suppressors designed to reduce the  $k$  factor defined above and to limit or even completely eliminate the high pre-damping voltage frequencies. Each case is different, but the technical data tolerances and the generous sizing of parts have enabled us to reduce the number of variants.

We have chosen the following solutions: transil diodes, varistors and RC blocks.

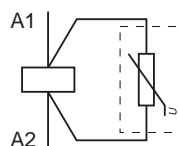
**Note:** A varistor is a resistor whose value increases to a very large extent when a certain voltage is applied at its terminals.

#### Wiring diagrams

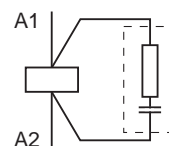
Transil diode



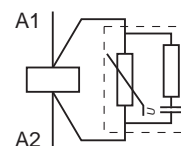
Varistor (only)



RC type



Varistor + RC



#### General technical data

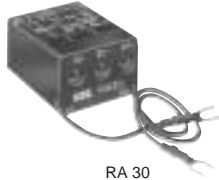
The housings and impregnation resins of the surge suppressors are made of flame-resistant materials in accordance with the UL 94 standard.

These systems are not polarized, i.e. d.c. operated devices do not have to be connected in a specific direction.

- Operating temperature: -20 to +70 °C
- Connection to the coil terminals (parallel mounting)
  - For **RT 7**, **RV-BC 6** and **RC-EH**: flexible, accessible leads, equipped with forked lugs. Except for the **RV-BC 6 F** variant: 2.8mm faston.
  - For **RT 5**, **RV 5**, **RC 5-1** and **RC 5-2**: clip-on for both fixing and connection.
- Mounting:
  - **RV-BC 6** and **RT 7**: dovetail mounting on both the top and bottom part of the contactor base. Alternatively, they can be clipped onto the front part of the contactor head.
  - **RT 5**, **RV 5** and **RC 5**: clipped onto the top part of the contactor base. This mounting method prevents any projections and change in contactor dimensions.
  - **RC-EH**: glued to the top part of the contactor base.

## Accessories

### Interface relays for A/BC contactors



RA 30



BC 9-30-10 + RA 30



RA 5

#### Interface relays

Mounting on contactor types	Coil voltages	Catalog number	List price
KC, BC9 – BC30 N, A9 – A110	12 – 250VDC 24 – 250V, 50, 60 Hz	RA30 RA5	\$ 75

#### Description

RA30 and RA5 interface relays are designed to receive 24 V d.c. signals delivered by PLCs or other sources with a low output power and to restore them with sufficient power to operate the coils of the relevant contactors

#### Types

- RA30 for combination with BC9 to BC30 contactors and KC contactor relays.
- RA5 for combination with A9 – A110 contactors and N contactor relays.

#### Description

RA30 and RA5 interface relays are made up of a miniature electromechanical relay equipped with a N.O. contact and with a low consumption 24 V d.c. 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 RA 30 and RA 5 are equipped with surge suppressors:

- on the 24 V d.c. relay coil via a diode
- on the power contactor coil via a varistor.

Furthermore, the RA30 and RA5 are protected against relay pole reversal by a diode inserted between the E1 and E2 input terminals.

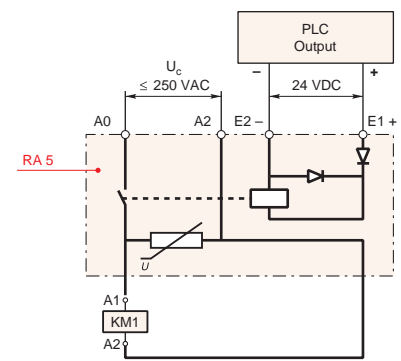
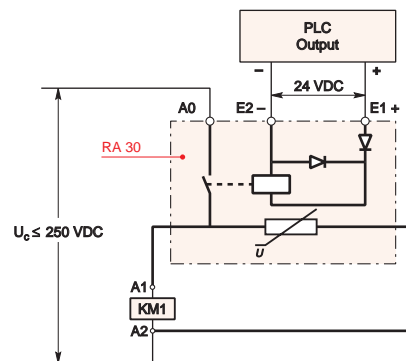
#### Connection

The “E1+” and “E2–” input terminals must be connected, according to their polarity, to the PLC output.

- The RA30 has two leads to be connected to the A1 and A2 terminals of the contactor coil. This coil is supplied between its own A2 terminal and the A0 terminal of the RA 30.
- The RA 5 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 RA 5.

RA 30 interface relay for the BC 9 – BC 30 contactors and KC contactor relays

RA 5 interface relay for the A 9 – A 110 contactors and N contactor relays



#### Mounting

- RA30: dovetail mounting at the top of the contactor base.
- RA5: terminal pads clamped inside the contactor coil terminals.



## Accessories

### Interface relay technical data

#### General technical data

<b>Standards</b>		IEC 255-5
<b>Rated insulation voltage <math>U_i</math></b> acc. to IEC 947-4-1 and VDE 0110	VAC	250
<b>Permissible ambient temperature</b>		
• For free air operation:		
– at $U_e = 24\text{VDC}$ (between E1 & E2)	°C	-25 to +70
– from 0.85 to 1.1 $U_e$	°C	-25 to +55
• For storage	°C	-40 to +70
<b>Climatic withstand</b>		Complies with that of associated contactors
<b>Mounting position</b>		No limitation
<b>Operating height</b>	meters	3000
<b>Mounting</b>		Dovetail mounting in the top part of the contactors Cable clamps and M 3.5 (+, -) pozidriv screws (2)
<b>Connecting terminals</b> (open on delivery)		Using the contactor A1 and A2 terminal connecting points
<b>Cable cross-sectional area:</b>		
• Rigid solid	2 x mm <sup>2</sup>	1 to 4
• Flexible	2 x mm <sup>2</sup>	0.75 to 2.5
<b>Degree of protection</b>		Protection against direct contact acc. to VDE 0106, Part 100

#### Construction data

<b>Surge suppression:</b>		Varistor
• For contactor coil		Diode
• For interface relay coil		Diode
<b>Protection against polarity reversal between terminals E1 and E2</b>		
<b>Use on contactors with coils:</b>		
• 24 to 250V/50, 60 Hz	types	–
• 12 to 250VDC	types	KC, BC9 – BC30
<b>Interface relay operating time</b>	ms	Closing and drop-out 10
<b>Total operating time, interface relay + contactor</b>		
• Between energization and:		
– NO contact opening	ms	59 to 84
– NC contact opening	ms	54 to 79
• Between de-energization and:		
– NO contact opening	ms	25 to 40
– NC contact opening	ms	27 to 42

#### Electrical input data

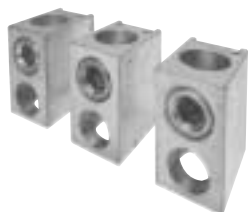
<b>Control voltage</b> (E1 and E2 terminals) $U_c$ :		
• Rated value	VDC	24
• Maximum range	VDC	17 to 30
<b>Max. consumption for <math>U_c = 24\text{ VDC}</math>, <math>\varnothing=20^\circ\text{C}</math></b>	W	0.3
<b>“0” status</b> (relay open)		
• For $U_c$	VDC	2.4
• For $I_c$	mA	1
<b>“1” status</b> (relay closed) for $U_c$	VDC	17
<b>Max. short supply interruption immunity time</b>	ms	4

#### Electrical output data

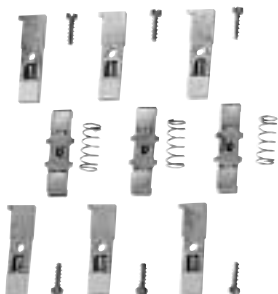
<b>Switching voltage</b> (A0 and A2 terminals)	VAC	–
	VDC	250
<b>Electrical lifetime</b>	millions of operations	10 (1200 ops./h)
		–

## Accessories for A/AE/AF contactors

Across the line  
contactors



ATK185



ZL75



WB75A-04



BA5-50

### Terminal lug kits

Wire range	For contactor	Catalog number	List price
6 – 250 MCM	A145 – A185	ATK185	\$ 45
4 – 400 MCM	A210 – A300	ATK300	68
(2) 4-500 MCM	A210 – A300	ATK300/2	110
(2) 2/0 – 500 MCM	AF400 – AF580	ATK580/2	150
(3) 2/0 – 500 MCM	AF400 – AF750	ATK750/3	225

### Contact kits

	For contactors	Catalog number	List price
<b>3 Pole</b>	A/AE/AF50	ZL50	\$ 113
	A/AE/AF63	ZL63	135
	A/AE/AF75	ZL75	158
	A/AE/AF95	ZL95	225
	A/AE/AF110	ZL110	255
	A/AF145	ZL145	300
A/AF185	ZL185	420	
A/AF210	ZL210	525	
A/AF260	ZL260	855	
A/AF300	ZL300	1020	
<b>4 Pole</b>	AF400	ZL400	1716
	AF460	ZL460	2434
	AF580	ZL580	3795
	AF750	ZL750	3960
	A/AE45	ZLT45	150
A/AE50	ZLT50	150	
A/AE75	ZLT75	210	

### Mechanical latches

	For contactors	Catalog number	List price
	A9 - A75 & AE45 -AE75	WB75A-★	\$ 84

★ - Coil voltage suffix. Refer to Coil Voltage Selection chart and substitute the desired coil voltage suffix for the ★.

### Coil voltage selection chart — mechanical latches for A & AE contactors

50 Hz	60 Hz	Voltage code
24	24 – 28	01
42	42 – 48	02
48	48 – 55	03
110	110 – 127	04
220 – 230	220 – 255	06
230 – 240	230 – 277	05
380 – 415	380 – 440	07
415 – 440	440 – 480	08

**Range:** WB75A for contactors A9 – A75, AC9 – AC30, AE45 – AE75 and control relays N and KC.

**Description:** WB75A block: contains a mechanical latching device with electromagnetic impulse unlatching (AC or DC) or manual unlatching.

Captive screw type connecting terminals, built-in cable clamps, M 3.5 (=, -) posidrive 1 screw with screwdriver guidance, delivered untightened and protected against accidental direct contact.

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

Contact opening can be controlled:

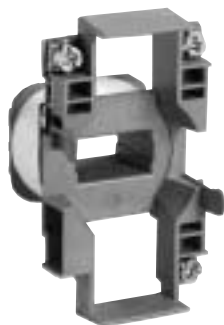
- Electrically by an impulse\* (AC or DC) on the WB75A block coil. The coil is not designed to permanently energized.
- Manually by pressing the pushbutton on the front face of the WB75A block.

**Mounting:** WB75A is clipped onto the front face of the contactor.

### Identification marker

Mounting on	Coil voltage	Catalog number	List price
A9 – A110	Pack of 50	BA5-50	\$ 15

## Accessories for A/AE/AF contactors Coils & coil voltage codes



ZA16-81

### Coils — AC operated

For contactors	Catalog number	List price
A9 – A16	ZA16-★	\$ 24
A26 – A40	ZA40-★	30
A45 – A75	ZA75-★	57
A95 – A110	ZA110-★	60
A145 – A185	ZA185-★	150
A210 – A300	ZA300-★	180

### Coils — DC operated

AE9 – AE16	ZAE16-★	24
AE26 – AE40	ZAE40-★	30
AE45 – AE75	ZAE75-★	57
AE95 – AE110	ZAE110-★	90
BC9 – BC30	KBC30G-★	36

Auxiliary including an insertion contact and a varistor for DC operated contactors

AE45 – AE75	CDL5-01	45
AE95 – AE110	CCL5-01	

### Coils — AC/DC operated

AF45 – AF75	ZAF75-★	120
AF95, AF110	ZAF110-★	165
AF145 – AF185	ZAF185-★	200
AF210 – AF300	ZAF300-★	240
AF400, AF460	ZAF460-★	450
AF580, AF750	ZAF750-★	525

★ – Coil voltage suffix. Refer to Coil Voltage Selection charts below and substitute the desired coil voltage code for the ★.

### Coil voltage selection — AC operated for A9 – A300; UA26 – UA110

VAC (50Hz)	VAC (60Hz)	Voltage Code
24	24	81
26	28	16
28	32	17
42	42	82
48	48	83
60	60	73
100	100 – 110	74 ②
110	110 – 120	84
110 – 115	115 – 127	89 ③
120	140	29
125 – 127	150	30
175	208	34
190	220	36
200	200 – 220	75 ②
220 – 230	230 – 240	80
230 – 240	240 – 260	88
230 – 240	277	42
230/400	—	62 ①
—	230/400	63 ①
380 – 400	400 – 415	85
400 – 415	415 – 440	86
—	480	51
440	500	53
500	600	55
550	—	56
660 – 690	—	58

### Coil voltage selection — DC operated for AE contactors

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

### Coil voltage selection — DC operated for BC contactors

VDC	Voltage code AE contactors
12	07
24	01
42	02
48	16
50	17
60	03
75	22
110	04
125	27
220	05
240	33
250	34

### Coil voltage selection — AC/DC operated for AF50 – AF750

VAC & VDC 40-60 Hz	Suffix Code
24 – 60 VDC	68 ④
20 – 60 VDC	72 ⑤
48 – 130 VAC/VDC	69
100 – 250 VAC/VDC	70
200 – 500 VAC/VDC	71

① Only for A9 – A16.

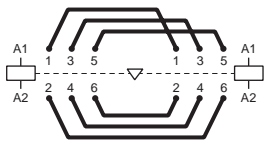
② Not for A145 – A300

③ A145 – A300 at 60 Hz, 115V only.

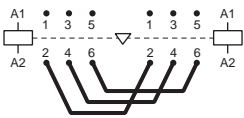
④ AF400 – AF750.

⑤ AF145 – AF300.

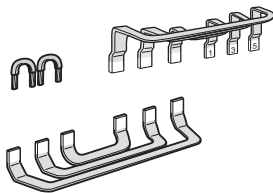
## Accessories for A/AE/AF contactors



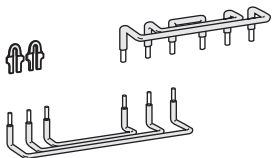
BEM circuit diagram



BES110 connection diagram



BED40U



BED75U

### Connection kits for reversing

Mounting on 3 pole contactors	Catalog number	List price
A/AE9 – A/AE16 A/AE26 A/AE30, A/AE40	BEM16-30 BEM26-30 BEM40-30	\$ 23 30 45
A/AE/AF50 – A/AE/AF75 A/AE/AF95, A/AE/AF110 A/AF145 – A/AF185 A/AF210 – A/AF300	BEM75-30 BEM110-30 BEM185-30 BEMA300-30	165 180 260 470
AF400 – AF460 AF580 – AF750	BEM460-30 BEM750-30	850 1200
BC9, BC16 BC25 BC30	BSM16-30 BSM25-30BC BSM30-30BC	23 30 45

#### Application

Connections between the main poles of **two 3 pole contactors** mounted side by side so that they operate as reversing contactors.

#### Description

The connection kits for reversing contactors are made up of three reversing connections and three phase to phase connections.

BEM16-30	— Insulated, solid, rigid copper wires
BEM26 and 40-30	— Insulated, stranded, rigid copper wires
BEM75 and 110-30	— Insulated, solid copper bars
BSM16-30, BSM25 and 30-30BC	— Insulated, solid, rigid copper wires

### Connection kits for phase to phase

Mounting on 3 pole contactors	Catalog number	List price
A/AE/AF50, A/AE/AF75 A/AE/AF95, A/AE/AF110 A/AF145 – A/AF185 A/AF210 – A/AF300	BES75-30 BES110-30 BES185-30 BESA300-30	\$ 75 90 130 200
AF400 – AF460 AF580 – AF750	BES460-30 BES750-30	425 650

#### Description

The connection kit for phase to phase contactors is made up of three phase to phase bus bars.

### Connection kits for wye-delta starters

Mounting on contactors		Catalog number	List price
Line and delta contactor	Wye contactor		
A30 A40	A26 A26	BED40U	\$ 53
A50 A63	A30 A40	BED50U	165
A75 A95 A110 A145 A185 A210	A50 A75 A95 A110 A145 A185	BED75U BED95U BED110U BED145U BED185U BED210U	180 195 225 250 290 375
A260/A300	A210	BED300U	500
AF400/AF460	A260/A300	BED400U	850
AF460	AF400	BED460U	900
AF580	AF400/AF460	BED580U	1250
AF750	AF580	BED750U	1450

#### Application

Connections between the main poles of a wye-delta starter.

#### Description

The connection kits for wye-delta starters are made up of:

- Three line contactor/wye contactor connections — line side.
- Three wye contactor/delta contactor connections — load side.
- The shorting connection for the “S” contactor.

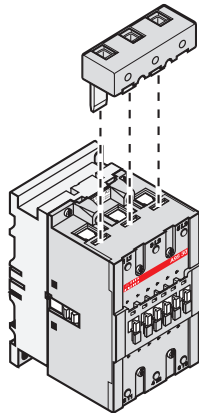
BED40U – Insulated, stranded, rigid copper wires.

BED50U thru BED750U — Insulated, solid copper bars.

The above connection sets allow a mechanical interlock unit to be mounted between the wye and delta contactors if required.

# Accessories for A/AE/AF contactors

Across the line  
contactors



LD110



BEXT-75



ZL145



LT185-AC



LT185-AL

## Additional terminal block

Mounting on 3 pole contactors	Catalog number	List price
A/AE/AF75	LD-75	\$ 28
A/AE/AF95 and A/AE/AF110	LD-110	30

## Application

The LD110 terminal block is designed to increase the connection capacity of the contactor on which it is mounted: A(E)95 or A(E)110.

## Description

Block housing three connectors: 1 per phase. Each connector is equipped with an HC, M8 socket head screw and has the following connection details:

- Stranded conductor (1) 6–2/0 OR (2) 4–1/0
- Busbar max. width 12 mm

## Mounting

The LD110 terminal block can be mounted in the terminal slots located on line or load side of contactor.

## Terminal extensions

Mounting on contactors	Catalog number	List price
A/AE/AF50 – A/AE/AF75	BEXT-75	\$ 15
A/AE/AF95, A/AE/AF110	LW-110	15
A/AF145 – A/AF185	LX185	90
A/AF210 – A/AF300	LX300	140
AF400 – AF460	LX460	195
AF580 – AF750	LX750	225

## Application

They are designed to increase the width of the contactor terminal pads to allow larger connectors to be mounted.

## Description

Terminal extension sets contain 3 bars.

## Terminal shrouds — two pieces

For contactor	Catalog number	List price
A/AF145 – A/AF185 for flush mount	LT185-AC	\$ 10
A/AF145 – A/AF185 for extended mount	LT185-AL	
A/AF145 – A/AF185 for shorting bar LY...between A(F)145 / A(F)185 & TA200DU	LT185-AY	
A/AF210 – A/AF300 for flush mount	LT300-AC	
A/AF210 – A/AF300 for extended mount	LT300-AL	
A/AF210 – A/AF300 for shorting bar LY300	LT300-AY	20
AF400 – AF460 for flush mount	LT460-AC	
AF400 – AF460 for extended mount	LT460-AL	
AF580 – AF750 for flush mount	LT750-AC	
AF580 – AF750 for extended mount	LT750-AL	

## Terminal enlargements

For contactor	Catalog number	List price
A/AF145 – A/AF185	LW185	\$ 120
A/AF210 – A/AF300	LW300	130

## Accessories for A/AE/AF contactors



BEA185/S3/S4



LP185

### Vertical connection bars between contactor and MCCB — three bars

MCCB	For contactor	Catalog number	List price
S3, S4	A/AF145 – A/AF185	BEA185/S3/S4	\$ 60
S4	A/AF210 – A/AF300	BEA210/S4	70
S5	A/AF210 – A/AF300	BEA300/S5	75
S5	AF400 – AF460	BEA400/S5	95
S6	AF400 – AF750	BEA750/S6	115

### Vertical connection bars between contactor and MCCB — three bars

MCCB	For contactor	Catalog number	List price
S3, S4	A/AF145 – A/AF185	BEA185D/S3/S4	\$ 70
S4	A/AF210 – A/AF300	BEA210D/S4	80
S5	A/AF210 – A/AF300	BEA300D/S5	85
S5	AF400 – AF460	BEA400D/S5	105
S6	AF400 – AF750	BEA750D/S6	125

To be used when power take off is needed (IP00) or with other bus bars. (EX: Reversing, IP20)

### Horizontal connection busbars between contactor and MCCB — three bars

MCCB	For contactor	Catalog number	List price
S3, S4	A/AF145 – A/AF185	BEA185H/S4	\$ 150
S4	A/AF210 – A/AF300	BEA210H/S4	220
S5	A/AF210 – A/AF300	BEA300H/S5	220
S5	AF400 – AF460	BEA400H/S5	435
S6	AF400 – AF460	BEA460H/S6	660
S6	AF580 – AF750	BEA750H/S6	670

### Shorting bars, 2 pole

For contactor	Catalog number	List price
A/AF145 – A/AF185	LP185	\$ 35
A/AF210 – A/AF300	LP300	50
AF400 – AF460	LP460	50
AF580 – AF750	LP750	50

### Shorting bars, 3 pole

For contactor	Catalog number	List price
A/AE45 – A/AE/AF75	LF75	\$ 40
A/AE/AF95 – A/AE/AF110	LY110	40
A/AE/AF145 – A/AE/AF185	LY185	40
A/AE/AF210 – A/AE/AF300	LYA300	60
AF400 – AF460	LY460	60
AF580 – AF750	LY750	60

### Vertical connection bars between contactor and disconnect switch

Disconnect switch	For contactor	Catalog number	List price
OS160	A/AF145	OSZA15	\$ 200
OESA250	A/AF185	BEF185V/OESA250	260
OESA250 - OESA400	A/AF210 - A/AF300	BEF300V/OESA400	270
OESA400	AF400 - AF460	BEF460V/OESA400	300
OESA630 - OESA800	AF460 - AF750	BEF750V/OESA800	320

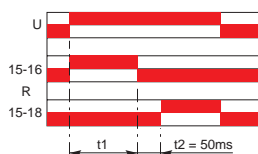
### Horizontal connection bars between contactor and disconnect switch

Disconnect switch	For contactor	Catalog number	List price
OESA250	A/AF145 - A/AF185	BEF185H/OESA250	\$ 515
OESA250 - OESA400	A/AF210 - A/AF300	BEF300H/OESA400	595
OESA400	AF400 - AF460	BEF460H/OESA400	615

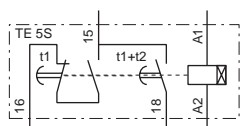
## Accessories for A contactors TE5S electronic timer for wye-delta starters



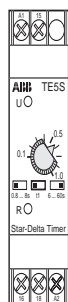
TE5S-\*



Chart



Equivalent diagram



Front face

### Electronic timer

For contactors	Rated control voltage $U_c$ V	Packing piece	Unit weight kg	Catalog number	List price
A9 – AF750	24 AC/DC	1	0.080	TE5S-24	\$ 120
	110 – 115 AC	1	0.080	TE5S-115	
	220 – 230 AC	1	0.080	TE5S-230	

### Application

#### Utilization

When used in wye-delta starters, the **TE5S** lags the wye connection and provides a lapse of 50 ms before the switchover to the delta connection.

#### Description

According to the type of device chosen, the electronic circuit has a 24 VAC/VDC, 110 – 120 VAC or 220 – 230 VAC supply. An output relay with reversing contact ensures high current switching. A two-position switch allows selection of one of the two time delay ranges: 0.8 to 8 s or 6 to 60 s. The 0.1 to 1.0 adjustable knob allows an initial setting without steps within the previously selected range which can then be adjusted using a stopwatch.

Note: We recommend that you allow for temperature drift for the final adjustment of the time delay setting. Drift: – 0.2% per °C. For example, a setting made at 20 °C will yield a time delay shorter by 7% at 55 °C in an enclosure. ( – 0.2% per °C i.e. – 0.2 x 35 = – 7%).

The TE5S, which is not affected by these settings, establishes a fixed “lapse” of 50 ms between the opening of contact 15 – 16 and the closing of contact 15 – 18. It is this time delay that prevents from arc short-circuit during wye to delta switching.

#### Operation

On energization, the green U indicator light (voltage applied) comes on. Contact 15 – 16 then immediately moves to the closed position.

Count-down of the programmed time immediately commences.

When the time delay has elapsed, contact 15 – 16 opens and at the same time the 50 ms lapse,  $t_2$ , begins after which contact 15 – 18 moves to the closed position. The yellow R indicator light comes on.

On de-energization, the U and R indicator lights go out and, after the 250 ms resetting time, the device is ready for a new cycle.

#### Mounting

Mounts on 35mm DIN rail.

## Accessories for A contactors TE5S electronic timer for wye-delta starters

### Technical data

Type		TE5S-24	TE5S-115	TE5S-230	
Compliance with standards		IEC 947-5-1, EN 60947-5-1 and VDE 0435			
Rated insulation voltage $U_i$ according to IEC 947-5-1	V	250			
Rated supply voltage $U_c$	VDC	24	—	—	
	VAC	24	110 – 115	220 – 230	
Rated frequency limits	Hz	48 – 63			
Supply voltage range		0.85 – 1.1 $U_c$			
Oversvoltage protection		Built-in varistor			
Load factor	%	100			
Average consumption	in DC	0.7	—	—	
	in AC	1.5	3.5	6.5	
Time delay range ( $t_1$ ) selected by switch	S	0.8 – 8 and 6 – 60			
Temperature drift	% per °C	- 0.2			
Mechanical setting accuracy		± 15% of the setting range			
On-load reiteration accuracy under constant conditions		± 2% after 1 million operations			
Minimum time lapse ( $t_2$ )	ms	50			
Min. time lapse after 1 million operations	ms	40			
Resetting time (maximum)	ms	250			
Front panel display:	green indicator light yellow indicator light	Energization Output relay activated			
Rated operational voltage $U_o$ acc. to IEC 947-5-1	VDC VAC	24 24 – 230			
Conventional free air thermal current $I_{th}$	A	10			
Rated operational current $I_o$ acc. to IEC 947-5-1	DC-13	24 VDC	A		4
	AC-15	24 – 115 VAC	A		5
		220 – 230 VAC	A		4
	Permissible air temperature for operation	°C	-25 ... +60		
for storage	°C	-40 ... +85			
Mechanical durability in millions of operations		5			
Electrical durability in millions of operations		1			
On-load maximum switching frequency	ops./h	720			
Shock and vibration withstand		on request			
Fixing on mounting rail according to EN 50022		35 x 7.5 or 35 x 15			
Connecting terminals		(+, -) pozidriv 1 screw			
Tightening torque	N.m	0.6 – 0.8 max.			
Connecting capacity	Rigid solid	1 or 2 x mm <sup>2</sup>		1 – 2.5	
	Flexible without cable end	1 or 2 x mm <sup>2</sup>		0.75 – 2.5	
Degree of protection acc. to IEC 529, IEC 947-1 and EN 60 529					
Housing		IP 50			
Terminals		IP 20			

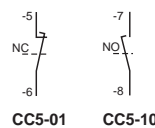
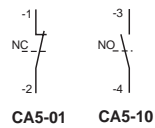


# Accessories

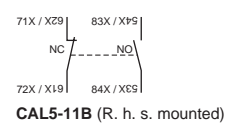
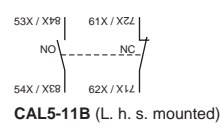
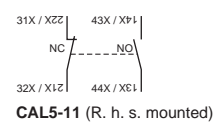
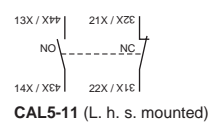
## Terminal marking and positioning

### CA/CC/CAL/CCL auxiliary contacts

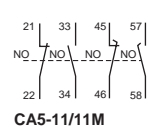
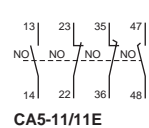
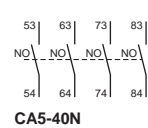
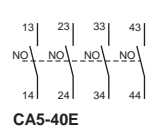
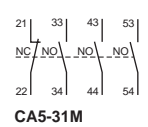
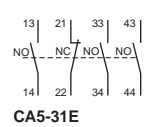
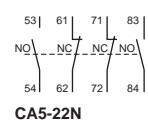
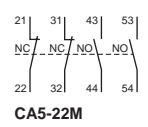
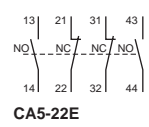
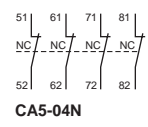
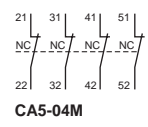
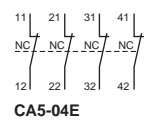
#### One pole auxiliary contacts



#### Two pole auxiliary contacts



#### Four pole auxiliary contacts



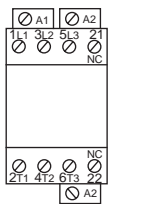
1

# Accessories

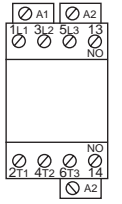
## Terminal marking & positioning for A/UA contactors

### Standard devices without addition of auxiliary contacts

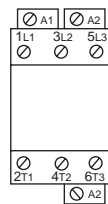
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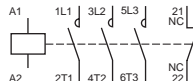
A9 - A40-30-01



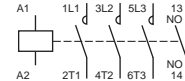
A9 - A40-30-10



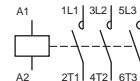
A50 - A110-30-00  
UA50 - UA110-30-00



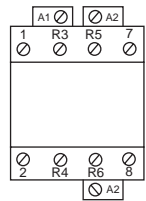
A9 - A40-30-01



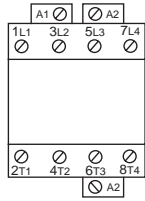
A9 - A40-30-10



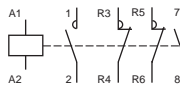
A50 - A110-30-00  
UA50 - UA110-30-00



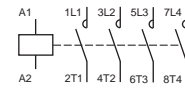
A9 - A26-22-00  
A45 - A75-22-00



A9 ... A26-40-00  
A45 ... A75-40-00

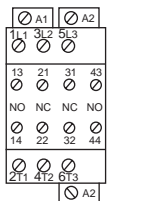


A9 - A26-22-00  
A45 - A75-22-00

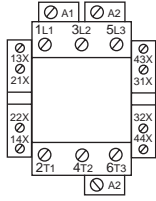


A9 - A26-40-00  
A45 - A75-40-00

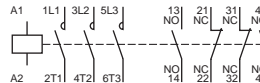
### Standard 3 pole devices with factory mounted auxiliary contacts



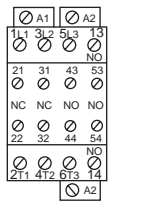
A9 - A16-30-22



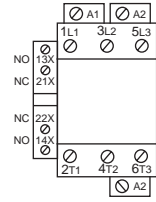
Combination  
22



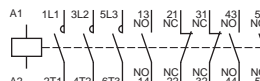
A9 - A16-30-22  
A50 - A110-30-22



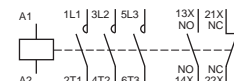
A9 - A40-30-32



A50 ... A110-30-11  
UA50 ... UA110-30-11

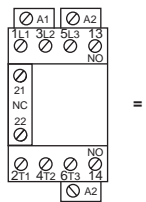


A9 - A40-30-32

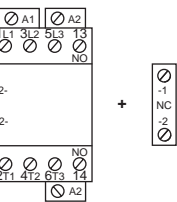


A50 - A110-30-11  
UA50 - UA110-30-11

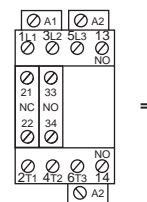
### Other possible contact combinations with auxiliary contacts added by the user



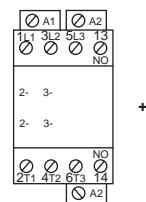
Combination  
11



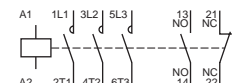
= A9 - A40-30-10 + CA5-01



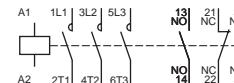
Combination  
21



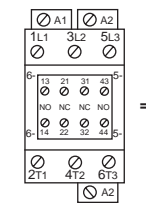
= A9 - A40-30-10 + CA5-01 + CA5-10



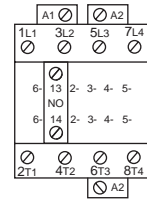
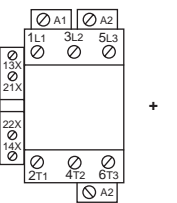
Combination 11



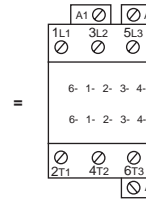
Combination 21



A50 - A110-30-22 = A50 - A75-30-11 + CAL5-11



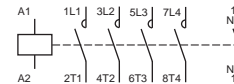
Combination  
10



= A45 - A75-40-00 + CA5-10



Combination 22

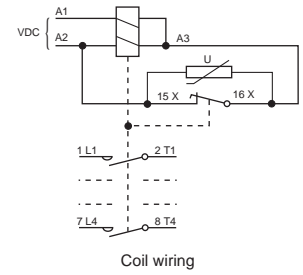
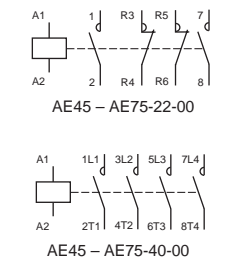
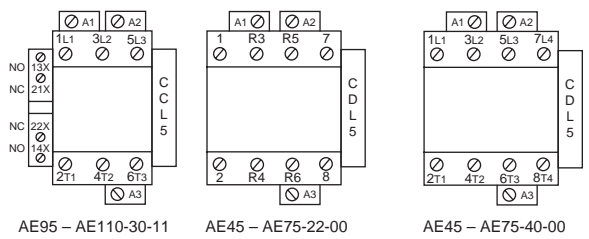
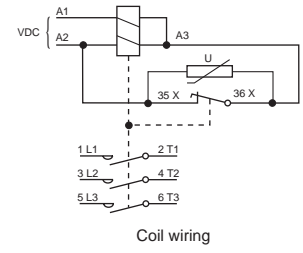
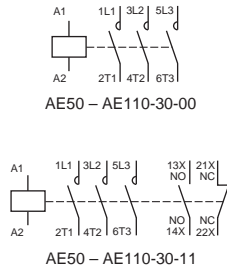
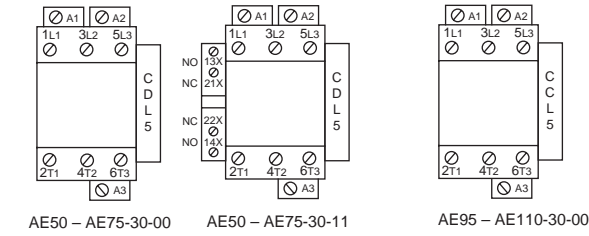


Combination 10

# Accessories

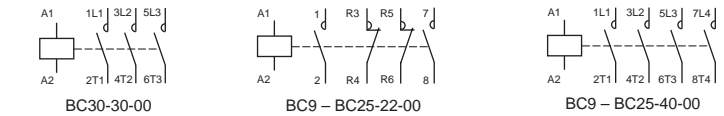
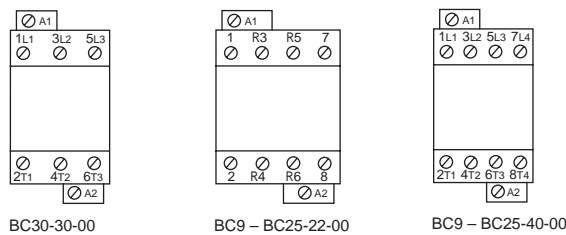
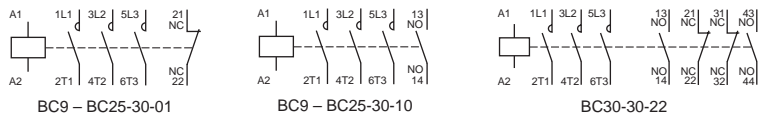
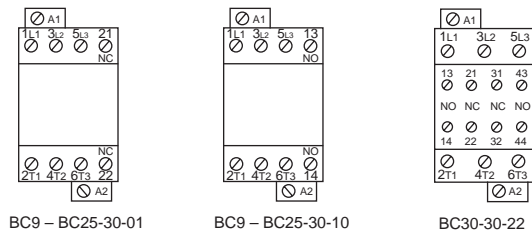
## Terminal marking and positioning for AE/AC contactors

### AE Contactors — D.C. operated



### AC Contactors — D.C. operated

Standard devices without addition of auxiliary contacts



### Other possible contact combinations with auxiliary contacts added by the user

