

AS 3-pole contactors and NS 3-pole contactor relays with screw terminals

3-pole contactors

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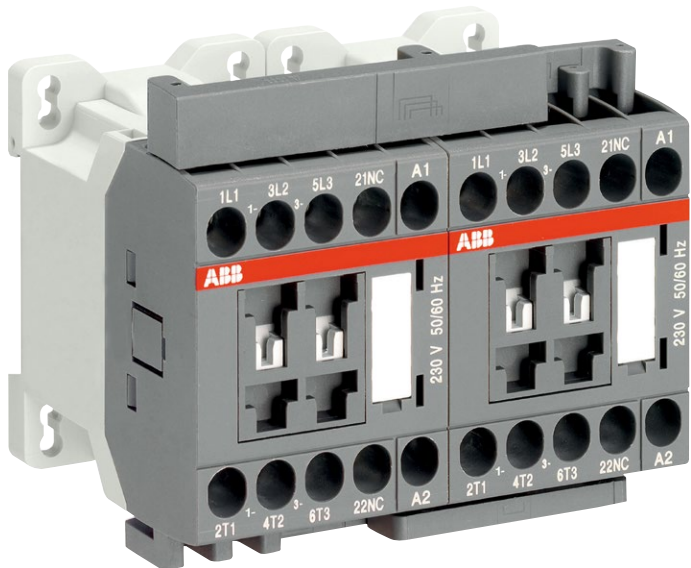
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AS contactors

Efficient and space saving



The compact AS contactor range allows you to optimize equipment design and is a reliable, time and cost saving solution.



Speed up your projects

Simpler by design

AS contactors come in one single size and are designed to make life easy for engineering, handling and wiring purposes. These products follow a simple marking pattern, which enables a quick identification of their individual features.



Easy to install

Easy to use

Make engineering a simple process with AS contactors. Every product is delivered with opened terminals, located directly on the front for easy access. Every terminal is screwdriver guided. Spring terminal versions are also available for a time-saving and reliable connection alternative.



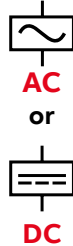
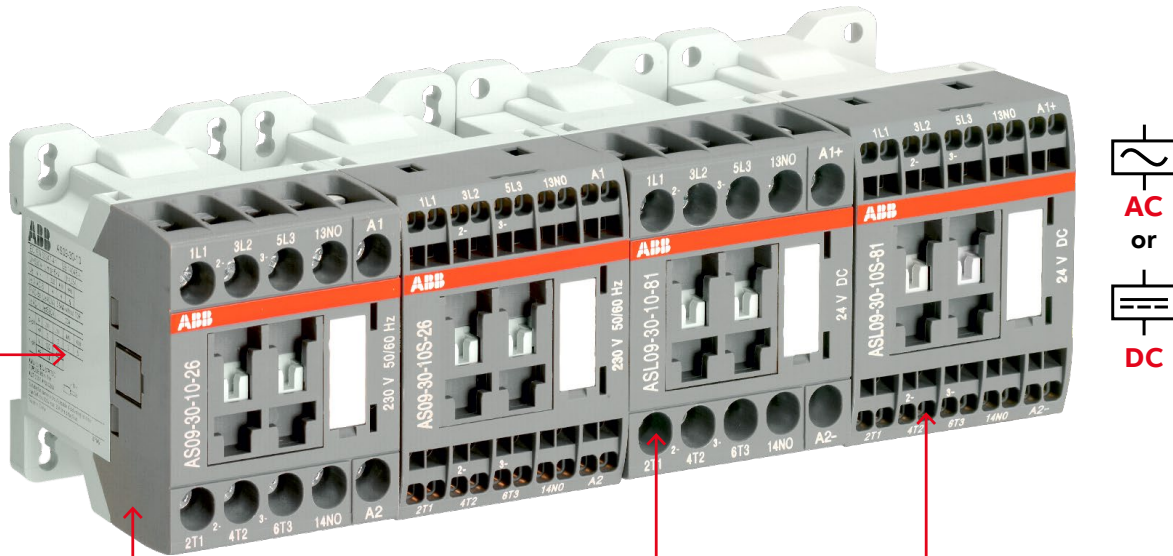
Space saving

Space optimization

The addition of accessories keeps the panel smart and compact, while providing additional features. Interlocking kits and surge suppression are clipped into the housing without adding width to the small frame of the contactor.

Compact and efficient

Optimize your equipment dimensions!



W 45 x H 68 x D 72.5 mm

Easy to engineer with just one size

For motor starting solutions up to 7.5 kW at 400 V and 3 hp at 440 V, contactors are in one frame size for both AC and DC coils.



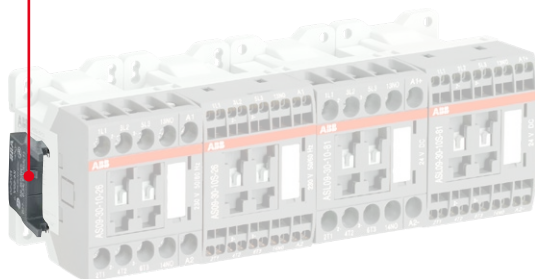
Screw

Screw terminal
On top of that, they are available with screw or spring terminals.



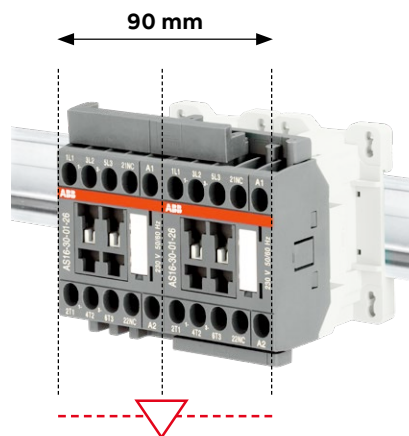
Spring

Spring terminal



Side clip-on surge suppressors

This add-on snaps and connects to the side of the housing and does not add width to the frame. The coil terminals remain accessible this way.



Compact reversing contactors

With their low consumption coil of only 3 W, AS contactors can be controlled directly by most PLC's. For 24 V control circuits, this is only 125 mA.

Easy to use

Space-saving and intuitive

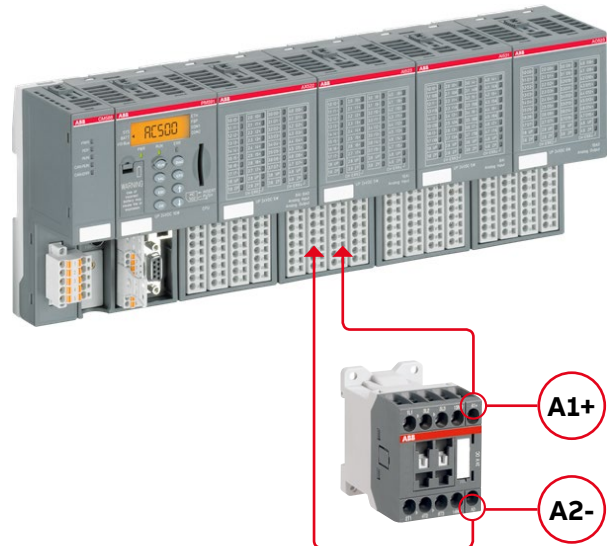


Make your control circuits reliable

Built-in and add-on auxiliary contacts offer high reliability for low signals and meet the requirements for mechanically linked and mirror contacts according to IEC standards.

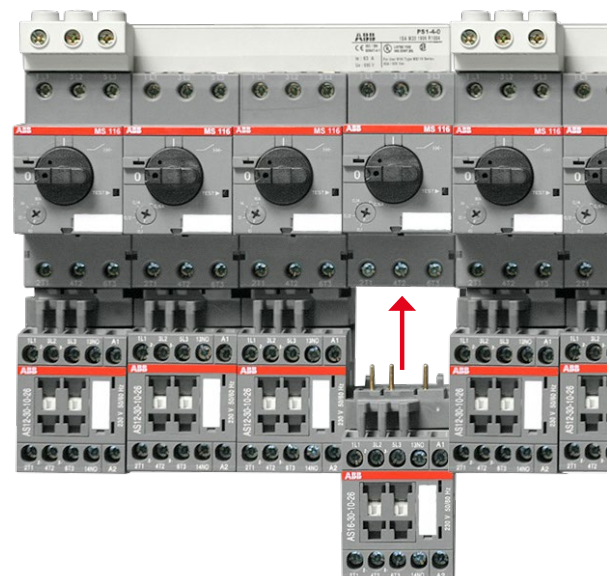
Two types of terminals, for even more choices

As an alternative to the conventional screw terminals, spring terminals are often used in applications with vibrations. Both types are able to accommodate two cables. This way, AS offers the right type of terminal depending on the installation.



Direct control by PLC

With their low consumption coil of only 3 W, AS contactors can be controlled directly by most PLC's. For 24 V control circuits, this is only 125 mA.



Choose reliable and time-saving solutions

AS contactors can easily be connected to manual motor starters or overload relays. The connecting accessories prevent mistakes and save time when assembling starter combinations.

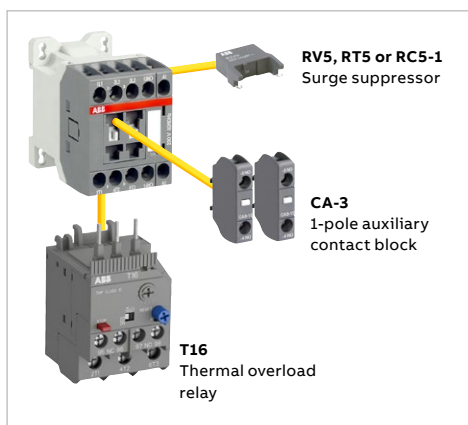
3-pole contactors

Main accessories



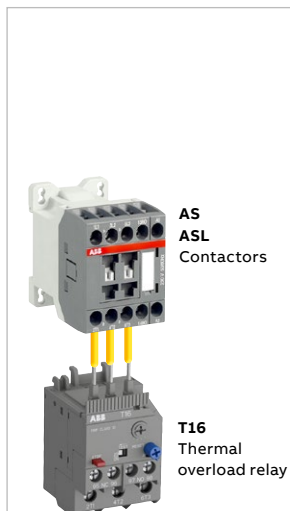
AS09 ... AS16
3-pole contactors

Main accessories for contactors

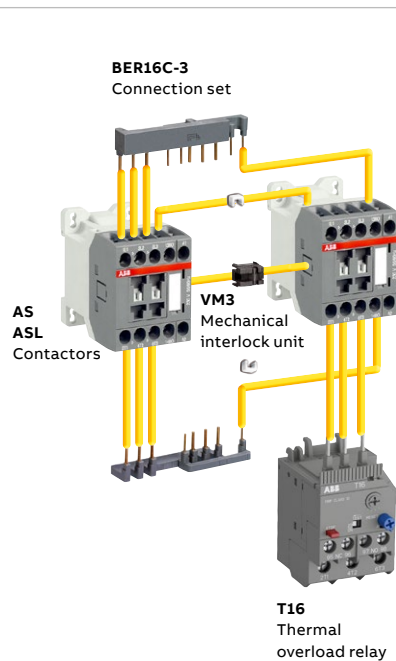


Main accessories for starting solutions

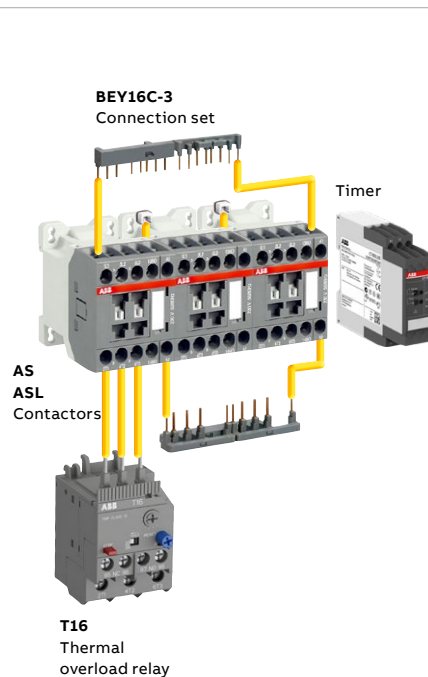
Direct-on-line starter



Reversing starter



Star-delta starter



3-pole contactors



Screw terminals



	AC control voltage	AS09	AS12	AS16
	DC control voltage	ASL09	ASL12	ASL16

Switching of 3-phase cage motors

	IEC	AC-3	Rated operational power	400 V	4 kW	5.5 kW	7.5 kW
			Rated operational current	$\theta \leq 60^\circ\text{C}$ 400 V	9 A	12 A	15.5 A
				$\theta \leq 60^\circ\text{C}$ 415 V	9 A	12 A	15.5 A
				$\theta \leq 60^\circ\text{C}$ 690 V	5 A	7 A	9 A
	UL / CSA	3-phase motor rating		440-480 V	5 hp	7.5 hp	10 hp
		NEMA size			00	00	0

Protection of 3-phase motors

Thermal overload relays

**T16...**

0.10... 0.13	0.23... 0.31	0.55... 0.74	1.30... 1.70	3.10... 4.20	7.60... 10.0
0.13... 0.17	0.31... 0.41	0.74... 1.00	1.70... 2.30	4.20... 5.70	10.0... 13.0
0.17... 0.23	0.41... 0.55	1.00... 1.30	2.30... 3.10	5.70... 7.60	13.0... 16.0

Switching of resistive circuits

	IEC	AC-1	Rated operational current	$\theta \leq 40^\circ\text{C}$ 690 V	22 A	24 A	24 A
				$\theta \leq 60^\circ\text{C}$ 690 V	18 A	20 A	20 A
				$\theta \leq 70^\circ\text{C}$ 690 V	15 A	16 A	16 A
			With conductor cross-sectional area		2.5 mm ²	2.5 mm ²	2.5 mm ²
	UL / CSA	General use rating		600 V AC	20 A	20 A	20 A
		With conductor cross-sectional area			AWG 12	AWG 12	AWG 12

Main accessories

Auxiliary contact blocks	Front mounting		1-pole CA3-10 or CA3-01
Interlocks	Mechanical		VM3
Surge suppressors	Side-mounted (without additional width)		RV5 (Varistor) AC / DC RC5-1 (Capacitor) AC RT5 (Transil diode) DC
Connection sets	Reversing starters Star-delta starters		BER16C-3 BEY16C-3
Connecting link	With manual motor starter		BEA16-3

AS09 ... AS16 3-pole contactors

4 to 7.5 kW
AC operated



AS09-30-10

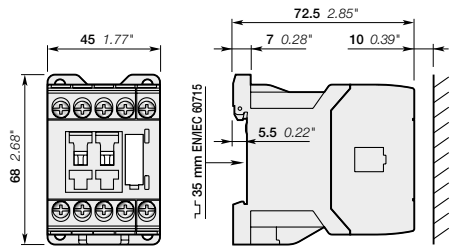
AS09 ... AS16 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.

These contactors are of the block type design with:

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

IEC		UL/CSA		Rated control circuit voltage U _c (1)		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power	operational current θ ≤ 40 °C	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
400 V AC-3	AC-1	hp	A	V 50 Hz	V 60 Hz				kg
4	22	5	20	24	24	1 0	AS09-30-10-20	1SBL101001R2010	0.220
						0 1	AS09-30-01-20	1SBL101001R2001	0.220
				230	230	1 0	AS09-30-10-26	1SBL101001R2610	0.220
						0 1	AS09-30-01-26	1SBL101001R2601	0.220
5.5	24	7.5	20	24	24	1 0	AS12-30-10-20	1SBL111001R2010	0.220
						0 1	AS12-30-01-20	1SBL111001R2001	0.220
				230	230	1 0	AS12-30-10-26	1SBL111001R2610	0.220
						0 1	AS12-30-01-26	1SBL111001R2601	0.220
7.5	24	10	20	24	24	1 0	AS16-30-10-20	1SBL121001R2010	0.220
						0 1	AS16-30-01-20	1SBL121001R2001	0.220
				230	230	1 0	AS16-30-10-26	1SBL121001R2610	0.220
						0 1	AS16-30-01-26	1SBL121001R2601	0.220

Note: for multiple packaging, please contact your ABB local sales organization.
(1) Other control voltages see voltage code table.



AS09, AS12, AS16
Main dimensions mm, inches

ASL09 ... ASL16 3-pole contactors

4 to 7.5 kW

DC operated



ASL09-30-10

ASL09 ... ASL16 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.

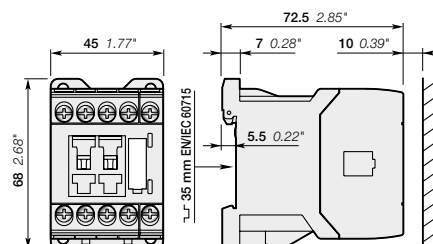
These contactors are of the block type design with:

- 3 main poles and 1 built-in auxiliary contact
- control circuit: low consumption (3 W at pull-in and holding) DC operated with solid core magnet. Suitable for direct control by PLC outputs (the polarity on the coil terminals A1+ and A2- must be respected)
- add-on auxiliary contact blocks for front mounting and a comprehensive range of accessories.

IEC	UL/CSA		Rated control circuit voltage		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating 480 V	General use rating 600 V AC	U_c (1)				Pkg (1 pce)
400 V AC-3 kW	AC-1 A	hp	A	V DC				kg
4	22	5	20	24	1 0	ASL09-30-10-81	1SBL103001R8110	0.280
					0 1	ASL09-30-01-81	1SBL103001R8101	0.280
5.5	24	7.5	20	24	1 0	ASL12-30-10-81	1SBL113001R8110	0.280
					0 1	ASL12-30-01-81	1SBL113001R8101	0.280
7.5	24	10	20	24	1 0	ASL16-30-10-81	1SBL123001R8110	0.280
					0 1	ASL16-30-01-81	1SBL123001R8101	0.280

Note: for multiple packaging, please contact your ABB local sales organization.

(1) Other control voltages see voltage code table.



ASL09, ASL12, ASL16

Main dimensions mm, inches

AS09 ... AS16 2-stack 3-pole contactors

4 to 7.5 kW

AC operated



AS09-30-32

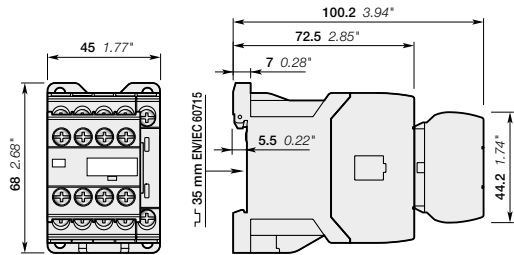
AS09 ... AS16 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.

These contactors are of the block type design with:

- 1st stack with 3 main poles and 1 N.O. built-in auxiliary contact
- 2nd stack with permanently fixed 2 N.O. + 2 N.C. auxiliary contact block. The auxiliary contact elements are mechanically linked (side-marked symbol) and the N.C. auxiliary contacts are mirror contacts
- control circuit: AC operated
- a comprehensive range of accessories.

IEC		UL/CSA		Rated control circuit voltage U _c (1)		Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
Rated operational power	current θ ≤ 40 °C	3-phase motor rating 480 V	General use rating 600 V AC	V 50 Hz	V 60 Hz				
400 V AC-3	AC-1								
kW	A	hp	A						
4	22	5	20	24	24	3 2	AS09-30-32-20	1SBL101001R2032	0.260
				230	230	3 2	AS09-30-32-26	1SBL101001R2632	0.260
5.5	24	7.5	20	24	24	3 2	AS12-30-32-20	1SBL111001R2032	0.260
				230	230	3 2	AS12-30-32-26	1SBL111001R2632	0.260
7.5	24	10	20	24	24	3 2	AS16-30-32-20	1SBL121001R2032	0.260
				230	230	3 2	AS16-30-32-26	1SBL121001R2632	0.260

Note: for multiple packaging, please contact your ABB local sales organization.
 (1) Other control voltages see voltage code table.



AS09, AS12, AS16
Main dimensions mm, inches

ASL09 ... ASL16 2-stack 3-pole contactors

4 to 7.5 kW

DC operated



ASL09-30-32

ASL09 ... ASL16 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.

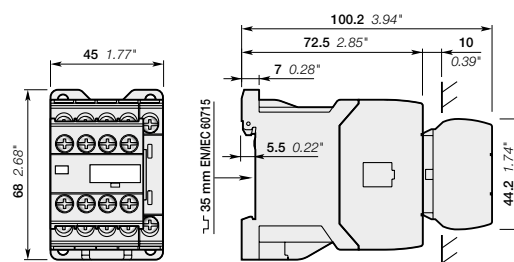
These contactors are of the block type design with:

- 1st stack with 3 main poles and 1 N.O. built-in auxiliary contact
- 2nd stack with permanently fixed 2 N.O. + 2 N.C. auxiliary contact block. The auxiliary contact elements are mechanically linked (side-marked symbol) and the N.C. auxiliary contacts are mirror contacts
- control circuit: low consumption (3 W at pull-in and holding) DC operated with solid core magnet. Suitable for direct control by PLC outputs (the polarity on the coil terminals A1+ and A2- must be respected)
- a comprehensive range of accessories.

IEC		UL/CSA		Rated control circuit voltage Uc (1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
400 V AC-3	AC-1							
kW	A	hp	A	V DC				kg
4	22	5	20	24	3 2	ASL09-30-32-81	1SBL103001R8132	0.320
5.5	24	7.5	20	24	3 2	ASL12-30-32-81	1SBL113001R8132	0.320
7.5	24	10	20	24	3 2	ASL16-30-32-81	1SBL123001R8132	0.320

Note: for multiple packaging, please contact your ABB local sales organization.

(1) Other control voltages see voltage code table.

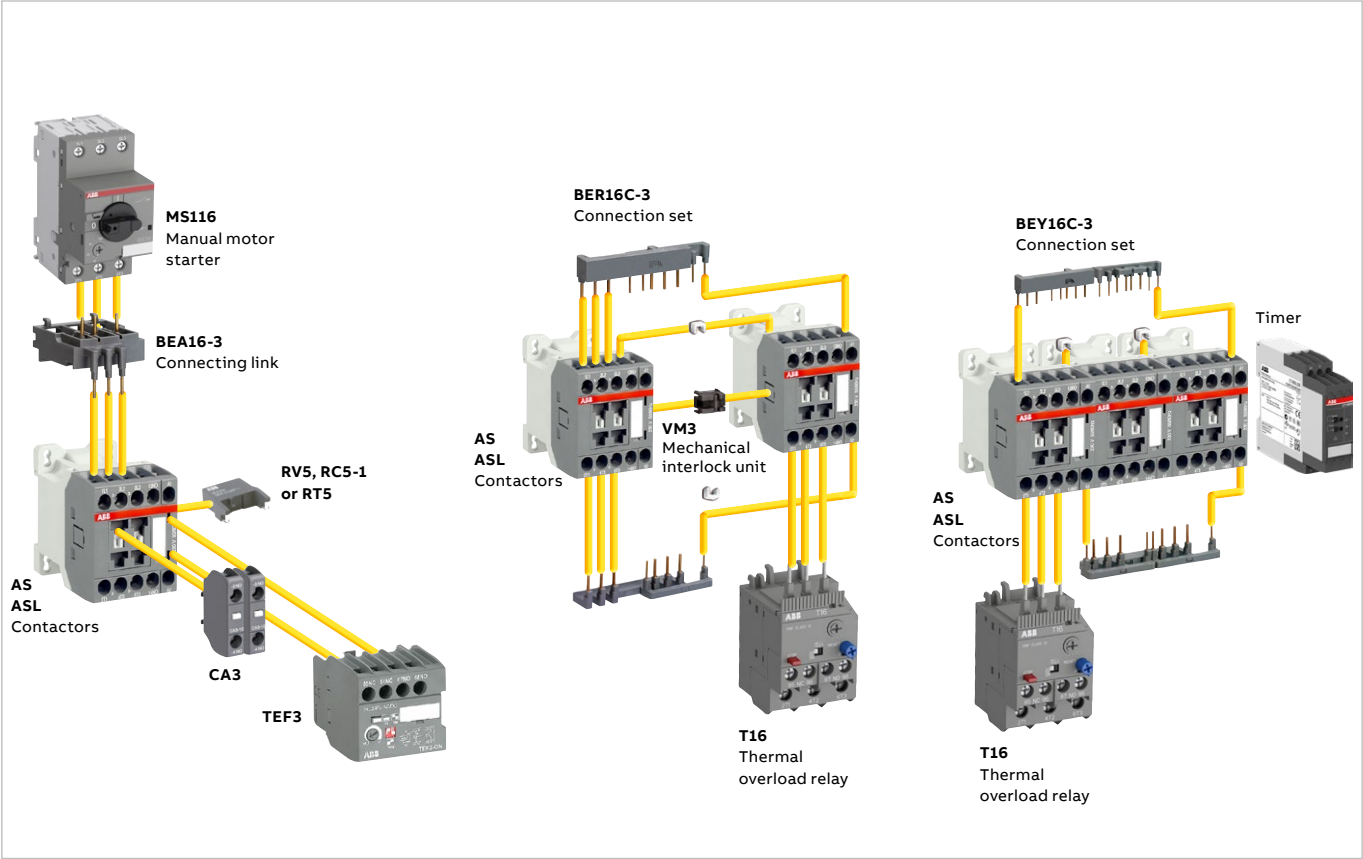


ASL09, ASL12, ASL16

Main dimensions mm, inches

AS09 ... AS16 and
ASL09 ... ASL16 3-pole contactors
Main accessories

Contactor and main accessories (other accessories available)



Main accessory fitting details

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

Contactor types	Main poles	Built-in auxiliary contacts	Front-mounted accessories			Side-mounted accessories	
			Auxiliary contact blocks	Electronic timer	Mechanical interlock unit (between 2 contactors)		
			1-pole CA3	TEF3	VM3	Surge suppressors	
AS09 ... AS16	3 0	1 0	2 max.	or 1	+ 1	RV5	or RC5-1
AS09 ... AS16	3 0	0 1	-	-	1	RV5	or RT5
ASL09 ... ASL16	3 0	3 2	2 max.	or 1	+ 1	RV5	or RT5
ASL09 ... ASL16	3 0	1 0	-	-	1	RV5	or RT5
ASL09 ... ASL16	3 0	0 1	-	-	1	RV5	or RT5
ASL09 ... ASL16	3 0	3 2	-	-	1	RV5	or RT5

Overload relays fitting details (1)

Contactor types	Thermal overload relays
AS09 ... AS16	T16 (0.10...16 A)
ASL09 ... ASL16	

The addition of an overload relay on the contactor does not prevent fitting of many other accessories as shown above.
(1) Direct mounting - No kit required.

AS09 ... AS16 and ASL09 ... ASL16 3-pole contactors

Main accessories



CA3-10



TEF3-ON



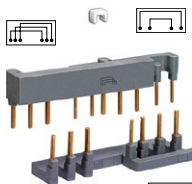
VM3



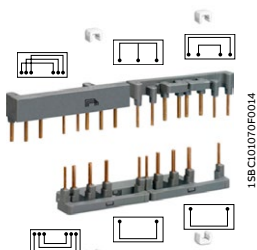
RV5



BEA16-3



BER16C-3



BEY16C-3

Front-mounted instantaneous auxiliary contact blocks

For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce)
					kg
AS09 ... AS16	1 0	CA3-10	1SBN011010T1010	10	0.011
ASL09 ... ASL16	0 1	CA3-01	1SBN011010T1001	10	0.011

Front-mounted electronic timer

For contactors	Rated control circuit voltage - U _c V	Type	Order code	Pkg qty	Weight (1 pce) kg
ON-delay					
AS09 ... AS16, ASL09 ... ASL16	24...240 V AC/DC	TEF3-ON	1SBN021012R1000	1	0.065
OFF-delay					
AS09 ... AS16, ASL09 ... ASL16	24...240 V AC/DC	TEF3-OFF	1SBN021014R1000	1	0.065

Mechanical interlock unit

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AS09 ... AS16, ASL09 ... ASL16	VM3	1SBN031005T1000	10	0.002

Surge suppressors

For contactors	Rated control circuit voltage - U _c V		Type	Order code	Pkg qty	Weight (1 pce) kg
	AC	DC				
AS09 ... AS16, ASL09 ... ASL16	24...50	● ●	RV5/50	1SBN050010R1000	2	0.015
	50...133	● ●	RV5/133	1SBN050010R1001	2	0.015
	110...250	● ●	RV5/250	1SBN050010R1002	2	0.015
	250...440	● ●	RV5/440	1SBN050010R1003	2	0.015
AS09 ... AS16	24...50	● -	RC5-1/50	1SBN050100R1000	2	0.012
	50...133	● -	RC5-1/133	1SBN050100R1001	2	0.012
	110...250	● -	RC5-1/250	1SBN050100R1002	2	0.012
	250...440	● -	RC5-1/440	1SBN050100R1003	2	0.012
ASL09 ... ASL16	12...32	- ●	RT5/32	1SBN050020R1000	2	0.015
	25...65	- ●	RT5/65	1SBN050020R1001	2	0.015
	50...90	- ●	RT5/90	1SBN050020R1002	2	0.015
	77...150	- ●	RT5/150	1SBN050020R1003	2	0.015
	150...264	- ●	RT5/264	1SBN050020R1004	2	0.015

Connecting links with manual motor starters

For contactors	Manual motor starter	Type	Order code	Pkg qty	Weight (1 pce) kg
AS09 ... AS16 ASL09 ... ASL16	MS116-0.16 ... MS116-16 MS132-0.16 ... MS132-16	BEA16-3	1SBN081006T1000	10	0.019

Connection sets for reversing contactors

For contactors	Mechanical interlock unit	Type	Order code	Pkg qty	Weight (1 pce) kg
AS09 ... AS16, ASL09 ... ASL16	with or without VM3	BER16C-3	1SBN081012R1000	1	0.035

Note: BER16C-3 connection set includes two BB3 fixing clips, and an electrical interlocking when fitted on contactors with built-in N.C. auxiliary contacts. BER16C-3 can be used with or without VM3 mechanical interlock unit.

Connection sets for star-delta starting

For contactors	Mech. interlock unit between Star & Delta contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AS09 ... AS12, ASL09 ... ASL12	with or without VM3	BEY16C-3	1SBN081018R2000	1	0.041

Note: BEY16C-3 connection set includes two BB3 fixing clips, and an electrical interlocking when fitted on Star and Delta contactors with built-in N.C. auxiliary contacts. BEY16C-3 can be used with or without VM3 mechanical interlock unit.

AS09 ... AS16 and ASL09 ... ASL16 3-pole contactors

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types		AC operated	AS09	AS12	AS16
		DC operated	ASL09	ASL12	ASL16
Standards			IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1		
Rated operational voltage U_e max.			690 V		
Rated frequency (without derating)			50 / 60 Hz		
Conventional free-air thermal current I_{th} acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$			22 A	25 A	25 A
With conductor cross-sectional area			2.5 mm ²	4 mm ²	4 mm ²
AC-1 Utilization category					
For air temperature close to contactor					
I_e / Rated operational current AC-1	$\theta \leq 40^\circ\text{C}$		22 A	24 A	24 A
U_e max. $\leq 690\text{ V}$, 50/60 Hz	$\theta \leq 60^\circ\text{C}$		18 A	20 A	20 A
	$\theta \leq 70^\circ\text{C}$		15 A	16 A	16 A
With conductor cross-sectional area			2.5 mm ²		
AC-3 Utilization category					
For air temperature close to contactor $\theta \leq 60^\circ\text{C}$					
I_e / Max. rated operational current AC-3 (1)					
	220-230-240 V		9 A	12 A	15.7 A
	400 V		9 A	12 A	15.5 A
	415 V		9 A	12 A	15.5 A
	440 V		8 A	11 A	13.6 A
	500 V		8 A	11 A	12.5 A
	690 V		5 A	7 A	9 A
Rated operational power AC-3 (1)					
	220-230-240 V		2.2 kW	3 kW	4 kW
	400 V		4 kW	5.5 kW	7.5 kW
	415 V		4 kW	5.5 kW	7.5 kW
	440 V		4 kW	5.5 kW	7.5 kW
	500 V		4 kW	5.5 kW	7.5 kW
	690 V		4 kW	5.5 kW	7.5 kW
Rated making capacity AC-3			10 x I_e AC-3 acc. to IEC 60947-4-1		
Rated breaking capacity AC-3			8 x I_e AC-3 acc. to IEC 60947-4-1		
AC-8a Utilization category					
(without thermal overload relay - U_e 400 V 50/60 Hz - $\theta \leq 40^\circ\text{C}$)					
I_e / Rated operational current AC-8a			12 A	16 A	22 A
Rated operational power AC-8a			5.5 kW	7.5 kW	11 kW
Short-circuit protection device for contactors without thermal overload relay - Motor protection excluded (2)					
$U_e \leq 500\text{ V AC}$ - gG type fuse			25 A		
Rated short-time withstand current I_{cw} at 40°C ambient temperature, in free air from a cold state	1 s		230 A	250 A	250 A
	10 s		100 A	124 A	124 A
	30 s		65 A	75 A	75 A
	1 min		50 A	55 A	55 A
	15 min		22 A	24 A	24 A
Maximum breaking capacity $\cos \phi = 0.45$	at 440 V		155 A		
	at 690 V		90 A		
Power dissipation per pole	I_e / AC-1		1 W	1.2 W	1.2 W
	I_e / AC-3		0.16 W	0.3 W	0.5 W
Max. electrical switching frequency	AC-1		600 cycles/h		
	AC-3		1200 cycles/h		
	AC-4		300 cycles/h		

(1) For the corresponding kW/A or hp/A values of 1500 r.p.m. 50 Hz or 1800 r.p.m. 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".

(2) For the protection of motor starters against short circuits, see "Coordination with short-circuit protection devices".

AS09 ... AS16 and ASL09 ... ASL16 3-pole contactors

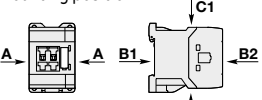
Technical data

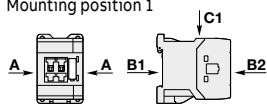
Main pole - Utilization characteristics according to UL / NEMA / CSA

Contactor types		AC operated	AS09	AS12	AS16
		DC operated	ASL09	ASL12	ASL16
Standards		UL 508, CSA C22.2 N°14			
Max. operational voltage		690 V			
NEMA size		00			
NEMA continuous amp rating	Thermal current		9 A	9 A	18 A
NEMA maximum horse power ratings 1-phase, 60 Hz	115 V AC		1/3 hp	1/3 hp	1 hp
	230 V AC		1 hp	1 hp	2 hp
NEMA maximum horse power ratings 3-phase, 60 Hz	200 V AC		1 1/2 hp	1 1/2 hp	3 hp
	230 V AC		1 1/2 hp	1 1/2 hp	3 hp
	460 V AC		2 hp	2 hp	5 hp
	575 V AC		2 hp	2 hp	5 hp
UL / CSA general use rating					
600 V AC			20 A	20 A	20 A
With conductor cross-sectional area			AWG 12	AWG 12	AWG 12
UL / CSA maximum 1-phase motor rating					
Full load current	120 V AC		7.2 A	9.8 A	13.8 A
	240 V AC		8 A	10 A	12 A
Horse power rating	120 V AC		1/3 hp	1/2 hp	3/4 hp
	240 V AC		1 hp	1-1/2 hp	2 hp
UL / CSA maximum 3-phase motor rating					
Full load current (1)	200-208 V AC		7.8 A	7.8 A	11 A
	220-240 V AC		6.8 A	9.6 A	15.2 A
	440-480 V AC		7.6 A	11 A	14 A
	550-600 V AC		9 A	11 A	11 A
Horse power rating (1)	200-208 V AC		2 hp	2 hp	3 hp
	220-240 V AC		2 hp	3 hp	5 hp
	440-480 V AC		5 hp	7-1/2 hp	10 hp
	550-600 V AC		7-1/2 hp	10 hp	10 hp
Short-circuit protection device for contactors					
without thermal overload relay - Motor protection excluded					
Fuse rating			40 A	50 A	60 A
Fuse type, 600 V			J		
Max. electrical switching frequency					
For general use			600 cycles/h		
For motor use			1200 cycles/h		

(1) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".

General technical data

Contactor types	AC operated	AS09	AS12	AS16
	DC operated	ASL09	ASL12	ASL16
Rated insulation voltage Ui				
acc. to IEC 60947-4-1		690 V		
acc. to UL / CSA		600 V		
Rated impulse withstand voltage Uimp.		6 kV		
Ambient air temperature close to contactor				
Operation	Fitted with thermal overload relay	-25...+60 °C		
	Without thermal overload relay	-40...+70 °C		
Storage		-60...+80 °C		
Climatic withstand		Category B according to IEC 60947-1 Annex Q		
Maximum operating altitude (without derating)		3000 m		
Mechanical durability				
Number of operating cycles		10 millions operating cycles		
Max. switching frequency		3600 cycles/h		
Shock withstand		1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position		
acc. to IEC 60068-2-27 and EN 60068-2-27				
Mounting position 1		Shock direction	AS contactors - AC operated	ASL contactors - DC operated
		A	20 g	20 g closed position / 10 g open position
		B1	10 g closed position / 5 g open position	15 g closed position / 5 g open position
		B2	15 g	10 g
		C1	20 g closed position / 9 g open position	15 g closed position / 8 g open position
		C2	20 g closed position / 14 g open position	14 g closed position / 8 g open position
Vibration withstand acc. to IEC 60068-2-6		5...300 Hz / 3 g closed position / 2 g open position		



AS09 ... AS16 and ASL09 ... ASL16 3-pole contactors

Technical data

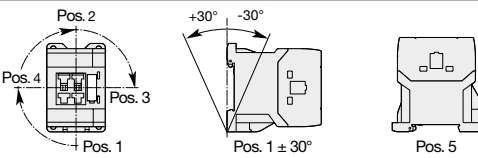
Magnet system characteristics for AS09 ... AS16 contactors

Contactor types			AC operated	AS09	AS12	AS16
Coil operating limits acc. to IEC 60947-4-1			AC supply	0.85...1.1 x U _c (at θ ≤ 60 °C); U _c (at θ ≤ 70 °C)		
AC control voltage	Rated control circuit voltage U _c		at 50 Hz	24...415 V		
			at 60 Hz	24...415 V		
Coil consumption	Average pull-in value	50 Hz	33 VA			
		60 Hz	33 VA			
		50/60 Hz	33 VA			
	Average holding value	50 Hz	6.5 VA / 1.5 W			
		60 Hz	5 VA / 1.2 W			
		50/60 Hz	6.5 VA / 1.5 W			
Drop-out voltage			Approx. 30...50 % of U _c			
Operating time						
Between coil energization and:	N.O. contact closing		9...24 ms			
	N.C. contact opening		6...18 ms			
Between coil de-energization and:	N.O. contact opening (1)		5...19 ms			
	N.C. contact closing (1)		7...22 ms			
			(1) The use of RC5-1 surge suppressor increases opening time by a factor of 2 to 3			

Magnet system characteristics for ASL09 ... ASL16 contactors

Contactor types		DC operated	ASL09	ASL12	ASL16
Coil operating limits acc. to IEC 60947-4-1		DC supply	0.85...1.1 x U _c (at θ ≤ 60 °C); U _c (at θ ≤ 70 °C)		
DC control voltage	Rated control circuit voltage U _c		12...240 V DC		
	Coil consumption	Average pull-in value	3 W		
		Average holding value	3 W		
Drop-out voltage			Approx. 10...40 % of U _c		
Coil time constant	Open	L/R	12 ms		
	Closed	L/R	40 ms		
Operating time					
Between coil energization and:	N.O. contact closing		36...59 ms		
	N.C. contact opening		31...53 ms		
Between coil de-energization and:	N.O. contact opening (1)		13...17 ms		
	N.C. contact closing (1)		15...20 ms		
			(1) The use of RT5 surge suppressor increases opening time by a factor of 1.1 to 1.2		

Mounting characteristics and conditions for use

Contactor types		AC operated	AS09	AS12	AS16
		DC operated	ASL09	ASL12	ASL16
Mounting positions					
Mounting distances		The contactors can be assembled side by side.			
Fixing	On rail according to IEC 60715, EN 60715	35 x 7.5 mm or 35 x 15 mm			
	By screws (not supplied)	2 x M4 screws placed diagonally			

AS09 ... AS16 and ASL09 ... ASL16 3-pole contactors

Technical data

Connecting characteristics

Contactor types	AC operated	AS09	AS12	AS16
	DC operated	ASL09	ASL12	ASL16
Main terminals	 Screw terminals with cable clamp			
Connection capacity (min. ... max.)				
Main conductors (poles)				
	Rigid solid	1 x	0.75...4 mm ²	
		2 x	0.75...4 mm ²	
	Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²	
		2 x	0.75...2.5 mm ²	
	Flexible with insulated ferrule	1 x	0.75...2.5 mm ²	
		2 x	0.75...1.5 mm ²	
	Bars or lugs	L ≤	7.7 mm	
		l >	3.2 mm	
Connection capacity acc. to UL / CSA		1 or 2 x	AWG 18...12	
Stripping length		9 mm		
Tightening torque	Recommended	1.00 Nm / 9 lb.in		
	Max.	1.20 Nm		
Auxiliary conductors				
(built-in auxiliary terminals + coil terminals)				
	Rigid solid	1 x	0.75...2.5 mm ²	
		2 x	0.75...2.5 mm ²	
	Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²	
		2 x	0.75...2.5 mm ²	
	Flexible with insulated ferrule	1 x	0.75...2.5 mm ²	
		2 x	0.75...1.5 mm ²	
	Lugs	L ≤	7.7 mm	
		l >	3.2 mm	
Connection capacity acc. to UL / CSA		1 or 2 x	AWG 18...14	
Stripping length				
Tightening torque				
Coil terminals	Recommended	1.00 Nm / 9 lb.in		
	Max.	1.20 Nm		
Built-in auxiliary terminals	Recommended	1.00 Nm / 9 lb.in		
	Max.	1.20 Nm		
Degree of protection				
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529				
All terminals		IP20		
Screw terminals		Delivered in open position, screws of unused terminals must be tightened		
All terminals		M3		
Screwdriver type		Flat Ø 5.5 / Pozidriv 2		

AS09 ... AS16 and ASL09 ... ASL16 3-pole contactors

Technical data

Built-in auxiliary contacts according to IEC

Contactor types	AC operated	AS09	AS12	AS16
	DC operated	ASL09	ASL12	ASL16
Rated operational voltage U_e max.		690 V		
Rated frequency (without derating)		50 / 60 Hz		
Conventional free-air thermal current I_{th} - $\theta \leq 40^\circ\text{C}$		10 A		
I_e / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A		
	220-240 V 50/60 Hz	4 A		
	400-440 V 50/60 Hz	3 A		
	500 V 50/60 Hz	2 A		
	690 V 50/60 Hz	2 A		
Making capacity AC-15		10 x I_e AC-15 acc. to IEC 60947-5-1		
Breaking capacity AC-15		10 x I_e AC-15 acc. to IEC 60947-5-1		
I_e / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	6 A / 144 W		
	48 V DC	2.8 A / 134 W		
	72 V DC	1 A / 72 W		
	110 V DC	0.55 A / 60 W		
	125 V DC	0.55 A / 69 W		
	220 V DC	0.27 A / 60 W		
	250 V DC	0.27 A / 68 W		
Short-circuit protection device gG type fuse		10 A		
Rated short-time withstand current I_{cw}	for 1.0 s	100 A		
	for 0.1 s	140 A		
Minimum switching capacity		12 V / 3 mA		
with failure rate acc. to IEC 60947-5-4		10^{-7}		
Non-overlapping time between N.O. and N.C. contacts		1.5 ms		
Power dissipation per pole at 6 A		0.1 W		
Max. electrical switching frequency	AC-15	1200 cycles/h		
	DC-13	900 cycles/h		
Mechanically linked contacts acc. to annex L of IEC 60947-5-1		Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts (CA3 aux. contact blocks) are mechanically linked contacts.		
Mirror contacts acc. to annex F of IEC 60947-4-1		Built-in N.C. auxiliary contacts or additional N.C. auxiliary contacts (CA3 aux. contact blocks) are mirror contacts.		

Built-in auxiliary contacts according to UL / CSA

Contactor types	AC operated	AS09	AS12	AS16
	DC operated	ASL09	ASL12	ASL16
Max. operational voltage		600 V AC, 250 V DC		
Pilot duty		A600, Q300		
AC thermal rated current		10 A		
AC maximum volt-ampere making		7200 VA		
AC maximum volt-ampere breaking		720 VA		
DC thermal rated current		2.5 A		
DC maximum volt-ampere making-breaking		69 VA		

Notes

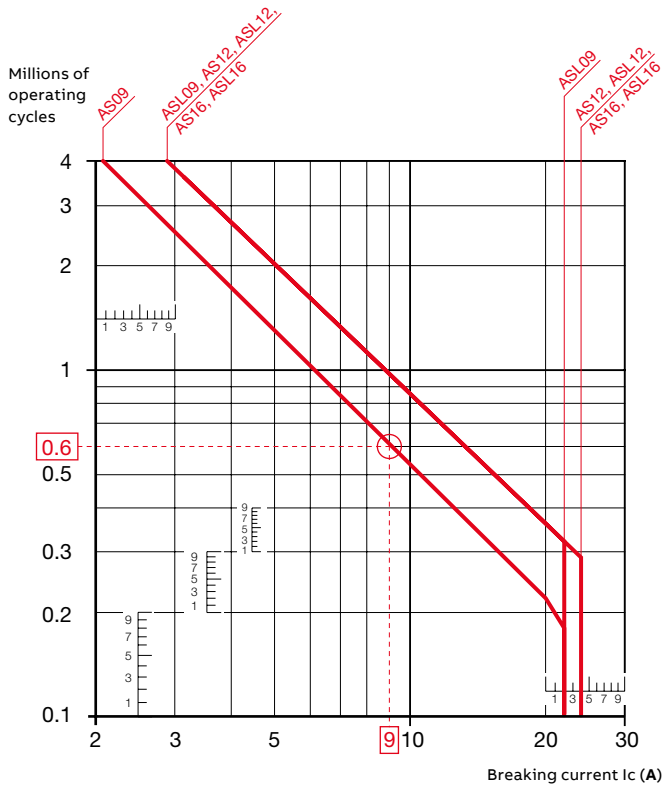
AS09 ... AS16 and ASL09 ... ASL16 3-pole contactors

Electrical durability

Electrical durability for AC-1 utilization category - $U_e \leq 690$ V

Note: AC-1 maximum current is selected according to ambient temperature. Please see technical data.

Switching non-inductive or slightly inductive loads. The breaking current I_c for AC-1 is equal to the rated operational current of the load. Maximum electrical switching frequency: 600 cycles / hour.



Example:

Breaking current = 9 A.

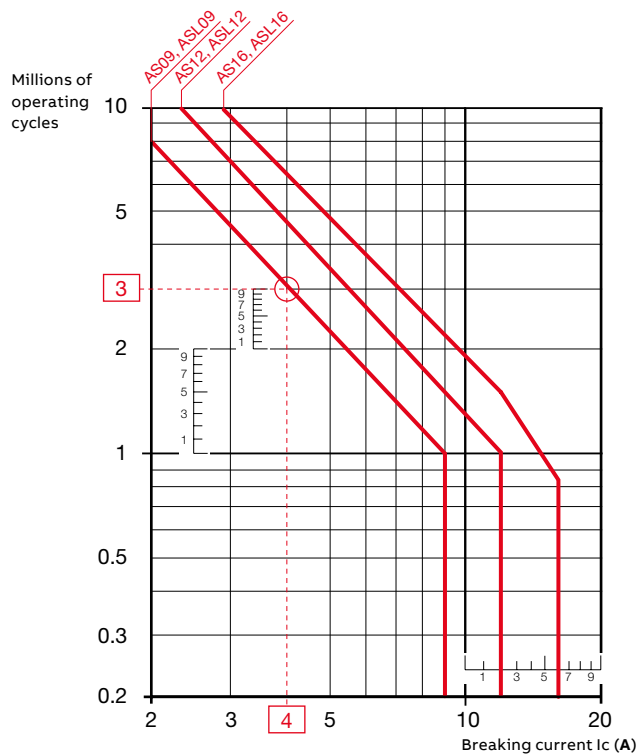
On the opposite curve at intersection "O" 9 A the corresponding value for the electrical durability is approximately 0.6 millions operating cycles.

AS09 ... AS16 and ASL09 ... ASL16 3-pole contactors

Electrical durability

Electrical durability for AC-3 utilization category - $U_e \leq 440 \text{ V}$ - Ambient temperature $\leq 60^\circ \text{C}$

Switching cage motors: starting and switching off running motors. The breaking current I_c for AC-3 is equal to the rated operational current I_e (I_e = motor full load current). Maximum electrical switching frequency: 1200 cycles / hour.



Example:

Breaking current = 4 A.

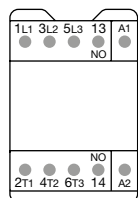
On the opposite curve at intersection "O" 4 A the corresponding value for the electrical durability is approximately 3 millions operating cycles.

AS09 ... AS16 3-pole contactors

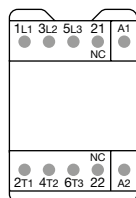
Terminal marking and positioning

AS contactors - AC operated

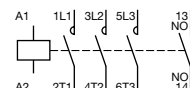
Standard devices without addition of auxiliary contacts



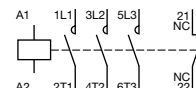
AS09 ... AS16-30-10



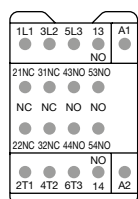
AS09 ... AS16-30-01



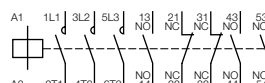
AS09 ... AS16-30-10



AS09 ... AS16-30-01

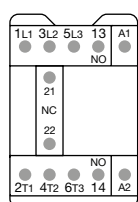


AS09 ... AS16-30-32

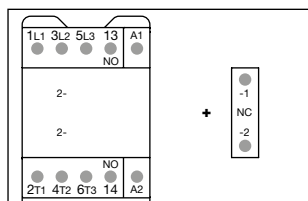


AS09 ... AS16-30-32

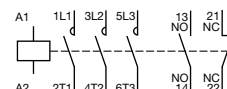
Other possible contact combinations with auxiliary contact blocks added by the user



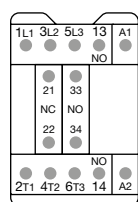
Combination 11



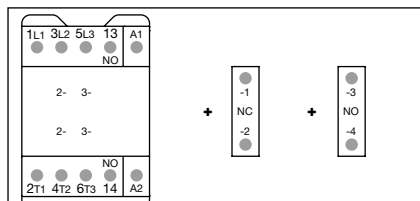
AS09 ... AS16-30-10 + CA3-01



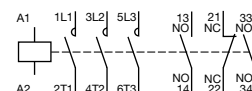
Combination 11



Combination 21

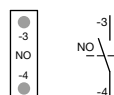


AS09 ... AS16-30-10 + CA3-01 + CA3-10



Combination 21

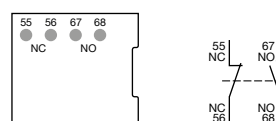
CA3 1-pole auxiliary contact blocks



CA3-10



CA3-01



TEF3

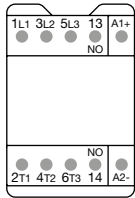
TEF3 front-mounted electronic timer

ASL09 ... ASL16 3-pole contactors

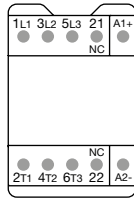
Terminal marking and positioning

ASL contactors - DC operated (the polarity A1+, A2- must be respected)

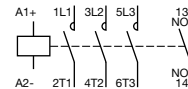
Standard devices without addition of auxiliary contacts



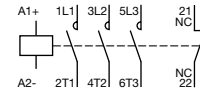
ASL09 ... ASL16-30-10



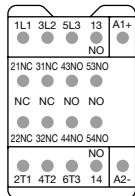
ASL09 ... ASL16-30-01



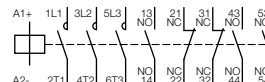
ASL09 ... ASL16-30-10



ASL09 ... ASL16-30-01

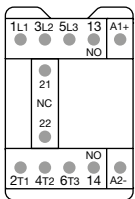


ASL09 ... ASL16-30-32

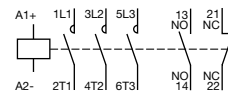
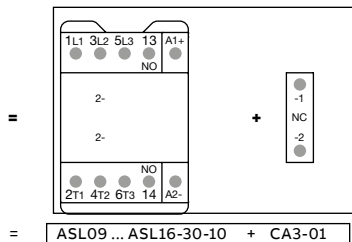


ASL09 ... ASL16-30-32

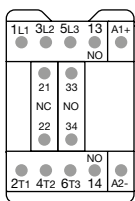
Other possible contact combinations with auxiliary contact blocks added by the user



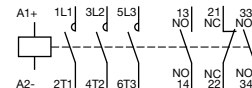
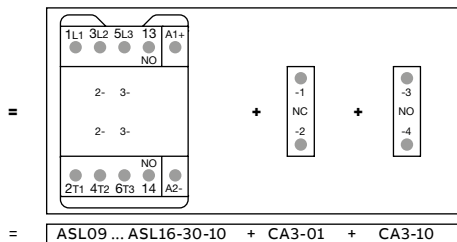
Combination 11



Combination 11

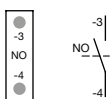


Combination 21

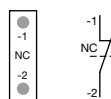


Combination 21

CA3 1-pole auxiliary contact blocks

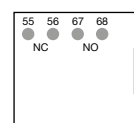


CA3-10



CA3-01

TEF3 front-mounted electronic timer

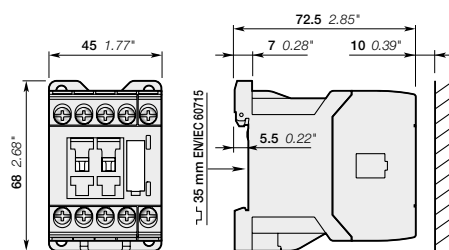


TEF3

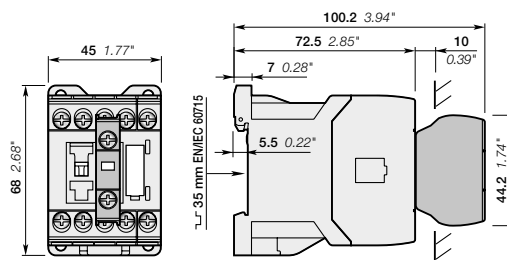
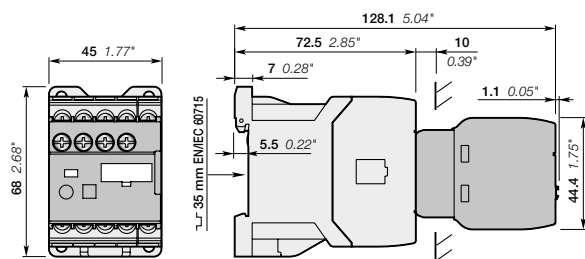
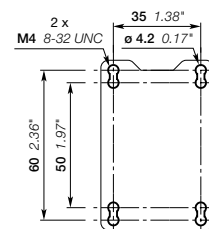
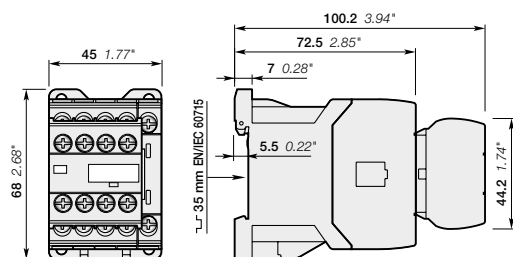


AS09 ... AS16 3-pole contactors

Dimensions



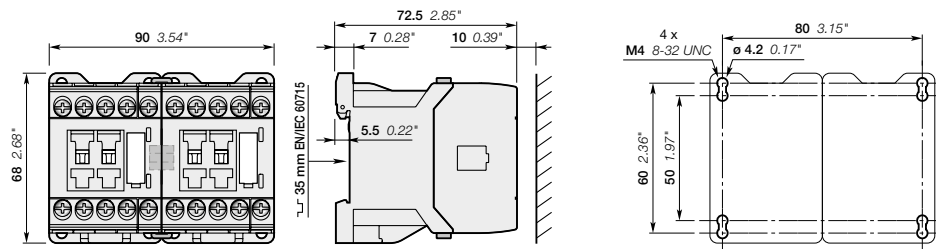
AS09, AS12, AS16

AS09, AS12, AS16
+ CA3 front-mounted 1-pole auxiliary contact blockAS09, AS12, AS16
+ TEF3 electronic timer

AS09 ... 16-30-32

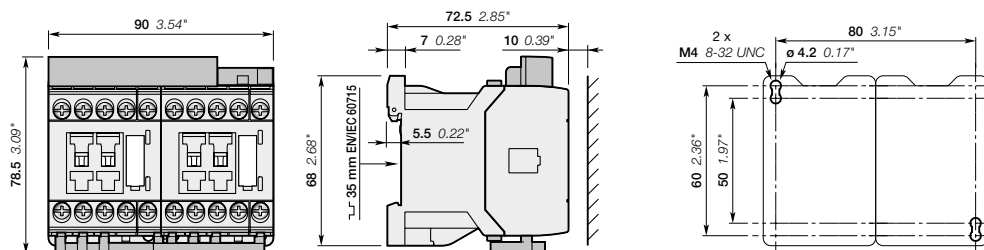
AS09 ... AS16 3-pole contactors

Dimensions



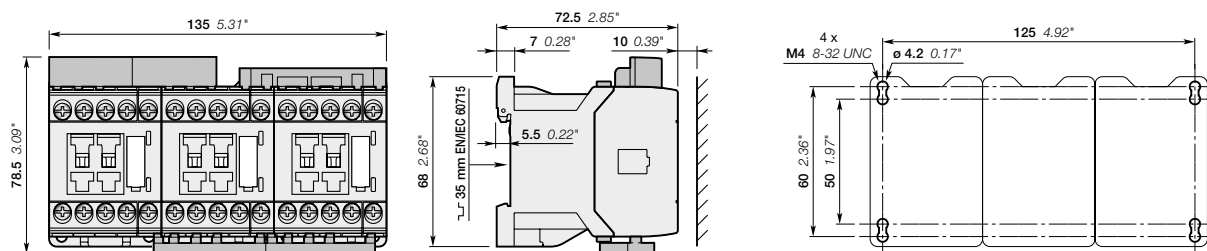
AS09, AS12, AS16

+ VM3 mechanical interlock unit including two BB3 fixing clips



AS09, AS12, AS16

+ BER16C-3 connection set for reversing starter including two BB3 fixing clips



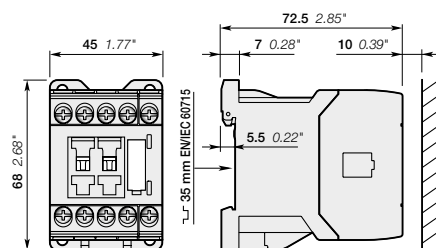
AS09, AS12, AS16

+ BEY16C-3 connection set for star-delta starter including four BB3 fixing clips

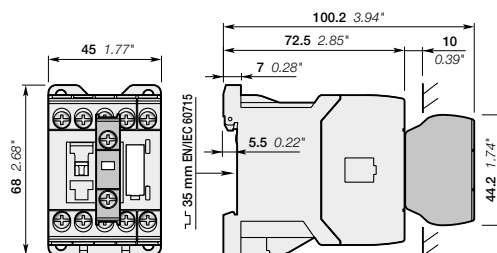
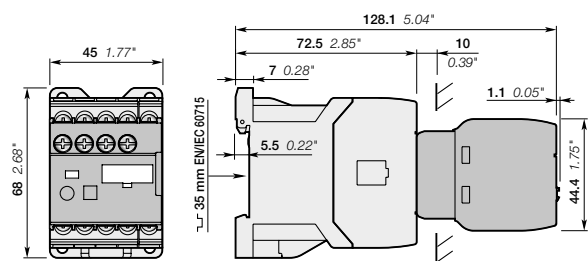
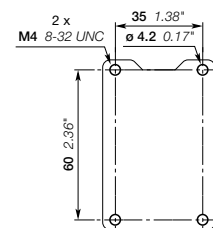
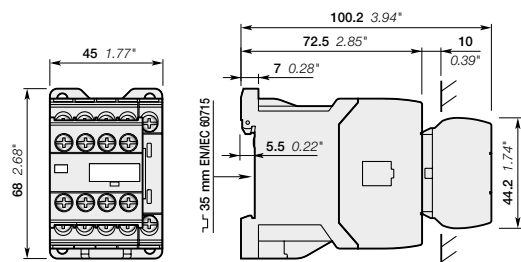
Main dimensions mm, inches

ASL09 ... ASL16 3-pole contactors

Dimensions



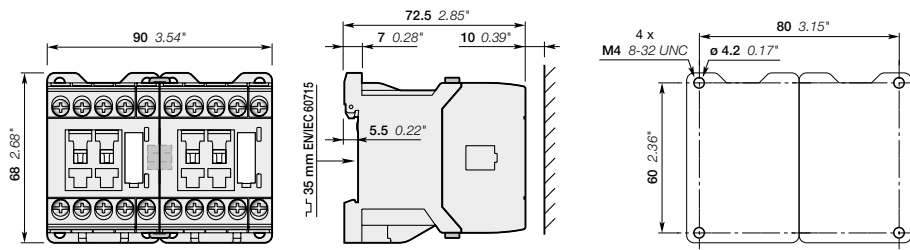
ASL09, ASL12, ASL16

ASL09, ASL12, ASL16
+ CA3 front-mounted 1-pole auxiliary contact blockASL09, ASL12, ASL16
+ TEF3 electronic timer

ASL09 ... 16-30-32

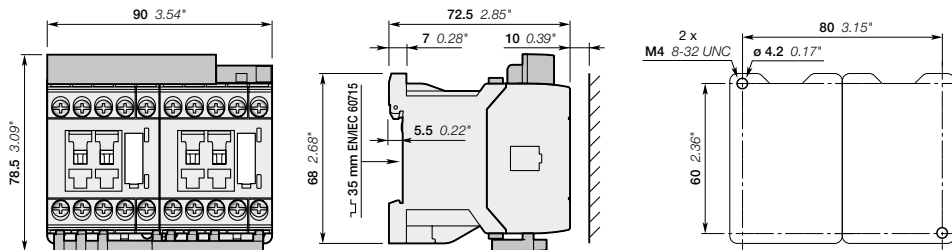
ASL09 ... ASL16 3-pole contactors

Dimensions



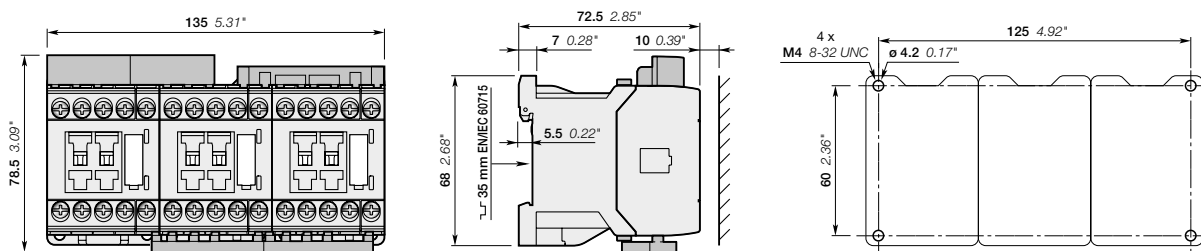
ASL09, ASL12, ASL16

+ VM3 mechanical interlock unit including two BB3 fixing clips



ASL09, ASL12, ASL16

+ BER16C-3 connection set for reversing starter including two BB3 fixing clips



ASL09, ASL12, ASL16

+ BEY16C-3 connection set for star-delta starter including four BB3 fixing clips

Main dimensions mm, inches

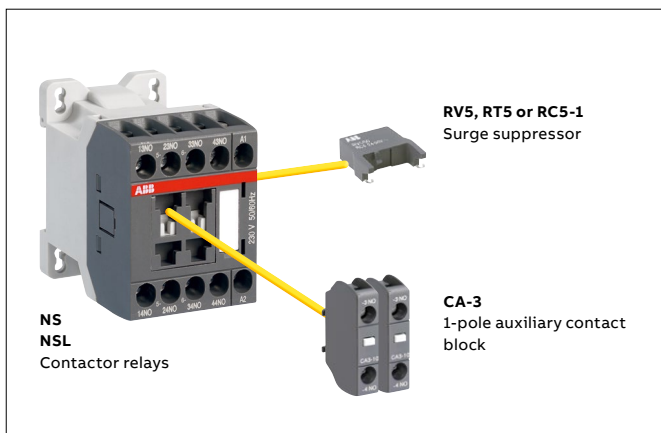
Contactor relays

Main accessories

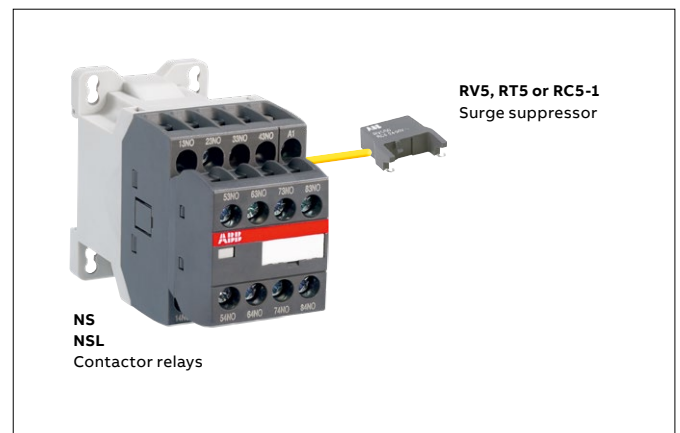


NS, NSL
Contactor relays

4-pole contactor relays



8-pole contactor relays



Contactor relays



Screw terminals



NS



NSL

	AC control voltage	NS22E	NS31E	NS40E
	DC control voltage	NSL22E	NSL31E	NSL40E
		2 N.O. + 2 N.C.	3 N.O. + 1 N.C.	4 N.O.



NS



NSL

	AC control voltage	NS44E	NS53E	NS62E	NS71E	NS80E
	DC control voltage	NSL44E	NSL53E	NSL62E	NSL71E	NSL80E
		4 N.O. + 4 N.C.	5 N.O. + 3 N.C.	6 N.O. + 2 N.C.	7 N.O. + 1 N.C.	8 N.O.

Control circuit switching

IEC	Rated operational current AC-15	240 V	4 A
		400 V	3 A
		690 V	2 A
	DC-13	24 V	6 A / 144 W
		250 V	0.27 A / 68 W
UL / CSA	Pilot Duty	A600, Q300	

Main accessories

Auxiliary contact blocks	Front mounting	1-pole CA3-10 or CA3-01	
Surge suppressors	Side-mounted (without additional width)	RV5 RC5-1 RT5	(Varistor) AC / DC (Capacitor) AC (Transil diode) DC

NS contactor relays

AC operated



NS22E

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

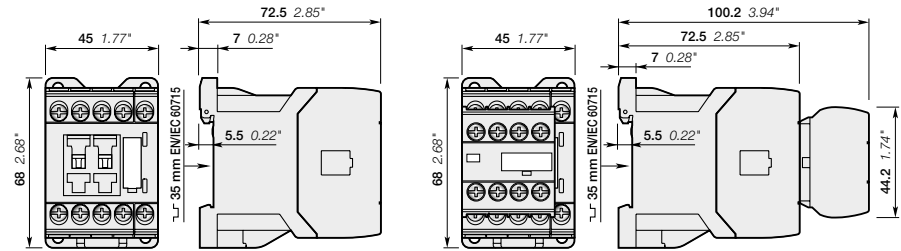
These contactor relays are designed with:

- 4 poles or 8 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: AC operated
- add-on auxiliary contact blocks for front mounting and a comprehensive range of accessories.

Number of contacts		Rated control circuit voltage		Type	Order code	Weight Pkg (1 pce) kg
1st stack	2nd stack	Uc (1) V 50 Hz	V 60 Hz			
		24	24	NS22E-20	1SBH101001R2022	0.220
		230	230	NS22E-26	1SBH101001R2622	0.220
		24	24	NS31E-20	1SBH101001R2031	0.220
		230	230	NS31E-26	1SBH101001R2631	0.220
		24	24	NS40E-20	1SBH101001R2040	0.220
		230	230	NS40E-26	1SBH101001R2640	0.220
		24	24	NS44E-20	1SBH101001R2044	0.260
		230	230	NS44E-26	1SBH101001R2644	0.260
		24	24	NS53E-20	1SBH101001R2053	0.260
		230	230	NS53E-26	1SBH101001R2653	0.260
		24	24	NS62E-20	1SBH101001R2062	0.260
		230	230	NS62E-26	1SBH101001R2662	0.260
		24	24	NS71E-20	1SBH101001R2071	0.260
		230	230	NS71E-26	1SBH101001R2671	0.260
		24	24	NS80E-20	1SBH101001R2080	0.260
		230	230	NS80E-26	1SBH101001R2680	0.260

Note: for multiple packaging, please contact your ABB local sales organization.

(1) Other control voltages see voltage code table.



NS22E, NS31E, NS40E

NS44E, NS53E, NS62E, NS71E, NS80E

Main dimensions mm, inches

NSL contactor relays

DC operated



NSL22E

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

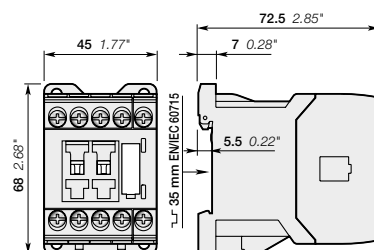
These contactor relays are designed with:

- 4 poles or 8 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: low coil consumption (3 W at pull-in and holding) DC operated with solid core magnet. Suitable for direct control by PLC outputs (the polarity on the coil terminals A1+ and A2- must be respected)
- add-on auxiliary contact blocks for front mounting and a comprehensive range of accessories.

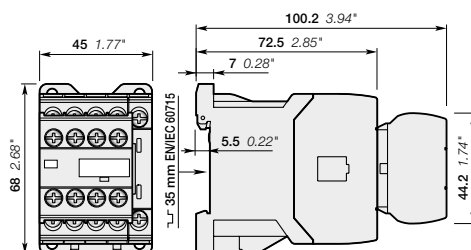
Number of contacts		Rated control circuit voltage Uc (1) V DC	Type	Order code	Weight Pkg (1 pce) kg
1st stack	2nd stack				
		24	NSL22E-81	1SBH103001R8122	0.280
		24	NSL31E-81	1SBH103001R8131	0.280
		24	NSL40E-81	1SBH103001R8140	0.280
		24	NSL44E-81	1SBH103001R8144	0.320
		24	NSL53E-81	1SBH103001R8153	0.320
		24	NSL62E-81	1SBH103001R8162	0.320
		24	NSL71E-81	1SBH103001R8171	0.320
		24	NSL80E-81	1SBH103001R8180	0.320

Note: for multiple packaging, please contact your ABB local sales organization.

(1) Other control voltages see voltage code table.



NSL22E, NSL31E, NSL40E



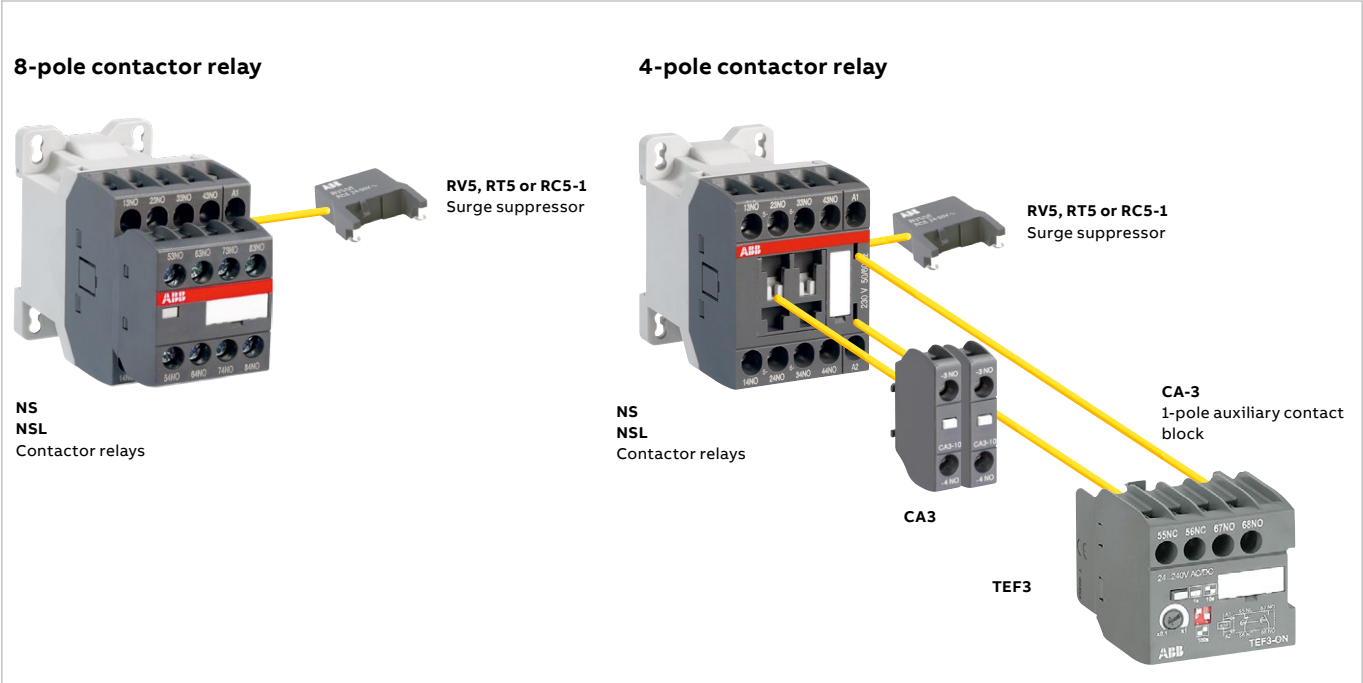
NSL44E, NSL53E, NSL62E, NSL71E, NSL80E

Main dimensions mm, inches

NS and NSL contactor relays

Main accessories

Contactor relays and main accessories (other accessories available)



Main accessory fitting details

Contactor types	Main poles	Front-mounted accessories		Side-mounted accessories	
		Auxiliary contact blocks	Electronic timer	Surge suppressors	
		1-pole CA3	TEF3		
NS..	2 2 E	2 max.	or 1	+ RV5	or RC5-1
NS..	3 1 E				
NS..	4 0 E				
NS..	4 4 E	-	-	RV5	or RC5-1
NS..	5 3 E				
NS..	6 2 E				
NS..	7 1 E				
NS..	8 0 E				
NSL..	2 2 E	2 max.	or 1	+ RV5	or RT5
NSL..	3 1 E				
NSL..	4 0 E				
NSL..	4 4 E	-	-	RV5	or RT5
NSL..	5 3 E				
NSL..	6 2 E				
NSL..	7 1 E				
NSL..	8 0 E				

NS and NSL contactor relays

Main accessories



CA3-10

1SBCL01036F0014



TEF3-ON

1SBCL01337F0014



RV5

1SBCE57401010301

Front-mounted instantaneous auxiliary contact blocks

For contactor relays	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce)
					kg
NS, NSL	1 0	CA3-10	1SBN011010T1010	10	0.011
	0 1	CA3-01	1SBN011010T1001	10	0.011

Front-mounted electronic timer

For contactors	Rated control circuit voltage - Uc	Type	Order code	Pkg qty	Weight (1 pce)
	V				kg

ON-delay

NS, NSL	24...240 V AC/DC	TEF3-ON	1SBN021012R1000	1	0.065
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OFF-delay

NS, NSL	24...240 V AC/DC	TEF3-OFF	1SBN021014R1000	1	0.065
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Surge suppressors

For contactor relays	Rated control circuit voltage - Uc			Type	Order code	Pkg qty	Weight (1 pce)
	V	AC	DC				
NS, NSL	24...50	●	●	RV5/50	1SBN050010R1000	2	0.015
	50...133	●	●	RV5/133	1SBN050010R1001	2	0.015
	110...250	●	●	RV5/250	1SBN050010R1002	2	0.015
	250...440	●	●	RV5/440	1SBN050010R1003	2	0.015
NS	24...50	●	–	RC5-1/50	1SBN050100R1000	2	0.012
	50...133	●	–	RC5-1/133	1SBN050100R1001	2	0.012
	110...250	●	–	RC5-1/250	1SBN050100R1002	2	0.012
	250...440	●	–	RC5-1/440	1SBN050100R1003	2	0.012
NSL	12...32	–	●	RT5/32	1SBN050020R1000	2	0.015
	25...65	–	●	RT5/65	1SBN050020R1001	2	0.015
	50...90	–	●	RT5/90	1SBN050020R1002	2	0.015
	77...150	–	●	RT5/150	1SBN050020R1003	2	0.015
	150...264	–	●	RT5/264	1SBN050020R1004	2	0.015

NS and NSL contactor relays

Technical data

Contact utilization characteristics according to IEC

Contactor relay types	AC operated	NS
	DC operated	NSL
Standards	IEC 60947-5-1 and EN 60947-5-1	
Rated operational voltage U_e max.	690 V	
Rated frequency (without derating)	50 / 60 Hz	
Conventional free-air thermal current I_{th} - $\theta \leq 40^\circ\text{C}$	10 A	
I_e / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A
	220-240 V 50/60 Hz	4 A
	400-440 V 50/60 Hz	3 A
	500 V 50/60 Hz	2 A
	690 V 50/60 Hz	2 A
Making capacity AC-15	10 x I_e AC-15 acc. to IEC 60947-5-1	
Breaking capacity AC-15	10 x I_e AC-15 acc. to IEC 60947-5-1	
I_e / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	6 A / 144 W
	48 V DC	2.8 A / 134 W
	72 V DC	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.27 A / 60 W
	250 V DC	0.27 A / 68 W
Short-circuit protection device for contactors		
$U_e \leq 500$ V AC - gG type fuse	10 A	
Rated short-time withstand current I_{cw}	for 1.0 s	100 A
	for 0.1 s	140 A
Minimum switching capacity	12 V / 3 mA	
with failure rate acc. to IEC 60947-5-4	10^{-7}	
Non-overlapping time between N.O. and N.C. contacts	1.5 ms	
Power dissipation per pole at 6 A	0.1 W	
Max. electrical switching frequency	AC-15	1200 cycles/h
	DC-13	900 cycles/h
Mechanically linked contacts acc. to annex L of IEC 60947-5-1	Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts (CA3 aux. contact blocks) are mechanically linked contacts.	

Contact utilization characteristics according to UL / CSA

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

NS and NSL contactor relays

Technical data

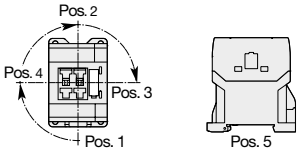
Magnet system characteristics for NS contactor relays

Contactor relay types	AC operated	NS
Coil operating limits acc. to IEC 60947-5-1	AC supply	0.85...1.1 x U_c (at $\theta \leq 60^\circ\text{C}$); U_c (at $\theta \leq 70^\circ\text{C}$)
AC control voltage	Rated control circuit voltage U_c	at 50 Hz 24...415 V
		at 60 Hz 24...415 V
Coil consumption	Average pull-in value	50 Hz 33 VA
		60 Hz 33 VA
		50/60 Hz 33 VA
Average holding value		50 Hz 6.5 VA / 1.5 W
		60 Hz 5 VA / 1.2 W
		50/60 Hz 6.5 VA / 1.5 W
Drop-out voltage		Approx. 30...50 % of U_c
Operating time		
Between coil energization and:	N.O. contact closing	9...24 ms
	N.C. contact opening	6...18 ms
Between coil de-energization and:	N.O. contact opening (1)	5...19 ms
	N.C. contact closing (1)	7...22 ms
(1) The use of RC5-1 surge suppressor increases opening time by a factor of 2 to 3.		

Magnet system characteristics for NSL contactor relays

Contactor relay types	DC operated	NSL
Coil operating limits acc. to IEC 60947-5-1	DC supply	0.85...1.1 x U_c (at $\theta \leq 60^\circ\text{C}$); U_c (at $\theta \leq 70^\circ\text{C}$)
DC control voltage	Rated control circuit voltage U_c	12...240 V DC
Coil consumption	Average pull-in value	3 W
	Average holding value	3 W
Drop-out voltage		Approx. 10...40 % of U_c
Coil time constant	Open	L/R 12 ms
	Closed	L/R 40 ms
Operating time		
Between coil energization and:	N.O. contact closing	36...59 ms
	N.C. contact opening	31...53 ms
Between coil de-energization and:	N.O. contact opening (1)	13...17 ms
	N.C. contact closing (1)	15...20 ms
(1) The use of RT5 surge suppressor increases opening time by a factor of 1.1 to 1.2.		

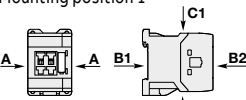
Mounting characteristics and conditions for use

Contactor relay types	AC operated	NS
	DC operated	NSL
Mounting positions		
Mounting distances	The contactor relays can be assembled side by side.	
Fixing	On rail according to IEC 60715, EN 60715	35 x 7.5 mm or 35 x 15 mm
	By screws (not supplied)	2 x M4 screws placed diagonally

NS and NSL contactor relays

Technical data

General technical data

Contactor relay types	AC operated	NS	
	DC operated	NSL	
Rated insulation voltage Ui			
acc. to IEC 60947-5-1		690 V	
acc. to UL / CSA		600 V	
Rated impulse withstand voltage Uimp.		6 kV	
Ambient air temperature close to contactor relay			
Operation in free air		-40...+70 °C	
Storage		-60...+80 °C	
Climatic withstand		Category B according to IEC 60947-1 Annex Q	
Maximum operating altitude (without derating)		3000 m	
Mechanical durability			
Number of operating cycles		20 millions operating cycles	
Max. switching frequency		3600 cycles/h	
Shock withstand		1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position	
acc. to IEC 60068-2-27 and EN 60068-2-27		Shock direction	
Mounting position 1			
	A	20 g	20 g closed position / 10 g open position
	B1	5 g	15 g closed position / 5 g open position
	B2	15 g	10 g
	C1	19 g closed position / 8 g open position	19 g closed position / 8 g open position
	C2	16 g closed position / 13 g open position	14 g closed position / 8 g open position
Vibration withstand acc. to IEC 60068-2-6		5...300 Hz / 3 g closed position / 2 g open position	

Connecting characteristics

Contactor relay types	AC operated	NS	
	DC operated	NSL	
Main terminals		 Screw terminals with cable clamp	
Connection capacity (min. ... max.)			
Pole and coil terminals			
 Rigid solid	1 x	0.75...2.5 mm ²	
	2 x	0.75...2.5 mm ²	
 Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²	
	2 x	0.75...2.5 mm ²	
 Flexible with insulated ferrule	1 x	0.75...2.5 mm ²	
	2 x	0.75...1.5 mm ²	
 Lugs	L ≤	7.7 mm	
	l >	3.2 mm	
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...14	
Stripping length		9 mm	
Tightening torque	Recommended	1.00 Nm / 9 lb.in	
	Max.	1.20 Nm	
Degree of protection			
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529			
All terminals		IP20	
Screw terminals		Delivered in open position, screws of unused terminals must be tightened	
All terminals		M3	
Screwdriver type		Flat Ø 5.5 / Pozidriv 2	

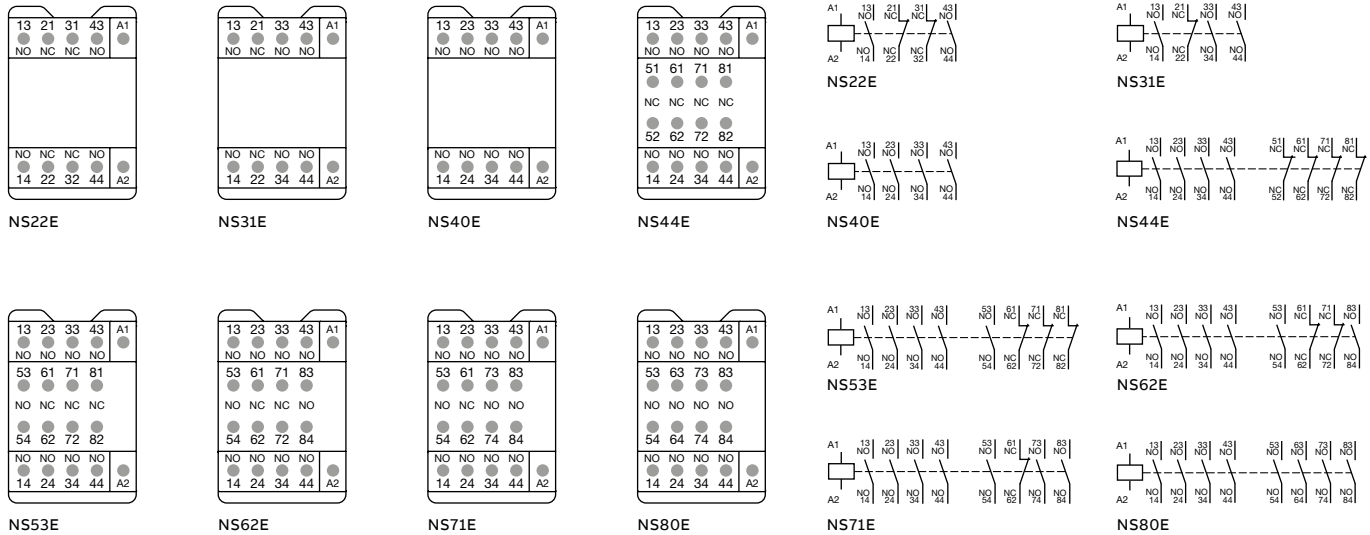
Notes

NS contactor relays

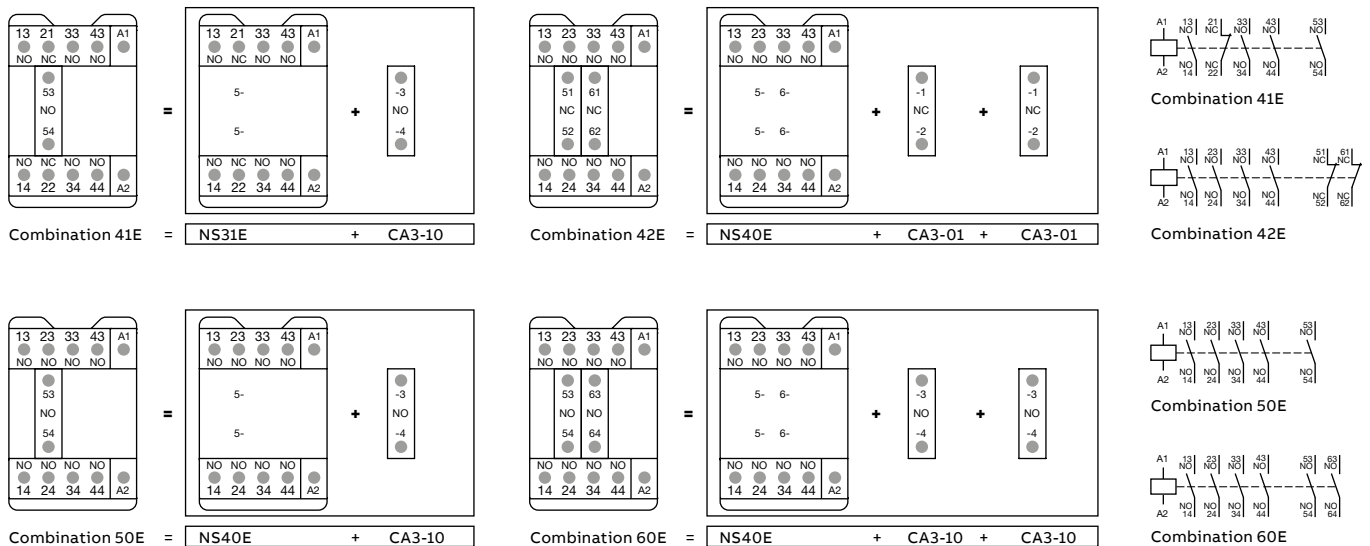
Terminal marking and positioning

NS contactor relays - AC operated

Standard devices without addition of auxiliary contact blocks



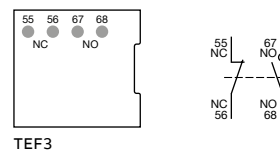
Other possible contact combinations with auxiliary contact blocks added by the user



CA3 1-pole auxiliary contact blocks



TEF3 front-mounted electronic timer

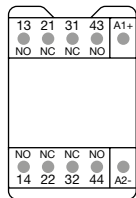


NSL contactor relays

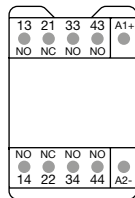
Terminal marking and positioning

NSL contactor relays - DC operated (the polarity A1+, A2- must be respected)

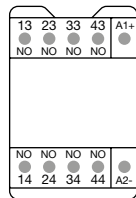
Standard devices without addition of auxiliary contact blocks



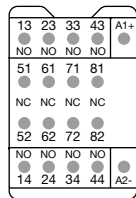
NSL22E



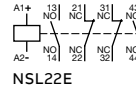
NSL31E



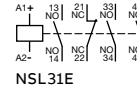
NSL40E



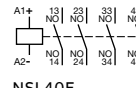
NSL44E



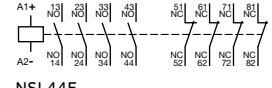
NSL22E



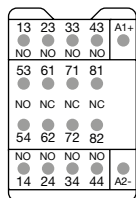
NSL31E



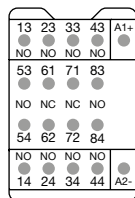
NSL40E



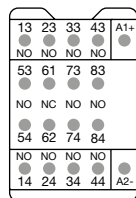
NSL44E



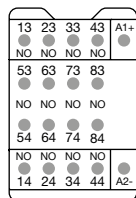
NSL53E



NSL62E



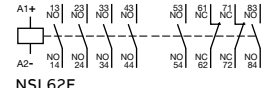
NSL71E



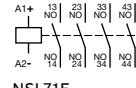
NSL80E



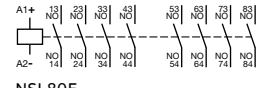
NSL53E



NSL62E

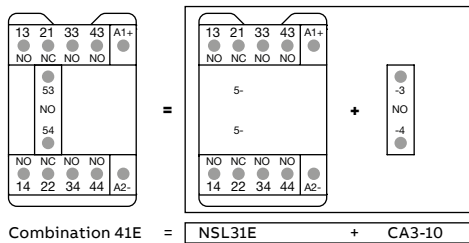


NSL71E

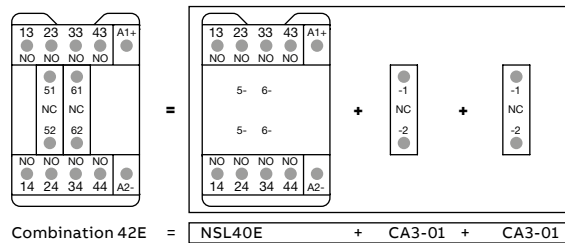


NSL80E

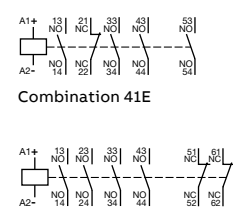
Other possible contact combinations with auxiliary contact blocks added by the user



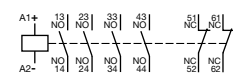
Combination 41E = NSL31E + CA3-10



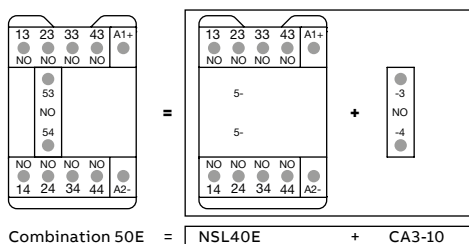
Combination 42E = NSL40E + CA3-01 + CA3-01



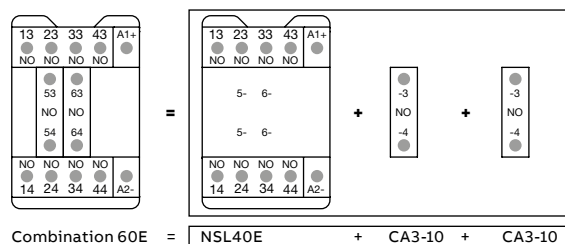
Combination 41E



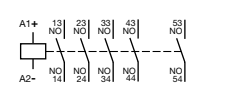
Combination 42E



Combination 50E = NSL40E + CA3-10



Combination 60E = NSL40E + CA3-10 + CA3-10

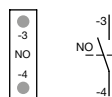


Combination 50E

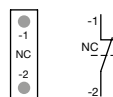


Combination 60E

CA3 1-pole auxiliary contact blocks

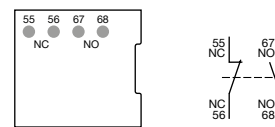


CA3-10



CA3-01

TEF3 front-mounted electronic timer

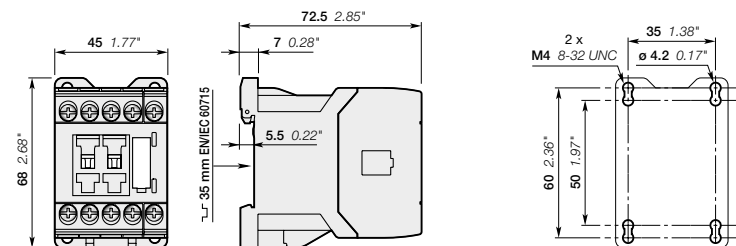


TEF3

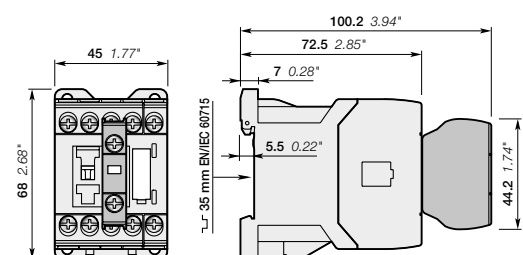
NS contactor relays

Dimensions

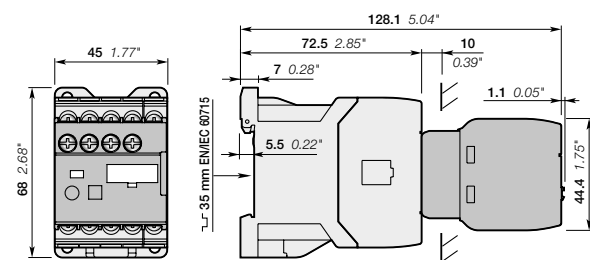
4-pole contactor relays



NS22E, NS31E, NS40E

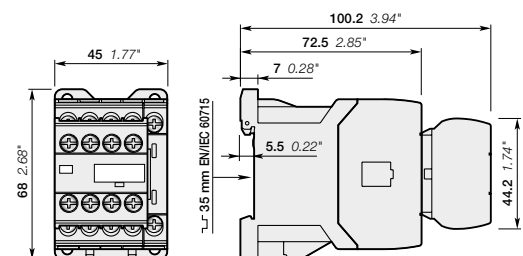


NS22E, NS31E, NS40E
+ CA3 front-mounted 1-pole auxiliary contact block



NS22E, NS31E, NS40E
+ TEF3 electronic timer

8-pole contactor relays

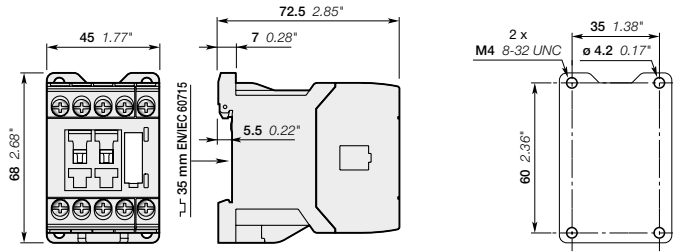


NS44E, NS53E, NS62E, NS71E, NS80E

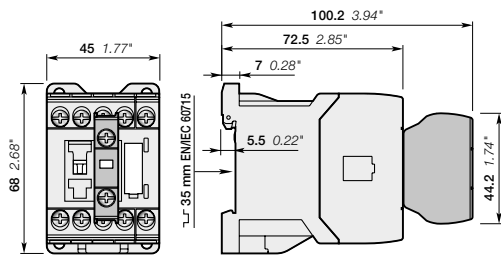
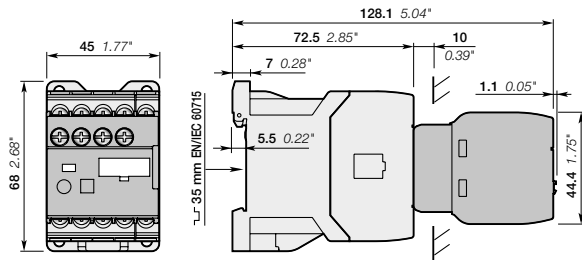
NSL contactor relays

Dimensions

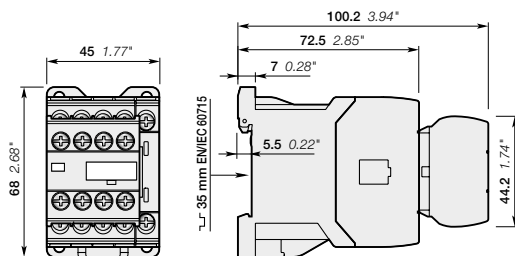
4-pole contactor relays



NSL22E, NSL31E, NSL40E

NSL22E, NSL31E, NSL40E
+ CA3 front-mounted 1-pole auxiliary contact blockNSL22E, NSL31E, NSL40E
+ TEF3 electronic timer

8-pole contactor relays



NSL44E, NSL53E, NSL62E, NSL71E, NSL80E

Main dimensions mm, inches

Auxiliary contact blocks

Accessories



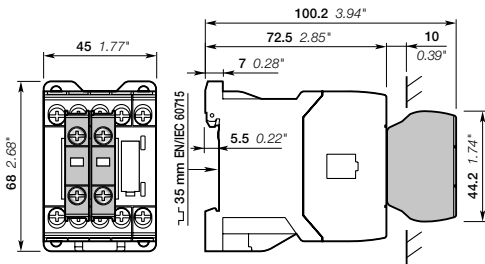
The auxiliary contact blocks are used for the operation of auxiliary circuits and control circuits. CA3 1-pole auxiliary contact blocks, designed for standard industrial environments, are equipped with:

- N.O. or N.C. contacts.
- Screw-type connecting terminals with cage clamp delivered open.

All 1-pole auxiliary contact blocks are protected against accidental direct contact and bear the corresponding function marking.

A maximum of two 1-pole auxiliary contact blocks can be front-mounted on 1-stack contactors or 1-stack contactor relays.

For contactors	For contactor relays	Contact blocks	Type	Order code	Pkg qty	Weight (1 pce)
						kg
1-pole auxiliary contact blocks with screw terminals						
AS09 ... AS16	NS, NSL	1 -	CA3-10	1SBN011010T1010	10	0.011
ASL09 ... ASL16		- 1	CA3-01	1SBN011010T1001	10	0.011



Main dimensions mm, inches

Auxiliary contact blocks

Technical data

Contact utilization characteristics according to IEC

Types	1-pole CA3	
Standards	IEC 60947-5-1 and EN 60947-5-1	
Rated insulation voltage U_i acc. to IEC 60947-5-1	690 V	
Rated impulse withstand voltage U_{imp}	6 kV	
Rated operational voltage U_e max.	690 V	
Conventional thermal current I_{th} - $\theta \leq 40^\circ\text{C}$	10 A	
I _e / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A
	220-240 V 50/60 Hz	4 A
	400-440 V 50/60 Hz	3 A
	500 V 50/60 Hz	2 A
	690 V 50/60 Hz	2 A
Making capacity	10 x I _e AC-15 acc. to IEC 60947-5-1	
Breaking capacity	10 x I _e AC-15 acc. to IEC 60947-5-1	
I _e / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	6 A / 144 W
	48 V DC	2.8 A / 134 W
	72 V DC	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.27 A / 60 W
	250 V DC	0.27 A / 68 W
Short-circuit protection device gG type fuse	10 A	
Rated short-time withstand current I _{cw} $\theta = 40^\circ\text{C}$	for 1.0 s	100 A
	for 0.1 s	140 A
Minimum switching capacity	12 V / 3 mA	
with failure rate acc. to IEC 60947-5-4	10 ⁻⁷	
Power dissipation per pole at 6 A	0.1 W	
Mechanical durability		
Number of operating cycles	10 millions operating cycles	
Max. switching frequency	3600 cycles/h	
Max. electrical switching frequency	AC-15	1200 cycles/h
	DC-13	900 cycles/h
Mechanically linked contacts acc. to annex L of IEC 60947-5-1	Additional N.O. or N.C. auxiliary contacts (CA3) are mechanically linked contacts	
Mirror contacts acc. to annex F of IEC 60947-4-1	Additional N.C. auxiliary contacts (CA3) are mirror contacts	

Contact utilization characteristics according to UL / CSA

Standards	UL 508, CSA C22.2 N°14	
Max. operational voltage	690 V AC, 250 V DC	
Pilot duty	A600, Q300	
AC thermal rated current	10 A	
AC maximum volt-ampere making	7200 VA	
AC maximum volt-ampere breaking	720 VA	
DC thermal rated current	2.5 A	
DC maximum volt-ampere making-breaking	69 VA	

Connecting characteristics

Connection capacity (min. ... max.)		
 Rigid solid	1 x	0.75...2.5 mm ²
	2 x	0.75...2.5 mm ²
 Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²
	2 x	0.75...2.5 mm ²
 Flexible with insulated ferrule	1 x	0.75...2.5 mm ²
	2 x	0.75...1.5 mm ²
 Lugs	L ≤	7.7 mm
	L >	3.2 mm
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...14
Stripping length	9 mm	
Tightening torque	Recommended	1 Nm / 9 lb.in
	Max.	1.20 Nm
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529	IP20	
Screw terminals	Delivered in open position, screws of unused terminals must be tightened	
All terminals	M3	
Screwdriver type	Flat Ø 5.5 / Pozidriv 2	

Auxiliary contact blocks for AS09 ... AS16, ASL09 ... ASL16 contactors and NS, NSL contactor relays

Electrical durability

Electrical durability for AC-15 utilization category - $U_e \leq 400$ V

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

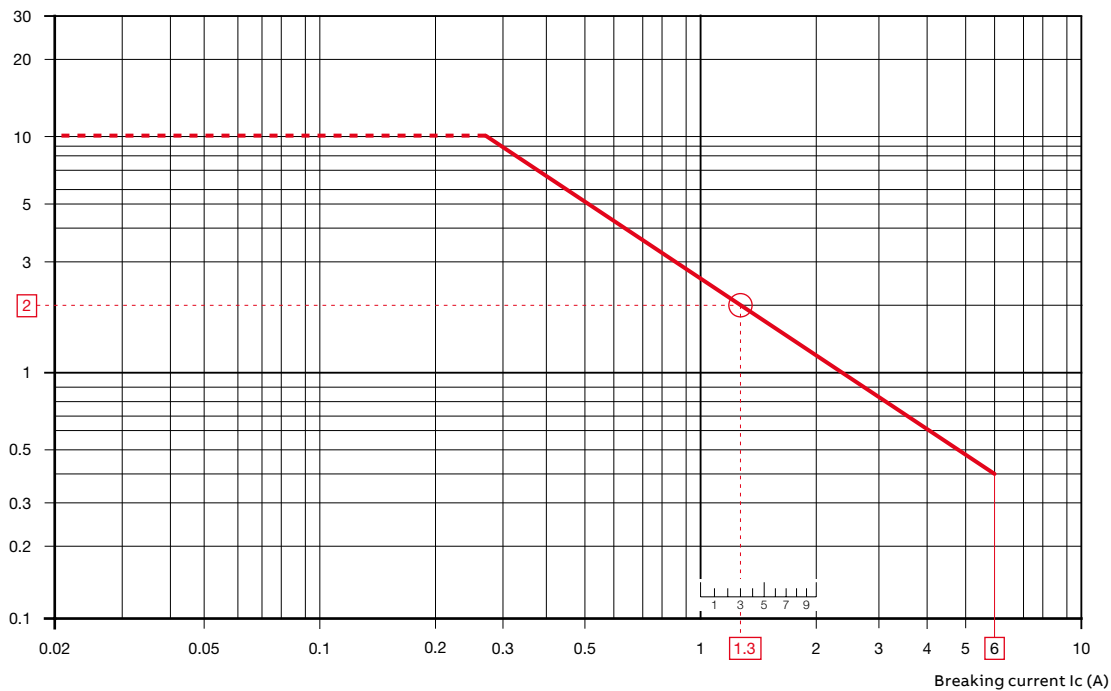
- making current: $10 \times I_e$ with $\cos \phi = 0.7$ and U_e
- breaking current: I_e with $\cos \phi = 0.4$ and U_e .

This curve represents the electrical durability of the built-in or add-on auxiliary contacts in relation to the breaking current.

The curve has been drawn for resistive and inductive loads up to 400 V:

- AS09 ... AS16 and ASL09 ... ASL16 contactor built-in auxiliary contacts
- 1-pole CA3
- NS and NSL contactor relays.

Millions of
operating
cycles



Example:

Breaking current = 1.3 A

On the opposite curve at intersection "O" 1.3 A the corresponding value for the electrical durability is approximately 2 millions operating cycles.

Electronic timers



TEF3-ON



TEF3-OFF

TEF3 frontal electronic timers are used for realizing timing function and are available in ON-delay and OFF-delay versions.

Compact solution in cabinet compared to separate timers

TEF3 electronic timers are front-mounted and locked on AS/ASL contactors or NS/NSL contactor relays. A mechanical indicator allows to show the state of the contactor.

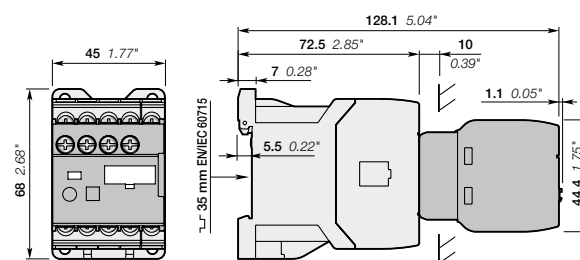
Safe and cost-reduced wiring

TEF3 electronic timers are supplied by a direct plug-in parallel connection to the coil terminals A1 - A2 of the contactor or contactor relay. A varistor is integrated on the timer to offer a built-in protection against surges in the contactor coil.

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

TEF3-ON or TEF3-OFF allow time-delayed functions up to 100 s in 3 distinct time ranges, independently of the control system. The time delay ranges are selected by a switch and the time delay can be adjusted by means of a rotary switch. The timing function is activated by closing or opening the device on which the timer is mounted. The OFF-delay version operates without additional control supply.

For contactors, contactor relays	Time delay range selected by switch	Delay type	Rated control circuit voltage U _c	Auxiliary contacts	Type	Order code	Weight
			V 50/60 Hz or DC				Pkg (1 pce) kg
AS09 ... AS16	0.1...1 s	ON-delay	24...240	1 1	TEF3-ON	1SBN021012R1000	0.065
ASL09 ... ASL16	1...10 s	OFF-delay	24...240	1 1	TEF3-OFF	1SBN021014R1000	0.065
NS, NSL	10...100 s						



Main dimensions mm, inches

Electronic timers

Technical data

Contact utilization characteristics according to IEC

Types		TEF3-ON	TEF3-OFF
Standards		IEC 60947-5-1 and EN 60947-5-1	
Rated insulation voltage U_i acc. to IEC 60947-5-1		400 V	
Rated impulse withstand voltage U_{imp}		4 kV	
Rated operational voltage U_e max.		240 V	
Rated frequency (without derating)		50 / 60 Hz	
Conventional thermal current I_{th} - $\theta \leq 40^\circ\text{C}$		5 A	
I _e / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V	3 A	
	50/60 Hz		
	220-240 V	1.5 A	
		50/60 Hz	
Making capacity acc. to IEC 60947-5-1		10 x I _e AC-15	
Breaking capacity acc. to IEC 60947-5-1		10 x I _e AC-15	
I _e / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	1 A / 24 W	
		6 A	
Short-circuit protection device gG type fuse		8 A	
Rated short-time withstand current I_{cw} $\theta = 40^\circ\text{C}$	for 1.0 s	8 A	
	for 0.1 s	8 A	
Minimum switching capacity		12 V / 3 mA	
with failure rate acc. to IEC 60947-5-4		10-7	
Power dissipation per pole at 3 A		0.1 W	
Function diagram		ON-delay	OFF-delay
		Bistable relay inside. Before use, once apply U_c then switch it off in order to initialize position of the contacts.	
Control circuit voltage			
AC control voltage 50/60 Hz	Rated control circuit voltage U_c	24...240 V AC	
	Average consumption	1.5 mA RMS	1 mA RMS
DC control voltage	Rated control circuit voltage U_c	24...240 V DC	
	Average consumption	1.5 mA	1 mA
Rated frequency limits		50 / 60 Hz	
Supply voltage range		0.85...1.1 x U_c (at $\theta \leq 70^\circ\text{C}$)	
Overvoltage protection		Varistor included	
Time delay range (t) selected by switch	0.1...1 s		
	1...10 s		
	10...100 s		
On-load reiteration accuracy under constant conditions		$\leq 1\%$	
Minimum ON period		0.1 s	1 s
Recovery time		0.15 s	0.1 s
Ambient air temperature	Operation	-25 °C ... +70 °C	
	Storage	-40 °C ... +80 °C	
Climatic withstand		Category B according to IEC 60947-1 Annex Q	
Maximum operating altitude		2000 m	
Mounting positions		Mounting positions 1, 1 +/- 30°, 2, 3, 4, 5	
Shock withstand		1/2 sinusoidal shock for 11 ms: no change in contact position	
acc. to IEC 60068-2-27 and EN 60068-2-27 (Mounting position 1)		Same as contactor or contactor relay	
Vibration withstand		5...300 Hz	
acc. to IEC 60068-2-6		3 g closed position / 2 g open position	
Mechanical durability			
Number of operating cycles		5 millions operating cycles	
Max. switching frequency		3600 cycles/h	1800 cycles/h
Max. electrical switching frequency			
		AC-15	1200 cycles/h
		DC-13	900 cycles/h

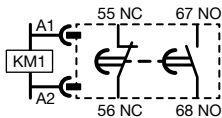
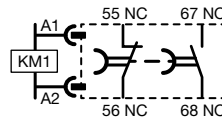
Electronic timers

Technical data

Contact utilization characteristics according to UL / CSA

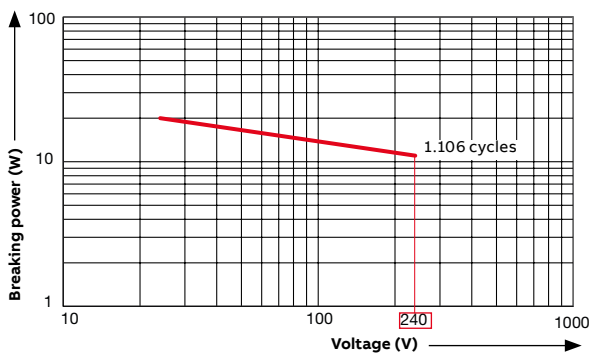
Types	TEF3-ON	TEF3-OFF
Standards	UL 508, CSA C22.2 N°14	
Rated insulation voltage Ui acc. to UL / CSA	300 V	
Max. operational voltage	240 V	
Pilot duty	B300, R300	
AC thermal rated current	5 A	
AC maximum volt-ampere making	3600 VA	
AC maximum volt-ampere breaking	360 VA	
DC thermal rated current	1 A	
DC maximum volt-ampere making-breaking	28 VA	

Connecting characteristics

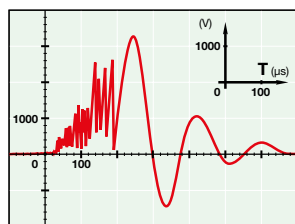
Connection capacity (min. ... max.)		
	Rigid solid	1 x 0.75...2.5 mm ²
		2 x 0.75...2.5 mm ²
	Flexible with non insulated ferrule	1 x 0.75...2.5 mm ²
		2 x 0.75...2.5 mm ²
	Flexible with insulated ferrule	1 x 0.75...2.5 mm ²
		2 x 0.75...1.5 mm ²
	Lugs	L ≤ 7.7 mm
		l > 3.2 mm
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...14
Stripping length		9 mm
Tightening torque	Recommended	1 N.m / 9 lb.in
	Max.	1.20 N.m
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529	IP20	
Screw terminals	Delivered in open position, screws of unused terminals should be tightened	
All terminals	M3	
Screwdriver type	Flat Ø 5.5 / Pozidriv 2	
Terminal Marking	 	

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 Ie and Ue.



Surge suppressors for contactor coils



The operation of inductive circuits causes overvoltages, in particular on opening 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 the breakdown of insulators and even the 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 :

$$k = \frac{\hat{U}_s \text{ max.}}{\hat{U}_c} \quad \text{in DC} \quad k = \frac{\hat{U}_s \text{ max.}}{U_c} \quad \text{in AC} \quad k = \frac{\hat{U}_s \text{ max.}}{U_c \sqrt{2}}$$

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

To reduce 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 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 decreases to a very large extent when a certain voltage is applied at its terminals.



RV5

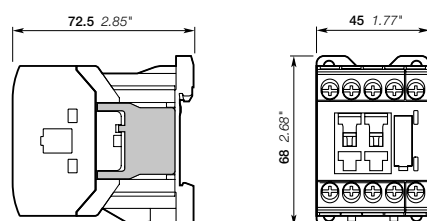


RC5-1



RT5

For contactors	For contactor relays	Rated control circuit voltage - U_c		Type	Order code	Pkg qty	Weight (1 pce)
		V	AC DC				
AS, ASL	NS, NSL	24...50	● ●	RV5/50	1SBN050010R1000	2	0.015
		50...133	● ●	RV5/133	1SBN050010R1001	2	0.015
		110...250	● ●	RV5/250	1SBN050010R1002	2	0.015
		250...440	● ●	RV5/440	1SBN050010R1003	2	0.015
AS	NS	24...50	● -	RC5-1/50	1SBN050100R1000	2	0.012
		50...133	● -	RC5-1/133	1SBN050100R1001	2	0.012
		110...250	● -	RC5-1/250	1SBN050100R1002	2	0.012
		250...440	● -	RC5-1/440	1SBN050100R1003	2	0.012
ASL	NSL	12...32	- ●	RT5/32	1SBN050020R1000	2	0.015
		25...65	- ●	RT5/65	1SBN050020R1001	2	0.015
		50...90	- ●	RT5/90	1SBN050020R1002	2	0.015
		77...150	- ●	RT5/150	1SBN050020R1003	2	0.015
		150...264	- ●	RT5/264	1SBN050020R1004	2	0.015



Main dimensions mm, inches

Easy connection to the coil terminals
(parallel mounting)
Clip-on for both fixing and connection.

No additional space
Clipped onto the right side part of the contactor base without changing contactor overall dimensions and keeping a free access to coil terminals.

Surge suppressors for contactor coils

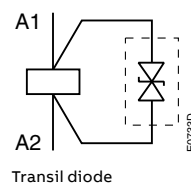
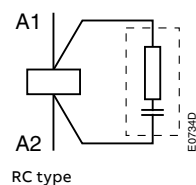
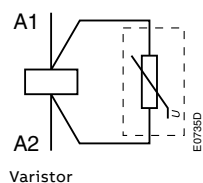
Technical data

Varistor	RV5/50	RV5/133	RV5/250	RV5/440
Rated control circuit voltage U_c	24...50 V AC 24...50 V DC	50...133 V AC 50...133 V DC	110...250 V AC 110...250 V DC	250...440 V AC 250...440 V DC
Residual overvoltage (clipping voltage)	132 V AC 132 V DC	270 V AC 270 V DC	480 V AC 480 V DC	825 V AC 825 V DC
Opening time growth factor	none			
Operating temperature	-20...+70 °C			
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 $\pm 10\%$.			

RC type	RC5-1/50	RC5-1/133	RC5-1/250	RC5-1/440
Rated control circuit voltage U_c	24...50 V AC	50...133 V AC	110...250 V AC	250...440 V AC
Residual overvoltage (clipping voltage)	2 to 3 x U_c max.			
Opening time growth factor	2...3			
Operating temperature	-20...+70 °C			
Advantages	Very fast clipping - Attenuation of steep fronts and thus of high frequencies.			

Transil diode	RT5/32	RT5/65	RT5/90	RT5/150	RT5/264
Rated control circuit voltage U_c	12...32 V DC	25...65 V DC	50...90 V DC	77...150 V DC	150...264 V DC
Residual overvoltage (clipping voltage)	50 V DC	100 V DC	150 V DC	210 V DC	390 V DC
Opening time growth factor	1.1...1.2				
Operating temperature	-20...+70 °C				
Advantages	Good energy absorption - Unpolarized system - Simple, reliable system.				
Drawback	Delay on drop out which does not however reduce contactor breaking capacity.				

Wiring diagrams



Mechanical interlock unit and other accessories



VM3



Mechanical interlock unit

When mounted between two contactors without additional width, the VM3 mechanical interlock unit prevents one of the contactors from closing as long as the other contactor is closed.

The mechanical interlock unit includes 2 fixing clips.

For contactors		Type	Order code	Pkg qty	Weight (1 pce) kg
Left	Right	VM3	1SBN031005T1000	10	0.002
AS	AS				
ASL	ASL				

Note : VM3 mechanical durability, 5 millions of operating cycles on both reversing contactors.

Fixing clips

BB3 is a set of 50 fixing clips.

For contactors		Type	Order code	Pkg qty	Weight (1 pce) kg
AS, ASL		BB3	1SBN111020R1000	1	0.009

Test block

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

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

For contactors		Type	Order code	Pkg qty	Weight (1 pce) kg
AS, ASL, NS, NSL		BDT4	1SBN110122T1000	10	0.007

Function markers

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

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

For contactors		Type	Order code	Pkg qty	Weight (1 pce) kg
AS, ASL, NS, NSL		BA4	1SNA235156R2700	16	0.011
AMS 500 support plate for 8 BA4		SPRC 1	1SNA360010R1500	1	0.220
HTP500 support plate		HTP500-BA4	1SNA235712R2400	1	0.290



BDT4



BA4

1SNC16010F0014

Connection accessories for starting solutions



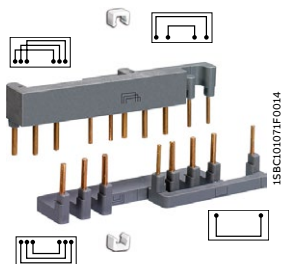
BEA16-3

Connecting links

The BEA16-3 insulated 3-pole connecting links are used to connect an AC or DC operated contactors with manual motor starters.

The connecting links ensure the electrical and mechanical connection between the contactor and the manual motor starter.

For contactors	Manual motor starter	Type	Order code	Pkg qty	Weight (1 pce) kg
AS09 ... AS16 ASL09 ... ASL16	MS116-0.16 ... MS116-16 MS132-0.16 ... MS132-16	BEA16-3	1SBN081006T1000	10	0.019



BER16C-3

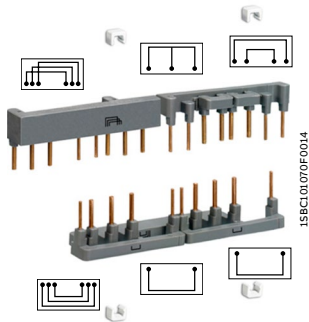
Connection sets for reversing contactors

The BER16C-3 connection sets are used for the connections between the main poles of two 3-pole contactors mounted side by side as reversing contactors, including electrical interlocking between built-in N.C. auxiliary contact and coil terminals.

The connection sets are made up of:

- 1 upstream and 1 downstream connections: insulated, solid copper bars,
- 2 connections to realize electrical interlocking between contactors equipped with built-in N.C. auxiliary contacts,
- 2 fixing clips.

For contactors	Mechanical interlock unit	Type	Order code	Pkg qty	Weight (1 pce) kg
2 x AS09 ... AS16 2 x ASL09 ... ASL16	with or without VM3	BER16C-3	1SBN081012R1000	1	0.035



BEY16C-3

Connection sets for star-delta starting

BEY16C-3 connection sets are designed for star-delta starters whose contactors are assembled according to line delta star mounting.

The connection sets are made up of:

- Line contactor / delta contactor: upstream phase-to-phase connection,
- Delta contactor / star contactor: downstream connection in parallel,
- Star contactor: star point upstream,
- An electrical interlocking between delta and star contactors equipped with built-in N.C. auxiliary contacts,
- 4 fixing clips.

For contactors			Mech. interlock unit between star & delta contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
Line	Delta	Star					
AS09	AS09	AS09	with or without VM3	BEY16C-3	1SBN081018R2000	1	0.041
AS12	AS12	AS09					

Voltage code table

The below tables indicate the available coil voltages and corresponding digits for order codes. When placing an order, please give either type or order code. Select a standard contactor from ordering detail pages. Change the coil voltage code in the type or in the order code according to the table below. Example: for contactor AS09-30-10 and coil 42 V 50/60 Hz, type is AS09-30-10-21 and order code is 1SBL101001R2110.

3-pole contactors

Type

AS16 - 30 - 10 - 26

Auxiliary contacts

N.O. N.C.

N.O. N.C.

Main contacts

AS

ASL

AC operated

DC operated

Order code

1SBL121001R 26 10

AC coil code

50 Hz

60 Hz

80

81

83

84

86

87

88

89

12 V

24 V

48 V

60 V

110 V

125 V

220 V

240 V

20

21

22

23

24

16

25

26

27

17

13

28

29

24 V 24 V

42 V 42 V

48 V 48 V

110 V

115 V

- 120 V

220 V

230 V

240 V

- 277 V

380 V

400 V

415 V

110 V

115 V

220 V

230 V

240 V

-

400 V

415 V

Contactor relays

Type

NS 40 E - 26

N.O. N.C.

Number contacts

NS

NSL

AC operated

DC operated

Order code

1SBH101001R 26 40

AC coil code

50 Hz

60 Hz

80

81

83

84

86

87

88

89

12 V

24 V

48 V

60 V

110 V

125 V

220 V

240 V

20

21

22

23

24

16

25

26

27

17

13

28

29

24 V 24 V

42 V 42 V

48 V 48 V

110 V

115 V

- 120 V

220 V

230 V

240 V

- 277 V

380 V

400 V

415 V

110 V

115 V

220 V

230 V

240 V

-

400 V

415 V

Notes



AS..S 3-pole contactors and NS..S contactor relays with spring terminals

AS..S 3-pole contactors - with spring terminals

5/56	AS09..S ... AS16..S	AC operated
5/57	ASL09..S ... ASL16..S	DC operated
5/58	AS09..S ... AS16..S	AC operated - 2-stack
5/59	ASL09..S ... ASL16..S	DC operated - 2-stack
5/60	Main accessories	
5/62	Technical data	
5/68	Electrical durability	
5/69	Terminal marking and positioning	
5/71	Main dimensions	

NS..S contactors relays - with spring terminals

5/73	NS..S	AC operated
5/74	NSL..S	DC operated
5/75	Main accessories	
5/77	Technical data	
5/80	Terminal marking and positioning	
5/82	Main dimensions	

Accessories

5/84	Auxiliary contact blocks - with spring terminals
5/88	Surge suppressors for contactor coils
5/90	Connecting links for starting solution and other accessories

5/91 Voltage code table



For direct product details information, use product type or order code, ex:

- www.abb.com/productdetails/AF09-30-10-13
- or www.abb.com/productdetails/1SBL137001R1310

AS09..S ... AS16..S 3-pole contactors

4 to 7.5 kW

AC operated - with spring terminals



AS09-30-10S

AS09 ... AS16 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.

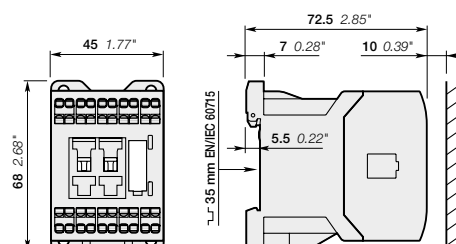
These contactors are of the block type design with:

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

IEC		UL/CSA		Rated control circuit voltage U_c (1)		Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating 480 V	General use rating 600 V AC	V 50 Hz	V 60 Hz				
400 V AC-3	AC-1								
kW	A	hp	A						
4	20	5	12	24	24	1 0	AS09-30-10S-20	1SBL101004R2010	0.220
						0 1	AS09-30-01S-20	1SBL101004R2001	0.220
				230	230	1 0	AS09-30-10S-26	1SBL101004R2610	0.220
						0 1	AS09-30-01S-26	1SBL101004R2601	0.220
5.5	22	7.5	12	24	24	1 0	AS12-30-10S-20	1SBL111004R2010	0.220
						0 1	AS12-30-01S-20	1SBL111004R2001	0.220
				230	230	1 0	AS12-30-10S-26	1SBL111004R2610	0.220
						0 1	AS12-30-01S-26	1SBL111004R2601	0.220
7.5	22	10	15.2	24	24	1 0	AS16-30-10S-20	1SBL121004R2010	0.220
						0 1	AS16-30-01S-20	1SBL121004R2001	0.220
				230	230	1 0	AS16-30-10S-26	1SBL121004R2610	0.220
						0 1	AS16-30-01S-26	1SBL121004R2601	0.220

Note: for multiple packaging, please contact your ABB local sales organization.

(1) Other control voltages see voltage code table.



AS09..S, AS12..S, AS16..S

Main dimensions mm, inches

ASL09..S ... ASL16..S 3-pole contactors

4 to 7.5 kW

DC operated - with spring terminals



ASL09-30-10S

ASL09..S ... ASL16..S contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.

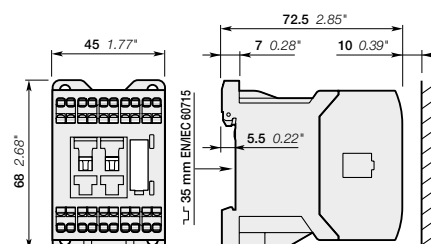
These contactors are of the block type design with:

- spring terminals
- 3 main poles and 1 built-in auxiliary contact
- control circuit: low consumption (3 W at pull-in and holding) DC operated with solid core magnet. Suitable for direct control by PLC outputs (the polarity on the coil terminals A1+ and A2- must be respected)
- add-on auxiliary contact blocks for front mounting and comprehensive range of accessories.

IEC		UL/CSA		Rated control circuit voltage U _c (1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce) kg
400 V								
AC-3	AC-1							
kW	A	hp	A	V DC				
4	20	5	12	24	1 0	ASL09-30-10S-81	1SBL103004R8110	0.280
					0 1	ASL09-30-01S-81	1SBL103004R8101	0.280
5.5	22	7.5	12	24	1 0	ASL12-30-10S-81	1SBL113004R8110	0.280
					0 1	ASL12-30-01S-81	1SBL113004R8101	0.280
7.5	22	10	15.2	24	1 0	ASL16-30-10S-81	1SBL123004R8110	0.280
					0 1	ASL16-30-01S-81	1SBL123004R8101	0.280

Note: for multiple packaging, please contact your ABB local sales organization.

(1) Other control voltages see voltage code table.



ASL09..S, ASL12..S, ASL16..S

Main dimensions mm, inches

AS09..S ... AS16..S 2-stack 3-pole contactors

4 to 7.5 kW

AC operated - with spring terminals



AS09-30-32S

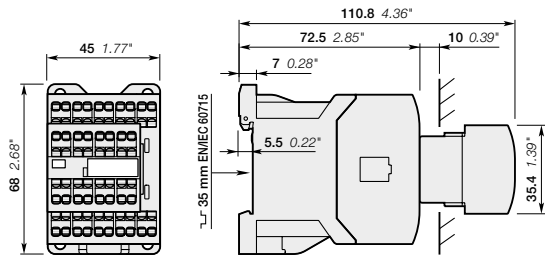
AS09..S ... AS16..S contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.

These contactors are of the block type design with:

- spring terminals
- 1st stack with 3 main poles and 1 N.O. built-in auxiliary contact
- 2nd stack with permanently fixed 2 N.O. + 2 N.C. auxiliary contact block
- the auxiliary contact elements are mechanically linked (side-marked symbol) and the N.C. auxiliary contacts are mirror contacts
- control circuit: AC operated
- a comprehensive range of accessories.

IEC		UL/CSA		Rated control circuit voltage Uc (1)		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power	current θ ≤ 40 °C	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
400 V	AC-3			V 50 Hz	V 60 Hz				kg
4	20	5	12	24	24	3 2	AS09-30-32S-20	1SBL101004R2032	0.260
				230	230	3 2	AS09-30-32S-26	1SBL101004R2632	0.260
5.5	22	7.5	12	24	24	3 2	AS12-30-32S-20	1SBL111004R2032	0.260
				230	230	3 2	AS12-30-32S-26	1SBL111004R2632	0.260
7.5	22	10	15.2	24	24	3 2	AS16-30-32S-20	1SBL121004R2032	0.260
				230	230	3 2	AS16-30-32S-26	1SBL121004R2632	0.260

Note: for multiple packaging, please contact your ABB local sales organization.
(1) Other control voltages see voltage code table.



AS09..S, AS12..S, AS16..S

Main dimensions mm, inches

ASL09..S ... ASL16..S 2-stack 3-pole contactors

4 to 7.5 kW

DC operated - with spring terminals



ASL09-30-32S

ASL09..S ... ASL16..S contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.

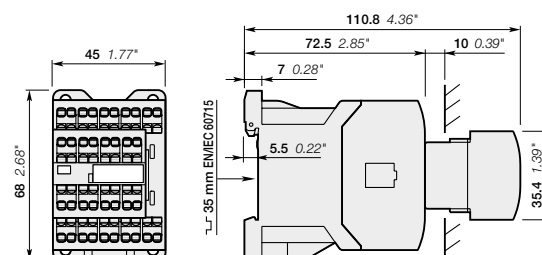
These contactors are of the block type design with:

- spring terminals
- 1st stack with 3 main poles and 1 N.O. built-in auxiliary contact
- 2nd stack with permanently fixed 2 N.O. + 2 N.C. auxiliary contact block
- the auxiliary contact elements are mechanically linked (side-marked symbol) and the N.C. auxiliary contacts are mirror contacts
- control circuit: low consumption (3 W at pull-in and holding) DC operated with solid core magnet. Suitable for direct control by PLC outputs (the polarity on the coil terminals A1+ and A2- must be respected)
- a comprehensive range of accessories.

IEC		UL/CSA		Rated control circuit voltage U _c (1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power	current $\theta \leq 40^\circ\text{C}$	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
400 V								
AC-3	AC-1							
kW	A	hp	A	V DC				kg
4	20	5	12	24	3 2	ASL09-30-32S-81	1SBL103004R8132	0.320
5.5	22	7.5	12	24	3 2	ASL12-30-32S-81	1SBL113004R8132	0.320
7.5	22	10	15.2	24	3 2	ASL16-30-32S-81	1SBL123004R8132	0.320

Note: for multiple packaging, please contact your ABB local sales organization.

(1) Other control voltages see voltage code table.

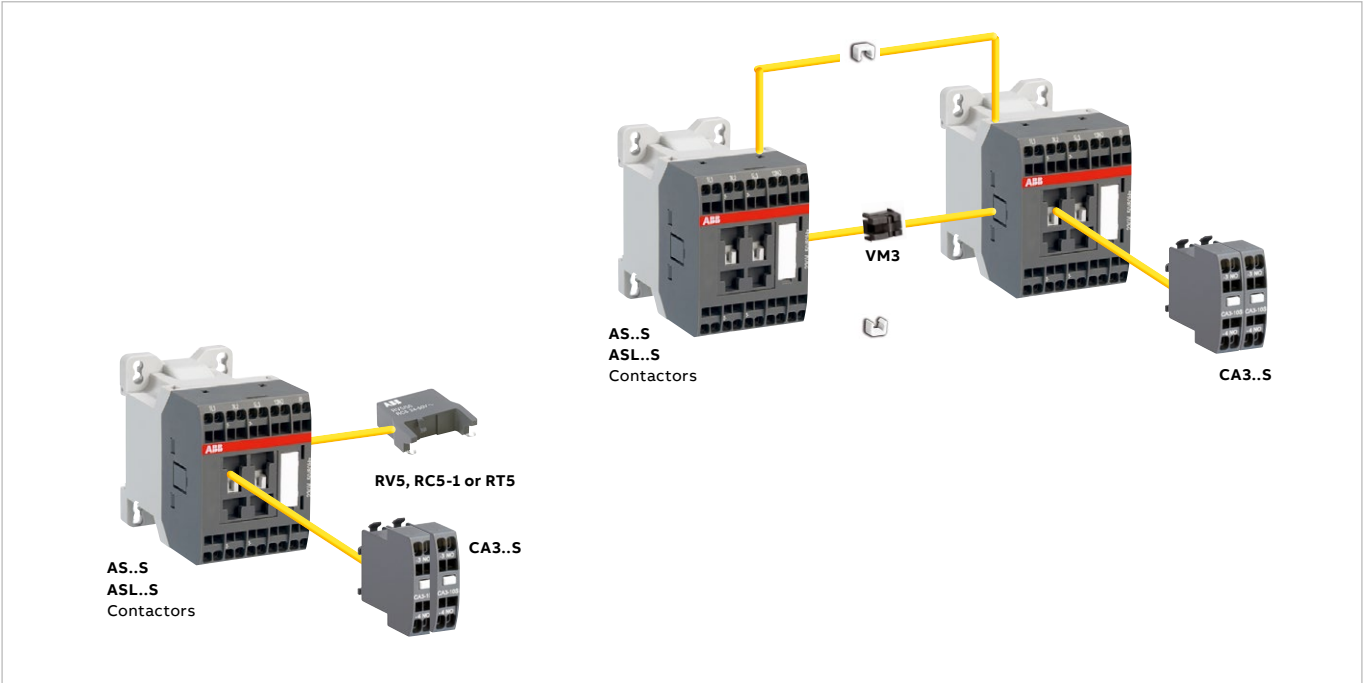


ASL09..S, ASL12..S, ASL16..S

Main dimensions mm, inches

AS09..S ... AS16..S and
ASL09..S ... ASL16..S 3-pole contactors - with spring terminals
Main accessories

Contactor and main accessories (other accessories available)



Main accessory fitting details

Contactor types	Main poles 	Built-in auxiliary contacts 	Front-mounted accessories		Side-mounted accessories	
			Auxiliary contact blocks	Mechanical interlock unit (between 2 contactors)	Surge suppressors	
AS09..S ... AS16..S	3 0	1 0	1-pole CA3..S	VM3		
AS09..S ... AS16..S	3 0	0 1	2 max.	+ 1	+ RV5	or RC5-1
AS09..S ... AS16..S	3 0	3 2	–	1	+ RV5	or RC5-1
ASL09..S ... ASL16..S	3 0	1 0	2 max.	+ 1	+ RV5	or RT5
ASL09..S ... ASL16..S	3 0	0 1				
ASL09..S ... ASL16..S	3 0	3 2	–	1	+ RV5	or RT5

AS09..S ... AS16..S and ASL09..S ... ASL16..S 3-pole contactors - with spring terminals

Main accessories



CA3-10S

1SBC101037F0014



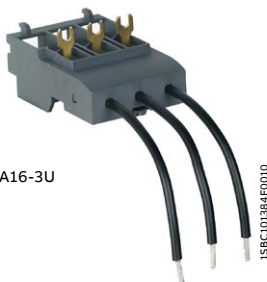
VM3

1SBC101069F0014



RV5

1SBC574001F0301



BEA16-3U

1SBC101384F0010

Front-mounted instantaneous auxiliary contact blocks

For contactors	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce) kg
AS09..S ... AS16..S	1 0	CA3-10S	1SBN011019T1010	10	0.011
ASL09..S ... ASL16..S	0 1	CA3-01S	1SBN011019T1001	10	0.011

Mechanical interlock unit

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AS09..S ... AS16..S, ASL09..S ... ASL16..S	VM3	1SBN031005T1000	10	0.002

Surge suppressors

For contactors	Rated control circuit voltage - Uc		Type	Order code	Pkg qty	Weight (1 pce) kg
	V	AC DC				
AS09..S ... AS16..S, ASL09..S ... ASL16..S	24...50	● ●	RV5/50	1SBN050010R1000	2	0.015
	50...133	● ●	RV5/133	1SBN050010R1001	2	0.015
	110...250	● ●	RV5/250	1SBN050010R1002	2	0.015
	250...440	● ●	RV5/440	1SBN050010R1003	2	0.015
AS09..S ... AS16..S	24...50	● -	RC5-1/50	1SBN050100R1000	2	0.012
	50...133	● -	RC5-1/133	1SBN050100R1001	2	0.012
	110...250	● -	RC5-1/250	1SBN050100R1002	2	0.012
	250...440	● -	RC5-1/440	1SBN050100R1003	2	0.012
ASL09..S ... ASL16..S	12...32	- ●	RT5/32	1SBN050020R1000	2	0.015
	25...65	- ●	RT5/65	1SBN050020R1001	2	0.015
	50...90	- ●	RT5/90	1SBN050020R1002	2	0.015
	77...150	- ●	RT5/150	1SBN050020R1003	2	0.015
	150...264	- ●	RT5/264	1SBN050020R1004	2	0.015

Connecting links with manual motor starters

For contactors	Manual motor starter	Type	Order code	Pkg qty	Weight (1 pce) kg
AS09..S ... AS16..S	MS116-0.16 ... MS116-16	BEA16-3U	1SBN081020R1000	1	0.045
ASL09..S ... ASL16..S	MS132-0.16 ... MS132-16				

AS09..S ... AS16..S and ASL09..S ... ASL16..S 3-pole contactors - with spring terminals

Technical data

Main pole - Utilization characteristics according to IEC

Contactor types	AC operated	AS09..S	AS12..S	AS16..S
	DC operated	ASL09..S	ASL12..S	ASL16..S
Standards	IEC 60947-1 / 60947-4-1 and EN 60947-1 / 60947-4-1			
Rated operational voltage U_e max.	690 V			
Rated frequency (without derating)	50 / 60 Hz			
Conventional free-air thermal current I_{th} acc. to IEC 60947-4-1, open contactors, $\theta \leq 40^\circ\text{C}$				
		20 A	22 A	22 A
With conductor cross-sectional area		2.5 mm ²	2.5 mm ²	2.5 mm ²
AC-1 Utilization category				
For air temperature close to contactor				
I_e / Rated operational current AC-1	$\theta \leq 40^\circ\text{C}$	20 A	22 A	22 A
U_e max. ≤ 690 V, 50/60 Hz	$\theta \leq 60^\circ\text{C}$	15 A	17 A	17 A
	$\theta \leq 70^\circ\text{C}$	12 A	14 A	14 A
With conductor cross-sectional area		2.5 mm ²		
AC-3 Utilization category				
For air temperature close to contactor $\theta \leq 60^\circ\text{C}$				
I_e / Max. rated operational current AC-3 (1)				
	220-230-240 V	9 A	12 A	15.7 A
	400 V	9 A	12 A	15.5 A
	415 V	9 A	12 A	15.5 A
	440 V	8 A	11 A	13.6 A
	500 V	8 A	11 A	12.5 A
	690 V	5 A	7 A	9 A
Rated operational power AC-3 (1)				
	220-230-240 V	2.2 kW	3 kW	4 kW
	400 V	4 kW	5.5 kW	7.5 kW
	415 V	4 kW	5.5 kW	7.5 kW
	440 V	4 kW	5.5 kW	7.5 kW
	500 V	4 kW	5.5 kW	7.5 kW
	690 V	4 kW	5.5 kW	7.5 kW
Rated making capacity AC-3	10 x I_e AC-3 acc. to IEC 60947-4-1			
Rated breaking capacity AC-3	8 x I_e AC-3 acc. to IEC 60947-4-1			
AC-8a Utilization category				
(without thermal overload relay - U_e 400 V 50/60 Hz - $\theta \leq 40^\circ\text{C}$)				
I_e / Rated operational current AC-8a		12 A	16 A	22 A
Rated operational power AC-8a		5.5 kW	7.5 kW	11 kW
Short-circuit protection device for contactors without thermal overload relay - Motor protection excluded (2)				
$U_e \leq 500$ V AC - gG type fuse		25 A		
Rated short-time withstand current I_{cw}	1 s	230 A	250 A	250 A
at 40°C ambient temperature,	10 s	100 A	124 A	124 A
in free air from a cold state	30 s	65 A	75 A	75 A
	1 min	50 A	55 A	55 A
	15 min	20 A	22 A	22 A
Maximum breaking capacity				
$\cos \phi = 0.45$	at 440 V	155 A		
	at 690 V	90 A		
Power dissipation per pole	I_e / AC-1	0.9 W	1.1 W	1.1 W
	I_e / AC-3	0.18 W	0.33 W	0.55 W
Max. electrical switching frequency	AC-1	600 cycles/h		
	AC-3	1200 cycles/h		
	AC-4	300 cycles/h		

(1) For the corresponding kW/A or hp/A values of 1500 r.p.m. 50 Hz or 1800 r.p.m. 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".

(2) For the protection of motor starters against short circuits, see "Coordination with short-circuit protection devices".

AS09..S ... AS16..S and ASL09..S ... ASL16..S 3-pole contactors - with spring terminals

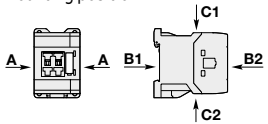
Technical data

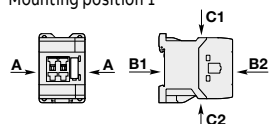
Main pole - Utilization characteristics according to UL / NEMA / CSA

Contactor types	AC operated	AS09..S	AS12..S	AS16..S
	DC operated	ASL09..S	ASL12..S	ASL16..S
Standards		UL 508, CSA C22.2 N°14		
Max. operational voltage		690 V		
NEMA size		00	00	00
NEMA continuous amp rating	Thermal current	9 A		
NEMA maximum horse power ratings 1-phase, 60 Hz	115 V AC	1/3 hp	1/3 hp	1/3 hp
	230 V AC	1 hp	1 hp	1 hp
NEMA maximum horse power ratings 3-phase, 60 Hz	200 V AC	1-1/2 hp	1-1/2 hp	1-1/2 hp
	230 V AC	1-1/2 hp	1-1/2 hp	1-1/2 hp
	460 V AC	2 hp	2 hp	2 hp
	575 V AC	2 hp	2 hp	2 hp
UL / CSA General use rating				
600 V AC		12 A	12 A	15.2 A
With conductor cross-sectional area		AWG 14	AWG 14	AWG 12
UL / CSA maximum 1-phase motor rating				
Full load current	120 V AC	7.2 A	9.8 A	13.8 A
	240 V AC	8 A	10 A	12 A
Horse power rating	120 V AC	1/3 hp	1/2 hp	3/4 hp
	240 V AC	1 hp	1-1/2 hp	2 hp
UL / CSA maximum 3-phase motor rating				
Full load current (1)	200-208 V AC	7.8 A	7.8 A	11 A
	220-240 V AC	6.8 A	9.6 A	15.2 A
	440-480 V AC	7.6 A	11 A	14 A
	550-600 V AC	9 A	11 A	11 A
Horse power rating (1)	200-208 V AC	2 hp	2 hp	3 hp
	220-240 V AC	2 hp	3 hp	5 hp
	440-480 V AC	5 hp	7-1/2 hp	10 hp
	550-600 V AC	7-1/2 hp	10 hp	10 hp
Short-circuit protection device for contactors without thermal overload relay - Motor protection excluded				
Fuse rating		40 A	50 A	60 A
Fuse type, 600 V		J		
Max. electrical switching frequency				
For general use		600 cycles/h		
For motor use		1200 cycles/h		

(1) For the corresponding kW/A or hp/A values of 1500 r.p.m, 50 Hz or 1800 r.p.m, 60 Hz, 3-phase motors, see "Motor rated operational powers and currents".

General technical data

Contactor types	AC operated	AS09..S	AS12..S	AS16..S
	DC operated	ASL09..S	ASL12..S	ASL16..S
Rated insulation voltage Ui				
acc. to IEC 60947-4-1		690 V		
acc. to UL / CSA		600 V		
Rated impulse withstand voltage Uimp.		6 kV		
Ambient air temperature close to contactor				
Operation		-40...+70 °C		
Storage		-60...+80 °C		
Climatic withstand		Category B according to IEC 60947-1 Annex Q		
Maximum operating altitude (without derating)		3000 m		
Mechanical durability				
Number of operating cycles		10 millions operating cycles		
Max. switching frequency		3600 cycles/h		
Shock withstand		1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position		
acc. to IEC 60068-2-27 and EN 60068-2-27				
Mounting position 1				
				
		Shock direction	AS contactors - AC operated	ASL contactors - DC operated
		A	20 g	20 g closed position / 10 g open position
		B1	10 g closed position / 5 g open position	15 g closed position / 5 g open position
		B2	15 g	10 g
		C1	20 g closed position / 9 g open position	15 g closed position / 8 g open position
		C2	20 g closed position / 14 g open position	14 g closed position / 8 g open position
Vibration withstand				
acc. to IEC 60068-2-6		5...300 Hz / 3 g closed position / 2 g open position		



AS09..S ... AS16..S and ASL09..S ... ASL16..S 3-pole contactors - with spring terminals

Technical data

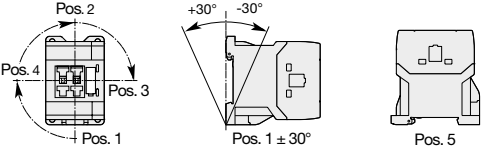
Magnet system characteristics for AS09..S ... AS16..S contactors

Contactor types		AC operated	AS09..S	AS12..S	AS16..S
Coil operating limits acc. to IEC 60947-4-1		AC supply	0.85...1.1 x U _c (at θ ≤ 60 °C); U _c (at θ ≤ 70 °C)		
AC control voltage	Rated control circuit voltage U _c	at 50 Hz	24...415 V		
		at 60 Hz	24...415 V		
	Coil consumption	Average pull-in value	50 Hz	33 VA	
			60 Hz	33 VA	
			50/60 Hz	33 VA	
	Average holding value		50 Hz	6.5 VA / 1.5 W	
			60 Hz	5 VA / 1.2 W	
			50/60 Hz	6.5 VA / 1.5 W	
Drop-out voltage			Approx. 30...50 % of U _c		
Operating time					
Between coil energization and:		N.O. contact closing	9...24 ms		
		N.C. contact opening	6...18 ms		
Between coil de-energization and:		N.O. contact opening (1)	5...19 ms		
		N.C. contact closing (1)	7...22 ms		
			(1) The use of RC5-1 surge suppressor increases opening time by a factor of 2 to 3.		

Magnet system characteristics for ASL09..S ... ASL16..S contactors

Contactor types		DC operated	ASL09..S	ASL12..S	ASL16..S
Coil operating limits acc. to IEC 60947-4-1		DC supply	0.85...1.1 x U _c (at θ ≤ 60 °C); U _c (at θ ≤ 70 °C)		
DC control voltage	Rated control circuit voltage U _c		12...240 V DC		
	Coil consumption	Average pull-in value	3 W		
		Average holding value	3 W		
Drop-out voltage			Approx. 10...40 % of U _c		
Coil time constant	Open	L/R	12 ms		
	Closed	L/R	40 ms		
Operating time					
Between coil energization and:		N.O. contact closing	36...59 ms		
		N.C. contact opening	31...53 ms		
Between coil de-energization and:		N.O. contact opening (1)	13...17 ms		
		N.C. contact closing (1)	15...20 ms		
			(1) The use of RT5 surge suppressor increases opening time by a factor of 1.1 to 1.2		

Mounting characteristics and conditions for use

Contactor types		AC operated	AS09..S	AS12..S	AS16..S
		DC operated	ASL09..S	ASL12..S	ASL16..S
Mounting positions					
Mounting distances		The contactors can be assembled side by side.			
Fixing	On rail according to IEC 60715, EN 60715	35 x 7.5 mm or 35 x 15 mm			
	By screws (not supplied)	2 x M4 screws placed diagonally			

AS09..S ... AS16..S and ASL09..S ... ASL16..S 3-pole contactors - with spring terminals

Technical data

Connecting characteristics

Contactor types	AC operated	AS09..S	AS12..S	AS16..S
	DC operated	ASL09..S	ASL12..S	ASL16..S
Main terminals	 Spring terminals			
Connection capacity (min. ... max.)				
Main conductors (poles)				
 Rigid	1 x	0.75...2.5 mm ²		
	2 x	0.75...2.5 mm ²		
 Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²		
	2 x	0.75...2.5 mm ²		
 Flexible with insulated ferrule	1 x	0.75...1.5 mm ²		
	2 x	0.75...1.5 mm ²		
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...12		
Stripping length	10 mm			
Auxiliary conductors (built-in auxiliary terminals + coil terminals)				
 Rigid solid	1 x	0.75...2.5 mm ²		
	2 x	0.75...2.5 mm ²		
 Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²		
	2 x	0.75...2.5 mm ²		
 Flexible with insulated ferrule	1 x	0.75...1.5 mm ²		
	2 x	0.75...1.5 mm ²		
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...14		
Stripping length	10 mm			
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529				
All terminals	IP20			
Screwdriver type	Flat Ø 3.5			

AS09..S ... AS16..S and ASL09..S ... ASL16..S 3-pole contactors - with spring terminals

Technical data

Built-in auxiliary contacts according to IEC

Contactor types	AC operated	AS09..S	AS12..S	AS16..S
	DC operated	ASL09..S	ASL12..S	ASL16..S
Rated operational voltage U _e max.		690 V		
Rated frequency (without derating)		50 / 60 Hz		
Conventional free air thermal current I _{th} - θ ≤ 40 °C		10 A		
I _e / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A		
	220-240 V 50/60 Hz	4 A		
	400-440 V 50/60 Hz	3 A		
	500 V 50/60 Hz	2 A		
	690 V 50/60 Hz	2 A		
Making capacity AC-15		10 x I _e AC-15 acc. to IEC 60947-5-1		
Breaking capacity AC-15		10 x I _e AC-15 acc. to IEC 60947-5-1		
I _e / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	6 A / 144 W		
	48 V DC	2.8 A / 134 W		
	72 V DC	1 A / 72 W		
	110 V DC	0.55 A / 60 W		
	125 V DC	0.55 A / 69 W		
	220 V DC	0.27 A / 60 W		
	250 V DC	0.27 A / 68 W		
Short-circuit protection device gG type fuse		10 A		
Rated short-time withstand current I _{cw}	for 1.0 s	100 A		
	for 0.1 s	140 A		
Minimum switching capacity with failure rate acc. to IEC 60947-5-4		12 V / 3 m		
		10-7		
Non-overlapping time between N.O. and N.C. contacts		1.5 ms		
Power dissipation per pole at 6 A		0.1 W		
Max. electrical switching frequency	AC-15	1200 cycles/h		
	DC-13	900 cycles/h		
Mechanically linked contacts acc. to annex L of IEC 60947-5-1		Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts (CA3 aux. contact blocks) are mechanically linked contacts.		
Mirror contacts acc. to annex F of IEC 60947-4-1		Built-in N.C. auxiliary contacts or additional N.C. auxiliary contacts (CA3 aux. contact blocks) are mirror contacts.		

Built-in auxiliary contacts according to UL / CSA

Contactor types	AC operated	AS09..S	AS12..S	AS16..S
	DC operated	ASL09..S	ASL12..S	ASL16..S
Max. operational voltage		600 V AC, 250 V DC		
Pilot duty		A600, Q300		
AC thermal rated current		10 A		
AC maximum volt-ampere making		7200 VA		
AC maximum volt-ampere breaking		720 VA		
DC thermal rated current		2.5 A		
DC maximum volt-ampere making-breaking		69 VA		

Notes

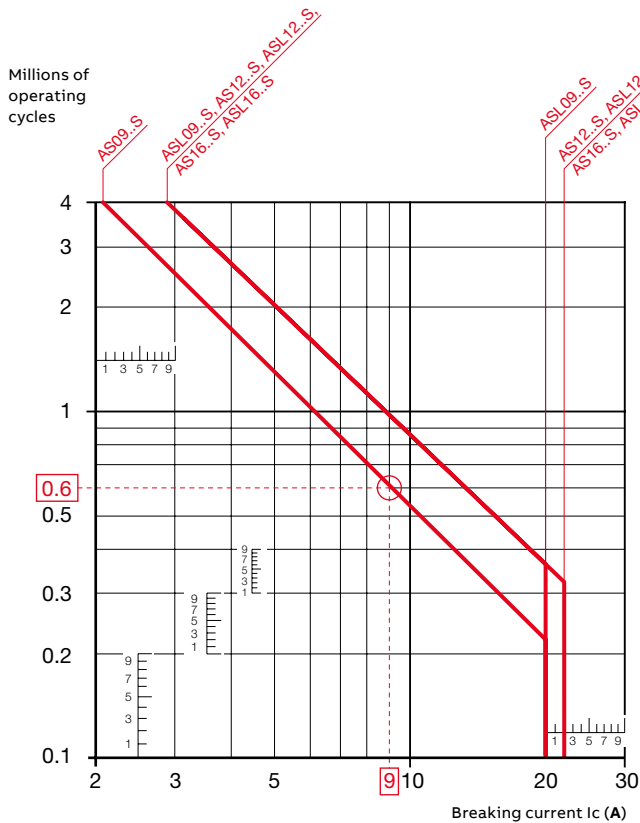
AS09..S ... AS16..S and ASL09..S ... ASL16..S 3-pole contactors - with spring terminals

Electrical durability

Electrical durability for AC-1 utilization category - $U_e \leq 690$ V

Note: AC-1 maximum current is selected according to ambient temperature. Please see technical data.

Switching non-inductive or slightly inductive loads. The breaking current I_c for AC-1 is equal to the rated operational current of the load. Maximum electrical switching frequency: 600 cycles / hour.



Example:

Breaking current = 9 A.

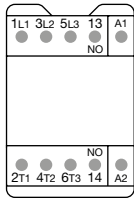
On the opposite curve at intersection "O" 9 A the corresponding value for the electrical durability is approximately 0.6 millions operating cycles.

AS09..S ... AS16..S 3-pole contactors - with spring terminals

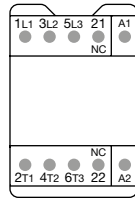
Terminal marking and positioning

AS..S contactors - AC operated

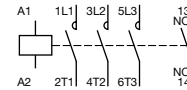
Standard devices without addition of auxiliary contacts



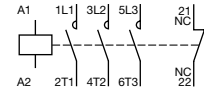
AS09 ... AS16-30-10S



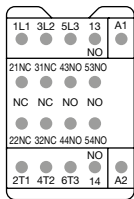
AS09 ... AS16-30-01S



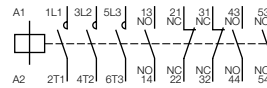
AS09 ... AS16-30-10S



AS09 ... AS16-30-01S

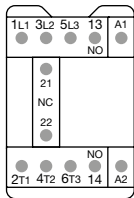


AS09 ... AS16-30-32S

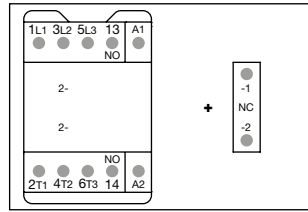


AS09 ... AS16-30-32S

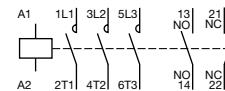
Other possible contact combinations with auxiliary contact blocks added by the user



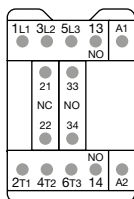
Combination 11



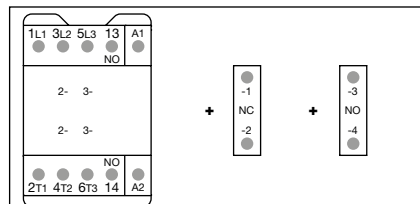
AS09 ... AS16-30-10S + CA3-01S



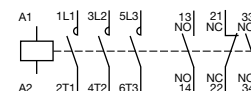
Combination 11



Combination 21

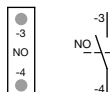


AS09 ... AS16-30-10S + CA3-01S + CA3-10S

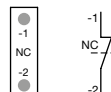


Combination 21

CA3..S 1-pole auxiliary contact blocks



CA3-10S



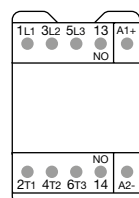
CA3-01S

ASL09..S ... ASL16..S 3-pole contactors - with spring terminals

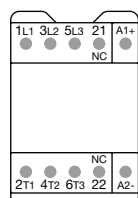
Terminal marking and positioning

ASL..S contactors - DC operated (the polarity A1+, A2- must be respected)

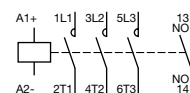
Standard devices without addition of auxiliary contacts



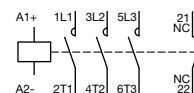
ASL09 ... ASL16-30-10S



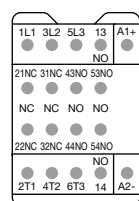
ASL09 ... ASL16-30-01S



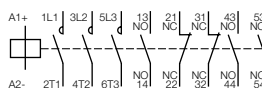
ASL09 ... ASL16-30-10S



ASL09 ... ASL16-30-01S

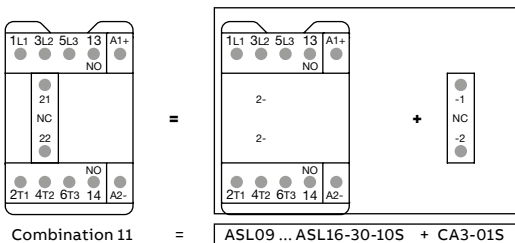


ASL09 ... ASL16-30-32

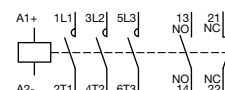


ASL09 ... ASL16-30-32S

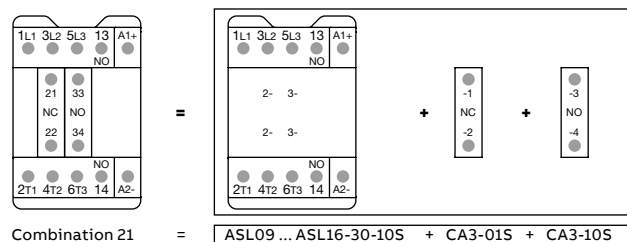
Other possible contact combinations with auxiliary contact blocks added by the user



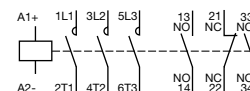
Combination 11



Combination 11

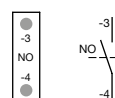


Combination 21

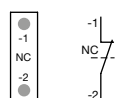


Combination 21

CA3..S 1-pole auxiliary contact blocks



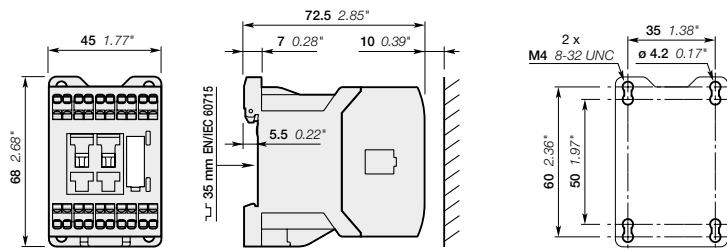
CA3-10S



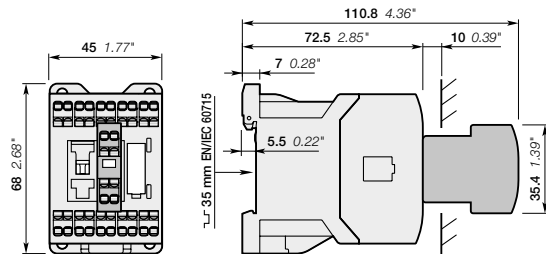
CA3-01S

AS09..S ... AS16..S 3-pole contactors - with spring terminals

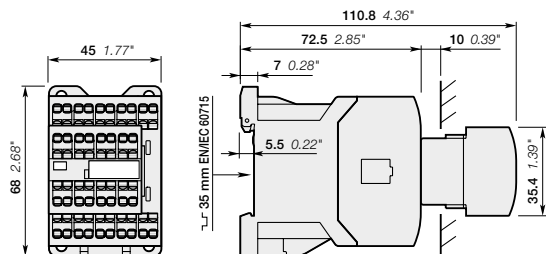
Dimensions



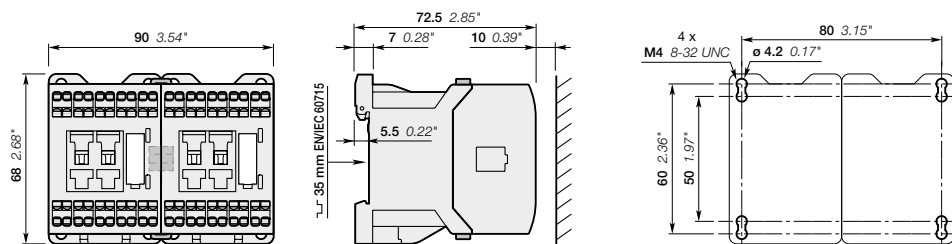
AS09..S, AS12..S, AS16..S



AS09..S, AS12..S, AS16..S
+ CA3..S front-mounted 1-pole auxiliary contact block



AS09...16-30-32S

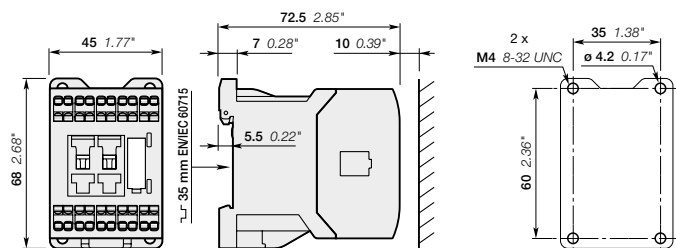


AS09..S, AS12..S, AS16..S
+ VM3 mechanical interlock unit including two BB3 fixing clips

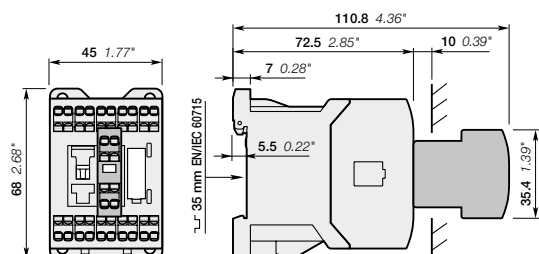
Main dimensions mm, inches

ASL09..S ... ASL16..S 3-pole contactors - with spring terminals

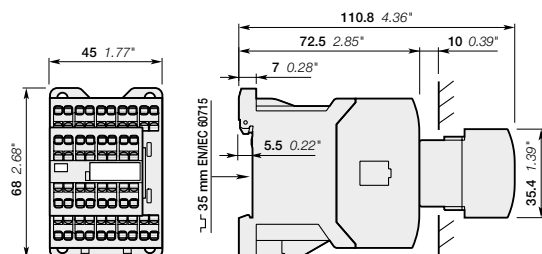
Dimensions



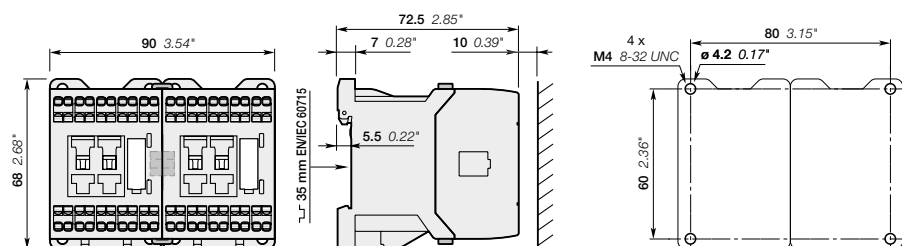
ASL09..S, ASL12..S, ASL16..S



ASL09..S, ASL12..S, ASL16..S
+ CA3..S front-mounted 1-pole auxiliary contact block



ASL09...16-30-32S



ASL09..S, ASL12..S, ASL16..S
+ VM3 mechanical interlock unit including two BB3 fixing clips

NS..S contactor relays - with spring terminals

AC operated



NS22ES

NS..S contactor relays are used for switching auxiliary and control circuits.

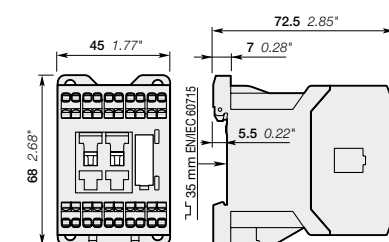
These contactor relays are designed with:

- spring terminals
- 4 poles or 8 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: AC operated
- add-on auxiliary contact blocks for front mounting and a comprehensive range of accessories.

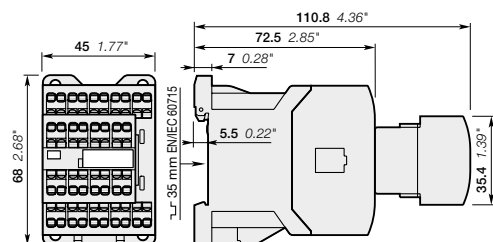
Number of contacts		Rated control circuit voltage Uc (1)		Type	Order code	Weight Pkg (1 pce) kg
1st stack	2nd stack	V 50 Hz	V 60 Hz			
		24	24	NS22ES-20	1SBH101004R2022	0.220
		230	230	NS22ES-26	1SBH101004R2622	0.220
		24	24	NS31ES-20	1SBH101004R2031	0.220
		230	230	NS31ES-26	1SBH101004R2631	0.220
		24	24	NS40ES-20	1SBH101004R2040	0.220
		230	230	NS40ES-26	1SBH101004R2640	0.220
		24	24	NS44ES-20	1SBH101004R2044	0.260
		230	230	NS44ES-26	1SBH101004R2644	0.260
		24	24	NS53ES-20	1SBH101004R2053	0.260
		230	230	NS53ES-26	1SBH101004R2653	0.260
		24	24	NS62ES-20	1SBH101004R2062	0.260
		230	230	NS62ES-26	1SBH101004R2662	0.260
		24	24	NS71ES-20	1SBH101004R2071	0.260
		230	230	NS71ES-26	1SBH101004R2671	0.260
		24	24	NS80ES-20	1SBH101004R2080	0.260
		230	230	NS80ES-26	1SBH101004R2680	0.260

Note: for multiple packaging, please contact your ABB local sales organization.

(1) Other control voltages see voltage code table.



NS22ES, NS31ES, NS40ES



NS44ES, NS53ES, NS62ES, NS71ES, NS80ES

Main dimensions mm, inches

NSL..S contactor relays - with spring terminals

DC operated



NSL22ES

NSL..S contactor relays are used for switching auxiliary and control circuits.

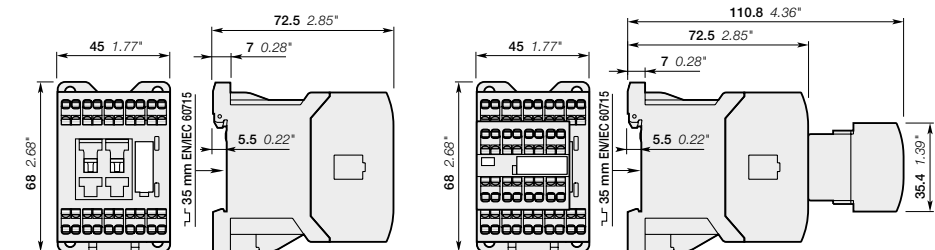
These contactor relays are designed with:

- spring terminals
- 4 poles or 8 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: low coil consumption (3 W at pull-in and holding) DC operated with solid core magnet. Suitable for direct control by PLC outputs (the polarity on the coil terminals A1+ and A2- must be respected)
- add-on auxiliary contact blocks for front mounting and a comprehensive range of accessories.

Number of contacts 1st stack 2nd stack	Rated control circuit voltage Uc (1) V DC	Type	Order code	Weight Pkg (1 pce) kg
	24	NSL22ES-81	1SBH103004R8122	0.280
	24	NSL31ES-81	1SBH103004R8131	0.280
	24	NSL40ES-81	1SBH103004R8140	0.280
	24	NSL44ES-81	1SBH103004R8144	0.320
	24	NSL53ES-81	1SBH103004R8153	0.320
	24	NSL62ES-81	1SBH103004R8162	0.320
	24	NSL71ES-81	1SBH103004R8171	0.320
	24	NSL80ES-81	1SBH103004R8180	0.320

Note: for multiple packaging, please contact your ABB local sales organization.

(1) Other control voltages see voltage code table.



NSL22ES, NSL31ES, NSL40ES

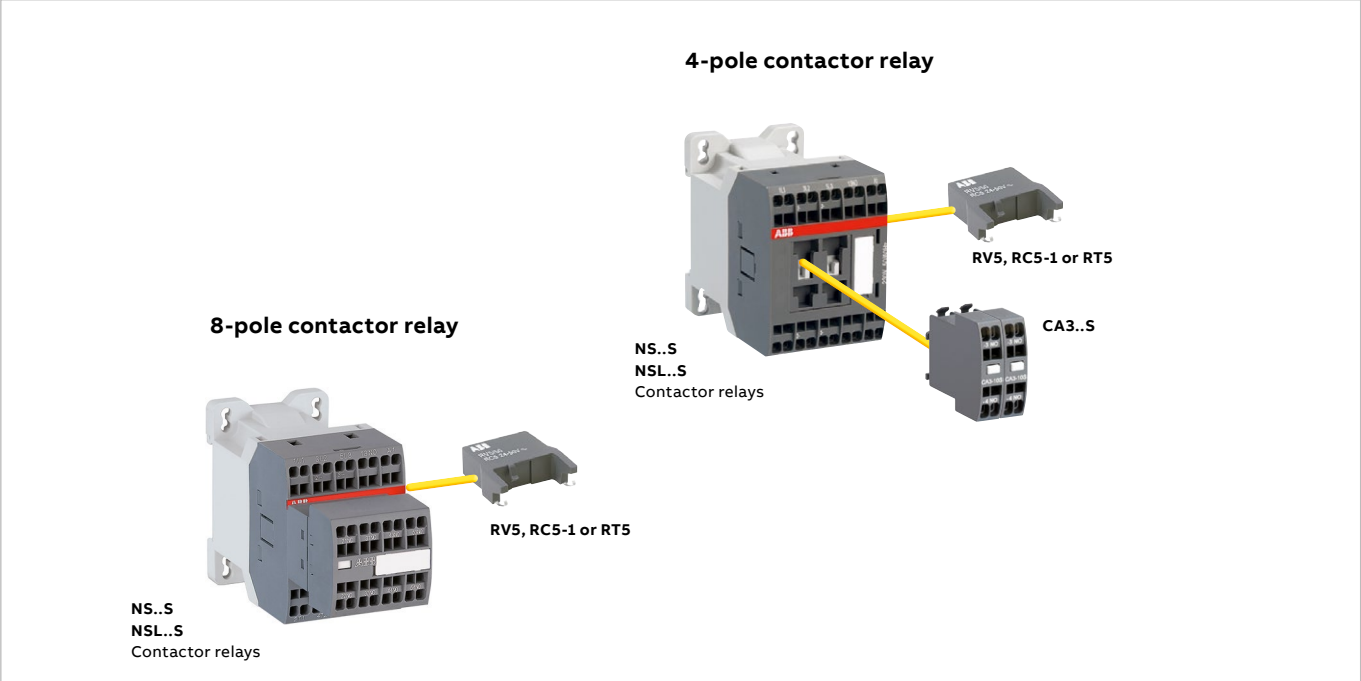
NSL44ES, NSL53ES, NSL62ES, NSL71ES, NSL80ES

Main dimensions mm, inches

NS..S and NSL..S contactor relays - with spring terminals

Main accessories

Contactor relays and main accessories



Main accessory fitting details

Contactor types	Main poles	Front-mounted accessories		Side-mounted accessories	
		Auxiliary contact blocks		Surge suppressors	
		1-pole CA3..S			
NS..S	2 2 E	2 max.	+	RV5	or RC5-1
NS..S	3 1 E				
NS..S	4 0 E				
NS..S	4 4 E			RV5	or RC5-1
NS..S	5 3 E	-	+		
NS..S	6 2 E				
NS..S	7 1 E				
NS..S	8 0 E				
NSL..S	2 2 E	2 max.	+	RV5	or RT5
NSL..S	3 1 E				
NSL..S	4 0 E				
NSL..S	4 4 E			RV5	or RT5
NSL..S	5 3 E	-	+		
NSL..S	6 2 E				
NSL..S	7 1 E				
NSL..S	8 0 E				

NS..S and NSL..S contactor relays - with spring terminals

Main accessories



CA3-10S

Front mounted instantaneous auxiliary contact blocks

For contactor relays	Auxiliary contacts	Type	Order code	Pkg qty	Weight (1 pce)
					kg
NS..S, NSL..S	1 0	CA3-10S	1SBN011019T1010	10	0.011
	0 1	CA3-01S	1SBN011019T1001	10	0.011



RV5

Surge suppressors

For contactor relays	Rated control circuit voltage - Uc		Type	Order code	Pkg qty	Weight (1 pce)
	V	AC DC				
NS..S, NSL..S	24...50	● ●	RV5/50	1SBN050010R1000	2	0.015
	50...133	● ●	RV5/133	1SBN050010R1001	2	0.015
	110...250	● ●	RV5/250	1SBN050010R1002	2	0.015
	250...440	● ●	RV5/440	1SBN050010R1003	2	0.015
NS..S	24...50	● -	RC5-1/50	1SBN050100R1000	2	0.012
	50...133	● -	RC5-1/133	1SBN050100R1001	2	0.012
	110...250	● -	RC5-1/250	1SBN050100R1002	2	0.012
	250...440	● -	RC5-1/440	1SBN050100R1003	2	0.012
NSL..S	12...32	- ●	RT5/32	1SBN050020R1000	2	0.015
	25...65	- ●	RT5/65	1SBN050020R1001	2	0.015
	50...90	- ●	RT5/90	1SBN050020R1002	2	0.015
	77...150	- ●	RT5/150	1SBN050020R1003	2	0.015
	150...264	- ●	RT5/264	1SBN050020R1004	2	0.015

NS..S and NSL..S contactor relays - with spring terminals

Technical data

Contact utilization characteristics according to IEC

Contactor relay types	AC operated	NS..S
	DC operated	NSL..S
Standards	IEC 60947-5-1 and EN 60947-5-1	
Rated operational voltage U _e max.	690 V	
Rated frequency (without derating)	50 / 60 Hz	
Conventional free-air thermal current I _{th} θ ≤ 40 °C	10 A	
I _e / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A
	220-240 V 50/60 Hz	4 A
	400-440 V 50/60 Hz	3 A
	500 V 50/60 Hz	2 A
	690 V 50/60 Hz	2 A
Making capacity AC-15	10 x I _e AC-15 acc. to IEC 60947-5-1	
Breaking capacity AC-15	10 x I _e AC-15 acc. to IEC 60947-5-1	
I _e / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	6 A / 144 W
	48 V DC	2.8 A / 134 W
	72 V DC	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.27 A / 60 W
	250 V DC	0.27 A / 68 W
Short-circuit protection device for contactors		
U _e ≤ 500 V AC - gG type fuse	10 A	
Rated short-time withstand current I _{cw} at 40 °C ambient temperature, in free air from a cold state	for 1.0 s	100 A
	for 0.1 s	140 A
Minimum switching capacity	12 V / 3 mA	
with failure rate acc. to IEC 60947-5-4	10 ⁻⁷	
Non-overlapping time between N.O. and N.C. contacts	1.5 ms	
Power dissipation per pole at 6 A	0.1 W	
Max. electrical switching frequency	AC-15	1200 cycles/h
	DC-13	900 cycles/h
Mechanically linked contacts acc. to annex L of IEC 60947-5-1	Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts (CA3..S aux. contact blocks) are mechanically linked contacts.	

Contact utilization characteristics according to UL / CSA

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

NS..S and NSL..S contactor relays - with spring terminals

Technical data

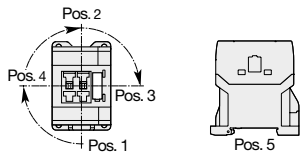
Magnet system characteristics for NS..S contactor relays

Contactor relay types	AC operated	NS..S
Coil operating limits acc. to IEC 60947-5-1	AC supply	0.85...1.1 x U_c (at $\theta \leq 60^\circ\text{C}$); U_c (at $\theta \leq 70^\circ\text{C}$)
AC control voltage	Rated control circuit voltage U_c	at 50 Hz 24...415 V
		at 60 Hz 24...415 V
Coil consumption	Average pull-in value	50 Hz 33 VA
		60 Hz 33 VA
		50/60 Hz 33 VA
	Average holding value	50 Hz 6.5 VA / 1.5 W
		60 Hz 5 VA / 1.2 W
		50/60 Hz 6.5 VA / 1.5 W
Drop-out voltage		Approx. 30...50 % of U_c
Operating time		
Between coil energization and:	N.O. contact closing	9...24 ms
	N.C. contact opening	6...18 ms
Between coil de-energization and:	N.O. contact opening (1)	5...19 ms
	N.C. contact closing (1)	7...22 ms
(1) The use of RC5-1 surge suppressor increases opening time by a factor of 2 to 3.		

Magnet system characteristics for NSL..S contactor relays

Contactor relay types	DC operated	NSL..S
Coil operating limits acc. to IEC 60947-5-1	DC supply	0.85...1.1 x U_c (at $\theta \leq 60^\circ\text{C}$); U_c (at $\theta \leq 70^\circ\text{C}$)
DC control voltage		
Rated control circuit voltage U_c		12...240 V DC
Coil consumption	Average pull-in value	3 W
	Average holding value	3 W
Drop-out voltage		Approx. 10...40 % of U_c
Coil time constant	Open	L/R 12 ms
	Closed	L/R 40 ms
Operating time		
Between coil energization and:	N.O. contact closing	36...59 ms
	N.C. contact opening	31...53 ms
Between coil de-energization and:	N.O. contact opening (1)	13...17 ms
	N.C. contact closing (1)	15...20 ms
(1) The use of RT5 surge suppressor increases opening time by a factor of 1.1 to 1.2.		

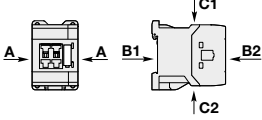
Mounting characteristics and conditions for use

Contactor relay types	AC operated	NS..S
	DC operated	NSL..S
Mounting positions		
Mounting distances	The contactor relays can be assembled side by side.	
Fixing	On rail according to IEC 60715, EN 60715	35 x 7.5 mm or 35 x 15 mm
	By screws (not supplied)	2 x M4 screws placed diagonally

NS..S and NSL..S contactor relays - with spring terminals

Technical data

General technical data

Contactor relay types	AC operated	NS..S	
	DC operated	NSL..S	
Rated insulation voltage Ui		690 V	
acc. to IEC 60947-5-1		600 V	
acc. to UL / CSA		6 kV	
Rated impulse withstand voltage Uimp.		6 kV	
Ambient air temperature close to contactor relay			
Operation in free air		-40...+70 °C	
Storage		-60...+80 °C	
Climatic withstand		Category B according to IEC 60947-1 Annex Q	
Maximum operating altitude (without derating)		3000 m	
Mechanical durability			
Number of operating cycles		20 millions operating cycles	
Max. switching frequency		3600 cycles/h	
Shock withstand		1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position	
acc. to IEC 60068-2-27 and EN 60068-2-27		Shock direction	
Mounting position 1			
		NS contactor relays - AC operated	NSL contactor relays - DC operated
		A 20 g	20 g closed position / 10 g open position
		B1 5 g	15 g closed position / 5 g open position
		B2 15 g	10 g
		C1 19 g closed position / 8 g open position	19 g closed position / 8 g open position
		C2 16 g closed position / 13 g open position	14 g closed position / 8 g open position
Vibration withstand		5...300 Hz	
acc. to IEC 60068-2-6		3 g closed position / 2 g open position	

Connecting characteristics

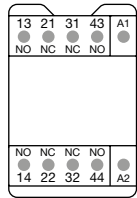
Contactor relay types	AC operated	NS..S	
	DC operated	NSL..S	
Main terminals		 Spring terminals	
Connection capacity (min. ... max.)			
Pole and coil terminals			
 Rigid solid	1 x	0.75...2.5 mm ²	
	2 x	0.75...2.5 mm ²	
 Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²	
	2 x	0.75...2.5 mm ²	
 Flexible with insulated ferrule	1 x	0.75...1.5 mm ²	
	2 x	0.75...1.5 mm ²	
Connection capacity acc. to UL / CSA		1 or 2 x AWG 18...14	
Stripping length		10 mm	
Degree of protection			
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529			
All terminals		IP20	
Screwdriver type		Flat Ø 3.5	

NS..S contactor relays - with spring terminals

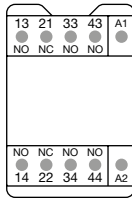
Terminal marking and positioning

NS..S contactor relays - AC operated

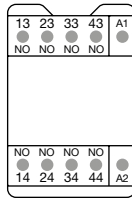
Standard devices without addition of auxiliary contact blocks



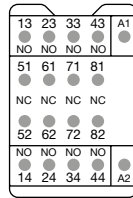
NS22ES



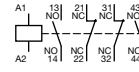
NS31ES



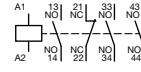
NS40ES



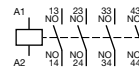
NS44ES



NS22ES



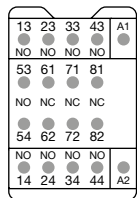
NS31ES



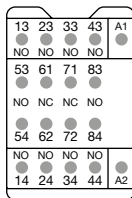
NS40ES



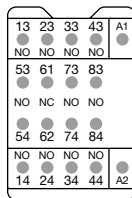
NS44ES



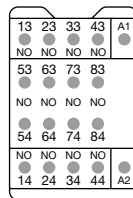
NS53ES



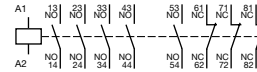
NS62ES



NS71ES



NS80ES



NS53ES



NS62ES

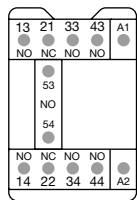


NS71ES

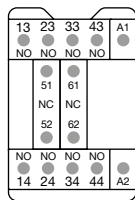
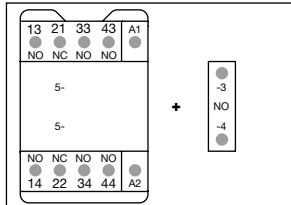


NS80ES

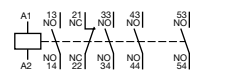
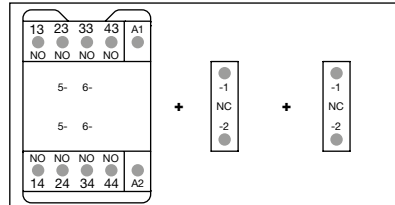
Other possible contact combinations with auxiliary contact blocks added by the user



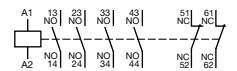
Combination 41E = NS31ES + CA3-10S



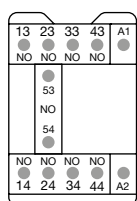
Combination 42E = NS40ES + CA3-01S + CA3-01S



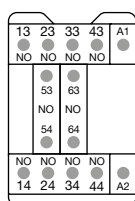
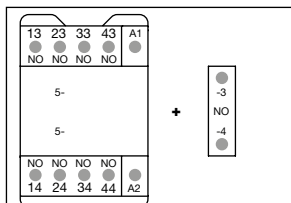
Combination 41E



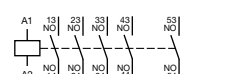
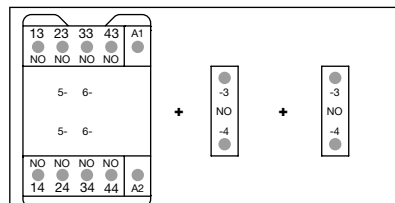
Combination 42E



Combination 50E = NS40ES + CA3-10S



Combination 60E = NS40ES + CA3-10S + CA3-10S

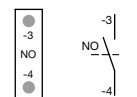


Combination 50E

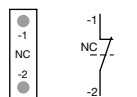


Combination 60E

CA3..S 1-pole auxiliary contact blocks



CA3-10S



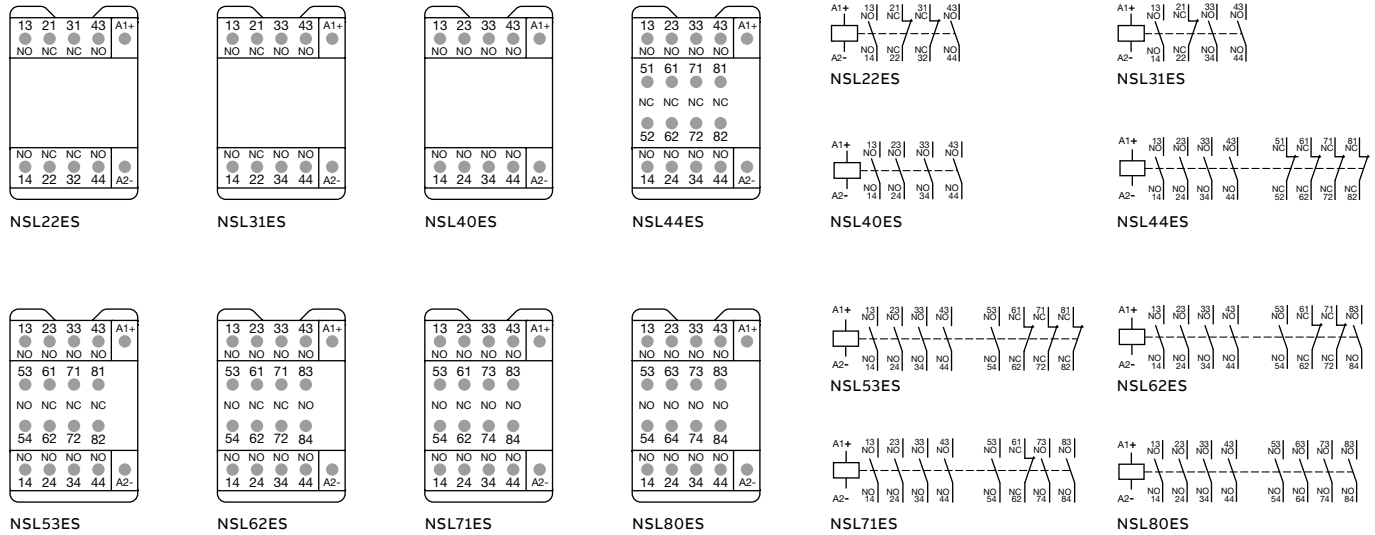
CA3-01S

NSL..S contactor relays - with spring terminals

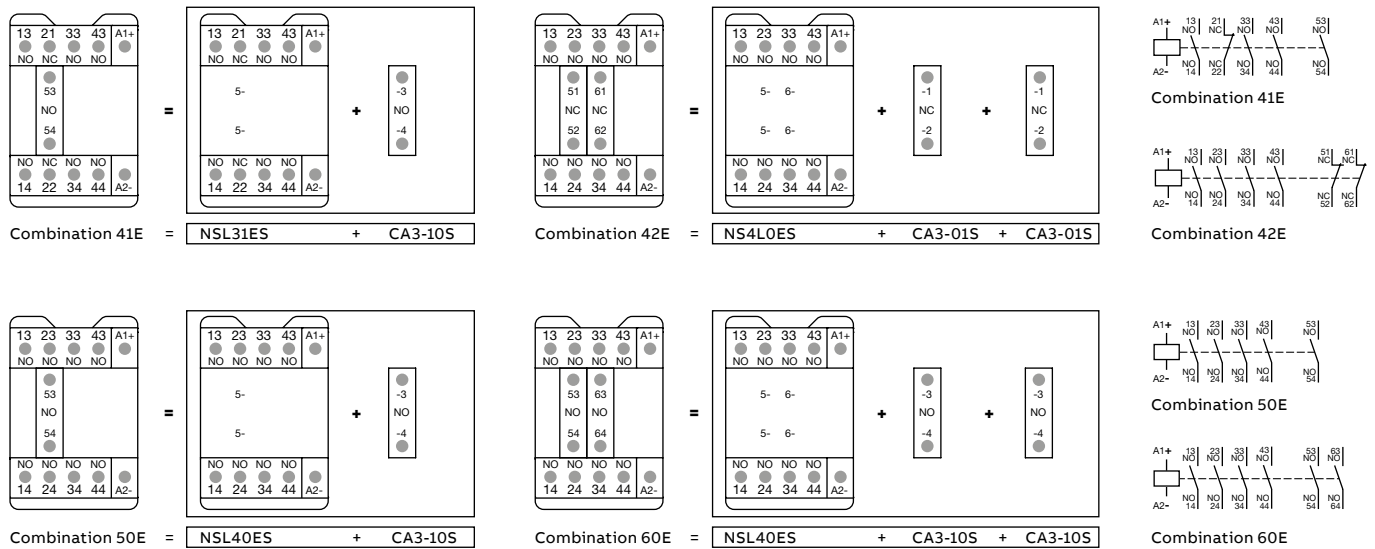
Terminal marking and positioning

NSL..S contactor relays - DC operated (the polarity A1+, A2- must be respected)

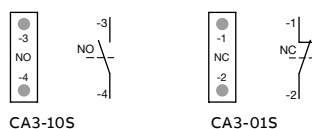
Standard devices without addition of auxiliary contact blocks



Other possible contact combinations with auxiliary contact blocks added by the user



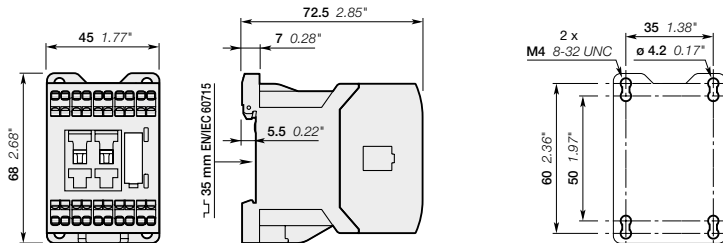
CA3..S 1-pole auxiliary contact blocks



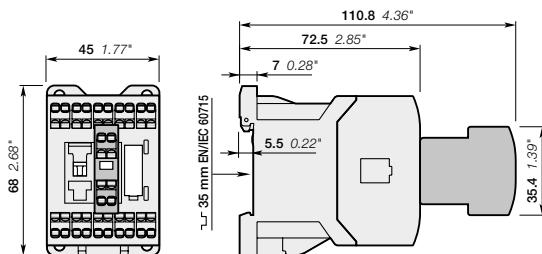
NS..S contactor relays - with spring terminals

Dimensions

4-pole contactor relays

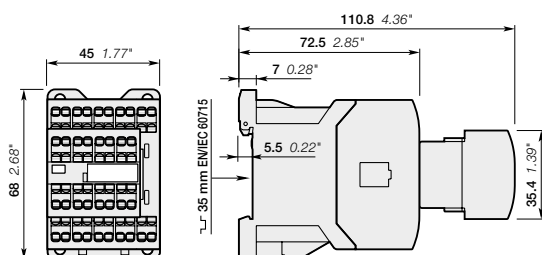


NS22ES, NS31ES, NS40ES



NS22ES, NS31ES, NS40ES
+ CA3..S front-mounted 1-pole auxiliary contact block

8-pole contactor relays

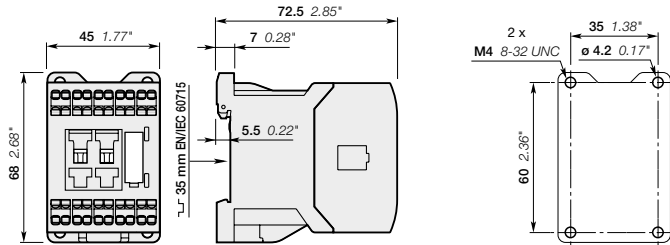


NS44ES, NS53ES, NS62ES, NS71ES, NS80ES

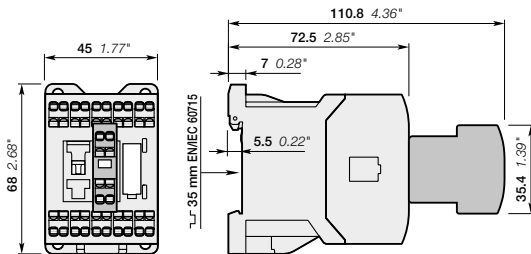
NSL..S contactor relays - with spring terminals

Dimensions

4-pole contactor relays

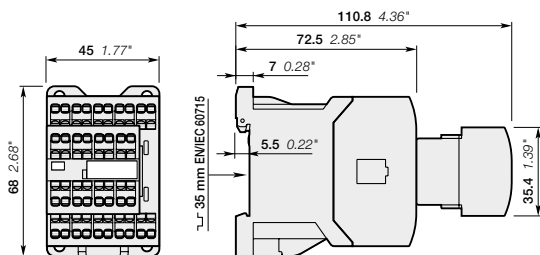


NSL22ES, NSL31ES, NSL40ES



NSL22ES, NSL31ES, NSL40ES
+ CA3..S front-mounted 1-pole auxiliary contact block

8-pole contactor relays



NSL44ES, NSL53ES, NSL62ES, NSL71ES, NSL80ES

Main dimensions mm, inches

Accessories

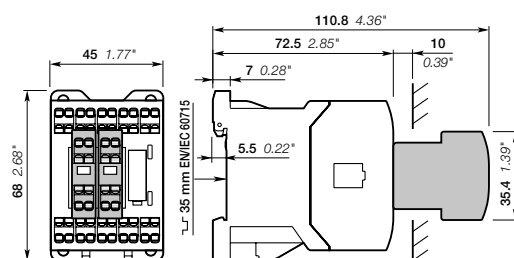


- N.O. or N.C. contacts.
- spring-type connecting terminals.

All 1-pole auxiliary contact blocks are protected against accidental direct contact and bear the corresponding function marking.

A maximum of two 1-pole auxiliary contact blocks can be front-mounted on 1-stack contactors or 1-stack contactor relays.

For contactors	For contactor relays	Contact blocks 	Type	Order code	Pkg qty	Weight (1 pce)
						kg
1-pole auxiliary contact blocks with spring terminals						
AS09..S ... AS16..S	NS..S, NSL..S	1 –	CA3-10S	1SBN011019T1010	10	0.011
ASL09..S ... ASL16..S		– 1	CA3-01S	1SBN011019T1001	10	0.011



Main dimensions mm, inches

Auxiliary contact blocks - with spring terminals

Front mounting

Technical data

Types		1-pole CA3..S
Contact utilization characteristics according to IEC		
Standards	IEC 60947-5-1 and EN 60947-5-1	
Rated insulation voltage U_i acc. to IEC 60947-5-1	690 V	
Rated impulse withstand voltage U_{imp}	6 kV	
Rated operational voltage U_e max.	690 V	
Conventional thermal current I_{th} - $\theta \leq 40^\circ\text{C}$	10 A	
I_e / Rated operational current AC-15 acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A
	220-240 V 50/60 Hz	4 A
	400-440 V 50/60 Hz	3 A
	500 V 50/60 Hz	2 A
	690 V 50/60 Hz	2 A
Making capacity	10 x I_e AC-15 acc. to IEC 60947-5-1	
Breaking capacity	10 x I_e AC-15 acc. to IEC 60947-5-1	
I_e / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	6 A / 144 W
	48 V DC	2.8 A / 134 W
	72 V DC	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.27 A / 60 W
	250 V DC	0.27 A / 68 W
Short-circuit protection device gG type fuse	10 A	
Rated short-time withstand current I_{cw} $\theta = 40^\circ\text{C}$	for 1.0 s	100 A
	for 0.1 s	140 A
Minimum switching capacity	12 V / 3 mA	
with failure rate acc. to IEC 60947-5-4	10-7	
Power dissipation per pole at 6 A	0.1 W	
Mechanical durability		
Number of operating cycles	10 millions operating cycles	
Max. switching frequency	3600 cycles/h	
Max. electrical switching frequency	AC-15	1200 cycles/h
	AC-13	900 cycles/h
Mechanically linked contact acc. to annex L of IEC 60947-5-1	Additional N.O. or N.C. auxiliary contacts (CA3..S aux. contact blocks) are mechanically linked contacts	
Mirror contacts acc. to annex F of IEC 60947-4-1	Additional N.C. auxiliary contacts (CA3..S aux. contact blocks) are mirror contacts	

Contact utilization characteristics according to UL / CSA

Standards	UL 508, CSA C22.2 N°14
Max. operational voltage	690 V AC, 250 V DC
Pilot duty	A600, Q300
AC thermal rated current	10 A
AC maximum volt-ampere making	7200 VA
AC maximum volt-ampere breaking	720 VA
DC thermal rated current	2.5 A
DC maximum volt-ampere making-breaking	69 VA

Connecting characteristics

Connection capacity (min. ... max.)		
 Rigid solid	1 x	0.75...2.5 mm ²
	2 x	0.75...2.5 mm ²
 Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²
	2 x	0.75...2.5 mm ²
 Flexible with insulated ferrule	1 x	0.75...1.5 mm ²
	2 x	0.75...1.5 mm ²
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...14
Stripping length	10 mm	
Degree of protection	IP20	
acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529		
Screw terminals		
All terminals	Spring terminals	
Screwdriver type	Flat Ø 3.5	

Auxiliary contact blocks for AS09..S ... AS16..S, ASL09..S ... ASL16..S contactors and NS, NSL contactor relays - with spring terminals

Electrical durability

Electrical durability for AC-15 utilization category - $U_e \leq 400$ V

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

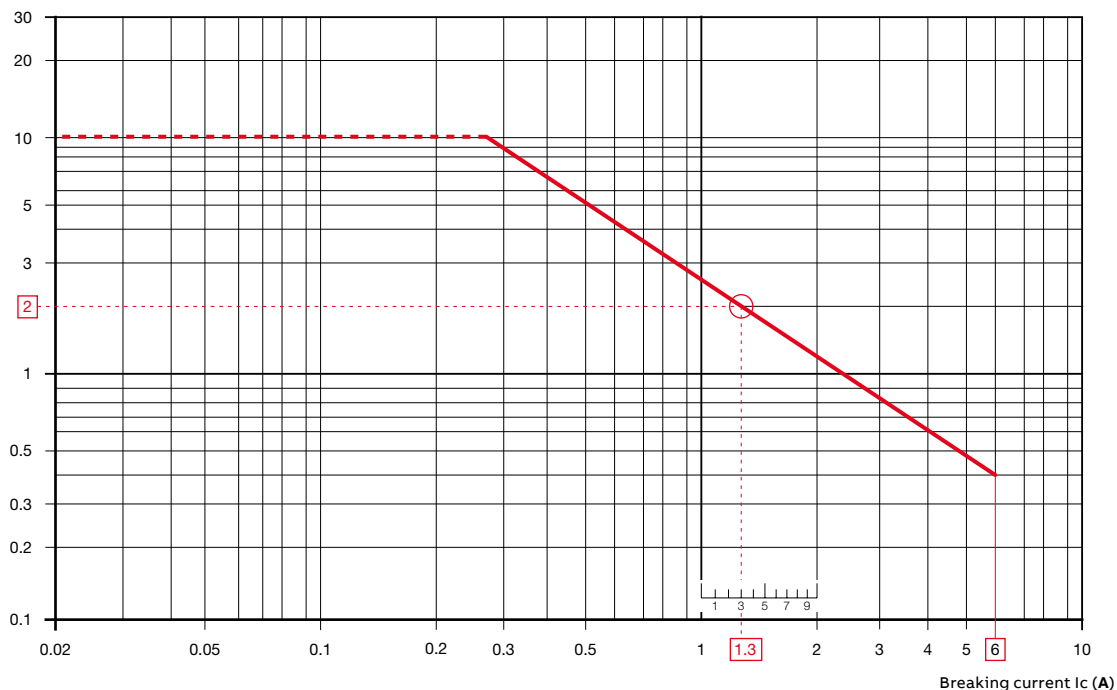
- making current: $10 \times I_e$ with $\cos \phi = 0.7$ and U_e
- breaking current: I_e with $\cos \phi = 0.4$ and U_e .

This curve represents the electrical durability of the built-in or add-on auxiliary contacts in relation to the breaking current.

The curve has been drawn for resistive and inductive loads up to 400 V:

- AS09..S ... AS16..S and ASL09..S ... ASL16..S contactor built-in auxiliary contacts
- 1-pole CA3..S
- NS..S and NSL..S contactor relays.

Millions of
operating
cycles



Example:

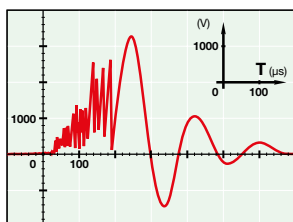
Breaking current = 1.3 A

On the opposite curve at intersection "O" 1.3 A the corresponding value for the electrical durability is approximately 2 millions operating cycles.

Notes

Surge suppressors for contactor coils

Accessories



The operation of inductive circuits causes overvoltages, in particular on opening 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 the breakdown of insulators and even the 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 :

$$k = \frac{\hat{U}_s \text{ max.}}{\hat{U}_c} \quad \text{in DC} \quad k = \frac{\hat{U}_s \text{ max.}}{U_c} \quad \text{in AC} \quad k = \frac{\hat{U}_s \text{ max.}}{U_c \sqrt{2}}$$

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

To reduce 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 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 decreases to a very large extent when a certain voltage is applied at its terminals.



RV5

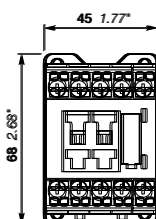
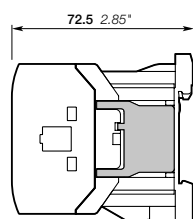


RC5-1



RT5

For contactors	For contactor relays	Rated control circuit voltage - U_c		Type	Order code	Pkg qty	Weight (1 pce)
		V	DC AC				
AS...S, ASL...S	NS...S, NSL...S	24...50	● ●	RV5/50	1SBN050010R1000	2	0.015
		50...133	● ●	RV5/133	1SBN050010R1001	2	0.015
		110...250	● ●	RV5/250	1SBN050010R1002	2	0.015
		250...440	● ●	RV5/440	1SBN050010R1003	2	0.015
AS...S	NS...S	24...50	- ●	RC5-1/50	1SBN050100R1000	2	0.012
		50...133	- ●	RC5-1/133	1SBN050100R1001	2	0.012
		110...250	- ●	RC5-1/250	1SBN050100R1002	2	0.012
		250...440	- ●	RC5-1/440	1SBN050100R1003	2	0.012
ASL...S	NSL...S	12...32	● -	RT5/32	1SBN050020R1000	2	0.015
		25...65	● -	RT5/65	1SBN050020R1001	2	0.015
		50...90	● -	RT5/90	1SBN050020R1002	2	0.015
		77...150	● -	RT5/150	1SBN050020R1003	2	0.015
		150...264	● -	RT5/264	1SBN050020R1004	2	0.015



Main dimensions mm, inches

Easy connection to the coil terminals
(parallel mounting)
Clip-on for both fixing and connection.

No additional space
Clipped onto the right side part of the contactor base without changing contactor overall dimensions and keeping a free access to coil terminals.

Surge suppressors for contactor coils

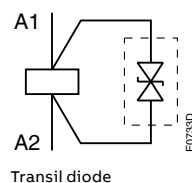
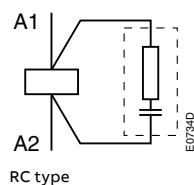
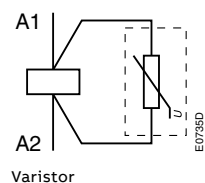
Technical data

Varistor	RV5/50	RV5/133	RV5/250	RV5/440
Rated control circuit voltage U_c	24...50 V AC 24...50 V DC	50...133 V AC 50...133 V DC	110...250 V AC 110...250 V DC	250...440 V AC 250...440 V DC
Residual overvoltage (clipping voltage)	132 V AC 132 V DC	270 V AC 270 V DC	480 V AC 480 V DC	825 V AC 825 V DC
Opening time growth factor	none			
Operating temperature	-20...+70 °C			
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 $\pm 10\%$.			

RC type	RC5-1/50	RC5-1/133	RC5-1/250	RC5-1/440
Rated control circuit voltage U_c	24...50 V AC	50...133 V AC	110...250 V AC	250...440 V AC
Residual overvoltage (clipping voltage)	2 to 3 x U_c max.			
Opening time growth factor	2...3			
Operating temperature	-20...+70 °C			
Advantages	Very fast clipping - Attenuation of steep fronts and thus of high frequencies.			

Transil diode	RT5/32	RT5/65	RT5/90	RT5/150	RT5/264
Rated control circuit voltage U_c	12...32 V DC	25...65 V DC	50...90 V DC	77...150 V DC	150...264 V DC
Residual overvoltage (clipping voltage)	50 V DC	100 V DC	150 V DC	210 V DC	390 V DC
Opening time growth factor	1.1...1.2				
Operating temperature	-20...+70 °C				
Advantages	Good energy absorption - Unpolarized system - Simple, reliable system.				
Drawback	Delay on drop out which does not however reduce contactor breaking capacity.				

Wiring diagrams



Connecting links for starting solutions and other accessories



BEA16-3U

1SBCE100384F0010

Connecting links

The BEA16-3U insulated connecting links are used to connect an AS..S AC operated contactor or an ASL..S DC operated contactor with a manual motor starter.

The connecting link ensure the electrical and mechanical connection between the contactor and the manual motor starter.

For contactors	Manual motor starter	Type	Order code	Pkg qty	Weight (1 pce) kg
AS09..S ... AS16..S ASL09..S ... ASL16..S	MS116-0.16 ... MS116-16 MS132-0.16 ... MS132-16	BEA16-3U	1SBN081020R1000	1	0.045



BDT4

1SBC100043V0014

Test block

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

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

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AS..S, ASL..S, NS..S, NSL..S	BDT4	1SBN110122T1000	10	0.007



BA4

1SNC160101F0014

Function markers

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

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

For contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
AS..S, ASL..S, NS..S, NSL..S	BA4	1SNA235156R2700	16	0.011
AMS 500 support plate for 8 BA4	SPRC 1	1SNA360010R1500	1	0.220
HTP500 support plate	HTP500-BA4	1SNA235712R2400	1	0.290

Voltage code table

The below tables indicate the available coil voltages and corresponding digits for order codes. When placing an order, please give either type or order code. Select a standard contactor from ordering detail pages. Change the coil voltage code in the type or in the order code according to the table below. Example: for contactor AS09-30-10S and coil 42 V 50/60 Hz, type is AS09-30-10S-21 and order code is 1SBL101004R2110.

3-pole contactors - with spring terminals

Type AS16 - 30 - 10 S - 26

Auxiliary contacts N.O. N.C.

Main contacts N.O. N.C.

Order code 1SBL121004R 26 10

Contactor type
AS AC operated
ASL DC operated

Contactor with spring terminal

AC coil code

	50 Hz	60 Hz
20	24 V	24 V
21	42 V	42 V
22	48 V	48 V
23	110 V	110 V
24	115 V	115 V
16	-	120 V
25	220 V	220 V
26	230 V	230 V
27	240 V	240 V
17	-	277 V
13	380 V	-
28	400 V	400 V
29	415 V	415 V

DC coil code

80	12 V
81	24 V
83	48 V
84	60 V
86	110 V
87	125 V
88	220 V
89	240 V

Contactor relays - with spring terminals

Type NS 40 E S - 26

Number contacts N.O. N.C.

Order code 1SBH101004R 26 40

Contactor type
NS AC operated
NSL DC operated

Contactor with spring terminal

AC coil code

	50 Hz	60 Hz
20	24 V	24 V
21	42 V	42 V
22	48 V	48 V
23	110 V	110 V
24	115 V	115 V
16	-	120 V
25	220 V	220 V
26	230 V	230 V
27	240 V	240 V
17	-	277 V
13	380 V	-
28	400 V	400 V
29	415 V	415 V

DC coil code

80	12 V
81	24 V
83	48 V
84	60 V
86	110 V
87	125 V
88	220 V
89	240 V