

Auxiliary Contact Blocks
Timers
Interlock Units
Surge Suppressors
Connection Pieces

Add-on Accessories

Accessories for Contactors and Contactor Relays



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Auxiliary Contact Blocks

Front Mounting



CA 5-10



CA 5-40 E



CE 5-01 W

Application

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

Description

Types of auxiliary contact blocks in standard version for general use:

- **CA...** 1 or 4-pole block, instantaneous with N.O., N.C. contacts.
- **CC...** 1-pole block, with N.O. leading contact or N.C. lagging contact.

Type of auxiliary contact block for low current and voltage levels (PLC's outputs) and for use in dusty or humid environments:

- **CE...** 1-pole block, instantaneous with N.O. contact or N.C. contact, designed in 2 protection versions:
  - **CE 5-.. D** with built-in microswitch IP 40, degree of protection (IP 20 on terminals)
  - **CE 5-.. W** with bulit-in microswitch IP 67, degree of protection (IP 20 on terminals).

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

Fitting Details

☞ Refer to the table below

For further information about fitting details compatibility with contactors and other types of accessories please refer to:

- page **4**/37 for A... and AF... 3-pole contactors
- page **4**/38 for AE..., TAE..., BC... and TBC... 3-pole contactors
- page **4**/39 for AE... and TAE... 4-pole contactors
- page **4**/40 for BC... and TBC... 4-pole contactors
- page **3**/15 for N... and NE..., KC... and TKC... contactor relays

Ordering Details

For contactors	Max. number of blocks	Contacts blocks	Type	Order code	Packing pieces	Weight kg
1-pole auxiliary contact blocks						
A 9 ... A 26(1)	4 blocks	1 – – –	CA 5-10	1SBN 01 0010 R1010	10	0.014
A 30, A 40(1)	5 blocks	– 1 – –	CA 5-01	1SBN 01 0010 R1001	10	0.014
A 45 ... A 110	6 blocks	– – 1 –	CC 5-10	1SBN 01 0011 R1010	10	0.014
AF 50 ... AF 110	6 blocks	– – – 1	CC 5-01	1SBN 01 0011 R1001	10	0.014
AE 9 ... AE 26	4 blocks	1 – – –	CE 5-10 D 0.1	1SBN 01 0015 R1010	1	0.020
AE 30, AE 40	5 blocks	– 1 – –	CE 5-01 D 0.1	1SBN 01 0015 R1001	1	0.020
AE 45 ... AE 110	6 blocks	1 – – –	CE 5-10 D 2	1SBN 01 0017 R1010	1	0.020
TAE 45 ... TAE 110	6 blocks	– 1 – –	CE 5-01 D 2	1SBN 01 0017 R1001	1	0.020
BC 9 ... BC 30	4 blocks	1 – – –	CE 5-10 W 0.1	1SBN 01 0016 R1010	1	0.020
TBC 9 ... TBC 30	4 blocks	– 1 – –	CE 5-01 W 0.1	1SBN 01 0016 R1001	1	0.020
KC .., TKC	4 blocks	1 – – –	CE 5-10 W 2	1SBN 01 0018 R1010	1	0.020
N ..(1), NE	4 blocks	– 1 – –	CE 5-01 W 2	1SBN 01 0018 R1001	1	0.020
4-pole auxiliary contact blocks						
A 9 ... A 26-40-00	1 block	4 – – –	CA 5-40 E	1SBN 01 0040 R1040	2	0.060
A 45 ... A 110	1 block	3 1 – –	CA 5-31 E	1SBN 01 0040 R1031	2	0.060
AE 9 ... AE 26-40-00	1 block	2 2 – –	CA 5-22 E	1SBN 01 0040 R1022	2	0.060
AE 45 ... AE 110	1 block	0 4 – –	CA 5-04 E	1SBN 01 0040 R1004	2	0.060
BC 9 ... BC 25-40-00	1 block	1 1 1 1	CA 5-11/11 E	1SBN 01 0040 R1018	2	0.060
BC 30-30-00	1 block					
A 9 ... A 40-30-10	1 block	3 1 – –	CA 5-31 M	1SBN 01 0040 R1131	2	0.060
BC 9 ... BC 25-30-10	1 block	2 2 – –	CA 5-22 M	1SBN 01 0040 R1122	2	0.060
		0 4 – –	CA 5-04 M	1SBN 01 0040 R1104	2	0.060
		1 1 1 1	CA 5-11/11 M	1SBN 01 0040 R1118	2	0.060
N and KC 4-pole	1 block	4 – – –	CA 5-40 N	1SBN 01 0040 R1240	2	0.060
		3 1 – –	CA 5-31 N	1SBN 01 0040 R1231	2	0.060
		2 2 – –	CA 5-22 N	1SBN 01 0040 R1222	2	0.060
		0 4 – –	CA 5-04 N	1SBN 01 0040 R1204	2	0.060

(1) In mounting position 5, there should be no more than 2 N.C. front-mounted auxiliary contacts on types **A 9** to **A 40-30-01**, **A 9** to **A 26-22-00, A 30-30-32, A 40-30-32, N 22 E, N 31 E.** The side-mounted blocks offer additional N.C. contacts.

Whatever the mounting position, there should be no more than 2 N.C. front-mounted auxiliary contacts on types **A 45** to **A 75-22-00**. The side-mounted blocks offer additional N.C. contacts.

Note: The auxiliary contact blocks provided for the A... contactors can be used for the UA..., GA... and GAE types.

>> Auxiliary Contacts for Safety Circuits ..... page 7/4
>> Side Mounted Aux. Contact Blocks ..... page 4/4
>> Mounting and Compatibility of Accessories ..... pages 4/37 to 4/40

Technical Data

Types			1-pole CA 5, 4-pole CA 5, 1-pole CC 5	1-pole CE 5-..0.1	1-pole CE 5-..2
Compliance with standards			IEC 60947-5-1 and EN 60947-5-1		
Certification and approvals			☞ section **7**		
Rated insulation voltage U_i					
according to IEC 60947-5-1		**V**	690	250	250
according to UL/CSA		**V**	600	250	250
Rated operational voltage U_e		**V a.c.**	24 to 690	125	250
Conventional thermal current I_{th}		**A**	16	0.1	2
Rated operational current I_e					
according to IEC 60947-5-1					
in a.c.			**AC-15**	**AC-14**	**AC-15**
	24 to 127 V	**A**	6	0.1	2
	220 to 240 V	**A**	4	–	2
	380 to 440 V	**A**	3	–	–
	500 to 690 V	**A**	2	–	–
in d.c.			**DC-13**	**DC-12**	**DC-12**
	24 V	**A**	6	0.1	2
	48 V	**A**	2.8	0.1	1
	72 V	**A**	1	0.1	0.3
	110 V	**A**	0.55	0.1	0.2
	125 V	**A**	0.55	–	0.2
	220 V	**A**	0.3	–	0.1
	250 V	**A**	0.3	–	–
Short circuit protection		**A**	10 (gG fuses)	0.1 (FF fuses*)	10 (FF fuses*)
Rated making capacity			10 x I_e AC-15	6 x I_e AC-14	10 x I_e AC-15
Rated breaking capacity			10 x I_e AC-15	6 x I_e AC-14	10 x I_e AC-15
Rated short-time withstand current I_{cw}	1 s	**A**	100	–	–
θ = 40 °C	0.1 s	**A**	140	–	–
Power loss per pole at 6 A		**W**	0.15	–	–
Min. switching capacity		**V / mA**	17 / 5 (A 9 ... A 75) - 24 / 50 (A 95, A 110)	3 / 1	17 / 5
Reliability for min. switching capacity			–	10^{-8}	10^{-8}
Mechanical durability					
– millions of operating cycles			10 (A 9 ... A 75) 3 (A 95, A 110)	5 for **CE 5-.. D** 2.5 for **CE 5-.. W**	5 for **CE 5-.. D** 2.5 for **CE 5-.. W**
– max. mech. switching frequency		**cycles/h**	3600	3600	3600
Electrical durability					
– millions of operating cycles			☞ page **4**/35	2.5 for **CE 5-.. D 0.1** 0.7 for **CE 5-.. W 0.1**	1 for **CE 5-.. D 2** 0.3 for **CE 5-.. W 2**
– max. elec. switching frequency		**cycles/h**	1200	1200	1200
Connecting terminals (Delivered in open position. Screws of unused terminals should be tightened.)			M3.5 (+,-) pozidriv 2 screw with cable clamp		
Tightening torque					
– recommended		**Nm**	1.00		
– max.		**Nm**	1.20		
Connecting capacity (min. ... max.)					
– Rigid solid		**1 or 2 x mm²**	1 ... 4		
– Flexible with cable end		**1 or 2 x mm²**	0.75 ... 2.5		
– Lugs		L **mm** ≤ l **mm** >	8 3.7		
Degree of protection acc. to IEC 60529, IEC 60144, DIN 40050 and NFC 20-010			IP 20 for the terminals		

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

>> **Terminal Marking and Positioning** ..... **section 8** >> **Dimensions** ..... **section 9**

Auxiliary Contact Blocks

Side Mounting



CAL 5-11

Application

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

Description

Types of auxiliary contacts blocks in standard version for general use:

- **CAL...** 2-pole block instantaneous N.O. + N.C. contacts.
- **CCL ...** 2-pole block N.O. leading + N.C. lagging contacts.

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

Fitting Details

Clipped onto the right and/or lefthand side of the contactors.

The **CAL 5-11B** is a second block for mounting in addition to a first **CAL 5-11** block, right and/or lefthand of the A 145 ... A 300 and AF 145 ... AF 750 contactors.

☞ Refer to the table below

For further information about fitting details compatibility with contactors and other types of accessories please refer to:

- page **4**/37 for A... and AF... 3-pole contactors
- page **4**/38 for AE..., TAE... 3-pole contactors
- page **4**/39 for AE... and TAE... 4-pole contactors
- page **3**/15 for N... and NE... contactor relays

Ordering Details

For contactors	Max. number of blocks	Contacts blocks				Type	Order code	Packing pieces	Weight kg
									1 piece
2-pole auxiliary contacts N.O. + N.C.									
A 9 ... A 110 ..... 2 blocks A 145 ... A 300 ..... 2 blocks [1] AF 50 ... AF 110 ..... 2 blocks AF 145 ... AF 750 ... 2 blocks [1] AE 9 ... AE 40 ..... 2 blocks AE 45 ... AE 110 ..... 1 block TAE 45 ... TAE 110 ... 1 block N ..... 2 blocks NE ..... 1 block		1	1	–	–	CAL 5-11	1SBN 01 0020 R1011	2	0.050
A 145 ... A 300 ..... 2 blocks [1] AF 145 ... AF 750 ... 2 blocks [1]		1	1	–	–	CAL 5-11B	1SBN 01 0420 R3311	2	0.050
N.O. leading + N.C. lagging contacts									
A 9 ... A 16 ..... 2 blocks AE 9 ... AE 16 ..... 2 blocks N ..... 2 blocks NE ..... 2 blocks		–	–	1	1	CCL 5-11	1SBN 01 1421 R1008	2	0.050

[1] 2 blocks CAL 5-11 + 2 blocks CAL 5-11 B

Notes: The auxiliary contact blocks provided for the **A...** contactors can be used for the **UA...** and **UA..-R** contactors.
Only one contact block can be mounted on **GA...** type.

>> Auxiliary Contacts for Safety Circuits ..... page 7/4
>> Front Mounted Aux. Contact Blocks ..... page 4/2
>> Mounting and Compatibility of Accessories ..... pages 4/37 to 4/39

Technical Data

Types			CAL 5-11	CAL 5-11B	CCL 5-11 (1)
Compliance with standards			IEC 60947-5-1, EN 60947-5-1		
Certification and approvals			☞ section **7**		
Rated insulation voltage U_i					
according to IEC 60947-5-1		**V**	690		
according to UL/CSA		**V**	690		
Rated operational voltage U_e		**V a.c.**	24 to 690		
Conventional free air thermal current I_{th}		**A**	16		
Rated operational current I_e acc. to IEC 60947-5-1					
AC-15	24-127 V a.c.	**A**	6		
	220-240 V a.c.	**A**	4		
	380-440 V a.c.	**A**	3		
	500-690 V a.c.	**A**	2		
DC-13	24 V d.c.	**A**	6		
	48 V d.c.	**A**	2.8		
	72 V d.c.	**A**	1		
	125 V d.c.	**A**	0.55		
	250 V d.c.	**A**	0.3		
Short-circuit protection - gG type fuses		**A**	10		
Rated making capacity			10 x I_e AC-15		
Rated breaking capacity			10 x I_e AC-15		
Rated short-time withstand current I_{cw}	1 s	**A**	100		
θ = 40 °C	0.1 s	**A**	140		
Power loss per pole at 6 A		**W**	0.15		
Min. switching capacity		**V / mA**	17 / 5 (A 9 ... A 75) - 24 / 50 (A 95 ... AF 750)		
Mechanical durability					
– millions of operating cycles			10 millions (A 9 ... A 75), 3 millions (A 95 ... A 110), 2 millions (A 145 ... AF 750)		
– max. mech. switching frequency		**cycles / h**	3600		
Electrical durability					
– millions of operating cycles			☞ page **4**/35		
– max. elec. switching frequency		**cycles / h**	1200		
Connecting terminals (Delivered in open position. Screws of unused terminals should be tightened.)			M3.5 (+,-) pozidriv 2 screw with cable clamp		
Tightening torque					
– recommended		**Nm**	1.00		
– max.		**Nm**	1.20		
Connecting capacity (min. ... max.)					
Rigid solid		**1 or 2 x mm²**	1 ... 4		
Flexible with cable end		**1 or 2 x mm²**	0.75 ... 2.5		
Lugs		L **mm** ≤	8		
		l **mm** >	3.7		
Degree of protection according to IEC 60529, IEC 60144, DIN 40050 and NFC 20-010			IP 20		

(1) CCL 5-11 auxiliary contact, only for A 9 ... A 16 and AE 9 ... AE 16 contactors and N... contactor relays.

>> **Terminal Marking and Positioning** ..... **section 8**

>> **Dimensions** ..... **section 9**

TE5S Electronic Timer for Star-Delta Starters



TE5S...

Application

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

Description

According to the type of device chosen, the electronic circuit has a 24 V a.c/d.c., 110 to 120 V a.c., 220 to 240 V a.c. or 380 to 440 V a.c. 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 graduated button allows an initial setting without steps within the previously selected range which can then be adjusted using a chronometer.

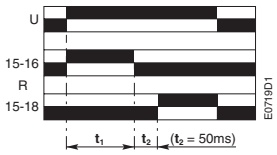
Note: We recommend that you allow for temperature drift for the final adjustment of the time delay setting. Drift: -0.2 % per °C.

For example, a setting made at 20 °C will yield a time delay shorter by 7 % at 55 °C in a cubicle.
(-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 star to delta switching.

Operation

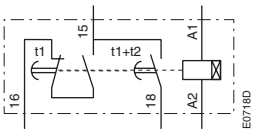
On energization, the green U indicator light (voltage applied) comes on. Contact 15-16 then immediately moves to the closed position.
Count-down of the programmed time immediately commences.
When the time delay has elapsed, contact 15-16 opens and at the same time the 50 ms lapse, t_2, begins after which 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.



Chart

Mounting

On 35 x 7.5 mm or 35 x 15 mm mounting rail according to EN 50022.

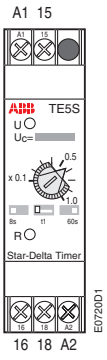


Equivalent diagram

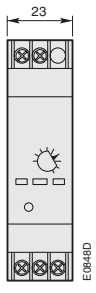
Ordering Details

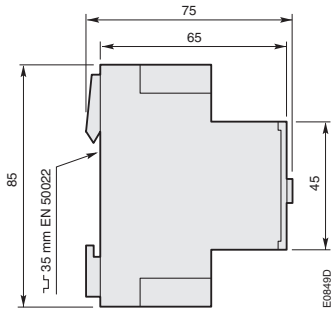
For contactors	Rated control voltage U_c V	Type	Order code	Pack[ing] pieces	Weight kg
A 9 ... A 300	24 a.c./d.c.	TE5S-24	1SBN 02 0010 R1001	1	0.080
	110 ... 120 a.c.	TE5S-120	1SBN 02 0010 R1002	1	0.080
	220 ... 240 a.c.	TE5S-240	1SBN 02 0010 R1003	1	0.080
	380 ... 440 a.c	TE5S-440	1SBN 02 0010 R1004	1	0.080

Dimensions (in mm)



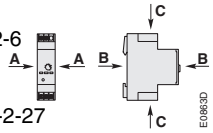
Front face



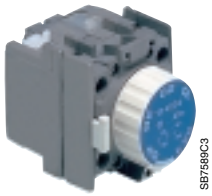


Technical Data

Types			TE5S-24	TE5S-120	TE5S-240	TE5S-440
Compliance with standards			IEC 60947-5-1, EN 60947-5-1			
Certification and approvals			☞ section **7**			
Rated insulation voltage U_i according to IEC 60947-5-1		**V**	440			
Rated operational voltage U_e		**V d.c.**	24			–
according to IEC 60947-5-1		**V a.c.**	24 ... 240			440
Conventional free air thermal current I_{th}		**A**	10			
Rated operational current I_e acc. to IEC 60947-5-1						
AC-15	24-120 V a.c.	**A**	5			–
	220-240 V a.c.	**A**	4			–
	380-440 V a.c.	**A**	–			3
DC-13	24 V d.c.	**A**	4			–
Short-circuit protection - gG type fuses		**A**	10			
Rated supply voltage U_c		**V d.c.**	24	–	–	–
		V a.c.	24	110 ... 120	220 ... 240	380 ... 440
– Rated frequency limits		**Hz**	48 ... 63			
– Supply voltage range			0.85 ... 1.1 **U_c**			
– Overvoltage protection			Built-in varistor			
– Load factor		**%**	100			
– Average consumption	– in d.c.	**W**	0.7	–	–	–
	– in a.c.	**VA**	1.5	3.5	6.5	12.5
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			Energization			
– yellow indicator light			Output relay activated			
Permissible air temperature						
– for operation		**°C**	-25 ... +60			
– for storage		**°C**	-40 ... +85			
Vibration withstand acc. to IEC 6068-2-6 and EN 60068-2-6			3 g from 10 to 300 Hz in the 3 directions			
Shock withstand acc. to IEC 6068-2-27 and EN 60068-2-27			20 g / 11 ms in directions A and C 15 g / 11 ms in direction B			
Electrical durability	in millions of operations		1			
Mechanical durability	in millions of operations		5			
On-load maximum switching frequency		**ops./h**	720			600
Fixing on mounting rail acc. to EN 50022			⎍ 35 x 7.5 or 35 x 15			
Connecting terminals			(+,-) pozidriv 1 screw			
Connecting capacity						
– rigid solid		**1 or 2 x mm²**	1 ... 2.5			
– flexible with cable end		**1 or 2 x mm²**	0.75 ... 2.5			
Tightening torque		**Nm**	0.6 ... 0.8 max.			
Degree of protection according to IEC 60529, IEC 60947-1						
– Housing			IP 50			
– Terminals			IP 20			



TP… Pneumatic Timer Blocks



TP 40 DA



BX-TP

Application

The timer blocks are equipped with adjustable time delay auxiliary contacts.

Types

– **TP 40 DA, TP 180 DA** (blue button) for time delay on energization.
– **TP 40 IA, TP 180 IA** (black button) for time delay on de-energization.

Description

- Pneumatic timer with 350° linear scale and setting via marked knurled knob.
- Block equipped with 2 time-delayed auxiliary contacts: 1N.O. and 1N.C. (electrically separate).
- Captive screw type connecting terminals with built-in cable clamps. M3.5 (+,-) pozidriv 2 screw with screwdriver guidance, supplied untightened and protected against accidental direct contact.

Mounting

Clipped onto the front panel of A 9 ... A 75, BC 9 ... BC 30 contactors and N and KC contactor relays, except for devices equipped with TBC and TKC type coils having large voltage ranges.

For further details, please turn to pages **3**/15 and **4**/37 to **4**/40 describing mounting compatibility with the other accessories.

Accessory

BX-TP plastic sealed cover protecting access to the time delay setting.

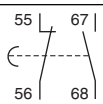
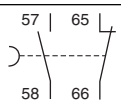
Ordering Details

Time delay setting	Type	Order code	Pack[ing] pieces	Weight kg
0.1 ... 40 s	TP 40 DA	1SBN 02 0300 R1000	1	0.070
10 ... 180 s	TP 180 DA	1SBN 02 0300 R1001	1	0.070
0.1 ... 40 s	TP 40 IA	1SBN 02 0301 R1000	1	0.070
10 ... 180 s	TP 180 IA	1SBN 02 0301 R1001	1	0.070
–	BX-TP	FPTN 472 657 R0001	1	0.006

Note: The TP... timers provided for A and BC contactors and N and KC contactor relays can be used for the AF, AE, TAE, UA, GA and GAE contactors and the NE contactor relays.

>> Mounting and Compatibility of Accessories ..... pages 4/37 to 4/40 **>> Dimensions ..... section 9**

Technical Data

Compliance with standards			IEC 60947-5-1, EN 60947-5-1	
Certification and approvals			☞ section **7**	
Rated insulation voltage U_i				
according to IEC 60947-5-1		**V a.c.**	690	
Rated operational voltage U_e				
according to IEC 60947-5-1		**V a.c.**	24 ... 690	
Conventional free air thermal current I_{th}		**A**	10	
Rated operational current I_e acc. to IEC 60947-5-1				
AC-15	24-127 V	**A**	6	
	220-240 V	**A**	4	
	380-400 V	**A**	3	
	500/690 V	**A**	1/0.5	
DC-13	24 V	**A**	6	
	48 V	**A**	2.8	
	72 V	**A**	1	
	125 V	**A**	0.55	
	250 V	**A**	0.3	
Rated making capacity			10 x I_e AC-15	
Rated breaking capacity			10 x I_e AC-15	
Short-circuit protection - gG type fuses		**A**	10	
Rated short-time withstand current I_{cw} at θ = 40 °C				
	1 s	**A**	50	
	0.1 s	**A**	100	
Heat loss per pole at 6 A		**W**	0.15	
N.O. and N.C. contact non-overlapping time		**ms**	1 ... 2	
Resetting time		**ms**	approx. 40	
Accuracy (measured over 10 successive cycles)			±2 %	
Drift (variation in mean value during TP lifetime)			TP ... DA: -15 to +15 %	TP ... IA: -25 to +15 %
Drift according to ambient temperature				
– between -20 °C and +20 °C		**% per °C**	0.25	
– between +20 °C and +65 °C		**% per °C**	0.20	
Electrical durability			☞ page **4**/35	
max. switching frequency		**cycles/h**	1200	
Mechanical durability		**cycles**	5 million	
Connecting terminals (delivered in open position)			M3.5 (+,-) pozidriv 2 screw with cable clamp	
Connecting capacity				
– rigid solid		**1 or 2 x mm²**	1 ... 2.5	
– flexible with cable end		**1 or 2 x mm²**	0.75 ... 2.5	
Tightening torque				
– recommended		**Nm**	1.00	
– max.		**Nm**	1.20	
Terminal marking			TP 40 DA TP 180 DA 	TP 40 IA TP 180 IA 

>> Mounting and Compatibility of Accessories ..... pages 4/37 to 4/40 >> Dimensions ..... section 9

Mechanical Interlock Units
Mechanical and Electrical Interlock Units

Application

When mounted between two contactors, the mechanical interlock unit prevents one of the contactors from closing as long as the other contactor is closed.

Description

Mechanical interlocking of two horizontal mounted contactors, a.c. or d.c. coil

Interlock type	For contactors On left	On right	Fixing
VBC 30	BC 9 ... BC 30, KC (1-stack)	BC 9 ... BC 30, KC (1-stack)	⌐¬ or plate not supplied
VM 5-1	A 9 ... A 40, N	A9 ... A 40, N	
VM 300H	A 95 ... A 300	A 145 ... A 300	Mounting plate ☞ page **4**/31
VM 300/460H	A 210 ... A 300	AF 400 ... AF 460	
VM 750H	AF 400 ... AF 750	AF 400 ... AF 750	

Mechanical and electrical interlocking of two horizontal mounted contactors, a.c. or d.c. coil

Type	For contactors On left	On right	Fixing
VE 5-1	A 9 ... A 40, N	A 9 ... A 40, N	⌐¬ or plate not supplied
VE 5-2 (1)	A 45 ... A 110	A 45 ... A 110	

(1) The combination of A 45 ... A 75 interlocked with A 95, A 110 cannot be mounted on symmetrical rail (75mm EN 50023).

Mechanical interlocking of two vertical mounted contactors, a.c. coil only

Type	For contactors Up	For contactors Down	Fixing
VM 300V	A 95 ... A 300	A 145 ... A 300	
VM 300/460V	A 210 ... A 300	AF 400 ... AF 460	additional plate not supplied
VM 750V	AF 400 ... AF 750	AF 400 ... AF 750	

Selection tables

Interlocking of two horizontal mounted contactors, a.c. or d.c. coil

Left \ Right	BC 9 ... BC 30, KC	A 9 ... A 26, N	A 30, A 40	A 45 ... A 75	A 95, A 110	A 145 ... A 300	AF 400 ... 460	AF 400 ... 750
BC 9 ... BC 30, KC	VBC 30	–	–	–	–	–	–	–
A 9 ... A 26, N	–	$VM/_{E}$ 5-1	$VM/_{E}$ 5-1	–	–	–	–	–
A 30, A 40	–	$VM/_{E}$ 5-1	$VM/_{E}$ 5-1	VE 5-2	–	–	–	–
A 45 ... A 75	–	–	VE 5-2	VE 5-2	VE 5-2	–	–	–
A 95, A 110	–	–	–	VE 5-2	VE 5-2	–	–	–
A 95 ... A 300	–	–	–	–	–	VM 300	–	–
A 210 ... A 300	–	–	–	–	–	–	VM 300/460H	–
AF 400 ... AF 750	–	–	–	–	–	–	–	VM 750H

Notes: VBC 30 is an interlock unit for 1-stack BC... contactors and KC... contactor relays.
The interlock units provided for A... and BC... contactors and the N... and KC... contactor relays, can be used for the AF, AE, UA, UA..-R, GA and TBC contactors and the NE and TKC contactors relays.
The VE 5-2 interlock unit can be used for the TAE 30-30-00 and TAE 75-30-00 contactors.

Interlocking of two vertical mounted contactors, a.c. coil only

Up \ Down	A 145 ... A 300	AF 400 ... AF 460	AF 400 ... AF 750
A 95 ... A 300	VM 300V	–	–
A 210 ... A 300	–	VM 300/460V	–
AF 400 ... AF 750	–	–	VM 750V

>> Mounting and Compatibility of Accessories ..... pages 4/37 to 4/40 >> Dimensions ..... section 9

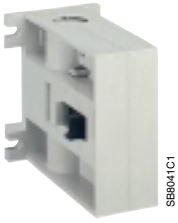
Mechanical Interlock Units
Mechanical and Electrical Interlock Units



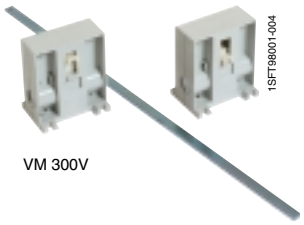
VBC 30



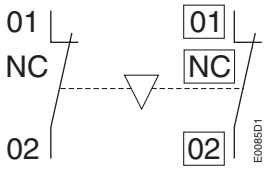
VE 5-1



VM 300H



VM 300V



VE 5-1, VE 5-2
Terminal marking and positioning

Ordering Details

Mechanical interlocking of two horizontal mounted contactors

For contactors	Type	Order code	Packing pieces	Weight kg
☞ page **4**/10	VBC 30	GJL 280 1911 R0001	1	0.015
	VM 5-1	1SBN 03 0100 R1000	1	0.066
	VM 300H	1SFN 03 4700 R1000	1	0.150
	VM 300/460H	1SFN 03 5100 R1000	1	0.150
	VM 750H	1SFN 03 5700 R1000	1	0.200

Mechanical and electrical interlocking of two horizontal mounted contactors

For contactors	Type	Order code	Packing pieces	Weight kg
☞ page **4**/10	VE 5-1	1SBN 03 0110 R1000	1	0.076
	VE 5-2	1SBN 03 0210 R1000	1	0.146

Mechanical interlocking of two vertical mounted contactors

For contactors	Type	Order code	Packing pieces	Weight kg
☞ page **4**/10	VM 300V	1SFN 03 4701 R1000	1	0.150
	VM 300/460V	1SFN 03 5101 R1000	1	0.150
	VM 750V	1SFN 03 5701 R1000	1	0.200

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Technical Data - VE 5-1 and VE 5-2 Mechanical and Electrical Interlock Units

Compliance with standards		IEC 60947-5-1, EN 60947-5-1
Rated insulation voltage U_i		
according to IEC 60947-5-1	**V**	690
according to UL / CSA	**V**	600
Rated operational voltage U_e		
acc. to IEC 60947-5-1	**V a.c.**	24 ... 690
Conventional thermal current I_{th}	**A**	16
Rated operational current I_e acc. to IEC 60947-5-1		
AC-15		
24-127 V	**A**	6
220-240 V	**A**	4
380-440 V	**A**	3
500-690 V	**A**	2
DC-13		
24 V	**A**	6
48 V	**A**	2.8
72 V	**A**	1
125 V	**A**	0.55
250 V	**A**	0.3
Rated making capacity		10 x I_e AC-15
Rated breaking capacity		10 x I_e AC-15

Rated short-time withstand current I_{cw} - θ = 40 °C		
1 s	**A**	100
0.1 s	**A**	140
Short-circuit protection gG type fuses	**A**	10
Heat loss per pole at 6 A	**W**	0.15
Mechanical durability	**cycles**	5 million
Max. switching frequency	**cycles/h**	600
Connecting capacity		
– rigid solid	**1 or 2 x mm²**	1 ... 4
– flexible with end	**1 or 2 x mm²**	0.75 ... 2.5
Connecting terminals delivered in open position (screws of unused terminals should be tightened)		M3.5 (+,-) pozidriv 2 screw with cable clamp
Tightening torque		
– recommended	**Nm**	1.00
– max.	**Nm**	1.20
Degree of protection acc. to IEC 60529, IEC 60144, DIN 40050, NFC 20010		IP 20

Technical note

When, during switching, the arc time is estimated to more than 40 ms, the closing signal of one of the two contactors must be delayed with respect to the opening signal of the other contactor in order to prevent a short-circuit.

Use a TP 40 pneumatic timer or a TE5S electronic timer with time lapse, as applicable.

>> Mounting and Compatibility of Accessories ..... pages 4/37 to 4/40
>> Mounting Plates ..... page 4/31
>> Dimensions ..... section 9

WB 75-A Mechanical Latching Unit



WB 75-A

Application

For converting standard contactors into latched contactors.

Description

The **WB 75-A** block contains a mechanical latching device with electromagnetic impulse unlatching (a.c. or d.c.) or manual unlatching.
Captive screw type connecting terminals, built-in cable clamps, M3.5 (+,-) pozidriv 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 contactor coil terminals.

Contactor opening can be controlled:

– electrically by an impulse* (a.c. or d.c.) on the WB 75-A block coil.

* the coil is not designed to be permanently energized.

– manually by pressing the pushbutton on the front face of the WB 75-A block.

Mounting

The **WB 75-A** block is clipped onto the front face of the contactor where it takes up two slots. The two other slots may accept **CA 5...** single pole auxiliary contacts (1 block on each side of the mechanical latch).

Ordering Details

For contactors or contactor relays	Type state coil voltage ⌊‗‗⌋ (see table below)	Order code state coil voltage code ☐☐ (see table below)	Weight kg Packing 1 piece
A 9 ... A 75, AF 50 ... AF 75, AE 9 ... AE 75 UA 16 ... UA 75, GA 75, GAE 75 BC 9 ... BC 30 (1) N, NE, KC (1)	WB 75-A ⌊‗‗⌋	FPTN 372 726 R10 ☐☐	0.120

(1) 1-stack contactors.

Coil voltages and codes

Voltage ⌊‗‗⌋ V - 50Hz/d.c.	Voltage ⌊‗‗⌋ V - 60Hz	Code ☐☐
24	24 ... 28	0 1
42	42 ... 48	0 2
48	48 ... 5	0 3
110	110 ... 127	0 4
220 ... 230	220 ... 255	0 6
230 ... 240	230 ... 277	0 5
380 ... 415	380 ... 440	0 7
415 ... 440	440 ... 480	0 8

>> Dimensions ..... section 9

WB 75-A Mechanical Latching Unit

Technical Data

Rated insulation voltage U_i				
according to IEC 60947-1		**V a.c.**	690	
Rated control voltage U_c		**V a.c.**	24 ... 480	
according to the coil voltage		**V d.c.**	24 ... 440	
Coil operating range			0.85 ... 1.1 **U_c**	
Max. electrical impulse time				
– on a.c. coil (with load factor 5 %)		**s**	20	
– on d.c. coil (with load factor 3 %)		**s**	8	
Min. electrical impulse time				
– for latching:	in a.c.	**ms**	50 (A... contactors, N... contactor relays)	40 (BC... contactors, KC... contactor relays)
(energizing of the contactor coil)	in d.c.	**ms**	50 (A... contactors, N... contactor relays)	80 (BC... contactors, KC... contactor relays)
– for pull-out:	in a.c.	**ms**	30	
(energizing of the WB block coil)	in d.c.	**ms**	50	
Coil consumption (mean values)				
– a.c. operated coil	inrush	**VA**	90	
	holding	**VA**	60	
– d.c. operated coil		**W**	110	
Operating time				
– on contactor closing (latching) between coil energization and:				
N.O. contact closing				
N.C. contact opening			☞ page **2**/62: no difference with the operation of a contactor only	
– on contactor closing (unlatching) between WB.. coil energization and:				
N.O. contact opening		**ms**	5 ... 25	
N.C. contact closing		**ms**	7 ... 28	
Mechanical durability	in millions of ops.		1	
Max. switching frequency		**ops./h**	3600 with on-load factor of 8 %	
Connecting terminals (delivered in open position)			M3.5 (+,-) pozidriv 1 screw with cable clamp	
Connecting capacity				
– rigid solid		**mm²**	1 ... 4	
– flexible with cable end		**mm²**	0.75 ... 2.5	
Tightening torque				
– recommended		**Nm**	1.00	
– max.		**Nm**	1.20	
Degree of protection			IP 20	

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>> Dimensions ..... section 9

Surge Suppressors for Contactor Coils

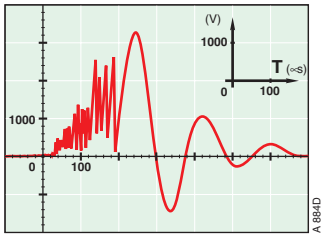
Application

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

The electromagnetic energy stored in 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 42 V / 50 Hz 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 3500 V.



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:

$$k = \frac{\hat{U}_s \text{ max.}}{\hat{U}_c} \qquad \text{in d.c.:} \quad k = \frac{\hat{U}_s \text{ max.}}{U_c} \qquad \text{or in a.c.:} \quad k = \frac{\hat{U}_s \text{ max.}}{U_c\sqrt{2}}$$

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

Description

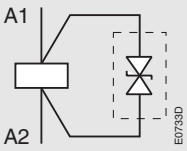
To guard against the harmful effects of these overvoltages, ABB has developed a range of surge suppressors designed to reduce the **k** factor defined above and to limit or even completely eliminate the high pre-damping voltage frequencies.

Each case is different, but the technical data tolerances and the generous sizing of parts have enabled us to reduce the number of variants.

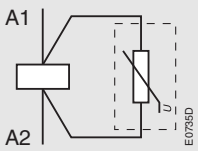
We have chosen the following solutions: transil diodes, varistors and RC blocks.

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

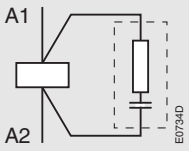
Wiring Diagrams



Transil diode

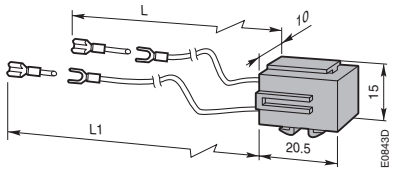


Varistor



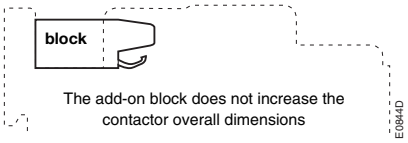
RC type

Dimensions (in mm)



RT 7, RV-BC 6

Types	RT 7	RV-BC6
L	85	135
L1	200	235

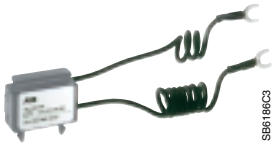


RT 5, RV 5, RC 5

Surge Suppressors for Contactor Coils



RT 7/...



RV-BC 6/...



RV 5/50



RC 5-1/50

Ordering Details

For contactors	Control voltage V	d.c.	a.c.	Type	Order code	Packing pieces	Weight kg 1 piece
BC 9 ... BC 30, and KC TBC 9 ... TBC 30 KC and TKC	12 ... 32	●	–	RT 7/32	FPTN 377 043 R0001	10	0.007
	25 ... 65	●	–	RT 7/65	FPTN 377 044 R0001	10	0.007
	50 ... 90	●	–	RT 7/90	FPTN 377 045 R0001	10	0.007
	77 ... 150	●	–	RT 7/150	FPTN 377 046 R0001	10	0.007
	150 ... 264	●	–	RT 7/264	FPTN 377 047 R0001	10	0.007
BC 9 ... BC 30 and KC	24 ... 60	●	–	RV-BC 6/60	GHV 250 1902 R0002	10	0.004
	50 ... 127	●	–	RV-BC 6/127	GHV 250 1908 R0002	10	0.004
	110 ... 250	●	–	RV-BC 6/250	GHV 250 1903 R0002	10	0.004
	200 ... 420	●	–	RV-BC 6/380	GHV 250 1904 R0002	10	0.004
BC 9 ... BC 30 and KC (1)	24 ... 60	●	–	RV-BC 6-F/60	GHV 250 1902 R0003	10	0.004
	50 ... 127	●	–	RV-BC 6-F/127	GHV 250 1908 R0003	10	0.004
	110 ... 250	●	–	RV-BC 6-F/250	GHV 250 1903 R0003	10	0.004
	200 ... 420	●	–	RV-BC 6-F/380	GHV 250 1904 R0003	10	0.004
AE 9 ... AE 110, TAE 45 ... TAE 110	12 ... 32	●	–	RT 5/32	1SBN 05 0020 R1000	2	0.015
	25 ... 65	●	–	RT 5/65	1SBN 05 0020 R1001	2	0.015
	50 ... 90	●	–	RT 5/90	1SBN 05 0020 R1002	2	0.015
	77 ... 150	●	–	RT 5/150	1SBN 05 0020 R1003	2	0.015
	150 ... 264	●	–	RT 5/264	1SBN 05 0020 R1004	2	0.015
A 9 ... A 110, AE 9 ... AE 110, TAE 45 ... TAE 110, N and NE	24 ... 50	●	●	RV 5/50	1SBN 05 0010 R1000	2	0.015
	50 ... 133	●	●	RV 5/133	1SBN 05 0010 R1001	2	0.015
	110 ... 250	●	●	RV 5/250	1SBN 05 0010 R1002	2	0.015
	250 ... 440	●	●	RV 5/440	1SBN 05 0010 R1003	2	0.015
A 9 ... A 40 and N	24 ... 50	–	●	RC 5-1/50	1SBN 05 0100 R1000	2	0.012
	50 ... 133	–	●	RC 5-1/133	1SBN 05 0100 R1001	2	0.012
	110 ... 250	–	●	RC 5-1/250	1SBN 05 0100 R1002	2	0.012
	250 ... 440	–	●	RC 5-1/440	1SBN 05 0100 R1003	2	0.012
A 45 ... A 300	24 ... 50	–	●	RC 5-2/50	1SBN 05 0200 R1000	2	0.015
	50 ... 133	–	●	RC 5-2/133	1SBN 05 0200 R1001	2	0.015
	110 ... 250	–	●	RC 5-2/250	1SBN 05 0200 R1002	2	0.015
	250 ... 440	–	●	RC 5-2/440	1SBN 05 0200 R1003	2	0.015

(1) The coils must be equipped with 2.8 mm flat pin lugs.

Note: The surge suppressors provided for A... contactors can be used for the UA, UA..-R and GA types.
The surge suppressors provided for AE 45 ... AE 110 contactors can be used for the GAE 75 types.

>> Technical Data ..... **page 4/16**

Technical Data

Transil diode		RT 5/32 RT 7/32	RT 5/65 RT 7/65	RT 5/90 RT 7/90	RT 5/150 RT 7/150	RT 5/264 RT 7/264
Control voltage U_c	**V d.c.**	12 ... 32	25 ... 65	50 ... 90	77 ... 150	150 ... 264
Residual overvoltage (clipping voltage)	**V d.c.**	50	100	150	210	390
Opening time growth factor		2.5 ... 3				
Operating temperature	**°C**	-20 ... +70				
Connection to the coil terminals (parallel mounting)		**RT 5:** Clip-on for both fixing and connection. **RT 7:** Flexible, accessible leads, equipped with forked lugs.				
Fixing		**RT 5:** Clipped onto the top part of the contactor base. This mounting method prevents any projections and change in contactor dimensions. **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.				
Advantages		Good energy absorption - Unpolarized system - Simple, reliable system.				
Drawback		A certain delay on drop out which does not however reduce contactor breaking capacity.				

Varistor		RV-BC 6/60 RV-BC 6-F/60	RV-BC 6/127 RV-BC 6-F/127	RV-BC 6/250 RV-BC 6-F/250	RV-BC 6/380 RV-BC 6-F/380	
Control voltage U_c	**V d.c.**	24 ... 60	50 ... 127	110 ... 250	200 ... 420	
Residual overvoltage (clipping voltage)	**V d.c.**	137	305	510	730	
Opening time growth factor		1.1 ... 1.5				
Operating temperature	**°C**	-20 ... +70				
Connection to the coil terminals (parallel mounting)		**RV-BC 6:** Flexible, accessible leads, equipped with forked lugs. **RV-BC 6-F:** Flexible, accessible leads, equipped with 2.8 mm faston lugs.				
Fixing		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.				
Advantages		High energy absorption: good damping - Unpolarized system.				
Drawback		Clipping as from U_{vdr}*, thus voltage front up to this point.				

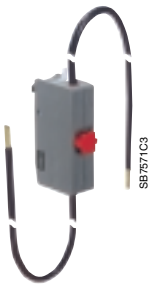
*U_{vdr} = Varistor operating voltage (voltage dependent resistor), tolerance ± 10 %.

Varistor		RV 5/50	RV 5/133	RV 5/250	RV 5/440	
Control voltage U_c	**V a.c./d.c.**	24 ... 50	50 ... 133	110 ... 250	250 ... 440	
Residual overvoltage (clipping voltage)	**V a.c./d.c.**	132	270	480	825	
Opening time growth factor		1.1 ... 1.5				
Operating temperature	**°C**	-20 ... +70				
Connection to the coil terminals (parallel mounting)		Clip-on for both fixing and connection.				
Fixing		Clipped onto the top part of the contactor base. This mounting method prevents any projections and change in contactor dimensions.				
Advantages		High energy absorption: good damping - Unpolarized system.				
Drawback		Clipping as from U_{vdr}*, thus voltage front up to this point.				

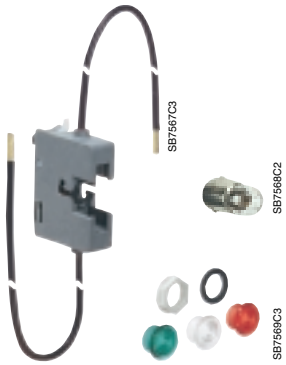
*U_{vdr} = Varistor operating voltage (voltage dependent resistor), tolerance ± 10 %.

RC type		RC 5-1/50 RC 5-2/50	RC 5-1/133 RC 5-2/133	RC 5-1/250 RC 5-2/250	RC 5-1/440 RC 5-2/440	
Control voltage U_c	**V a.c.**	24 ... 50	50 ... 133	110 ... 250	250 ... 440	
Residual overvoltage (clipping voltage)	**V a.c.**	2 to 3 x U_c max.				
Opening time growth factor		1.2 ... 1.3				
Operating temperature	**°C**	-20 ... +70				
Connection to the coil terminals (parallel mounting)		Clip-on for both fixing and connection.				
Fixing		Clipped onto the top part of the contactor base. This mounting method prevents any projections and change in contactor dimensions.				
Advantages		Very fast clipping - Attenuation of steep fronts and thus of high frequencies. No operating delays.				

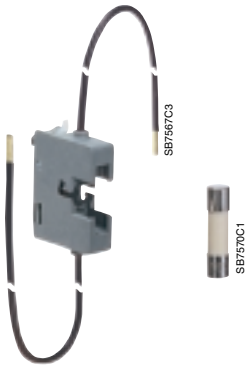
Impulse Contact blocks
Lamp Holder - Fuse Holder



CB 5...



BL 5-L



BL 5-F

CB 5... Impulse Contact Blocks

Application

Impulse contact blocks are available in two different types:
CB 5-10: N.O. contact with a black pushbutton ("ON" contact of d.o.l. starter)
CB 5-01: N.C. contact with a red pushbutton ("OFF" function).

Description

These blocks are equipped with 2 connecting leads 0.5 mm² with end, approximately 10 cm long.
Mounting: Clipped onto the front face of the contactors.

Ordering details

For contactors	Contacts	Type	Order code	Packing pieces	Weight kg
A 9 ... A 110, BC 9 ... BC 30	1 –	CB 5-10	1SBN 01 0013 R1010	1	0.012
	– 1	CB 5-01	1SBN 01 0013 R1001	1	0.012

Note: The CB 5-10 and CB 5-01 blocks provided for the A... and BC... contactors can be used for the AF, AE, TAE, UA, GA, GAE and TBC types.

BL 5-L Lamp Holder Block

Application: Lamp holder for indicator light.

Description

Block designed to hold a bulb, not supplied (BA 9 s type, max. P = 1.2 W, max. voltage = 400 V, max. length = 28 mm).
Equipped with 2 connecting leads (1 mm² and approximately 10 cm long), with 3 lenses (green, red, colourless) for fixing on the front face of the d.o.l. starter enclosures (insulated enclosures).
Mounting: Clipped onto the front face of the contactors.

Ordering details

For contactors	Type	Order code	Packing pieces	Weight kg
A 9 ... A 110, BC 9 ... BC 30, N, KC	BL 5-L	1SBN 07 0054 R1000	1	0.022

Note: The BL 5-L block provided for the A... and BC... contactors and N... and KC... contactor relays can be used for the AF, AE, TAE, UA, GA, GAE, TBC, NE and TKC types.

BL 5-F Fuse Holder Block

Application: Fuse holder for the control circuit.

Description

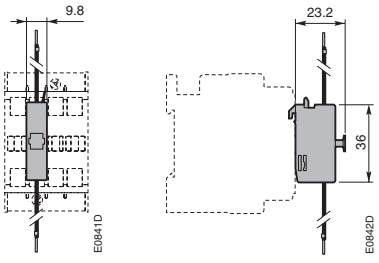
Block designed to hold a fuse cartridge (5 x 20, 4 A max.), not supplied.
Equipped with 2 connecting leads 1mm² and approximately 10 cm long.
Mounting: Clipped onto the front face of the contactors.

Ordering details

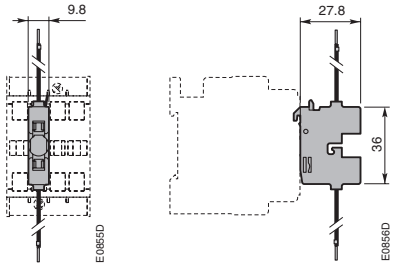
For contactors	Type	Order code	Packing pieces	Weight kg
A 9 ... A 110, BC 9 ... BC 30, N, KC	BL 5-F	1SBN 07 0055 R1000	1	0.020

Note: The BL 5-F block provided for the A... and BC... contactors and N... and KC... contactor relays can be used for the AF, AE, TAE, UA, GA, GAE, TBC, NE and TKC types.

Dimensions (in mm)



CB 5... Impulse contact blocks



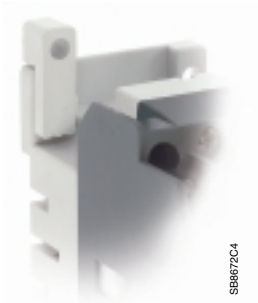
BL 5-L Lamp holder blocks
BL 5-F Fuse holder blocks

4

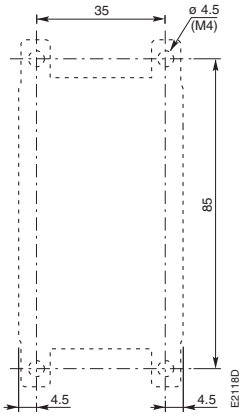
BA 5-50 Function Markers
BP 16 Mounting Piece



BA 5-50



BP 16



Drilling plan for contactor with BP 16

BA 5-50 Function Markers

Application

For marking contactors, thermal O/L relays, contactor relays and accessories.

Description

The **BA 5-50** is a set of 50 function markers designed to be clipped onto the front face of devices.
Effective marking surface: 7 x 19 mm.
Details can be added to these markers using a ball point pen, indelible felt-tip pen or pentel white.
Self-adhesive labels (not supplied) can also be added to them.

Ordering details

For contactors	Type	Order code	Packing box	Weight kg
A..., BC... contactors, thermal O/L relays, contactor relays and accessories	BA 5-50	1SBN 11 0000 R1000	1	0.017

BP 16 Mounting Piece

Application

Mounting piece for screw fixing (M4, not supplied) of A... series contactors indicated in the table below.
Easy handling of screwdrivers and screw driving.

Description

Add-on mounting piece on contactor's rear face, offering a wide fixing facility.

Ordering details

For contactors	Type	Order code	Packing pieces	Weight kg 1 piece
A 9 ... A 16, AE 9 ... AE 16 and UA 16, UA 16..-R, N and NE...	BP 16	1SBN 11 1403 R1000	100	1.380

RA 5 and RA 30 Interface Relays



RA 5



A 50-30-00 + RA 5



RA 30



BC 9-30-10 + RA 30

Application

RA 5 and **RA 30** interface relays are designed to receive 24 V d.c. signals delivered by PLC's or other sources **with a low output power** and to restore them with **sufficient power** to operate the coils of the relevant contactors.

Types

– **RA 5** for combination with **A 9 ... A 110** contactors and **N** contactor relays.
– **RA 30** for combination with **BC 9 ... BC 30** contactors and **KC** contactor relays.

Description

RA 5 and **RA 30** 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 5 and RA 30 are equipped with surge suppressors:
– on the 24 V d.c. relay coil via a diode,
– on the power contactor coil via a varistor.

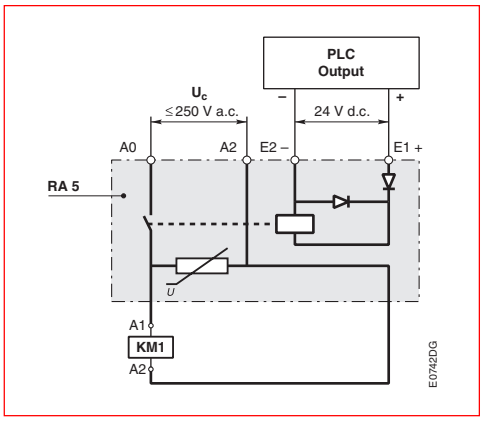
Furthermore, the RA 5 and RA 30 are protected against relay pole reversal by a diode inserted between the E1 and E2 input terminals.

Connection

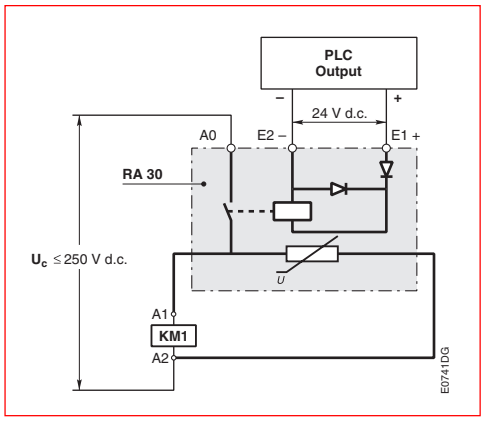
The "E1+" and "E2–" input terminals must be connected, according to their polarity, to the PLC output.

- The **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.
- The **RA 30** 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.

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



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



Mounting

– **RA 5:** terminal pads clamped inside the contactor coil terminals.
– **RA 30:** dovetail mounting at the top of the contactor base.

Ordering Details

For contactors	Coil voltages	Control voltage U_c	Type	Order code	Packing pieces	Weight kg 1 piece
BC9 ... BC30, KC, TKC	12 ... 250 V d.c.	24 V d.c.	RA 30	FPTN 472 770 R0002	1	0.035
	12 ... 250 V d.c.	24 V d.c.	RA 30	FPTN 472 770 R0001	10 (1)	0.035
A 9 ... A 110, N	24 ... 250 V / 50-60 Hz	24 V d.c.	RA 5	1SBN 06 0000 R1001	1	0.050
	24 ... 250 V / 50-60 Hz	24 V d.c.	RA 5	1SBN 06 0000 T1001	10 (1)	0.050

(1) Packing 10: Qty/Order: 10 or multiple of 10.

Note: The interface relays provided for the A... contactors can be used for the UA, UA..-R and GA types.

>> Dimensions ..... **section 9**

Technical Data

General technical data		RA 5	RA 30
Compliance with standards		IEC 255-5	
Rated insulation voltage U_i according to IEC 60947-4-1	**V a.c.**	250	
Permissible ambient temperature:			
– for free air operation:			
– at U_c = 24 V d.c. (between E1 and E2)	°C	-25 ... +70	
– from 0.85 to 1.1U_c	°C	-25 ... +55	
– for storage	°C	-40 ... +70	
Climatic withstand		Complies with that of associated contactors	
Operating height	**m**	≤ 3000	
Mounting position		No limitation	
Fixing		Using the contactor A1 and A2 terminal connecting parts	Dovetail mounting in the top part of the contactors
Connecting terminals (delivered in open position)		M3.5 (+,-) pozidriv 2 screw with cable clamp	
Connecting capacity (min. ... max.)			
– rigid solid	2 x **mm²**	1 ... 4	
– flexible with cable end	2 x **mm²**	0.75 ... 2.5	
Tightening torque			
– recommended	**Nm**	1.00	
– max.	**Nm**	1.20	
Degree of protection acc. to IEC 60947-1/EN 60947-1 and IEC 60529/EN 60529		Protection against direct contact according to VDE 0106 - Part. 100	

Working data		RA 5	RA 30
Surge suppression:			
– for contactor coil		Varistor	
– for interface relay coil		Diode	
Protection against polarity reversal between terminals E1 and E2		Diode	
Interface relay operating time	**ms**	Closing and drop-out ≤ 10	
Total operating time, interface relay + contactor:			
– between energization and:			
N.O. contact closing	**ms**	19 ... 36	59 ... 84
N.C. contact opening	**ms**	16 ... 32	54 ... 79
– between de-energization and:			
N.O. contact opening	**ms**	15 ... 25	25 ... 40
N.C. contact closing	**ms**	18 ... 28	27 ... 42

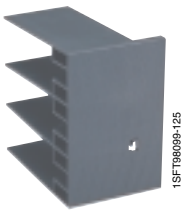
Electrical input data		RA 5	RA 30
Control voltage (E1and E2 terminals) **U_c**			
– rated value	**V d.c.**	24	
– max. range	**V d.c.**	17 ... 30	
Max. consumption for U_c = 24 V d.c., θ = 20 °C	**W**	0.3	
"0" status (relay open) for **U_c**	**V d.c.**	≤ 2.4	
or **I_c**	**mA**	< 1	
"1" status (relay closed) for **U_c**	**V d.c.**	≥ 17	
Max. short supply interruption immunity time	**ms**	4	

Electrical output data			
Switching voltage (A0 and A2 terminals)	**V a.c.**	≤ 250	–
	V d.c.	–	≤ 250
Electrical lifetime	**million of operations**	4 (600 ops./h) on A 9 ... A 40 contactors 2 (600 ops./h) on A 45 ... A 110 contactors	10 (1200 ops./h)

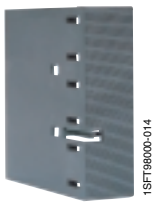
LT... Terminal Shrouds



LT ...-AC



LT ...-AL



LT ...-AY

Application

Main terminal protection for **A 145 ... AF 750** contactors.
The auxiliary contact blocks and coils are designed to provide an IP 20 degree of protection.
The main terminals, equipped with lugs or connectors, can be protected against accidental direct contact after wiring (VDE 0106 - Part. 100) by the addition of terminal shrouds (see table below).

Note: A 9 ... A 110 and BC 9 ... BC 30 contactors do not require additional terminal shrouds as their terminals are all already protected against accidental direct contact according to VDE 0106 - Part. 100.

Description

Each terminal shroud protects all the terminals on one side of the contactor. Two terminal shrouds should be provided for each separate contactor.

Ordering Details

For contactors	Type	Order code	Packing pieces	Weight kg 1 piece
A 145 ... A 185 with connectors	LT 185-AC	1SFN 12 4701 R1000	2	0.050
A 145 ... A 185 with lugs	LT 185-AL	1SFN 12 4703 R1000	2	0.220
A 145 ... A 185 with short. bar LY 185 or between A 145 and TA 200DU or between A 185 and TA 200DU	LT 185-AY	1SFN 12 4704 R1000	1	0.050
A 210 ... A 300 with connectors	LT 300-AC	1SFN 12 5101 R1000	2	0.070
A 210 ... A 300 with lugs	LT 300-AL	1SFN 12 5103 R1000	2	0.280
A 210 ... A 300 with short. bar LY 300	LT 300-AY	1SFN 12 5104 R1000	1	0.075
AF 400 ... AF 460 with connectors	LT 460-AC	1SFN 12 5701 R1000	2	0.100
AF 400 ... AF 460 with lugs	LT 460-AL	1SFN 12 5703 R1000	2	0.800
AF 580 ... AF 750 with connectors	LT 750-AC	1SFN 12 6101 R1000	2	0.120
AF 580 ... AF 750 with lugs	LT 750-AL	1SFN 12 6103 R1000	2	0.825

Note: The shrouds provided for the A... contactors can be used for the AF... types.

>> Dimensions ..... section 9

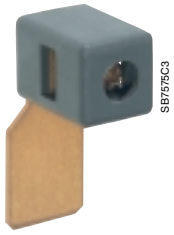
LK... Terminals for Control Lead Connections



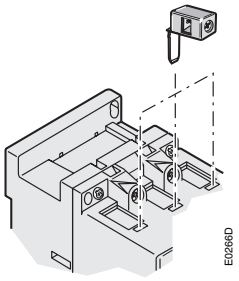
LK 75-L



LK 75-F



LK 110



LK ... positioning

Application

Terminals designed to connect the control conductors to the main poles of the **A 45 ... A 110** contactors and derivative versions.

Description

Accessories clipped into the slots placed above each power terminal connector.

The **LK 75...** are fitted with a pin designed to hold them in place until the connector has been fully clamped with its power cable.

The **LK 110** must be held in place until the connector has been clamped.

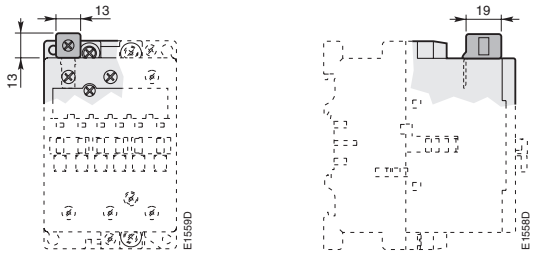
- Degree of protection IP 20
- Connecting terminal delivered in open position: cable clamp and M 3.5 (+,-) pozidriv 2 screw.
- Cable cross-sectional area: – 1 or 2 rigid conductors 1 ... 4 mm^2
  – 1 or 2 flexible conductors with cable end 0.75 ... 2.5 mm^2
- Tightening torque for the LK... screw: – recommended 1.00 N.m
  – maxi. 1.20 Nm

Ordering Details

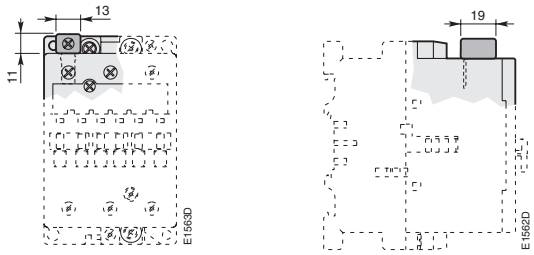
Connection	Type	Order code	Packing pieces	Weight kg 1 piece
Right and left on A 45 ... A 75	LK 75-L	1SBN 07 3552 R1003	2	0.006
Opposite on A 45 ... A 75	LK 75-F	1SBN 07 3552 R1002	2	0.006
Right and left on A 95 ... A 110	LK 110	1SFN 07 4352 R1000	2	0.010

Note: The LK... terminals provided for the A... contactors can be used for the AF, AE, AM, TAE, UA, GA and GAE types.

Dimensions (in mm)



LK 75-L, LK 110



LK 75-F

LZ... Connector Terminals
LC... Flat Pin Terminal Blocks





LZ...



LZ...



LC16-B

Type	Set
LC 16-B	2 pieces fig. 1 +2 pieces fig. 4
LC 26-B2	2 pieces fig. 1 +2 pieces fig. 2 +2 pieces fig. 4
LC 25-B1	2 pieces fig. 3 +2 pieces fig. 4

LZ... Connector Terminals for Al and Cu Cables

Application

Connection of copper and aluminium cables to the terminal pads of the poles of A and AF contactors.

Ordering details

Cables	For contactors	Cable cross section mm²	Type	Order code	Packing set	Weight kg 1 piece
Single, Cu	A 145, A 185	6 ... 185	–	1SDA 02 3354 R0001	3	0.200
	A 210 ... AF 460	16 ... 240	–	1SDA 02 3368 R0001	3	0.400
Single Al & Cu	A 145, A 185	35 ... 95	–	1SDA 02 3356 R0001	3	0.100
	A 145, A 185	25 ... 150	–	1SDA 02 3357 R0001	3	0.100
	A 210 ... A 300	120 ... 240	–	1SDA 02 3370 R0001	3	0.200
Double, Cu	A 145, A 185	2x(50 ... 120)	LZ 185-2C/120	1SFN 07 4709 R1000	3	0.300
Double Al & Cu	A 210 ... A 300	2x(95 ... 120)	–	1SDA 02 5766 R0001	3	0.400

Note: The LZ... connectors provided for the A... contactors can be used for the AF types.

LC... Flat Pin Terminal Blocks

Application

Flat pin terminal blocks are used to connect by means of clips the contactors equipped with screw terminals.
Flat pin terminal blocks are available for BC 9 ... BC 25 and TBC 9 ...TBC 25 contactors and KC, TKC contactor relays, and also suitable for **CA 5...** 4-pole auxiliary contact blocks.

Description

Set made up of two flat pin terminals allowing two 6.3 mm or 2.8 mm clips to be connected to each pole and two flat pins which are added to the coil terminals.
Protection against direct contact acc. to VDE 106 - Part. 100.

As stipulated by the NFC 20-120 and DIN 46249 standards, the maximum permissible current for the flat pins is 25 A.

Flat pin terminal blocks are fixed by the screw terminals with which the contactor is equipped.

Ordering details

For contactors		Type	Order code	Packing set	Weight kg 1 piece
KC, BC 9 ... BC 16 TKC, TBC 9 ... TBC 16	1 stack (1) 1 stack (1)	LC 16-B	GJL 280 1912 R0002	1	0.025
BC 18	2 stacks	LC 26-B2	GJL 280 1912 R0005	1	0.048
BC 25, TBC 25	1 stack	LC 25-B1	GJL 280 1912 R0003	1	0.023

(1) For 2-stack contactors, 2 sets are required.
Note: LC 16-B flat pin terminal block can be used with **CA 5...** 4-pole auxiliary contact blocks.

Dimensions (in mm)

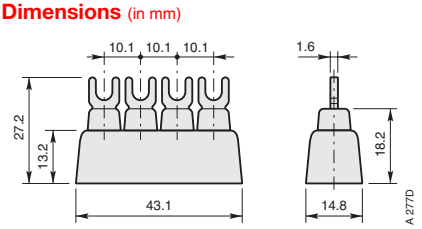


Fig.1

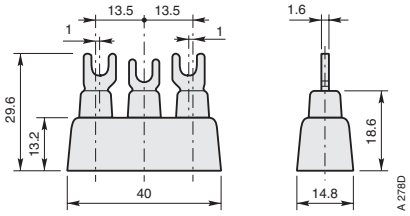


Fig.2

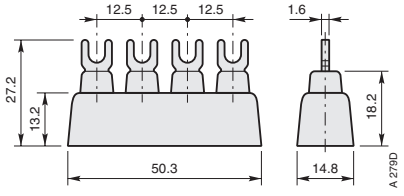


Fig.3

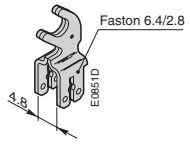


Fig.4

LD... Additional Terminal Blocks



A 9-30-10 with LD 16



LD 16



LD 26



LD 40



LD 75



LD 110

Application

The **LD...** terminal block is designed to increase the connection capacity of the contactor on which it is fitted and for preparation of the wiring before final connection on the contactor.

Description

LD... blocks are 3-pole terminal blocks with tunnel terminals. The available range can be used on A 9 to A 110 contactors.

LD75 and **LD110** terminal blocks are fixed in the 3 independent slots located above the built-in connectors.

Ordering Details

For contactors	Type	Order code	Packing pieces	Weight kg 1 piece
A 9 ... A 16	LD 16	1SBN 07 1408 R1000	2	0.030
A 26	LD 26	1SBN 07 2408 R1000	2	0.040
A 30, A 40	LD 40	1SBN 07 2808 R1000	1	0.075
A 45, A 75	LD 75	1SBN 07 3508 R1000	1	0.115
A 95, A 110	LD 110	1SFN 07 4308 R1000	1	0.150

Note: The LD... terminal blocks provided for the A... contactors can be used for the AF, AE, TAE and UA types.

Technical Data

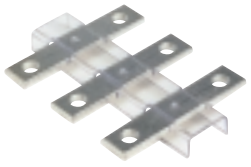
Types		LD 16	LD 26	LD 40	LD 75	LD 110
Rated insulation voltage U_i						
according to IEC 60947-5-1	**V**	690				
according to UL / CSA	**V**	600				
Connecting terminals						
with double connectors	**mm**	2x(6x6)	2x(6x7)	2x(8x10)	2x(10x11)	2x(12x12)
Connecting capacity (min. ... max.)						
Rigid solid (≤ 4 mm²)	**1 x mm²**	1.5 ... 1.6	2.5 ... 16	4 ... 35	6 ... 50	10 ... 70
stranded (≥ 6 mm²)	**2 x mm²**	1.5 ... 6	2.5 ... 6	4 ... 16	6 ... 25	10 ... 35
Fexible with cable end						
	1 x mm²	1.5 ... 16	2.5 ... 16	4 ... 25	6 ... 35	10 ... 50
	2 x mm²	1.5 ... 4	2.5 ... 4	4 ... 10	6 ... 16	10 ... 25
Bars	**mm**	6	6.5	8	10	12
Screw terminals		(+,-) pozidriv 2				Hexagon socket
(delivered in closed position)		M4	M5		M6	M8 (S = 4 mm)
Tightening torque (cable connection)	**Nm**	1.7	2.5	2.5	4	6
Degree of protection acc. to IEC 60947-4-1, EN 60947-4-1, IEC 60529 and EN 60529		IP 10				

Note: The utilization of **LD...** additional terminal blocks keeps the posssibility to connect the following cables directly in the contactor main terminals but the **BED** and **BEM** connecting sets can no longer be used.

Possible cross section of rigid cable in the contactor terminals		LD 16	LD 26	LD 40	LD 75	LD 110
	mm²	4	6	10	50	95

>> **Dimensions** ..... **section 9**

LX... Terminal Extension Pieces
LW... Terminal Enlargement Pieces



LX...

LX... Terminal Extension Pieces

Application

LX... extension pieces are designed to extend the terminal pads of the **A...** contactors for simultaneous mounting of the connectors (☞ page **4**/23) and the connection sets (☞ page **4**/27).

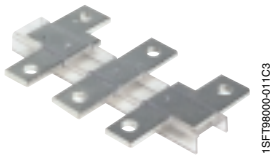
Description

LX... set contains 3 bars delivered with straps to prevent them from rotating.

Ordering details

For contactors	Dimensions hole Ø mm	bar mm	Type	Order code	Pack[ing] set	Weight kg 1 set
A 145, A185	8.5	17.5 x 5	LX 185	1SFN 07 4710 R1000	1	0.250
A 210 ... A 300	10.5	20 x 5	LX 300	1SFN 07 5110 R1000	1	0.350
AF 400, AF 460	10.5	25 x 5	LX 460	1SFN 07 5710 R1000	1	0.500
AF 580, AF 750	13	40 x 6	LX 750	1SFN 07 6110 R1000	1	0.850

Note: The LX... pieces provided for the A... contactors can be used for the AF types.



LW...

LW... Enlargement Pieces

Application

LW... enlargement pieces are designed to increase the width of the contactor terminal pads in order to allow larger connectors to be mounted.

Description

LW... sets contain 3 bars delivered with straps to prevent them from rotating.

Ordering details

For contactors	Dimensions hole Ø mm	bar mm	Type	Order code	Pack[ing] set	Weight kg 1 set
A 95, A 110	6.5	15 x 3	LW 110	1SFN 07 4307 R1000	1	0.100
A 145, A 185	10.5	17.5 x 5	LW 185	1SFN 07 4707 R1000	1	0.250
A 210 ... A 300	10.5	20 x 5	LW 300	1SFN 07 5107 R1000	1	0.450
AF 400, AF 460	10.5	25 x 5	LW 460	1SFN 07 5707 R1000	1	0.730
AF 580, AF 750	13	40 x 6	LW 750	1SFN 07 6107 R1000	1	1.230

Note: The LW... pieces provided for the A... contactors can be used for the AF, AE, TAE and UA types.

>> Dimensions ..... section 9

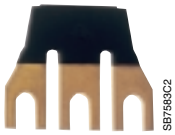
Terminal Connecting Strips and Shorting Bars



LP 25



LP 185



LY 16



LY 185



LH...



LF...



LG...

Application

Parallel and series connection of 3-pole and 4-pole contactor poles:

- To obtain a star point (3 parallel-connected poles): **LY**, **LF**, (LY allows 3 phases to be short-circuited).
- To connect poles in parallel and thus increase the a.c. load passing through the flow path made up of the parallel-connected poles: **LP** and **LH** (2 poles); **LY** and **LF** (3 poles) ; **LG** (4 poles).
  The maximum permissible current values with parallel-connected poles are given on page **2**/92.
  The relevant cable cross-sectional area may limit the maximum permissible current. Consult the information in the table below.
- To connect poles in series and thus increase the d.c. load controlled by the poles: **LP** and **LH**.

Description

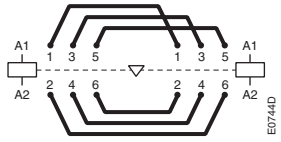
Types	for connection of "n" poles	with terminal	insulated
LP...	n = 2	no	yes (1)
LY...	n = 3	no	yes (1)
LH...	n = 2	yes	no
LF...	n = 3	yes	no
LG...	n = 4	yes	no

(1) LP 185 ... LP 750, LY 185 ... LY 750 not insulated. ☞ page **4**/21 for terminal shrouds.

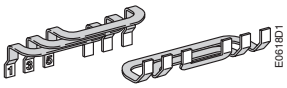
Ordering Details

For contactors	max. nominal continuous current with "n" poles A	Cable cross-sectional area mm²	Type	Order code	Packing pieces	Weight kg 1 piece
A 9, BC 9	30	6	LP 16	FPEP 407 000 R0001	10	0.002
A 12	32	6				
A 16, BC 16	34	6				
N, KC	–	6				
A 26, BC 25	50	–	LP 25	FPEP 407 001 R0001	10	0.004
A 145, A 185	300	–	LP 185	1SFN 07 4712 R1000	2	0.300
A 210 ... A 300	475	–	LP 300	1SFN 07 5112 R1000	2	0.400
AF 400, AF 460	725	–	LP 460	1SFN 07 5712 R1000	2	0.550
AF 580, AF 750	1200	–	LP 750	1SFN 07 6112 R1000	2	0.950
A 9, BC 9	33	6	LY 16	FPEP 407 002 R0001	10	0.005
A 12	36	6				
A 16, BC 16	39	6				
A 95, A 110	240	–	LY 110	1SFN 07 4303 R1000	1	0.055
A 145, A 185	400	–	LY 185	1SFN 07 4703 R1000	1	0.200
A 210 ... A 300	670	–	LY 300	1SFN 07 5103 R1000	1	0.300
AF 400, AF 460	1000	–	LY 460	1SFN 07 5703 R1000	1	0.450
AF 580, AF 750	1650	–	LY 750	1SFN 07 6103 R1000	1	0.800
A 9, BC 9	35	10	LH 16	FPTN 477 017 R0001	2	0.010
A 12	38	10				
A 16, BC 16	45	10				
A 26, BC 25	72	16	LH 25	FPTN 472 669 R0001	2	0.014
A 45 ... A 75	200	95	LH 75	FPTN 472 734 R0001	2	0.085
A 9, BC 9	50	16	LF 16	FPTN 477 017 R0002	2	0.010
A 12	54	16				
A 16, BC 16	63	16				
A 26			LF 26	in preparation		
A 30, A 40			LF 40	in preparation		
BC 30	121	50	LF 30	FPTN 472 743 R0001	2	0.035
A 45 ... A 75	275	150	LF 75	FPTN 472 735 R0001	2	0.095
A9, BC 9	62	16	LG 16	FPTN 477 017 R0003	2	0.012
A 12	67	16				
A 16, BC 16	72	16				

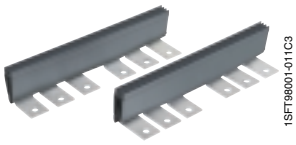
Note: – The strips and shorting bars provided for the A... contactors can be used for the AF, AE and TAE types.
– The strips provided for the BC... contactors can be used for the TBC types.
– The strips provided for the N... and KC... contactors relays can be used for the NE and TKC types.



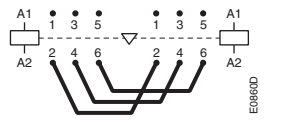
BEM… connections



BEM 75-30



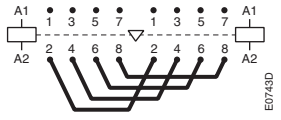
BEM 300-30



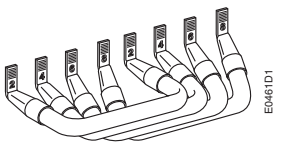
BES... for 3-pole connections



BES…



BES... for 4-pole connections



BES 75-40

Connections for Reversing Contactors

Application

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

Description

The sets are made up of three upstream connections and three downstream connections.

BEM 16-30 – Insulated, solid, rigid copper wires
BEM 26-30, BEM 40-30 – Insulated, stranded, rigid copper wires
BEM 75-30 ... BEM 750-30 – Insulated, solid copper bars
BSM 16-30, BSM 25-30 BC and BSM 30-30 BC – Insulated, solid, rigid copper wires

On the **A...** contactors, the power supply by bars or cables equipped with lugs is directly connected to the terminal pads of the main poles. For flange connectors (☞ page **4**/23), **LX…** terminal extension pieces should be used (☞ page **4**/25).

Ordering details

Mounting on 3-pole contactors	Type	Order code	Packing set	Weight kg 1 set
A 9 ... A 16	BEM 16-30	1SBN 08 1401 R1000	1	0.025
A 26	BEM 26-30	1SBN 08 2401 R1000	1	0.056
A 30, A 40	BEM 40-30	1SBN 08 2801 R1000	1	0.096
A 50 ... A 75	BEM 75-30	1SBN 08 3501 R1000	1	0.243
A 95, A 110	BEM 110-30	1SFN 08 4301 R1000	1	0.450
A145, A 185	BEM 185-30	1SFN 08 4701 R1000	1	0.900
A 210 ... A 300	BEM 300-30	1SFN 08 5101 R1000	1	1.100
AF 400, AF 460	BEM 460-30	1SFN 08 5701 R1000	1	4.400
AF 580, AF 750	BEM 750-30	1SFN 08 6101 R1000	1	7.300
BC 9, BC 16	BSM 16-30	FPTN 477 022 R0001	1	0.015
BC 25	BSM 25-30 BC	FPTN 477 041 R0001	1	0.020
BC 30	BSM 30-30 BC	FPTN 477 041 R0002	1	0.025

Note: The connections provided for the A... contactors can be used for the AF, AE and TAE types.
The connections provided for the BC... contactors can be used for the TBC types.

3-pole Connections Phase to Phase

Application

Connections between the main poles of **two 3-pole contactors** horizontal mounted.

Description

This set is made up of three downstream or upstream connections.

Ordering details

Mounting on 3-pole contactors	Type	Order code	Packing set	Weight kg 1 set
A 50 ... A 75	BES 75-30	1SBN 08 3504 R1000	1	0.130
A 95, A 110	BES 110	1SFN 08 4304 R1000	1	0.250
A 145, A 185	BES 185	1SFN 08 4704 R1000	1	0.500
A 210 ... A 300	BES 300	1SFN 08 5104 R1000	1	1.000
AF 400, AF 460	BES 460	1SFN 08 5704 R1000	1	2.200
AF 580, AF 750	BES 750	1SFN 08 6104 R1000	1	3.700

Note: The connections provided for the A... contactors can be used for the AF, AE and TAE types.

Connections for 4-pole Changeover Contactors

Application

Connection between the main poles of **two 4-pole contactors** mounted side by side so that they operate as source reversing contactors.

Description

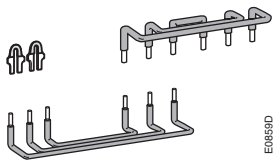
These sets are made up of four downstream connections, with insulated, stranded, rigid copper cables.

Ordering details

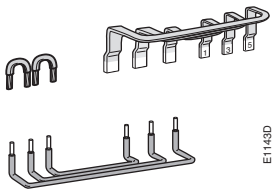
Mounting on 4-pole contactors	Type	Order code	Packing set	Weight kg 1 set
A 45, A 50, A 75	BES 75-40	1SBN 08 3302 R1000	1	0.400

Note: The connections provided for the A... contactors can be used for the AF, AE and TAE types.

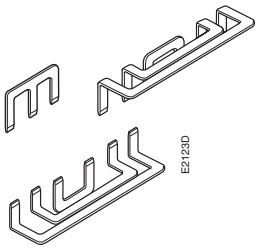
BED... Connection Sets



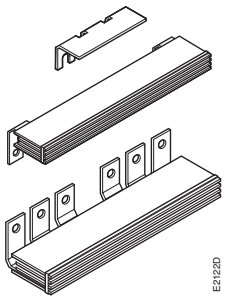
BED 40



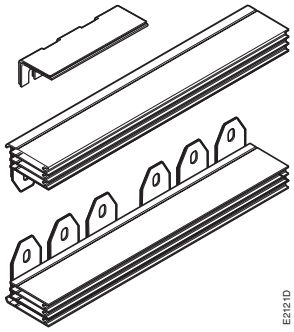
BED 75-1



BED 110



BED 185



BED 400

Connections for Star-Delta Starters

Application

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

Description

These sets are made up of:
– Three line contactor / delta contactor connections - Upstream side.
– Three connections for star and delta contactors **mounting joined side by side** - Downstream side.
– The necessary elements to create the star point upstream of the star contactor.

BED 16-1, BED 26-1	– Insulated, solid copper wires.
BED 40-1	– Insulated, stranded solid copper wires.
BED 50-1, BED 75-1	– Solid copper bars and insulated stranded copper wires.
BED 95 ... BED 750	– Insulated, solid copper bars.

BED 16-1 ... BED 75-1 connection sets are designed for star and delta contactors **without mechanical interlock unit.** ☞ 1st table below.
For **mechanically interlocked** star and delta contactors use **BED 16 ... BED 75** connection sets. ☞ 2nd table below.

BED 95 ... BED 750 are designed for both star and delta contactors **with or without mechanical interlock unit.** ☞ 1st table below.

Ordering details

For contactors		Type	Order code	Weight kg Packing 1 set
Line and Delta	Star			
A 9	A 9	BED 16-1	1SBN 08 1403 R1001	0.040
A 12	A 9			
A 16	A 12			
A 26	A 16	BED 26-1	1SBN 08 2403 R1001	0.045
A 30	A 26	BED 40-1	1SBN 08 2803 R1001	0.070
A 40	A 26			
A 50	A 30	BED 50-1	1SBN 08 3503 R1001	0.180
A 63	A 40			
A 75	A 50	BED 75-1	1SBN 08 4103 R1001	0.180
A 95	A 75	BED 95	1SFN 08 4303 R1000	0.400
A 110	A 95	BED 110	1SFN 08 4503 R1000	0.500
A 145	A 110	BED 145 A	1SFN 08 4703 R1000	1.300
A 185	A 145	BED 185	1SFN 08 4903 R1000	1.100
A 210	A 185	BED 210	1SFN 08 5103 R1000	1.500
A 260, A 300	A 210, A 260	BED 300	1SFN 08 5303 R1000	2.100
AF 400 / AF 460	A 260 / A 300	BED 400	1SFN 08 5503 R1000	3.500
AF 460	AF 400	BED 460	1SFN 08 5703 R1000	4.700
AF 580	AF 460 / AF 400	BED 580	1SFN 08 5903 R1000	6.300
AF 750	AF 580	BED 750	1SFN 08 6103 R1000	7.700

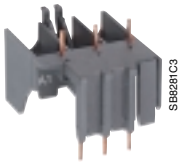
Note: The connections provided for A... contactors can be used for the AF, AE, and TAE types.

Variants (mounting on star and delta contactors with mechanical interlock unit)

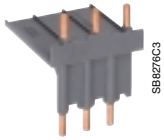
For contactors			Type	Order code	Weight kg Packing 1 set
Line and Delta	Star	Interlock unit			
A 9	A 9	VM / VE 5-1	BED 16	1SBN 08 1403 R1000	0.040
A 12	A 9				
A 16	A 12				
A 26	A 16	VM / VE 5-1	BED 26	1SBN 08 2403 R1000	0.050
A 30	A 26	VM / VE 5-1	BED 40	1SBN 08 2803 R1000	0.070
A 40	A 26				
A 50	A 30	VE 5-2	BED 50	1SBN 08 3503 R1000	0.280
A 63	A 40				
A 75	A 50	VE 5-2	BED 75	1SBN 08 4103 R1000	0.250

>> Controlgear Selection Guide for Star-Delta Starters ..... page 2/47

BEA 16 ... BEA 110 Connecting Links for Contactors and Manual Motor Starters



BEA 16/116



BEA 40/450



A 9-30-10 + BEA 16/116 + MS 116
DOL Starter Combination

Application

The **BEA...** connecting link is used for direct linking between a contactor and the associated manual motor starter which are used together as **DOL Starter Combination** in type 1 or type 2 co-ordination, complying with IEC 60947-4-1 and EN 60947-4-1.

☞ Database of co-ordination tables on the ABB Website:
www.abb.com/lowvoltage ☞ *left menu:* **"Low Voltage On-Line"** ☞ *select:* **"Support Tools".**

Description

The **BEA...** insulated 3-pole connecting link (touch safe) ensures the electrical linking between the contactor and the corresponding manual motor starter.
The **BEA...** connecting links can be used with the **A...** series contactors (including AF..., AE... and TAE... versions) and the **MS...** manual motor starter as indicated in the table below.
(For further information about contactors ☞ section **2** in this catalogue and ☞ separate technical catalogue for detailed information about the manual motor starter range).

Ordering Details

For contactors & fixing	Screws not supplied	For MMS &	fixing Screws / rail not supplied	I_e max. AC-3 400 V A	Type	Order code	Pack[ing] pieces	Weight kg 1 piece
A 9	–	MS 116	15 x 35 mm	9	BEA 16/116	1SBN 08 1406 R1000	10	0.020
A 12	–	MS 116		12	BEA 16/116	1SBN 08 1406 R1000	10	0.020
A 16	–	MS 116		16	BEA 16/116	1SBN 08 1406 R1000	10	0.020
A 26	2 x M4	MS 116		25	BEA 26/116	1SBN 08 2406 R1000	10	0.024
A 9	–	MS 325	15 x 35 mm	9	BEA 16/325	1SBN 08 1406 R1001	10	0.031
A 12	–	MS 325		12	BEA 16/325	1SBN 08 1406 R1001	10	0.031
A 16	–	MS 325		16	BEA 16/325	1SBN 08 1406 R1001	10	0.031
A 26	2 x M4	MS 325		25	BEA 26/325	1SBN 08 2406 R1001	10	0.031
A 30	2 x M4	MS 450	2 x M5	32	BEA 40/450	1SBN 08 3206 R1000	1	0.061
A 40	2 x M4	MS 450	2 x M5	37	BEA 40/450	1SBN 08 3206 R1000	1	0.061
A 50	2 x M4	MS 450	2 x M5	50	BEA 50/450	1SBN 08 3506 R1000	1	0.062
A 50	2 x M6	MS 495	2 x M5	50	BEA 75/495	1SBN 08 4106 R1000	1	0.120
A 63	2 x M6	MS 495	2 x M5	63	BEA 75/495	1SBN 08 4106 R1000	1	0.120
A 75	2 x M6	MS 495	2 x M5	75	BEA 75/495	1SBN 08 4106 R1000	1	0.120
A 90	2 x M6	MS 495	2 x M5	90	BEA 110/495	1SBN 08 4506 R1000	1	0.124
A 110	2 x M6	MS 495	2 x M5	100	BEA 110/495	1SBN 08 4506 R1000	1	0.124

>> Contactors ..... section 2
>> Manual Motor Starters ..... see Separate Catalogue
>> Dimensions ..... section 9

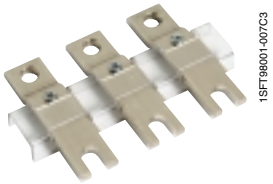
Connection Bars for Contactor and MCCB
Connection Bars for Contactor and Switch fuse



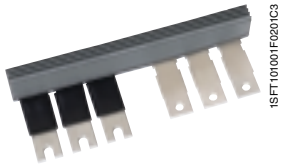
A 300-30 contactor + MCCB on top



BEA 300/S5



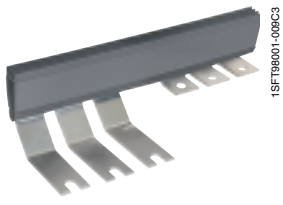
BEA...D/S



BEA 300H/S5



BEF 300/OESA400



BEF 300H/OESA400

Application

Connections between contactors/starters and moulded case circuit breakers or switch fuses.

Description

These connection sets are solid copper bars either isolated or protected by shrouds.

Ordering Details

Connection bars between contactor and MCCB

Vertical assembly

Contactors	MCCB	Type	Order code	Packing set	Weight kg 1 piece
A 145, A 185	T 3	BEA 185/T3	1SFN 08 4706 R1003	1	0.150
A 145, A 185	S 3, S 4	BEA 185/S3/S4	1SFN 08 4706 R1000	1	0.150
A 210	S 4	BEA 210/S4	1SFN 08 5106 R1001	1	0.160
A 210 ... A 300	S 5	BEA 300/S5	1SFN 08 5106 R1000	1	0.200
AF 400, AF 460	S 5	BEA 400/S5	1SFN 08 5706 R1000	1	0.250
AF 400 ... AF 750	S 6	BEA 750/S6	1SFN 08 6106 R1000	1	0.410

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

A 145, A 185	T 3	BEA 185 D/T3	1SFN 08 4706 R1004	1	0.175
A 145 ... A 185	S 3, S 4	BEA 185D/S3/S4	1SFN 08 4706 R1002	1	0.200
A 210	S 4	BEA 210D/S4	1SFN 08 5106 R1002	1	0.270
A 210 ... A 300	S 5	BEA 300D/S5	1SFN 08 5506 R1002	1	0.320
AF 400, AF 460	S 5	BEA 400D/S5	1SFN 08 5706 R1002	1	0.480
AF 400 ... AF 750	S 6	BEA 750D/S6	1SFN 08 6106 R1002	1	0.720

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

A 145, A 185	S 3, S 4	BEA 185H/S4	1SFN 08 4707 R1000	1	0.520
A 210	S 4	BEA 210H/S4	1SFN 08 5107 R1000	1	0.620
A 210, A 300	S 5	BEA 300H/S5	1SFN 08 5307 R1000	1	1.280
AF 400, AF 460	S 5	BEA 400H/S5	1SFN 08 5707 R1000	1	1.310
AF 400, AF 460	S 6	BEA 460H/S6	1SFN 08 5907 R1000	1	2.450
AF 580, AF 750	S 6	BEA 750H/S6	1SFN 08 6107 R1000	1	4.010

Note: The BEA... connection bars provided for the A 145 ... A 300 contactors can be used for the AF 145 ... AF 300 contactors.

Connection bars between contactor and switch fuse

Vertical assembly

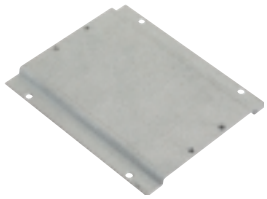
Contactors	Switch fuse	Type	Order code	Packing set	Weight kg 1 piece
A 185	OESA 250	BEF 185/OESA250	1SFN 08 4908 R1000	1	0.260
A210 ... A 300	OESA 250 to OESA 400	BEF 300/OESA400	1SFN 08 5108 R1000	1	0.330
AF 400 ... AF 460	OESA 400	BEF 460/OESA400	1SFN 08 5708 R1000	1	0.340
AF 460 ... AF 750	OESA 630 to OESA 800	BEF 750/OESA800	1SFN 08 6108 R1000	1	0.740

Horizontal assembly

A 145	OS 160..LR	OSZA 15	1SCA 02 2509 R0120	1	0.170
A 145, A 185	OESA 250..LR	BEF 185H/OESA250	1SFN 08 4709 R1000	1	0.550
A 210 ... A 300	OESA 250..LR to OESA 400..LR	BEF 300H/OESA400	1SFN 08 5109 R1000	1	1.200
AF 400, AF 460	OESA 400..LR	BEF 460H/OESA400	1SFN 08 5709 R1000	1	1.250

Note: The BEF... connection bars provided for the A 145 ... A 300 contactors can be used for the AF 145 ... AF 300 contactors.

Adapter Plates and Mounting Plates for A 95 ... AF 750 Contactors


1SFT98001-015C3

PR300-1


1SFT98001-014C3

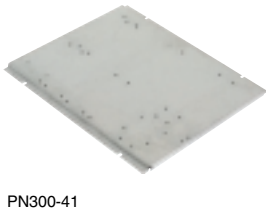
PR400-2


1SFT98001-016C3

PN300A-11


1SFT98001-017C3

PN300-21


1SFT98001-018C3

PN300-41

Application

This are adapter plates and mounting plates with pre-drilled hole for the specified contactors and overload relays.

Ordering Details

Adapter plates

From old contactor	To new contactor	Type	Order code	Weight kg Packing 1 piece
EH 65,75, 80, 90, EG 80	A 95, A 110	PR 110-1	1SFN 09 4500 R1000	0.270
EH 100, 145	A 110, A 145	PR 145-1	1SFN 09 4700 R1000	0.360
EH 150, 160, 175, 210, EG 160	A 185, A 210	PR 210-1	1SFN 09 4900 R1000	0.440
EH 250, 260, 300	A 210 ... A 300	PR 300-1	1SFN 09 5300 R1000	0.560
EH 370, 550, EG 315	AF 400 ... AF 580	PR 460-1	1SFN 09 5700 R1000	0.900
EH 700, 800	AF 750	PR 750-1	1SFN 09 6100 R1000	0.500
OKYM 150, 175	A 185	PR 185-2	1SFN 09 5100 R1001	0.500
OKYM 200, 250	A 210 ... A 300	PR 300-2	1SFN 09 5300 R1001	0.500
OKYM 315	AF 400, AF 460	PR 400-2	1SFN 09 5700 R1002	0.820
OKYM 400	AF 400, AF 460	PR 460-2	1SFN 09 5700 R1001	0.800
OKYM 500	AF 580	PR 580-2	1SFN 09 6100 R1002	0.700
EH 550, EG 630, OKYM 630	AF 580, AF 750	PR 750-2	1SFN 09 6100 R1001	1.100

Mounting plates for Direct on Line Starters

For contactor	For overload relay	Type	Order code	Weight kg Packing 1 piece
A 145, A 185	TA 200 DU, E 200 DU	PN 185-11	1SFN 09 4705 R1000	1.100
A 210, A 260, A 300	TA 450 DU, E 320 DU	PN 300A-11	1SFN 09 5105 R1000	1.650
AF 400, AF 460	E 500 DU	PN 460-11	1SFN 09 5705 R1000	2.120
AF 580, AF 750	E 800 DU	PN 750-11	1SFN 09 6105 R1000	2.500

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

For two contactors side by side with space for mechanical interlock	For one or two relays	Type	Order code	Weight kg Packing 1 piece
A 95, A 110	TA 80 DU, TA 110 DU	PN 110-21	1SFN 09 4301 R1000	0.600
A 145, A 185	TA 200 DU, E 200 DU	PN 185-21	1SFN 09 4701 R1000	1.800
A 210 ... A 300	TA 450 DU, E 320 DU	PN 300-21	1SFN 09 5101 R1000	2.530
AF 400, AF 460	E 500 DU	PN 460-21	1SFN 09 5701 R1000	3.490
AF 580, AF 750	E 800 DU	PN 750-21	1SFN 09 6101 R1000	4.230

Mounting plates for Star-Delta Starters and two speed starters for single windings

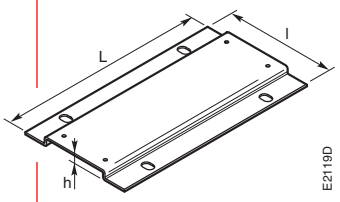
For Main and Delta contactors	For Star contactor (1)	For Overload relays	Type	Order code	Weight kg Packing 1 piece
A 95, A 110	A 75, A 95	TA 80 DU or TA 110 DU	PN 110-41	1SFN 09 4303 R1000	0.950
A 145, A 185	A 110, A 145	E 200 DU or TA 200 DU	PN 185-41	1SFN 09 4903 R1000	2.440
A 210, 260, 300	A 185, A 210, A 260	E 320 DU or TA 450 DU	PN 300-41	1SFN 09 5503 R1000	3.440
AF 400, AF 460	A 300, AF 400	E 500 DU	PN 460-41	1SFN 09 5703 R1000	5.310
AF 580, AF 750	AF 400, AF 460, AF 580	E 800 DU	PN 750-41	1SFN 09 6103 R1000	6.320

(1) Space for mechanical interlock included.

Note: The adapter plates provided for the A... contactors can be used for the AF, AE and TAE types.

>> Dimensions ..... page 4/32

Adapter Plates and Mounting Plates for A 95 ... AF 750 Contactors



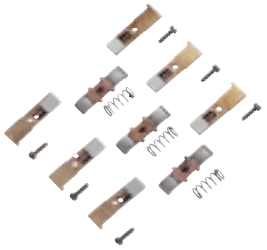
Dimensions (in mm)

Type of the plate	Dimensions L	l	h	Fixing holes mm
PR 110-1	151	106	11.2	2 x ø 7
PR 145-1	180	122	11.5	4 x ø 7
PR 210-1	200	132	11.5	4 x ø 7
PR 300-1	200	172	11.5	4 x ø 7
PR 460-1	278	198	11.5	4 x ø 7
PR 750-1	283	244	11.5	4 x ø 7
PR 185-2	202	152	11.2	4 x ø 11
PR 300-2	202	152	11.2	4 x ø 11
PR 400-2	278	151	11.5	4 x ø 11
PR 460-2	278	176	11.5	4 x ø 11
PR 580-2	283	176	11.5	4 x ø 11
PR 750-2	283	255	11.5	4 x ø 14

Note: The plates are drilled for contactor mounting.
Other fixing holes are available according to the plate type.

>> Ordering Details ..... **page 4/31**

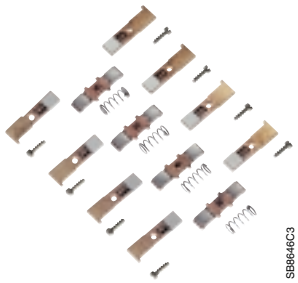
Main Contact Sets
Arc Chutes



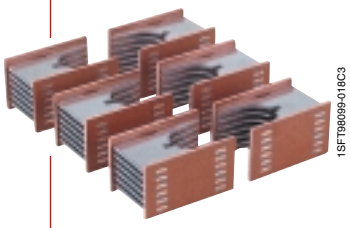
ZL 50



ZL 185



ZLT 50



ZW...

Main Contact Sets for 3-pole Contactors

Description

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

Ordering details

For contactors	Type	Order code	Packing set	Weight kg 1 piece
A/AF/AE/TAE 50-30	ZL 50	1SBN 16 3503 R1000	1	0.115
A/AF/AE/TAE 63-30	ZL 63	1SBN 16 3703 R1000	1	0.130
A/AF/AE/TAE 75-30	ZL 75	1SBN 16 4103 R1000	1	0.145
A/AF/AE/TAE 95-30	ZL 95	1SFN 16 4303 R1000	1	0.190
A/AF/AE/TAE 110-30	ZL 110	1SFN 16 4503 R1000	1	0.190
A/AF 145	ZL 145	1SFN 16 4703 R1000	1	0.380
A/AF 185	ZL 185	1SFN 16 4903 R1000	1	0.380
A/AF 210	ZL 210	1SFN 16 5103 R1000	1	0.670
A/AF 260	ZL 260	1SFN 16 5303 R1000	1	0.670
A/AF 300	ZL 300	1SFN 16 5503 R1000	1	0.670
AF 400	ZL 400	1SFN 16 5703 R1000	1	1.320
AF 460	ZL 460	1SFN 16 5903 R1000	1	1.320
AF 580	ZL 580	1SFN 16 6103R1000	1	1.840
AF 750	ZL 750	1SFN 16 6303 R1000	1	1.840
UA 50, UA 50-R	ZLU 50	1SBN 16 3502 R1000	1	0.115
UA 63, UA 63-R	ZLU 63	1SBN 16 3702 R1000	1	0.145
UA 75, UA 75-R	ZLU 75	1SBN 16 4102 R1000	1	0.145
UA 95	ZLU 95	1SFN 16 4302 R1000	1	0.190
UA 110	ZLU 110	1SFN 16 4502 R1000	1	0.190

Note: GA, GAE 75 contacts cannot be changed.

Main Contact Sets for 4-pole Contactors

Description

The contact sets for 4-pole contactors consist of eight fixed contacts, four moving contacts, springs and the necessary screws.

Ordering details

For contactors	Type	Order code	Packing set	Weight kg 1 piece
A/AE/AF 45-40	ZLT 45	1SBN 16 3304 R1000	1	0.150
A/AE/AF 50-40	ZLT 50	1SBN 16 3504 R1000	1	0.150
A/AE/AF 75-40	ZLT 75	1SBN 16 4104 R1000	1	0.160

Arc Chutes

Ordering details

For contactors	Type	Order code	Packing set	Weight kg 1 piece
A/AF 145, A/AF 185	ZW 185	1SFN 16 4701 R1000	1	0.360
A/AF 210 ... 300	ZW 300	1SFN 16 5110 R1000	1	0.410
AF 400, AF 460	ZW 460	1SFN 16 5710 R1000	1	1.380
AF 580, AF 750	ZW 750	1SFN 16 6110 R1000	1	1.500

Contactor Coils



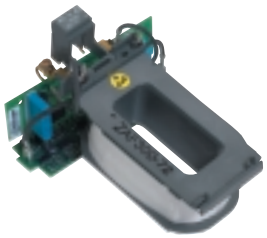
ZA 16



ZA 185



ZAF 110



ZAF 300

Ordering Details

a.c. Operated coils for A 9 ... A 300 contactors and N contactor relays

For contactors	Type state coil voltage ☐☐ ☞ page 0/1	Order code state coil voltage code ☐☐ ☞ page 0/1	Packing pieces	Weight kg 1 piece
A 9 ... A 16 ; UA16 ; UA 16..-R ; N	ZA 16 ☐☐	1SBN 15 1410 R☐☐06	1	0.093
A 26 ... A 40 ; UA 26, UA 30, UA 26..-R, UA 30..-R	ZA 40 ☐☐	1SBN 15 2410 R☐☐06	1	0.148
A 45 ... A 75 ; UA 50 ... UA 75 UA 50..-R to UA 75..-R ; GA 75	ZA 75 ☐☐	1SBN 15 3510 R☐☐06	1	0.166
A 95 ... A 110 ; UA 95 ... UA 110	ZA 110 ☐☐	1SFN 15 4310 R☐☐06	1	0.170
A 145 ... A 185	ZA 185 ☐☐	1SFN 15 4710 R☐☐06	1	0.180
A 210 ... A 300	ZA 300 ☐☐	1SFN 15 5110 R☐☐06	1	0.400

a.c. / d.c. Operated coils c/w electronic interface for AF 45 ... AF 750 contactors

For contactors	Type state coil voltage ☐☐ ☞ page 0/1	Order code state coil voltage code ☐☐ ☞ page 0/1	Packing pieces	Weight kg 1 piece
AF 45 ... AF 75	ZAF 75 ☐☐	1SBN 15 3570 R☐☐06	1	0.170
AF 95, AF 110	ZAF 110 ☐☐	1SFN 15 4370 R☐☐06	1	0.200
AF 145 ... AF 185	ZAF 185 ☐☐	1SFN 15 4770 R☐☐06	1	0.225
AF 210 ... AF 300	ZAF 300 ☐☐	1SFN 15 5170 R☐☐06	1	0.450
AF 400 ... AF 460	ZAF 460 ☐☐	1SFN 15 5770 R☐☐06	1	0.525
AF 580 ... AF 750	ZAF 750 ☐☐	1SFN 15 6170 R☐☐06	1	1.335

d.c. Operated coils for AE 9 ... AE 110 contactors

For contactors	Type state coil voltage ☐☐ ☞ page 0/1	Order code state coil voltage code ☐☐ ☞ page 0/1	Packing pieces	Weight kg 1 piece
Coils only				
AE 9 ... AE 16 ; NE	ZAE 16 ☐☐	1SBN 15 1490 R☐☐06	1	0.093
AE 26 ... AE 40	ZAE 40 ☐☐	1SBN 15 2490 R☐☐06	1	0.148
AE 45 ... AE 75 ; GAE 75	ZAE 75 ☐☐	1SBN 15 3590 R☐☐06	1	0.170
AE 95, AE 110	ZAE 110 ☐☐	1SFN 15 4390 R☐☐06	1	0.195
Auxiliary device including an insertion contact and a varistor				
AE 95, AE 110	CCL 5-01	1SFN 01 4321 R1001	1	0.040

Note: d.c. operated coils for TAE... contactors: please consult us (standard AE contactor coils are not suitable for TAE contactors).

d.c. Operated coil and diode for AM 45 ... AM 75 contactors

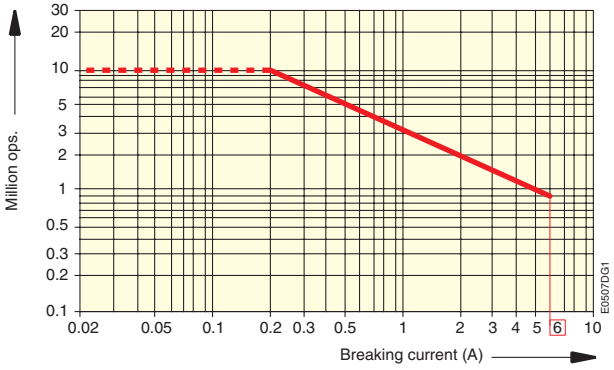
For contactors	Type state coil voltage ☐☐ ☞ page 0/1	Order code state coil voltage code ☐☐ ☞ page 0/1	Packing pieces	Weight kg 1 piece
Coil				
AM 45 ... AM 75	ZAM 75 ☐☐	1SBN 15 3580 R☐☐06	1	0.170
Diode				
AM 45 ... AM 75	RT5-AM	1SBN 05 0021 R1000	2	0.015

Electrical Durability for **AC-15** Utilization Category

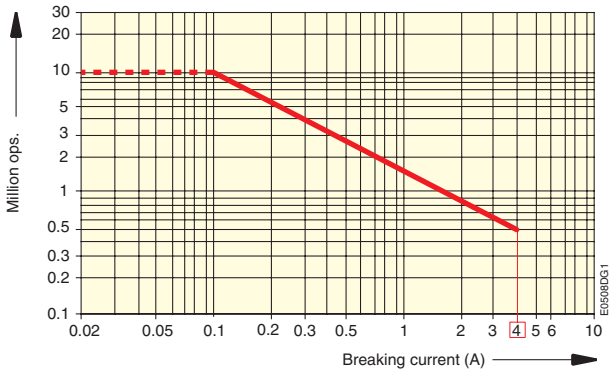
AC-15 utilization category according to IEC 60947-5-1 / EN 60947-5-1:
– making current: 10 x $\mathbf{I_e}$ with cos φ = 0.7 and $\mathbf{U_e}$
– breaking current: $\mathbf{I_e}$ with cos φ = 0.4 and $\mathbf{U_e}$

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

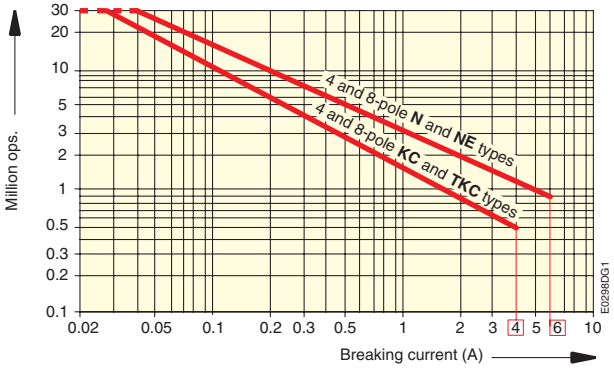
The curve have been drawn for resistive and inductive loads up to 690 V, 40 ... 60 Hz.



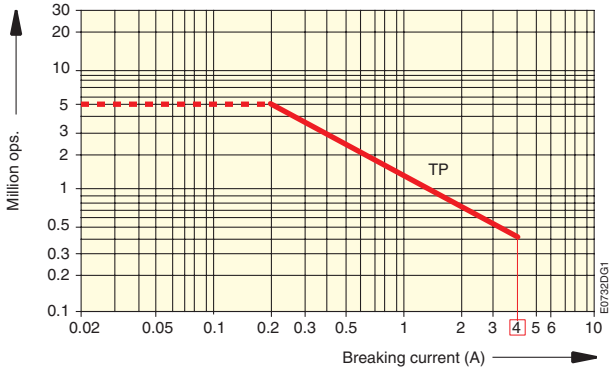
– A 9 ... A 40 contactor built-in auxiliary contacts
– 1-pole and 4-pole CA 5-..,
1-pole CC 5-..,
4-pole CA 5-.., 2-pole CAL 5-.. and CCL 5-.. add-on auxiliary contacts



– BC 9 ... BC 25 and TBC 9 ... TBC 25 contactor built-in auxiliary contacts. (For add-on auxiliary contacts see opposite curve).



– N..., NE..., KC... and TKC... contactor relays.
(For add-on auxiliary contacts see above curve).

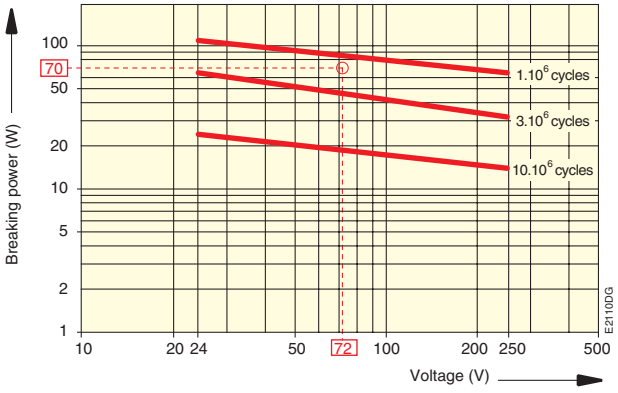


– TP... pneumatic timer contacts.

>> **Electrical Durability for DC-13 Utilization Category** ..... **page 4/36**

Electrical Durability for **DC-13** Utilization Category

DC-13 utilization category according to IEC 60947-5-1 / EN 60947-5-1:
making and breaking current = $\mathbf{I_e}$ with $\mathbf{U_e}$ value.



Example:
Control of d.c. electro-magnet: $\mathbf{U_e}$ voltage = 72 V d.c. and breaking power = 70 W.

On the opposite curve at intersection "O" 72 V / 70 W the corresponding value for the electrical durability is approximately 2.10^6 cycles.

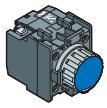
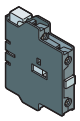
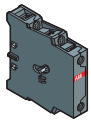
– A 9 ... A 40 contactor built-in auxiliary contacts
– 1-pole and 4-pole CA 5-..,
  1-pole CC 5-..,
  4-pole CA 5-.., 2-pole CAL 5-.. and CCL 5-.. add-on auxiliary contacts
– BC 9 ... BC 25 and TBC 9 ... TBC 25 contactor built-in auxiliary contacts
– N..., NE..., KC... and TKC... contactor relays
– TP... pneumatic timer contacts

>> Electrical Durability for AC-15 Utilization Category ..... page 4/35

A... and AF... 3-pole Contactors

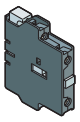
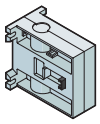
Fitting Details for Main Accessories

A 9 ... A 110 and AF 50 ... AF 110 3-pole Contactors

Contactor configuration			Front-mounted accessories			Side-mounted accessories	
Contactor types	Main poles	Available auxiliary contacts	 Auxiliary contact 1-pole CA 5-..	 Auxiliary contact 4-pole CA 5-..	 Pneumatic timer TP .. A	 Auxiliary contact 2-pole CAL 5-11	 Interlock unit VM 5-.. or VE 5-..
A 9 ... A 26	**3 0**	**1 0**	1 to 4 x CA 5-..	or 1 x CA 5-.. (4-pole)	or 1 x TP .. A (2)	+ 1 to 2 x CAL 5-11	or 1 x VM 5-1 or VE 5-1 + 1 x CAL 5-11
A 9 ... A 26	**3 0**	**0 1** (1)					
A 9 ... A 16	**3 0**	**2 2**	–	–	–	1 to 2 x CAL 5-11	or 1 x VM 5-1 or VE 5-1 + 1 x CAL 5-11
A 9 ... A 26	**3 0**	**3 2**					
A 30, A 40	**3 0**	**1 0**	1 to 5 x CA 5-..	or 1 x CA 5-.. (4-pole) + 1 x CA 5-.. (1-pole)	or 1 x TP .. A + 1 x CA 5-.. (1-pole)	+ 1 to 2 x CAL 5-11	or 1 x VM 5-1 or VE 5-1 + 1 x CAL 5-11
A 30, A 40	**3 0**	**0 1** (1)					
A 30, A 40	**3 0**	**3 2** (1)	1 x CA x 5-..	–	–	+ 1 to 2 x CAL 5-11	or 1 x VM 5-1 or VE 5-1 + 1 x CAL 5-11
A 50 ... A 75	**3 0**	**0 0**	1 to 6 x CA 5-..	or 1 x CA 5-.. (4-pole) + 2 x CA 5-.. (1-pole)	or 1 x TP .. A + 2 x CA 5-.. (1-pole)	+ 1 to 2 x CAL 5-11	or 1 x VE 5-2 + 1 x CAL 5-11
AF 50 ... AF 75	**3 0**	**0 0**					
A 50 ... A 75	**3 0**	**1 1**	1 to 6 x CA 5-..	or 1 x CA 5-.. (4-pole) + 2 x CA 5-.. (1-pole)	or 1 x TP .. A + 2 x CA 5-.. (1-pole)	+ 1 x CAL 5-11	or 1 x VE 5-2
AF 50 ... AF 75	**3 0**	**1 1**					
A 50 ... A 75	**3 0**	**2 2**	1 to 2 x CA 5-..	–	–	+ 1 to 2 x CAL 5-11	or 1 x VE 5-2 + 1 x CAL 5-11
A 95, A 110	**3 0**	**0 0**	1 to 6 x CA 5-..	or 1 x CA 5-.. (4-pole) + 2 x CA 5-.. (1-pole)	–	+ 1 to 2 x CAL 5-11	or 1 x VE 5-2 + 1 x CAL 5-11
AF 95, AF 110	**3 0**	**0 0**					
A 95, A 110	**3 0**	**1 1**	1 to 6 x CA 5-..	or 1 x CA 5-.. (4-pole) + 2 x CA 5-.. (1-pole)	–	+ 1 x CAL 5-11	or 1 x VE 5-2
AF 95, AF 110	**3 0**	**1 1**					
A 95, A 110	**3 0**	**2 2**	1 to 2 x CA 5-..	–	–	+ 1 to 2 x CAL 5-11	or 1 x VE 5-2 + 1 x CAL 5-11

(1) In mounting position 5 (☞ page **2**/68), max. 2 x N.C. front-mounted auxiliary contacts only are acceptable - The CAL 5-11 side-mounted blocks offer additional N.C. contacts.
(2) For **A 9**, **A 12**, **A 16-30-01** + **TP..DA** in mounting position 5, please consult us.

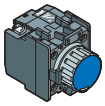
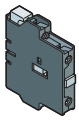
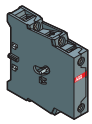
A 145 ... A 300 and AF 145 ... AF 750 3-pole Contactors

Contactor configuration			Front-mounted accessories	Side-mounted accessories	
Contactor types	Main poles	Available auxiliary contacts	Front-mounted accessories are not available on large A..., AF... contactors	 Auxiliary contact 2-pole CAL 5-11	 Interlock unit VM...
A 145 ... A 300	**3 0**	**1 1**	– – –	1 x CAL 5-11 + 2 x CAL 5-11B	☞ page **2**/14
AF 145 ... AF 750	**3 0**	**1 1**			
A 145 ... A 300	**3 0**	**2 2**	– – –	2 x CAL 5-11B	☞ page **2**/14
AF 145 ... AF 750	**3 0**	**2 2**			

>> **Auxiliary Contacts for Safety Circuits** ..... **page 7/4**

AE... and TAE... 3-pole Contactors
BC... and TBC... 3-pole Contactors
Fitting Details for Main Accessories

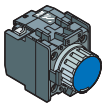
AE... and TAE... 3-pole Contactors

Contactor configuration			Front-mounted accessories (1)			Side-mounted accessories	
	Main poles	Available auxiliary contacts	 Auxiliary contact 1-pole CA 5-..	 Auxiliary contact 4-pole CA 5-.. (2)	 Pneumatic timer TP .. A	 Auxiliary contact 2-pole CAL 5-11	 Interlock unit VM 5-.. or VE 5-..
Contactor types							
AE 9 ... AE 26	3 0	0 0	1 to 4 x CA 5-..	or 1 x CA 5-.. (4-pole)	or 1 x TP .. A	+ 1 to 2 x CAL 5-11	or 1 x VM 5-1 or VE 5-1 + 1 x CAL 5-11
AE 30, AE 40	3 0	0 0	1 to 5 x CA 5-..	or 1 x CA 5-.. (4-pole) + 1 x CA 5-.. (1-pole)	or 1 x TP .. A + 1 x CA 5-.. (1-pole)	+ 1 to 2 x CAL 5-11	or 1 x VM 5-1 or VE 5-1 + 1 x CAL 5-11
AE 50 ... AE 75	3 0	0 0	1 to 6 x CA 5-..	or 1 x CA 5-.. (4-pole) + 2 x CA 5-.. (1-pole)	or 1 x TP .. A + 2 x CA 5-.. (1-pole)	+ 1 x CAL 5-11	or 1 x VE 5-2
TAE 50, 75	3 0	0 0					
AE 50 ... AE 75	3 0	1 1	1 to 6 x CA 5-..	or 1 x CA 5-.. (4-pole) + 2 x CA 5-.. (1-pole)	or 1 x TP .. A + 2 x CA 5-.. (1-pole)	–	–
TAE 50, 75	3 0	1 1					
AE 95, 110	3 0	0 0	1 to 6 x CA 5-..	or 1 x CA 5-.. (4-pole) + 2 x CA 5-.. (1-pole)	–	+ 1 x CAL 5-11	or 1 x VE 5-2
TAE 95, 110	3 0	0 0					
AE 95, 110	3 0	1 1	1 to 6 x CA 5-..	or 1 x CA 5-.. (4-pole) + 2 x CA 5-.. (1-pole)	–	–	–
TAE 95, 110	3 0	1 1					

(1) AE... contactors: in mounting position 5 (☞ page **2**/68), max. 2 x N.C. front-mounted auxiliary contacts only are acceptable (Pos. 5 unauthorized for the TAE... contactors). The CAL 5-11 side-mounted blocks offer additional N.C. contacts.

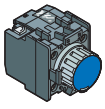
(2) Use the CA 5-..E 4-pole auxiliary contact block for correct contact terminal marking.

BC 9 ... BC 30 3-pole Contactors

Contactor configuration			Front-mounted accessories (1)				
	Main poles	Available auxiliary contacts	 Auxiliary contact 1-pole CA 5-..	 Auxiliary contact 4-pole CA 5-..	 Pneumatic timer TP .. A	 Interlock unit VBC...	 Add-on auxiliary contact CA 5-.. for each contactor
Contactor types							
BC 9 ... BC 25	3 0	1 0					
BC 9 ... BC 25	3 0	0 1	1 to 4 x CA 5-..	or 1 x CA 5-.. (4-pole)	or 1 x TP .. A	or 1 x VBC 30	+ 1 to 2 x CA 5-.. (1-pole)
BC 30	3 0	0 0					
BC 18	3 0	2 2	–	–	–	–	–
BC 30	3 0	2 2					

(1) In mounting position 5 (☞ page **2**/76) max. 2 x N.C. auxiliary contacts only are acceptable, and use only the TP .. DA pneumatic timer (TP .. IA unauthorized).

TBC 9 ... TBC 30 3-pole Contactors

Contactor configuration			Front-mounted accessories				
	Main poles	Available auxiliary contacts	 Auxiliary contact 1-pole CA 5-..	 Auxiliary contact 4-pole CA 5-..	 Pneumatic timer TP .. A	 Interlock unit VBC...	 Add-on auxiliary contact CA 5-.. for each contactor
Contactor types							
TBC 9 ... 25	3 0	1 0 (1)					
TBC 30	3 0	0 0 (1)	1 to 4 x CA 5-..	or 1 x CA 5-.. (4-pole)	–	or 1 x VBC 30	+ 1 to 2 x CA 5-.. (1-pole)
TBC 9 ... 25	3 0	0 1 (2)	1 to 4 x CA 5-..	or 1 x CA 5-.. (4-pole)	–	or 1 x VBC 30	–
TBC 30	3 0	2 2	–	–	–	–	

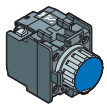
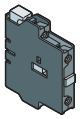
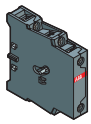
(1) In mounting positions 1, 3 or 4 (☞ page **2**/76), max. 2 N.C. auxiliary contacts only are acceptable. In mounting position 1 ± 30°, front mounted accessories unauthorized.
(2) In mounting positions 1, 3 or 4 (☞ page **2**/76), max. 1 N.C. auxiliary contact only are acceptable. In mounting position 1 ± 30°, front mounted accessories unauthorized.

>> Auxiliary Contacts for Safety Circuits ..... page 7/4

A..., AE... and TAE... 4-pole Contactors

Fitting Details for Main Accessories

A... 4-pole Contactors

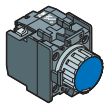
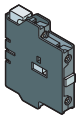
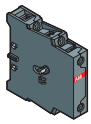
Contactor configuration			Front-mounted accessories			Side-mounted accessories	
Contactor types	Main poles	Available auxiliary contacts	 Auxiliary contact 1-pole CA 5-..	 Auxiliary contact 4-pole CA 5-..	 Pneumatic timer TP .. A	 Auxiliary contact 2-pole CAL 5-11	 Interlock unit VM 5-.. or VE 5-..
A 9 ... A 26	4 0	0 0	1 to 4 x CA 5-..	or 1 x CA 5-.. (4-pole)	or 1 x TP .. A (3)	+ 1 to 2 x CAL 5-11	or 1 x VM 5-1 or VE 5-1 + 1 x CAL 5-11
A 9 ... A 26	2 2	0 0 (1)					
A 45 ... A 75	4 0	0 0	1 to 6 x CA 5-..	or 1 x CA 5-.. (4-pole) + 2 x CA 5-.. (1-pole)	or 1 x TP .. A + 2 x CA 5-.. (1-pole)	+ 1 to 2 x CAL 5-11	or 1 x VE 5-2 + 1 x CAL 5-11
A 45 ... A 75	2 2	0 0 (2)					

(1) For A 9-22-00 to A 26-22-00 in mounting position 5 (☞ page **2**/68), max. 2 x N.C. front-mounted auxiliary contacts only are acceptable.
The CAL 5-11 side-mounted blocks offer additional N.C. contacts.

(2) Whatever the mounting position, max. 2 x N.C. front-mounted auxiliary contacts only are acceptable - The CAL 5-11 side-mounted blocks offer additional N.C. contacts.

(3) For **A 9-22-00** and **A 16-22-00** + **TP..DA** in mounting position 5, please consult us.

AE... and TAE... 4-pole Contactors

Contactor configuration			Front-mounted accessories (1)			Side-mounted accessories	
Contactor types	Main poles	Available auxiliary contacts	 Auxiliary contact 1-pole CA 5-..	 Auxiliary contact 4-pole CA 5-.. (2)	 Pneumatic timer TP .. A	 Auxiliary contact 2-pole CAL 5-11	 Interlock unit VM 5-.. or VE 5-..
AE 45 ... AE 75	4 0	0 0	1 to 6 x CA 5-..	or 1 x CA 5-.. (4-pole) + 2 x CA 5-.. (1-pole)	or 1 x TP .. A + 2 x CA 5-.. (1-pole)	+ 1 x CAL 5-11	or 1 x VE 5-2
AE 45 ... AE 75	2 2	0 0					
TAE 45 ... TAE 75	4 0	0 0	1 to 6 x CA 5-..	or 1 x CA 5-.. (4-pole) + 2 x CA 5-.. (1-pole)	or 1 x TP .. A + 2 x CA 5-.. (1-pole)	+ 1 x CAL 5-11	–
TAE 45 ... TAE 75	2 2	0 0					

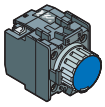
(1) AE... contactors: in mounting position 5 (☞ page **2**/68), max. 2 x N.C. front-mounted auxiliary contacts only are acceptable (Pos. 5 unauthorized for the TAE... contactors).
The CAL 5-11 side-mounted blocks offer additional N.C. contacts.

(2) Use the CA 5-..E 4-pole auxiliary contact block for correct contact terminal marking.

BC... and TBC... 4-pole Contactors

Fitting Details for Main Accessories

BC 9 ... BC 25 4-pole Contactors

Contactor configuration			Front-mounted accessories				
Contactor types	Main poles	Available auxiliary contacts	 Auxiliary contact 1-pole CA 5-..	 Auxiliary contact 4-pole CA 5-..	 Pneumatic timer TP .. A	 Interlock unit VBC...	 Add-on auxiliary contact CA 5-.. for each contactor
BC 9 ... BC 25	4 0	0 0 (1)	1 to 4 x CA 5-..	or 1 x CA 5-.. (4-pole)	or 1 x TP .. A (2)	or 1 x VBC 30	+ 1 to 2 x CA 5-.. (1-pole)
BC 9 ... BC 16	2 2	0 0 (3)	1 to 4 x CA 5-..	or 1 x CA 5-.. (4-pole)	–	or 1 x VBC 30	+ 1 to 2 x CA 5-.. (1-pole)
BC 25	2 2	0 0 (4)	1 to 4 x CA 5-..	or 1 x CA 5-.. (4-pole)	–	or 1 x VBC 30	+ 1 to 2 x CA 5-.. (1-pole)

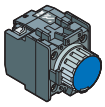
(1) In mounting position 5 (☞ pages **2**/76) max. 2 N.C. front-mounted auxiliary contacts only are acceptable.

(2) In mounting position 5 (☞ pages **2**/76) use only the TP .. DA pneumatic timer. (TP .. IA unauthorized).

(3) In mounting positions 1, 2, 3, 4, 6, max. 2 N.C. front-mounted auxiliary contacts only are acceptable. In mounting position 1 ± 30°, N.C. auxiliary contacts unauthorized. Mounting position 5 unauthorized (☞ pages **2**/76).

(4) Whatever the mounting position, N.C. auxiliary contacts unauthorized.

TBC 9 ... TBC 25 4-pole Contactors

Contactor configuration			Front-mounted accessories				
Contactor types	Main poles	Available auxiliary contacts	 Auxiliary contact 1-pole CA 5-..	 Auxiliary contact 4-pole CA 5-..	 Pneumatic timer TP .. A	 Interlock unit VBC...	 Add-on auxiliary contact CA 5-.. for each contactor
TBC 9 ... 25	2 2	0 0 (1)	1 to 4 x CA 5-..	or 1 x CA 5-.. (4-pole)	–	or 1 x VBC 30	+ 1 to 2 x CA 5-.. (1-pole)

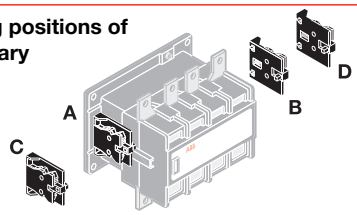
(1) Whatever the mounting position, N.C. auxiliary contacts unauthorized.

EK... 4-pole Contactors

Fitting Details for Main Accessories

EK... 4-pole contactors

Mounting positions of the auxiliary contacts

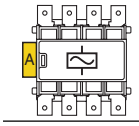
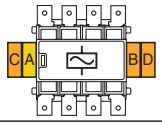
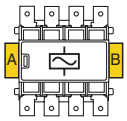
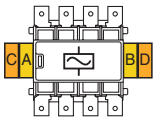
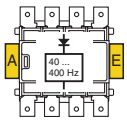
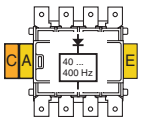
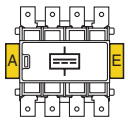
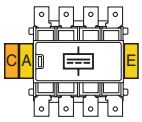


Auxiliary contact types and connecting diagrams

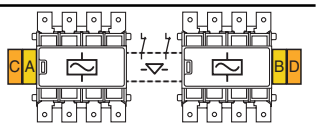
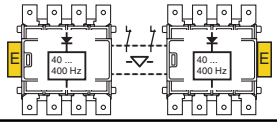
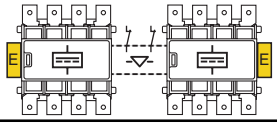


(1) Contact 35-36 used for some types of EK... contactors

EK... 4-pole contactors

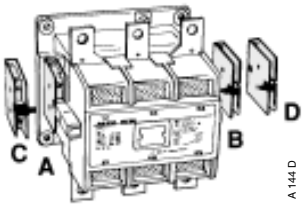
Contactor types	Main poles	Available auxiliary contacts		Add-on auxiliary contact blocks 2-pole CAL 16-11...	Mounting positions
					■ Factory mounted auxiliary contacts ■ Add-on CAL 16-11 auxiliary contacts
a.c. operated, 50 Hz, 60 Hz or 50/60 Hz					
EK 110 ... EK 1000	**4 0**	**1 1**		+ 1 x CAL 16-11 B + 1 x CAL 16-11 C + 1 x CAL 16-11 D	
EK 110 ... EK 1000	**4 0**	**2 2**		+ 1 x CAL 16-11 C 1 x CAL 16-11 D	
a.c. operated, 40 ... 400 Hz					
EK 110 ... EK 1000	**4 0**	**2 1**		1 x CAL 16-11 C	
d.c. operated					
EK 110 ... EK 1000	**4 0**	**2 1**		1 x CAL 16-11 C	

EK... 4-pole reversing contactors with VH 145 / VH 300 mechanical and electrical interlock units

"Lefthand" contactors	Interlocking	"Righthand" contactors	Add-on auxiliary contact blocks 2-pole CAL 16-11...	Mounting positions
				■ Factory mounted auxiliary contacts ■ Add-on CAL 16-11 auxiliary contacts
a.c. operated, 50 Hz, 60 Hz or 50/60 Hz				
EK 110 ... 150 EK 175, 210	**VH 145 VH 300**	**EK 110 ... 150 EK 175, 210**	+ 1 x CAL 16-11 C 1 x CAL 16-11 D	
a.c. operated, 40 ... 400 Hz				
EK 110 ... 150 EK 175, 210	**VH 145 VH 300**	**EK 110 ... 150 EK 175, 210**	–	
d.c. operated				
EK 110 ... 150 EK 175, 210	**VH 145 VH 300**	**EK 110 ... 150 EK 175, 210**	–	

Auxiliary Contact Blocks

Accessories for EK... Contactors



Mounting positions of the CAL 16-11

Application

Addition of auxiliary contacts on EK... contactors in side position for the self holding function or automation, alarms, etc.

Description

Auxiliary contact blocks are available in a 2-pole version with 1 N.O. and 1 N.C. contacts.
– **CAL...** : instantaneous, N.O. and N.C.
– **CCL...** : N.C. lagging + N.O.

They are equipped with screw type connecting terminals delivered open and protected against accidental direct contact.

Mounting:
Screwed onto the right and / or lefthand side of the **EK 110** to **EK 1000** contactors.

Ordering Details

For contactors	Max. number of blocks	Contacts blocks	Type	Order code	Weight kg Packing 1 piece
2-pole auxiliary contact blocks					
EK ...	1 block	1 1 – –	CAL 16-11 A	SK 829 002-A	0.050
	1 block	1 1 – –	CAL 16-11 B	SK 829 002-B	0.050
	1 block	1 1 – –	CAL 16-11 C	SK 829 002-C	0.050
	1 block	1 1 – –	CAL 16-11 D	SK 829 002-D	0.050
	1 block	1 – – 1	CCL 16-11 E (1)	SK 829 002-E	0.050

(1) Mounting of a **CCL 16-11 E** block does not allow an additional second block to be added on top of it.

>> **Mounting and Compatibility of Accessories** ..... **page 4/41**

Technical Data

Types			2-pole CAL 16-11	2-pole CCL 16-11
Compliance with standards			IEC 60947-5-1 and EN 60947-5-1	
Certification and approvals			☞ section **7**	
Rated insulation voltage U_i				
according to IEC 60947-5-1		**V**	690	
according to UL/CSA		**V**	600	
Rated operational voltage U_e		**V a.c.**	24 ... 690	
Conventional thermal current I_{th}		**A**	10	
Rated operational current I_e				
acc. to IEC 60947-5-1				
AC-15	24-127 V	**A**	6	
	220-240 V	**A**	6	
	380-440 V	**A**	4	
	500-690 V	**A**	1	
DC-13	24 V	**A**	6	
	48 V	**A**	6	
	72 V	**A**	4	
	125 V	**A**	1.8	
	250 V	**A**	0.6	
Short circuit protection (gG fuses)		**A**	10	
Rated making capacity			10 x I_e AC-15	
Rated breaking capacity			10 x I_e AC-15	
Rated short-time withstand current I_{cw}	1 s	**A**	50	
θ = 40 °C	0.1 s	**A**	100	
Power loss per pole at 6 A		**W**	0.2	
Min. switching capacity			0.25 VA / 12 V or 0.25 VA / 5 mA	
Mechanical durability				
– million of operating cycles			10	
– max. mech. switching frequency		**cycles /h**	3600	
Electrical durability				
– million of operating cycles			☞ page **4**/52	
– max. elec. switching frequency		**cycles /h**	1200	
Connecting terminals (Delivered in open position. Screws of unused terminals should be tightened.)			M3.5 (+,-) pozidriv 2 screw with cable clamp	
Tightening torque				
– recommended		**Nm**	1.00	
– max.		**Nm**	1.20	
Connecting capacity (min. ... max.)				
– Rigid solid		**1 or 2 x mm²**	0.5 ... 2.5	
– Flexible with cable end		**1 or 2 x mm²**	0.5 ... 2.5	
– Flexible with sleeve		**1 or 2 x mm²**	0.5 ... 1.5	
– Lugs		L **mm** ≤	8	
		l **mm** >	3.7	
Degree of protection according to IEC 60529, IEC 144, DIN 40050 and NFC 20-010			IP 20	

>> **Terminal Marking and Positioning** ..... **section 8** >> **Dimensions** ..... **section 9**

Mechanical Interlock Units
Mechanical and Electrical Interlock Units
Accessories for EK... Contactors

Application

When mounted between two contactors, the mechanical interlock unit prevents one of the contactors from closing as long as the other contactor is closed.

Description

Mechanical interlocking of two horizontal mounted contactors, a.c. or d.c. coil

Type	For contactors On left	On right	Fixing
VH 800	EK 370 ... EK 1000	EK 370 ... EK 1000	pre-drilled plate supplied

Mechanical and electrical interlocking of two horizontal mounted contactors, a.c. or d.c. coil

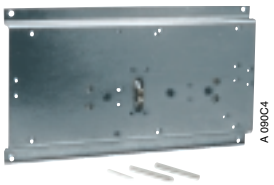
Type	For contactors On left	On right	Fixing
VH 145	EK 110, EK 150	EK 110, EK 150	additional plate **PN 210-22** ☞ page **4**/50
VH 300	EK 175, EK 210	EK 175, EK 210	additional plate **PN 300-22** ☞ page **4**/50

Selection tables

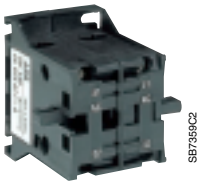
Interlocking of two horizontal mounted contactors, a.c. or d.c. coil

Left \ Right	EK 110, EK 150	EK 175, EK 210	EK 370 ... EK 1000	
EK 110, EK 150	VH 145	–	–	
EK 175, EK 210	–	VH 300	–	
EK 370 ... EK 1000	–	–	VH 800	

>> Mounting and Compatibility of Accessories ..... page 4/41 >> Dimensions ..... section 9



SK 829 070...



VH 145

Ordering Details

Mechanical interlocking of two horizontal mounted contactors, a.c. or d.c. coil

For contactors	Type	Order code	Packing piece	Weight kg
EK 370 ... EK 1000	VH 800	SK 829 070-F	1	6.000

Mechanical and electrical interlocking of two horizontal mounted contactors, a.c. or d.c. coil

For contactors	Type	Order code	Packing piece	Weight kg
EK 110, EK 150	VH 145	SK 829 071-A	1	0.130
EK 175, EK 210	VH 300	SK 829 071-B	1	0.130

Technical Data - VH 145 and VH 300 Mechanical and Electrical Interlock Units

Standards			IEC 60947-5-1, EN 60947-5-1
Rated insulation voltage U_i			
according to IEC 60947-5-1		**V**	690
according to UL / CSA		**V**	600
Rated operational voltage U_e			
according to IEC 60947-5-1		**V a.c.**	24 ... 690
Conventionnal thermal current I_{th}		**A**	10
Rated operational current I_e			
according to IEC 60947-5-1			
AC-15	24-127 V	**A**	6
	220-240 V	**A**	6
	380-440 V	**A**	4
	500-690 V	**A**	1
DC-13	24 V	**A**	6
	48 V	**A**	6
	72 V	**A**	4
	125 V	**A**	1.8
	250 V	**A**	0.6
Rated making capacity			10 x I_e AC-15
Rated breaking capacity			10 x I_e AC-15
Rated short-time withstand current I_{cw}			
θ = 40 °C	1 s	**A**	100
	0.1 s	**A**	140
Short-circuit protection			
gG type fuses		**A**	10
Heat loss per pole at 6 A		**W**	0.15
Mechanical durability		**cycles**	1 million
Max. switching frequency		**cycles /h**	600
Connecting capacity			
– rigid solid	1 or 2 x	**mm²**	1 to 2.5
– flexible with end	1 or 2 x	**mm²**	0.75 to 2.5
Connecting terminals			M3.5 (+,-) pozidriv 2 screws with cable clamp
delivered in open position			
(screws of unused terminals should be tightened)			
Tightening torque			
– recommended		**Nm**	1.00
– max.		**Nm**	1.20
Degree of protection			IP 20
according to IEC 60529, IEC 60144, DIN 40050, NFC 20010			

Technical note

When, during switching, the arc time is estimated to more than 40 ms, the closing signal of one of the two contactors must be delayed with respect to the opening signal of the other contactor in order to prevent a short-circuit.

Use a TP 40 pneumatic timer or a TE5S electronic timer with time lapse, as applicable.

>> Mounting Plates ..... page 4/50 >> Dimensions ..... section 9

Surge Suppressors for Contactor Coils

Accessories for EK... Contactors

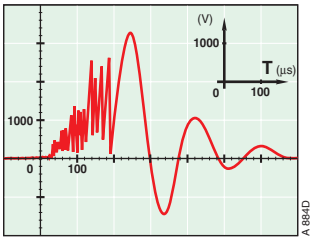
Application

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 42 V / 50 Hz 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 3500 V.



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:

$$k = \frac{\hat{U}_s \text{ max.}}{\hat{U}_c} \qquad \text{in d.c.: } k = \frac{\hat{U}_s \text{ max.}}{U_c} \qquad \text{or in a.c.: } k = \frac{\hat{U}_s \text{ max.}}{U_c\sqrt{2}}$$

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

Description

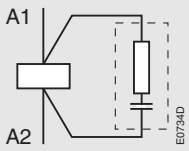
To guard against the harmful effects of these overvoltages, ABB has developed a range of surge suppressors designed to reduce the **k** factor defined above and to limit or even completely eliminate the high pre-damping voltage frequencies.

Each case is different, but the technical data tolerances and the generous sizing of parts have enabled us to reduce the number of variants.

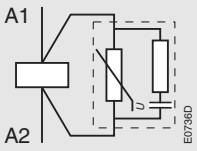
We have chosen the following solutions: varistors and RC blocks.

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

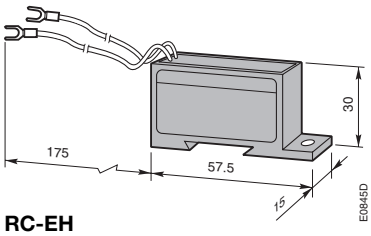


RC type



Varistor + RC

Dimensions (in mm)



RC-EH

Surge Suppressors for Contactor Coils

Accessories for EK... Contactors



RC-EH 300/48

Ordering Details

For contactors	Control voltage V	d.c.	a.c.	Type	Order code	Packing pieces	Weight kg
EK 110 ... 210	24 ... 48	–	●	RC-EH 300/48	SK 829 007-A	1	0.015
	110 ... 415	–	●	RC-EH 300/415	SK 829 007-B	1	0.015
EK 370 ... 1000	48 ... 110	–	●	RC-EH 800/110	SK 829 007-C	1	0.015
EK 110 ... 1000	24 ... 125	●	–				
EK 370 ... 1000	220 ... 600	–	●	RC-EH 800/600	SK 829 007-D	1	0.015

Technical Data

RC types		RC-EH 300/48	RC-EH 300/415
Control voltage U_c	**V a.c.**	24 ... 48	110 ... 415
Residual overvoltage (clipping voltage)	**V a.c.**	2 to 3 x U_c	
Opening time growth factor		1.2 ... 3	
Operating temperature	**°C**	-20 ... +70	
Connection to the coil terminal (parallel mounting)		Flexible, accessible leads, equipped with forked lugs	
Fixing		Glued to the top part of the contactor base	
Advantages		● Very fast clipping ● Attenuation of steep fronts and thus of high frequencies ● No operating delays	

Varistor + RC		RC-EH 800/110	RC-EH 800/600
Control voltage U_c (clipping voltage)	**V a.c.**	48 ... 110	220 ... 600
	V d.c.	24 ... 125	–
Residual overvoltage			
	V a.c.	205	1100
	V d.c.	205	–
Opening time growth factor		1.1 ... 1.15	
Operating temperature	**°C**	-20 ... +70	
Connection to the coil terminal (parallel mounting)		Flexible, accessible leads, equipped with forked lugs	
Fixing		Glued to the top part of the contactor base	
Advantages		● High energy absorption: good damping ● Unpolarized system ● The RC system damps the voltage front under the **U_{vdr}*** threshold.	

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

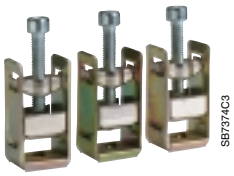
Connecting Auxiliary for Control Lead Connection

Application
Connection of the control conductors to the terminal pads of the main poles of the EK 110 to EK 1000 contactors.

Description
M4 x 12 screws

Ordering details

For contactors	Type	Order code	Packing pieces	Weight kg 1 piece
EK 110 ... EK 1000	–	2121 2415 - 291	10	0.002



OXFB...



TC...



TCD...

Connectors

Application
Connection of copper and aluminium cables to the terminal pads of the poles of EK... contactors.

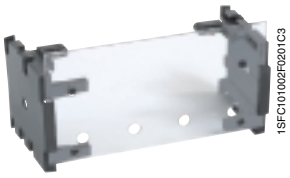
Description
There are three kinds of connectors:
– **OXFB ...** for copper cables : single steel connector with brass core for EK 110 ... EK 1000.
– **TC ...** for aluminium or copper cables : single aluminium connector for EK 110 ... EK 1000.
– **TCD ...** for aluminium or copper cables : double aluminium connector for EK 370 ... EK 1000.

Ordering details

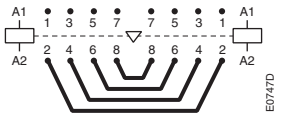
For contactors	Cable cross-sectional area in mm²	Type	Order code	Packing pieces	Weight kg 1 piece
Single connector for copper cables					
EK 110	25 ... 70	OXFB 70	SK 175 0001	3	0.050
EK 110	25 ... 120	OXFB 120	SK 175 0003	3	0.060
EK 150 ... EK 210	35 ... 150	OXFB 150	SK 175 0005	3	0.070
EK 150 ... EK 210	25 ... 185	OXFB 185	SK 175 0007	3	0.070
EK 370 ... EK 1000	70 ... 300	OXFB 300	SK 175 0009	3	0.130
Single connector for aluminium or copper cables					
EK 110	10 ... 70	TC 70-15	SK 173 001-AB	3	0.040
EK 150 ... EK 210	35 ... 120	TC 120-20	SK 173 001-AC	3	0.080
EK 370 ... EK 1000	70 ... 300	TC 300-25	SK 173 001-AD	3	0.160
Double connector for aluminium or copper cables					
EK 370 ... EK 1000	2 x (35 ... 185)	TCD 185-25	SK 173 001-BD	3	0.250

Terminal Shrouds - Connection Sets

Accessories for EK... Contactors



LT 210-EK



BSS 100 ... BSS 1000

Terminal Schrouds

Application

The use of terminal shrouds on the main terminals of **EK...** contactors is required in electrical panels or cubicles to be built in compliance with the rules for protection against accidental direct contact with live parts according to VDE 0106 - Part. 100.

Description

On **EK 110 ... EK 1000** contactors:

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

– The main terminals, equipped with lugs or connectors, can be protected against accidental direct contact after wiring (VDE 0106 - Part. 100) by the addition of terminal shrouds (☞ table below).

Each terminal shroud protects all the terminals on one side of the contactor. Two terminal shrouds should be provided for each separate contactor.

Ordering details

Mounting on contactor (with lugs or connectors)	Type	Order code	Packing pieces	Weight kg
EK 110, EK 150	LT 150-EK	SK 178 001-HB	1	0.139
EK 175, EK 210	LT 210-EK	SK 178 001-KB	1	0.152
EK 370, EK 550	LT 550-EK	SK 178 001-LB	1	0.190
EK 1000	LT 1000-EK	SK 178 001-MB	1	0.200

Connection Sets

Application

Connection between the main poles of **two 4-pole contactors** mounted side by side so that they operate as source reversing contactors.

Description

These sets are made up of four downstream connections.

BSS 100 ... BSS 210 – Insulated, flexible copper bars.

BSS 550, BSS 1000 – Bare, solid copper bars.

Ordering details

Mounting on 4-pole contactors	Type	Order code	Packing set	Weight kg
EK 110	BSS 100	SK 829 090-B	1	0.400
EK 150	BSS 145	SK 829 090-F	1	0.700
EK 175, 210	BSS 210	SK 829 090-G	1	1.000
EK 370, 550	BSS 550	SK 829 090-E	1	3.300
EK 1000	BSS 1000	SK 829 090-H	1	5.500

Mounting Plates

Accessories for EK... Contactors



PN...

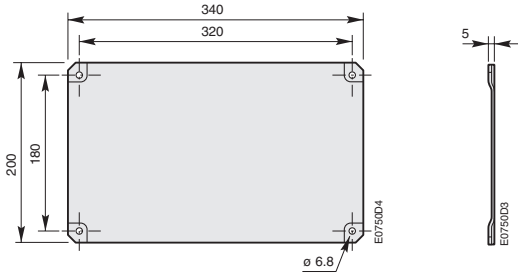
Application

Plates for two horizontal mounted contactors with or without a mechanical interlock unit.

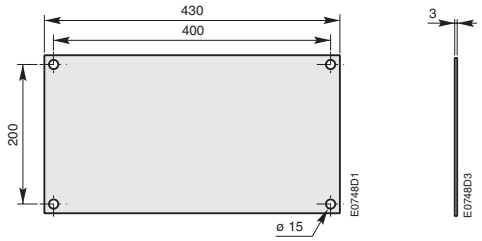
Ordering details

To use with: Lefthand contactor	Mechanical interlock	righthand contactor	Type	Order code	Weight kg Packing 1 piece
EK 110, EK150	VH 145	EK 110, EK150	PN 210-22	SK 829 075-C	1.400
EK 175, EK 210	VH 300	EK 175, EK 210	PN 300-22	SK 829 075-E	2.070

Dimensions (in mm)



PN 210-22



PN 300-22



KZK 370

Main Contact Sets for 4-pole Contactors

Description

The contact sets for 4-pole contactors consist of eight fixed contacts, four moving contacts, springs and the necessary screws. In addition, the sets include four moving arcing contacts for **EK 370** ... **EK 1000** contactors.

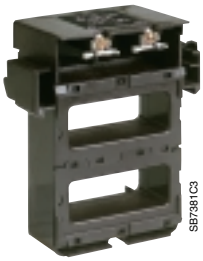
Ordering details

For contactors	Type	Order code	Packing set	Weight kg
EK 110	KZK 110	SK 824 204-A	1	0.450
EK 150	KZK 150	SK 824 204-B	1	0.450
EK 175	KZK 175	SK 825 204-A	1	0.700
EK 210	KZK 210	SK 825 204-B	1	0.700
EK 370	KZK 370	SK 827 204-A	1	2.400
EK 550	KZK 550	SK 827 204-B	1	2.400
EK 1000	KZK 1000	SK 827 204-F	1	3.000

Arc Chutes

Ordering details

For contactors	Type	Order code	Packing set	Weight kg
EK 110	KWK 110	5223 351-AH	1	0.660
EK 150	KWK 150	5223 351-AK	1	0.660
EK 175	KWK 175	5223 351-AL	1	1.260
EK 210	KWK 210	5223 351-AM	1	1.260
EK 370	KWK 370	5223 351-Y	1	3.170
EK 550	KWK 550	5223 351-Z	1	3.170
EK 1000	KWK 1000	5223 351-AN	1	3.170



KH 300

Contactor Coils

Ordering details

For contactors	Type state coil voltage ⌊‥⌋ ☞ page **0**/1	Order code state coil voltage code ☐☐ ☞ page **0**/1	Packing piece or set	Weight kg
a.c. or d.c. coils only				
EK 110, EK 150	KH 210 ⌊‥⌋	SK 825 400 - ☐☐	1	0.360
EK 175, EK 210	KH 300 ⌊‥⌋	SK 826 400 - ☐☐	1	0.440
EK 370, EK 550, EK 1000	KH 800 ⌊‥⌋	SK 828 100 - ☐☐	1	0.950
Sets including a d.c. coil, an economy resistor and an insertion contact				
EK 110, 150	KP 210 ⌊‥⌋ (1)	SK 825 450 - ☐☐	1 set	0.450
EK 175, 210	KP 300 ⌊‥⌋ (1)	SK 826 450 - ☐☐	1 set	0.550
EK 370, EK 550, EK 1000	KP 800 ⌊‥⌋	SK 828 150 - ☐☐	1 set	1.060

(1) The KP 210 and KP 300 have a double coil winding instead of an economy resistor.

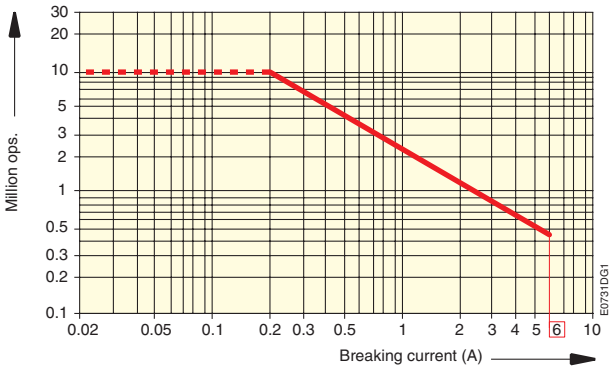
Sets including a multi-frequency coil and an insertion contact for contactor with built-in rectifier				
EK 110, EK 150	KP 210 ⌊‥⌋	SK 825 450 - E☐	1 set	0.450
EK 175, EK 210	KP 300 ⌊‥⌋	SK 826 450 - E☐	1 set	0.550

Electrical Durability for **AC-15** Utilization Category

AC-15 utilization category according to IEC 60947-5-1 / EN 60947-5-1:
– making current: 10 x $\mathbf{I_e}$ with cos φ = 0.7 and $\mathbf{U_e}$
– breaking current: $\mathbf{I_e}$ with cos φ = 0.4 and $\mathbf{U_e}$

This curve represents the electrical durability of the auxiliary contacts in relation to the breaking current.

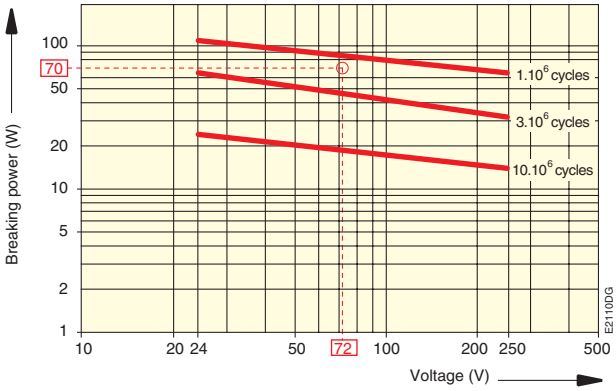
The curve has been drawn for resistive and inductive loads up to 690 V, 40 ... 60 Hz.



2-pole CAL 16... and CCL 16... auxiliary contact blocks

Electrical Durability for DC-13 Utilization Category

DC-13 utilization category according to IEC 60947-5-1 / EN 60947-5-1:
making and breaking current = $\mathbf{I_e}$ with $\mathbf{U_e}$ value.



2-pole CAL 16... and CCL 16... auxiliary contact blocks

Example:
Control of d.c. electro-magnet: $\mathbf{U_e}$ voltage = 72 V d.c. and breaking power = 70 W.
On the opposite curve at intersection "O" 72 V / 70 W the corresponding value for the electrical durability is approximately 2.10^6 cycles.