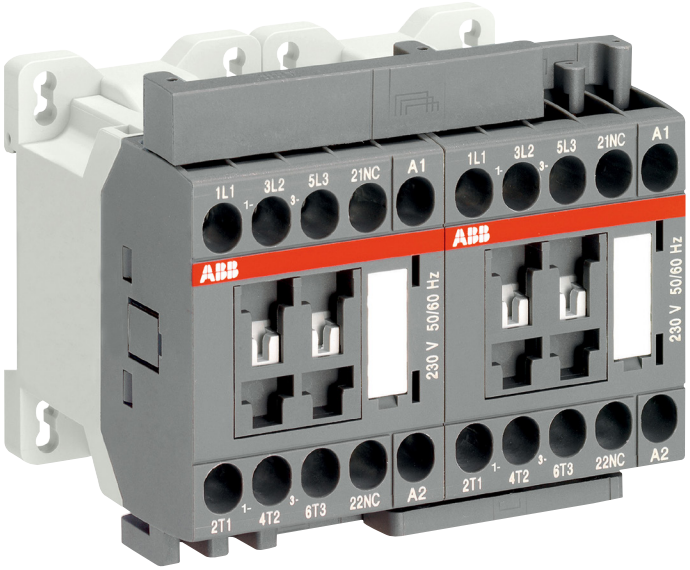
AS 3-pole contactors and NS 3-pole contactor relays
with screw terminals

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.

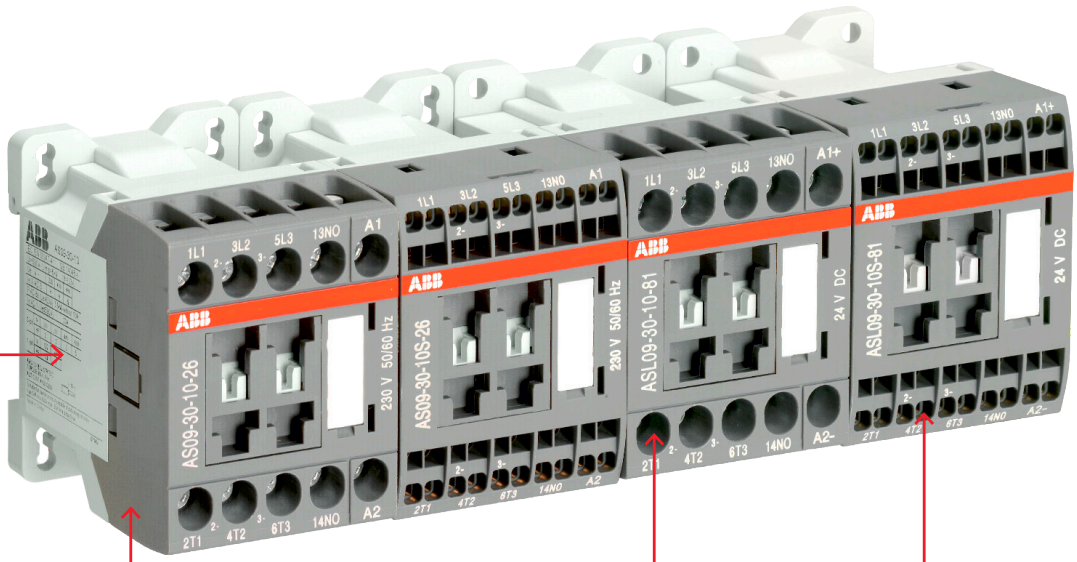
Speed up your projects
Simpler by design
AS contactors come in one single size and are designed to make life easy for engineering, handling and wiring purposes. These products follow a simple marking pattern, which enables a quick identification of their individual features.

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.

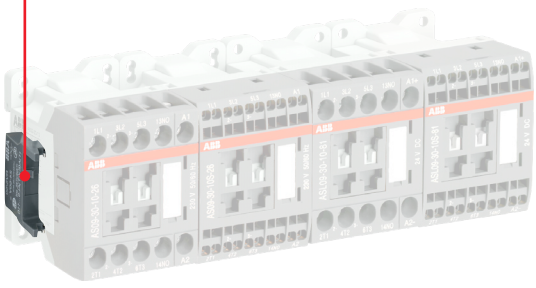
Screw

Screw terminal

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

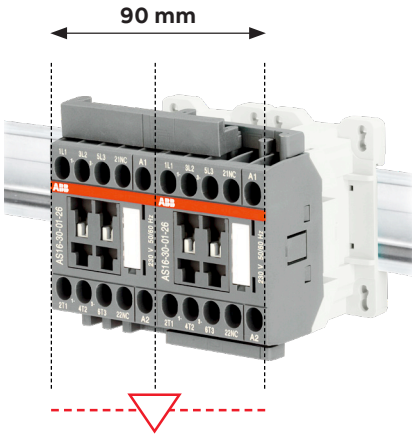
Spring

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.



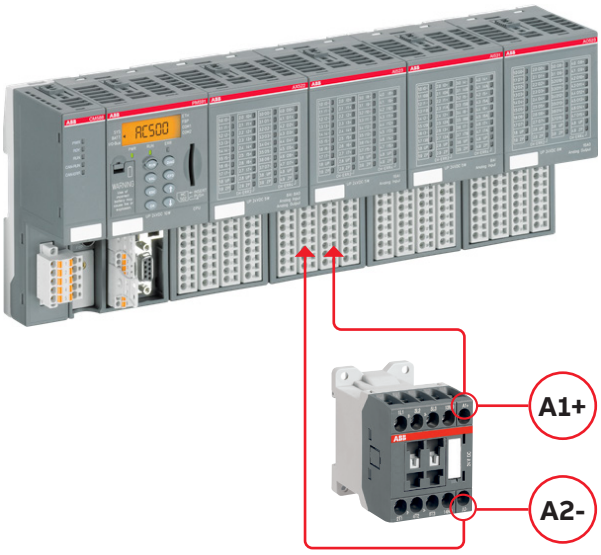
Compact reversing contactors

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.

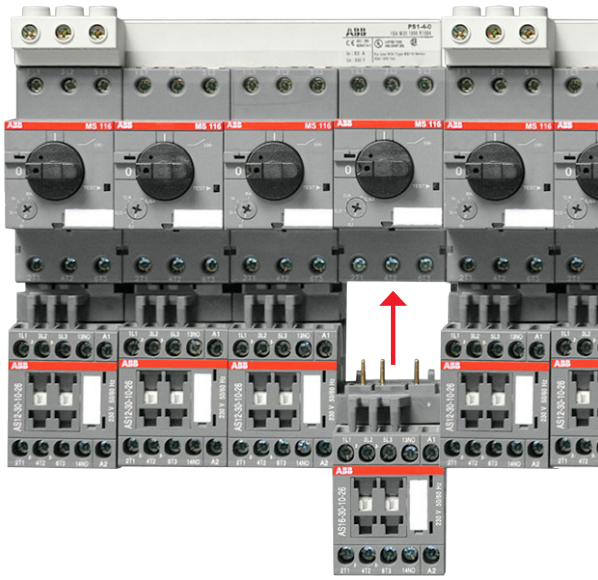
Easy to use
Space-saving and intuitive

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.

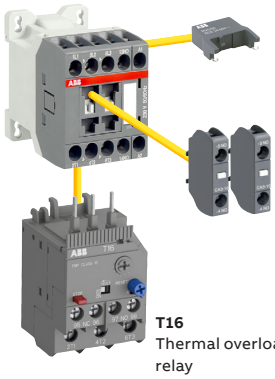


Choose reliable and time-saving solutions
AS contactors can easily be connected to manual motor starters or overload relays. The connecting accessories prevent mistakes and save time when assembling starter combinations.

3-pole contactors
Main accessories

AS09 ... AS16
3-pole contactors

Main accessories for contactors



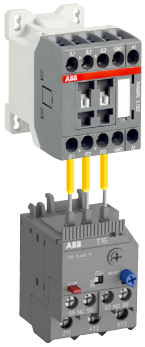
RV5, RT5 or RC5-1
Surge suppressor

CA-3
1-pole auxiliary contact block

T16
Thermal overload relay

Main accessories for starting solutions

Direct-on-line starter

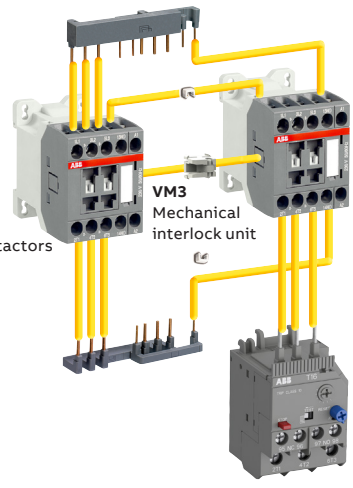


AS
ASL
Contactors

T16
Thermal overload relay

Reversing starter

BER16C-3
Connection set



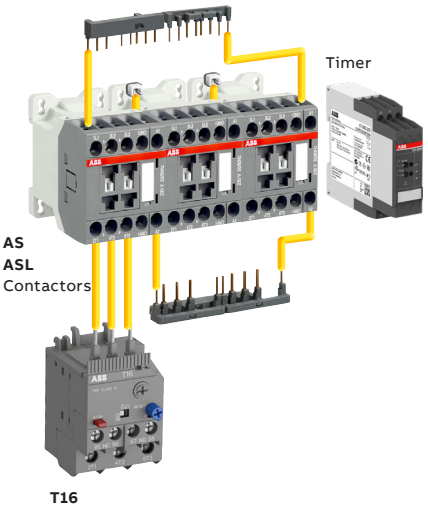
AS
ASL
Contactors

VM3
Mechanical interlock unit

T16
Thermal overload relay

Star-delta starter

BEY16C-3
Connection set



Timer

AS
ASL
Contactors

T16
Thermal overload relay

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	θ ≤ 60 °C	**400 V**	9 A	12 A	15.5 A
				θ ≤ 60 °C	**415 V**	9 A	12 A	15.5 A
				θ ≤ 60 °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

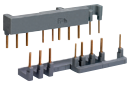
Protection of 3-phase motors

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	θ ≤ 40 °C	**690 V**	**22 A**	**24 A**	**24 A**
				θ ≤ 60 °C	**690 V**	18 A	20 A	20 A
				θ ≤ 70 °C	**690 V**	15 A	16 A	16 A
		With conductor cross-sectional area				2.5 mm²	2.5 mm²	2.5 mm²
	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

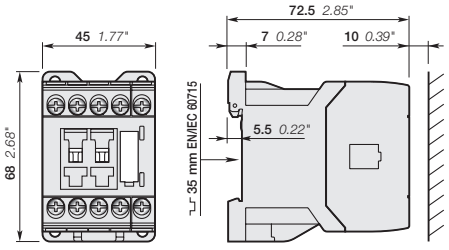
AS09 ... AS16 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.

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 Uc (1)		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current ϑ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	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
				220	220	1 0	AS09-30-10-25	1SBL101001R2510	0.220
						0 1	AS09-30-01-25	1SBL101001R2501	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
				220	220	1 0	AS12-30-10-25	1SBL111001R2510	0.220
						0 1	AS12-3001-25	1SBL111001R2501	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
				220	220	1 0	AS16-30-10-25	1SBL121001R2510	0.220
						0 1	AS16-30-01-25	1SBL121001R2501	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

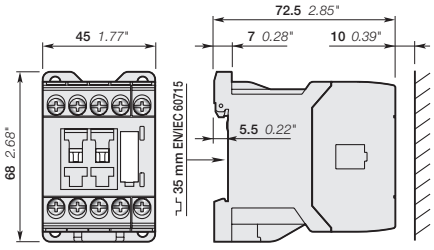
ASL09 ... ASL16 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.

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 Uc (1)	Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current ϑ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
kW	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

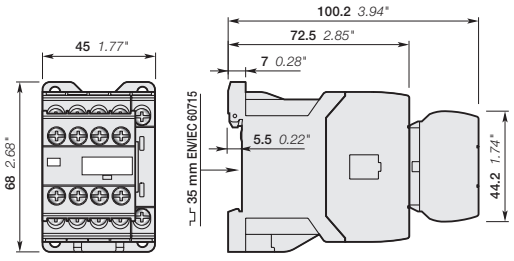
AS09 ... AS16 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.

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 Uc (1)		Auxiliary contacts fitted	Type	Order code	Weight
Rated operational power 400 V AC-3	current ϑ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC						Pkg (1 pce)
kW	A	hp	A	V 50 Hz	V 60 Hz				kg
4	22	5	20	24	24	3 2	AS09-30-32-20	1SBL101001R2032	0.260
				220	220	3 2	AS09-30-32-25	1SBL101001R2532	
				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
				220	220	3 2	AS12-30-32-25	1SBL111001R2532	
				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
				220	220	3 2	AS16-30-32-25	1SBL121001R2532	
				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

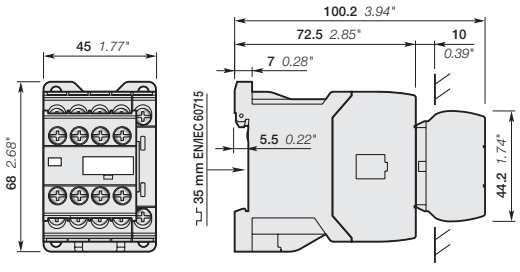
ASL09 ... ASL16 contactors are mainly used for controlling 3-phase motors and power circuits up to 690 V AC and 220 V DC.

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 400 V AC-3	current ϑ ≤ 40 °C AC-1	3-phase motor rating 480 V	General use rating 600 V AC					Pkg (1 pce)
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.



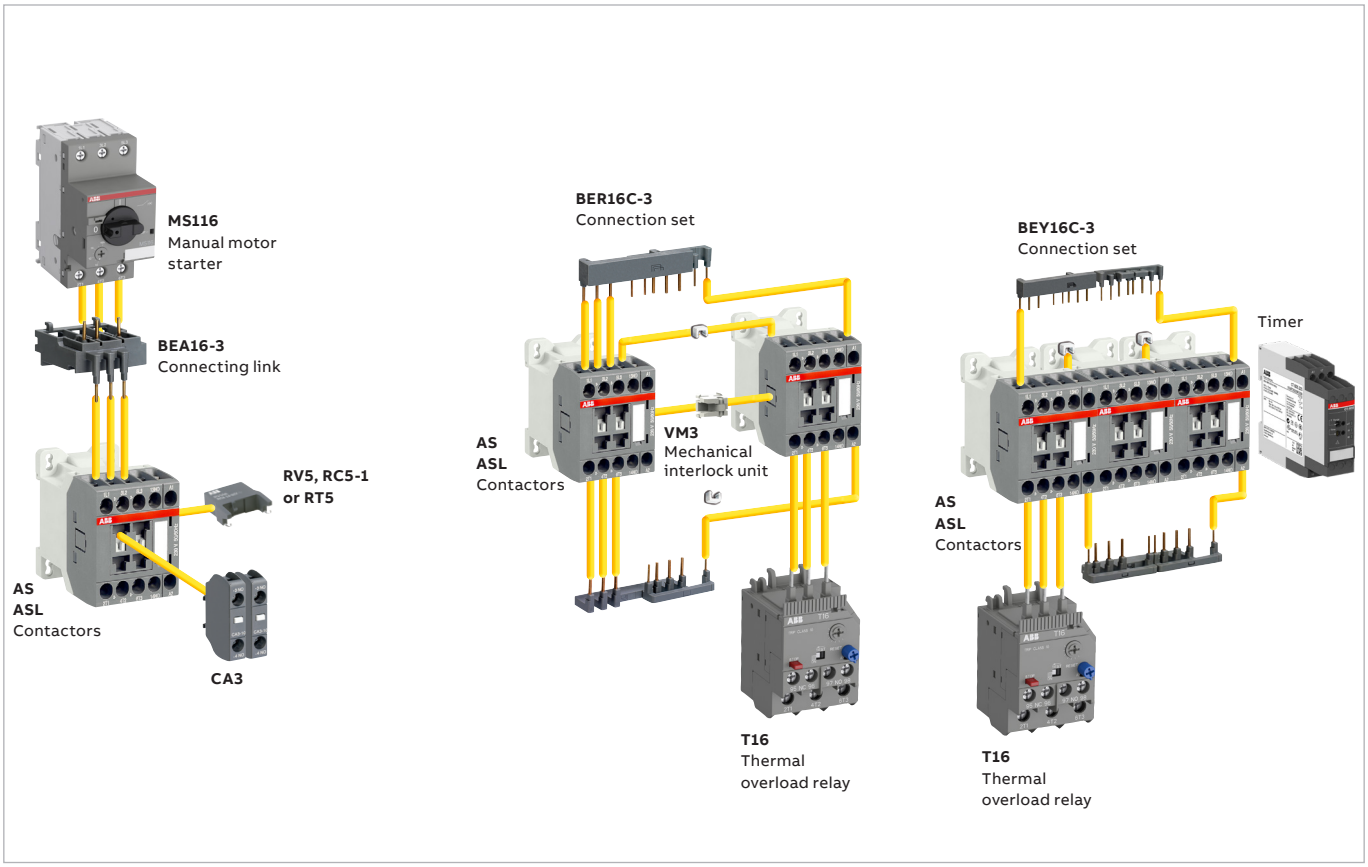
ASL09, ASL12, ASL16

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		Mechanical interlock unit (between 2 contactors)				
			1-pole CA3		VM3		Surge suppressors		
AS09 ... AS16	3 0 3 0	1 0 0 1	2 max.	+	1	+	RV5	or	RC5-1
AS09 ... AS16	3 0	3 2	–		1	+	RV5	or	RC5-1
ASL09 ... ASL16	3 0 3 0	1 0 0 1	2 max.	+	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 ASL09 ... ASL16	T16 (0.10...16 A)

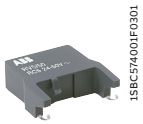
The addition of an overload relay on the contactor does not prevent fitting of many other accessories as shown above.
(1) Direct mounting - No kit required.

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

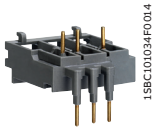
Main accessories

CA3-10

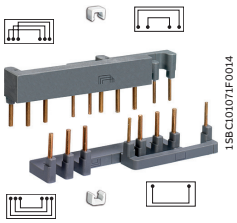
VM3



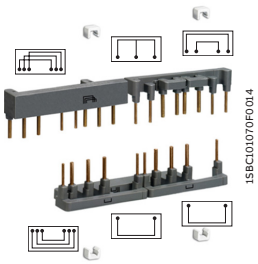
RV5



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

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 - Uc V	AC	DC	Type	Order code	Pkg qty	Weight (1 pce) kg
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 Ue max.		690 V		
Rated frequency (without derating)		50 / 60 Hz		
Conventional free-air thermal current Ith				
acc. to IEC 60947-4-1, open contactors, θ ≤ 40 °C		22 A	25 A	25 A
With conductor cross-sectional area		2.5 mm²	4 mm²	4 mm²
AC-1 Utilization category				
For air temperature close to contactor				
Ie / Rated operational current AC-1	θ ≤ 40 °C	22 A	24 A	24 A
Ue max. ≤ 690 V, 50/60 Hz	θ ≤ 60 °C	18 A	20 A	20 A
	θ ≤ 70 °C	15 A	16 A	16 A
With conductor cross-sectional area		2.5 mm²		
AC-3 Utilization category				
For air temperature close to contactor θ ≤ 60 °C				
Ie / Max. rated operational current AC-3 (1)				
	220-230-240 V	9 A	12 A	15.7 A
M 3~ 3-phase motors	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
M 3~ 1500 r.p.m. 50 Hz 1800 r.p.m. 60 Hz 3-phase motors	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 Ie AC-3 acc. to IEC 60947-4-1		
Rated breaking capacity AC-3		8 x Ie AC-3 acc. to IEC 60947-4-1		
AC-8a Utilization category				
(without thermal overload relay - Ue 400 V 50/60 Hz - θ ≤ 40 °C)				
Ie / 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)				
Ue ≤ 500 V AC - gG type fuse		25 A		
Rated short-time withstand current Icw	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	22 A	24 A	24 A
Maximum breaking capacity				
cos φ = 0.45	at 440 V	155 A		
	at 690 V	90 A		
Power dissipation per pole	Ie / AC-1	1 W	1.2 W	1.2 W
	Ie / 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

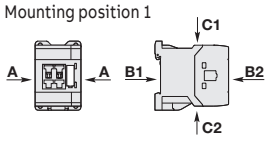
Main pole - Utilization characteristics according to UL / NEMA / CSA

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	00	0
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		
Pollution degree			3		
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		Shock direction	AS contactors - AC operated	ASL contactors - DC operated	
Mounting position 1		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

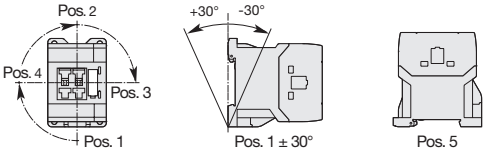
Magnet system characteristics for AS09 ... AS16 contactors

Contactor types			AC operated	AS09	AS12	AS16
Coil operating limits			AC supply			
acc. to IEC 60947-4-1				0.85...1.1 x Uc (at θ ≤ 60 °C); Uc (at θ ≤ 70 °C)		
AC control voltage	Rated control circuit voltage Uc		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 Uc		
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			DC supply			
acc. to IEC 60947-4-1				0.85...1.1 x Uc (at θ ≤ 60 °C); Uc (at θ ≤ 70 °C)		
DC control voltage	Rated control circuit voltage Uc			12...240 V DC		
	Coil consumption	Average pull-in value		3 W		
		Average holding value		3 W		
Drop-out voltage				Approx. 10...40 % of Uc		
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/Stranded	1 x	0.75...4 mm²		
	2 x	0.75...4 mm²		
Flexible with non insulated ferrule	1 x	0.75...2.5 mm²		
	2 x	0.75...2.5 mm²		
Flexible with insulated ferrule	1 x	0.75...2.5 mm²		
	2 x	0.75...1.5 mm²		
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/Stranded	1 x	0.75...2.5 mm²		
	2 x	0.75...2.5 mm²		
Flexible with non insulated ferrule	1 x	0.75...2.5 mm²		
	2 x	0.75...2.5 mm²		
Flexible with insulated ferrule	1 x	0.75...2.5 mm²		
	2 x	0.75...1.5 mm²		
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

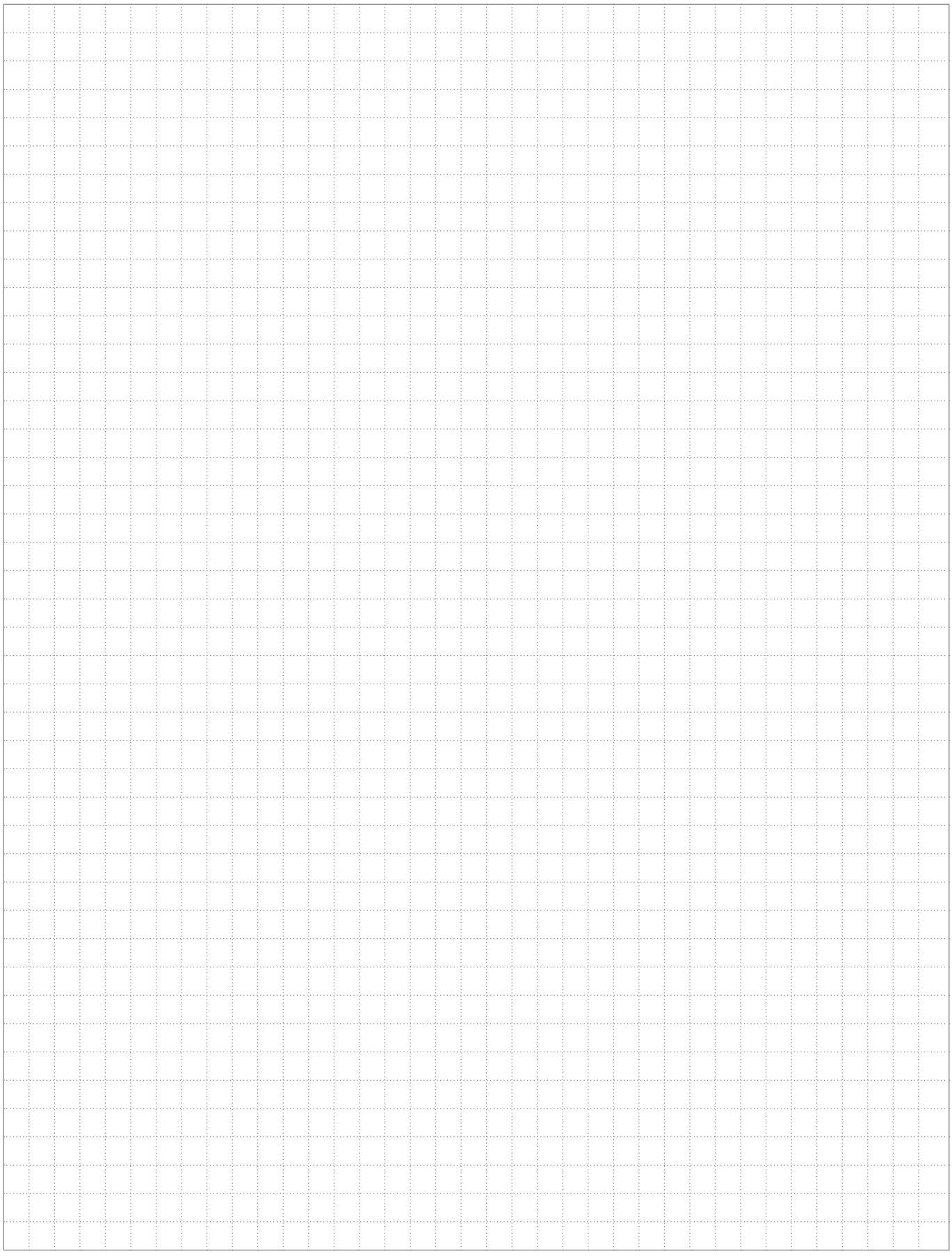
Built-in auxiliary contacts according to IEC

Contactor types	AC operated	**AS09**	**AS12**	**AS16**
	DC operated	**ASL09**	**ASL12**	**ASL16**
Rated operational voltage Ue max.		690 V		
Rated frequency (without derating)		50 / 60 Hz		
Conventional free-air thermal current Ith - θ ≤ 40 °C		10 A		
Ie / 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 Ie AC-15 acc. to IEC 60947-5-1		
Breaking capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1		
Ie / 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 Icw	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

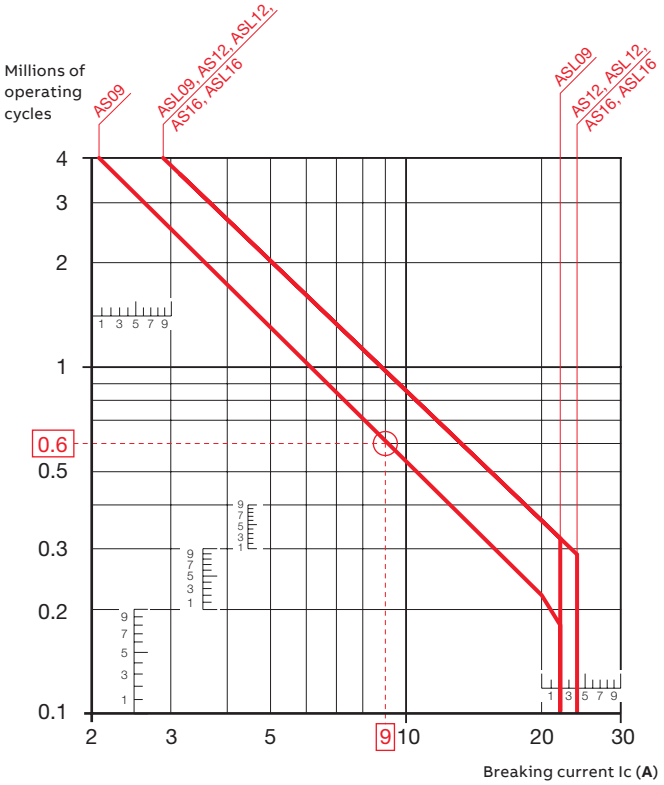


AS09 ... AS16 and ASL09 ... ASL16 3-pole contactors

Electrical durability

Electrical durability for AC-1 utilization category - Ue ≤ 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 Ic for AC-1 is equal to the rated operational current of the load. Maximum electrical switching frequency: 600 cycles / hour.



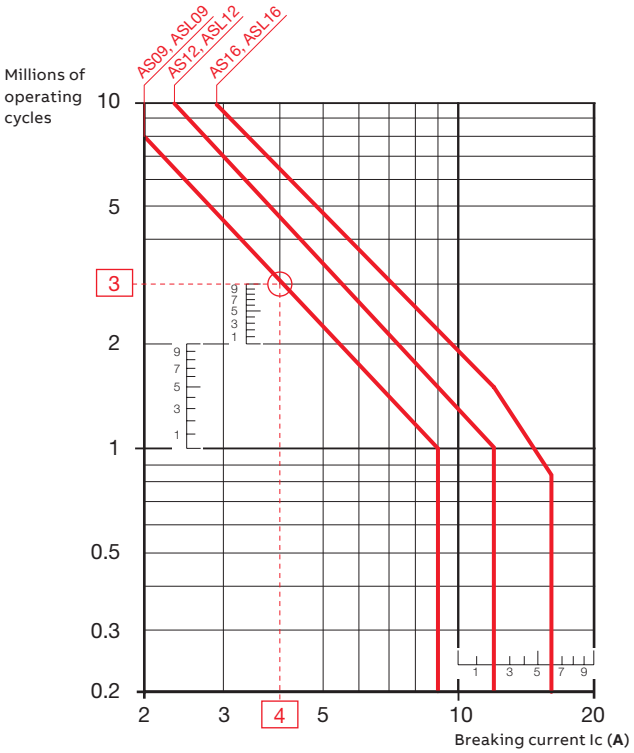
Example:
Breaking current = 9 A.
On the opposite curve at intersection "○" 9 A the corresponding value for the electrical durability is approximately 0.6 millions operating cycles.

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

Electrical durability

Electrical durability for AC-3 utilization category - Ue ≤ 440 V - Ambient temperature ≤ 60 °C

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

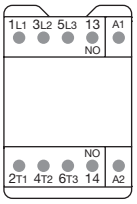


Example:
Breaking current = 4 A.
On the opposite curve at intersection "○" 4 A the corresponding value for the electrical durability is approximately 3 millions operating cycles.

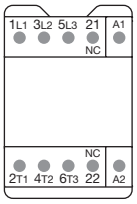
AS09 ... AS16 3-pole contactors
Terminal marking and positioning

AS contactors - AC operated

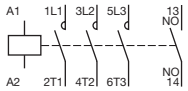
Standard devices without addition of auxiliary contacts



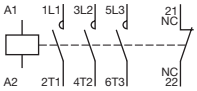
AS09 ... AS16-30-10



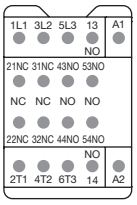
AS09 ... AS16-30-01



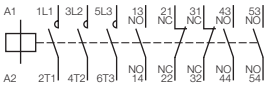
AS09 ... AS16-30-10



AS09 ... AS16-30-01

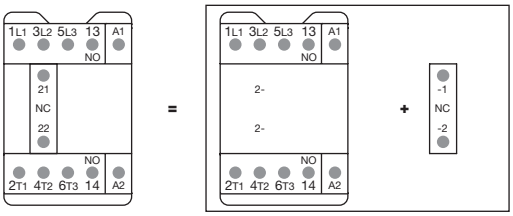


AS09 ... AS16-30-32

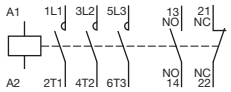


AS09 ... AS16-30-32

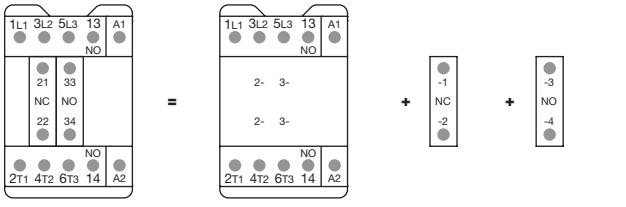
Other possible contact combinations with auxiliary contact blocks added by the user



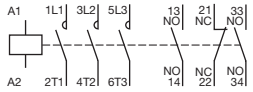
Combination 11 = AS09 ... AS16-30-10 + CA3-01



Combination 11

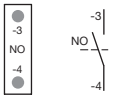


Combination 21 = AS09 ... AS16-30-10 + CA3-01 + CA3-10

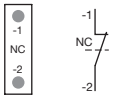


Combination 21

CA3 1-pole auxiliary contact blocks



CA3-10



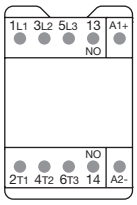
CA3-01

ASL09 ... ASL16 3-pole contactors

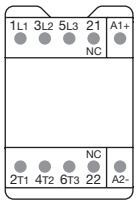
Terminal marking and positioning

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

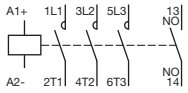
Standard devices without addition of auxiliary contacts



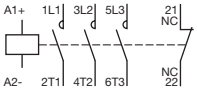
ASL09 ... ASL16-30-10



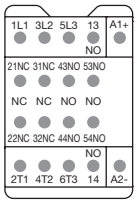
ASL09 ... ASL16-30-01



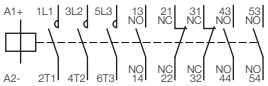
ASL09 ... ASL16-30-10



ASL09 ... ASL16-30-01

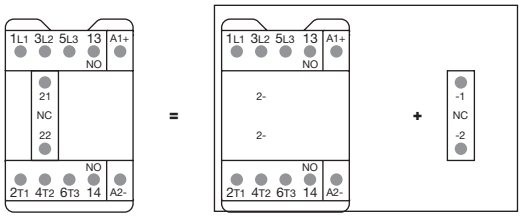


ASL09 ... ASL16-30-32

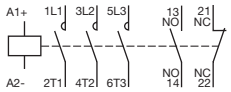


ASL09 ... ASL16-30-32

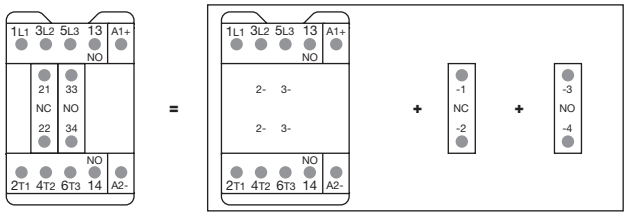
Other possible contact combinations with auxiliary contact blocks added by the user



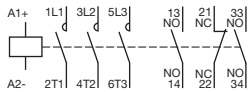
Combination 11 = ASL09 ... ASL16-30-10 + CA3-01



Combination 11

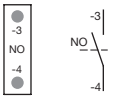


Combination 21 = ASL09 ... ASL16-30-10 + CA3-01 + CA3-10

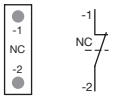


Combination 21

CA3 1-pole auxiliary contact blocks

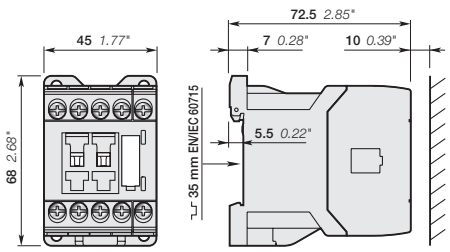


CA3-10

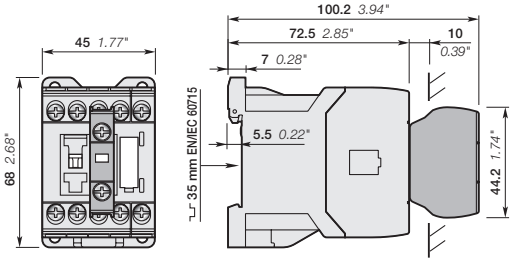


CA3-01

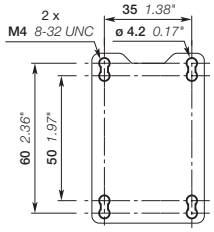
AS09 ... AS16 3-pole contactors
Dimensions

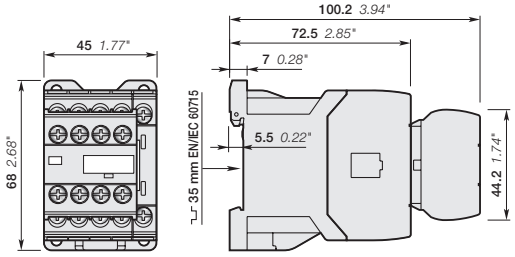


AS09, AS12, AS16



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



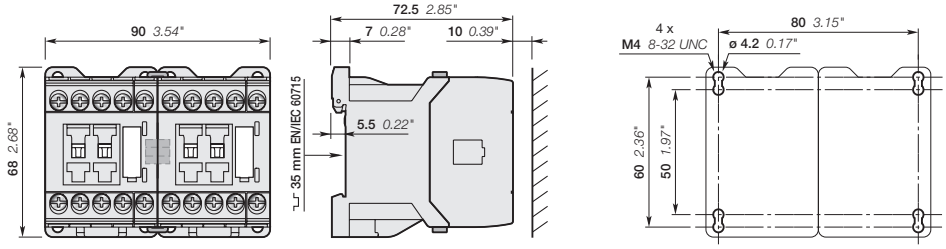


AS09 ... 16-30-32

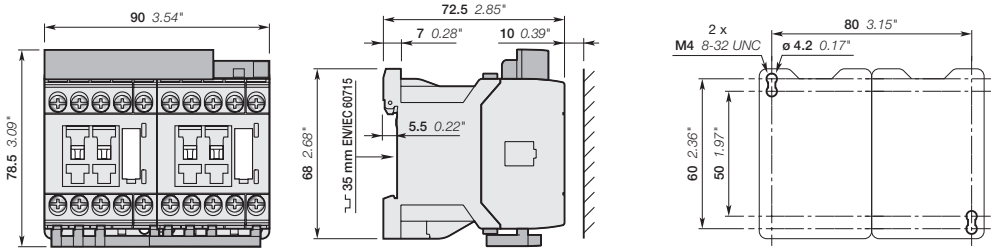
Main dimensions mm, inches

05

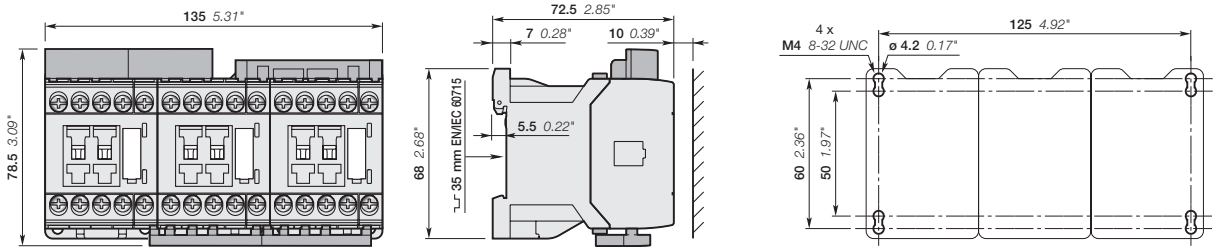
AS09 ... AS16 3-pole contactors
Dimensions



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

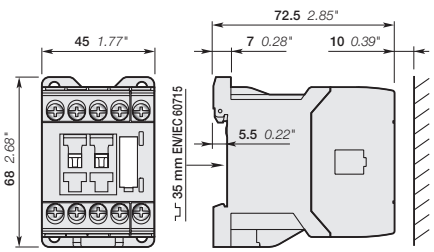


AS09, AS12, AS16
+ BEY16C-3 connection set for star-delta starter including four BB3 fixing clips

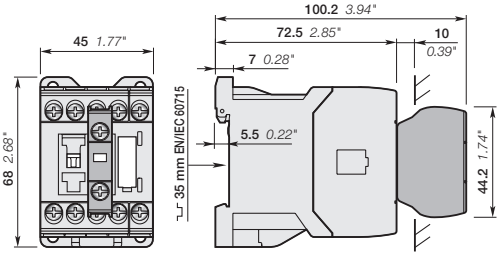
Main dimensions mm, inches

ASL09 ... ASL16 3-pole contactors

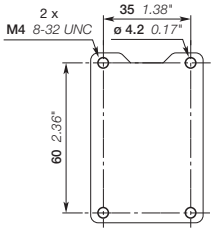
Dimensions

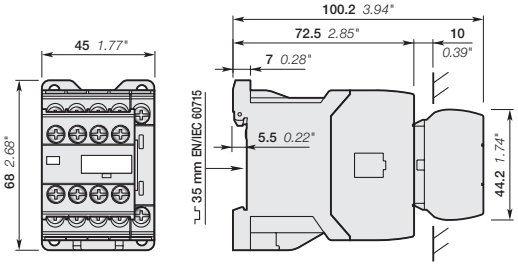


ASL09, ASL12, ASL16



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



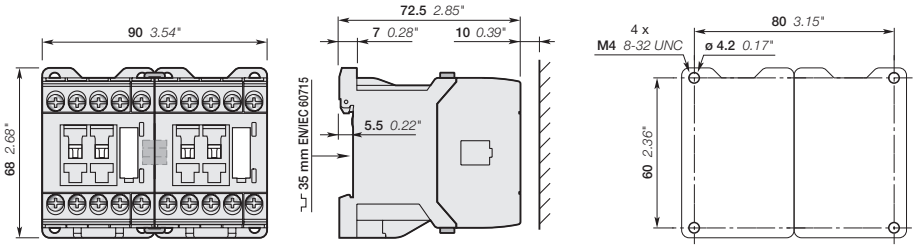


ASL09 ... 16-30-32

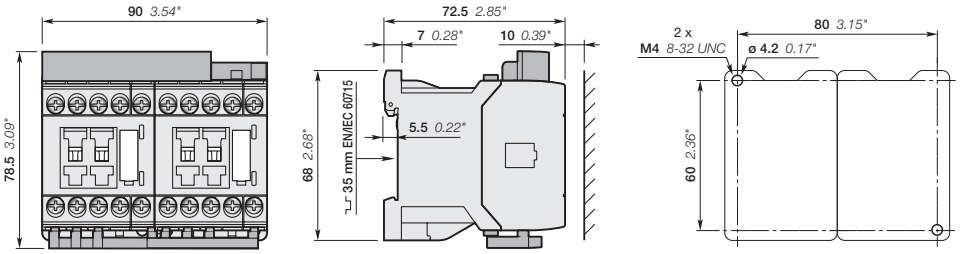
Main dimensions mm, inches

ASL09 ... ASL16 3-pole contactors

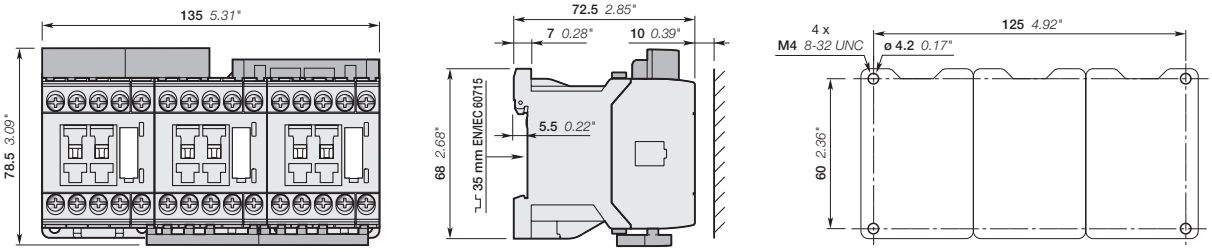
Dimensions



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

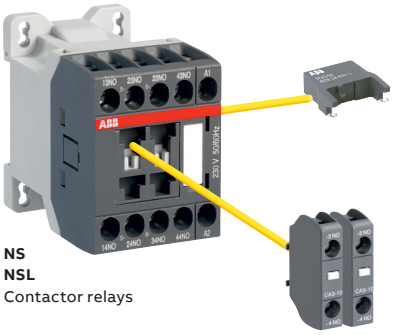


ASL09, ASL12, ASL16
+ BEY16C-3 connection set for star-delta starter including four BB3 fixing clips

Contactor relays
Main accessories

NS, NSL
Contactor relays

4-pole contactor relays



RV5, RT5 or RC5-1
Surge suppressor

CA-3
1-pole auxiliary contact block

NS
NSL
Contactor relays

8-pole contactor relays

RV5, RT5 or RC5-1
Surge suppressor

NS
NSL
Contactor relays

Contactor relays

NS

NSL

Screw terminals

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

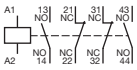
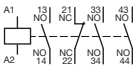
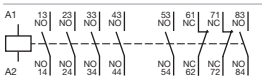
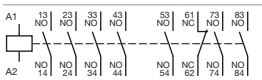
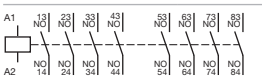
NS contactor relays
AC operated

NS22E

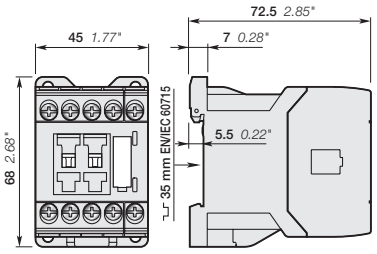
NS contactor relays are used for switching auxiliary and control circuits.

These contactor relays are designed with:

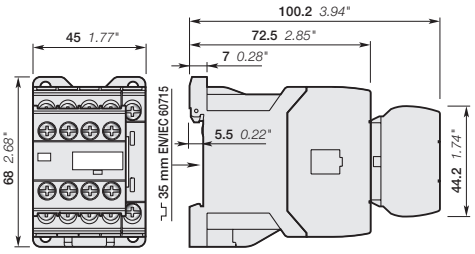
- 4 poles or 8 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: AC operated
- add-on auxiliary contact blocks for front mounting and a comprehensive range of accessories.

Number of contacts		Rated control circuit voltage Uc (1)		Type	Order code	Weight Pkg (1 pce)
1st stack	2nd stack	V 50 Hz	V 60 Hz			kg
		24	24	NS22E-20	1SBH101001R2022	0.220
		220	220	NS22E-25 Relay	1SBH101001R2522	0.220
		230	230	NS22E-26	1SBH101001R2622	0.220
		24	24	NS31E-20	1SBH101001R2031	0.220
		220	220	NS31E-25 Relay	1SBH101001R2531	0.220
		230	230	NS31E-26	1SBH101001R2631	0.220
		24	24	NS40E-20	1SBH101001R2040	0.220
		220	220	NS40E-25 Relay	1SBH101001R2540	0.220
		230	230	NS40E-26	1SBH101001R2640	0.220
		24	24	NS44E-20	1SBH101001R2044	0.260
		220	220	NS44E-25 Relay	1SBH101001R2544	0.260
		230	230	NS44E-26	1SBH101001R2644	0.260
		24	24	NS53E-20	1SBH101001R2053	0.260
		220	220	NS53E-25 Relay	1SBH101001R2553	0.260
		230	230	NS53E-26	1SBH101001R2653	0.260
		24	24	NS62E-20	1SBH101001R2062	0.260
		220	220	NS62E-25 Relay	1SBH101001R2562	0.260
		230	230	NS62E-26	1SBH101001R2662	0.260
		24	24	NS71E-20	1SBH101001R2071	0.260
		220	220	NS71E-25 Relay	1SBH101001R2571	0.260
		230	230	NS71E-26	1SBH101001R2671	0.260
		24	24	NS80E-20	1SBH101001R2080	0.260
		220	220	NS80E-25 Relay	1SBH101001R2580	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

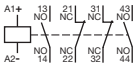
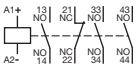
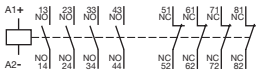
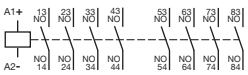
DC operated

NSL22E

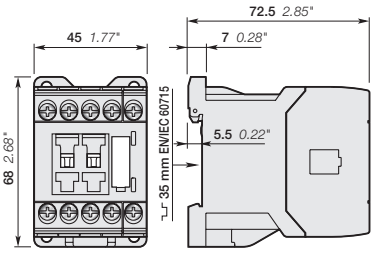
NSL contactor relays are used for switching auxiliary and control circuits.

These contactor relays are designed with:

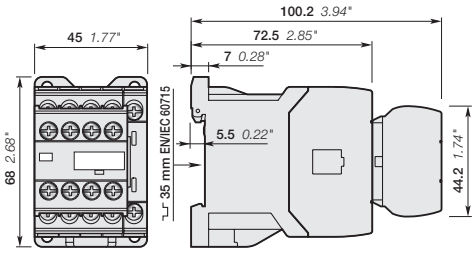
- 4 poles or 8 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: low coil consumption (3 W at pull-in and holding) DC operated with solid core magnet. Suitable for direct control by PLC outputs (the polarity on the coil terminals A1+ and 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

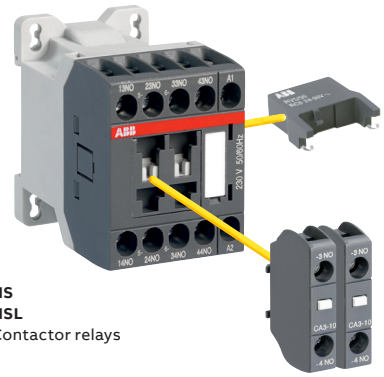
Contactor relays and main accessories (other accessories available)

8-pole contactor relay

RV5, RT5 or RC5-1
Surge suppressor

NS
NSL
Contactor relays

4-pole contactor relay



RV5, RT5 or RC5-1
Surge suppressor

NS
NSL
Contactor relays

CA-3
1-pole auxiliary contact block

CA3

Main accessory fitting details

Contactor types	Main poles		Front-mounted accessories Auxiliary contact blocks 1-pole CA3		Side-mounted accessories Surge suppressors	
NS..	2 2	E	2 max.	+	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.	+	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

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

RV5

Surge suppressors

For contactor relays	Rated control circuit voltage - Uc			Type	Order code	Pkg qty	Weight (1 pce)
	V	AC	DC				kg
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 Ue max.		690 V
Rated frequency (without derating)		50 / 60 Hz
Conventional free-air thermal current Ith - θ ≤ 40 °C		10 A
Ie / 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 Ie AC-15 acc. to IEC 60947-5-1
Breaking capacity AC-15		10 x Ie AC-15 acc. to IEC 60947-5-1
Ie / 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		
Ue ≤ 500 V AC - gG type fuse		10 A
Rated short-time withstand current Icw	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

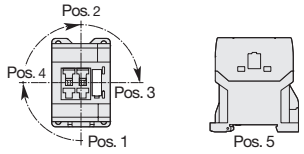
Magnet system characteristics for NS contactor relays

Contactor relay types			AC operated	**NS**
Coil operating limits			AC supply	
acc. to IEC 60947-5-1				0.85...1.1 x Uc (at θ ≤ 60 °C); Uc (at θ ≤ 70 °C)
AC control voltage	Rated control circuit voltage Uc		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 Uc
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			DC supply	
acc. to IEC 60947-5-1				0.85...1.1 x Uc (at θ ≤ 60 °C); Uc (at θ ≤ 70 °C)
DC control voltage	Rated control circuit voltage Uc			12...240 V DC
	Coil consumption		Average pull-in value	3 W
			Average holding value	3 W
Drop-out voltage				Approx. 10...40 % of Uc
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.

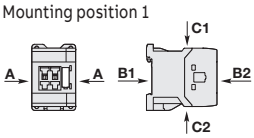
Mounting characteristics and conditions for use

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

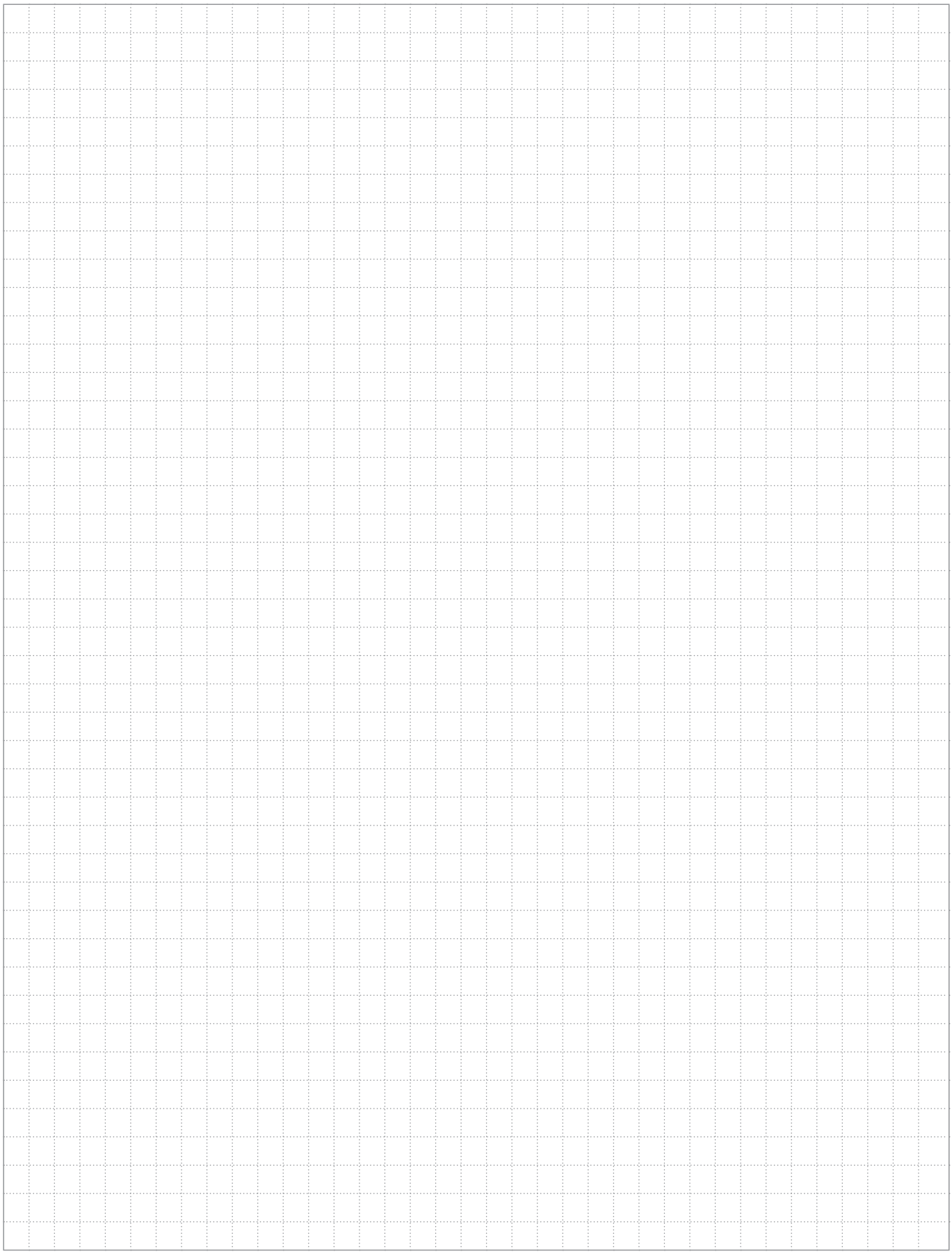
General technical data

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	
Pollution degree		3	
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	NS contactor relays - AC operated	NSL contactor relays - DC operated
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/Stranded	1 x	0.75...2.5 mm²	
	2 x	0.75...2.5 mm²	
Flexible with non insulated ferrule	1 x	0.75...2.5 mm²	
	2 x	0.75...2.5 mm²	
Flexible with insulated ferrule	1 x	0.75...2.5 mm²	
	2 x	0.75...1.5 mm²	
 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

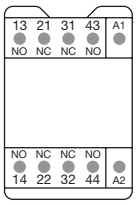


NS contactor relays

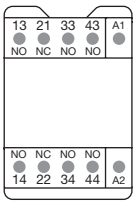
Terminal marking and positioning

NS contactor relays - AC operated

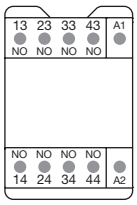
Standard devices without addition of auxiliary contact blocks



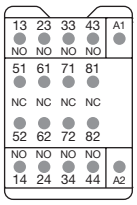
NS22E



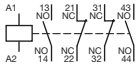
NS31E



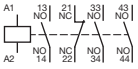
NS40E



NS44E



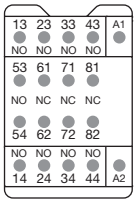
NS22E



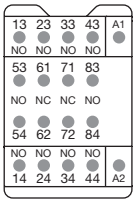
NS31E

NS40E

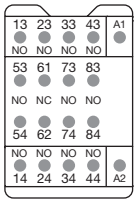
NS44E



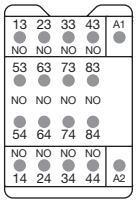
NS53E



NS62E



NS71E



NS80E

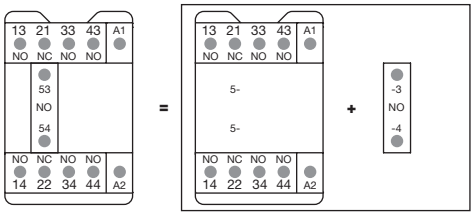
NS53E

NS62E

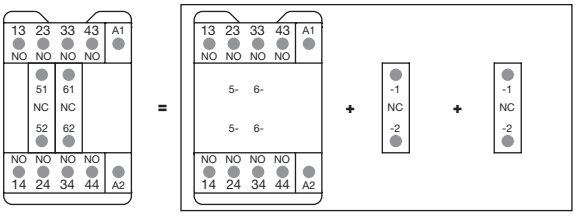
NS71E

NS80E

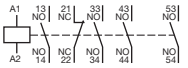
Other possible contact combinations with auxiliary contact blocks added by the user



Combination 41E = NS31E + CA3-10

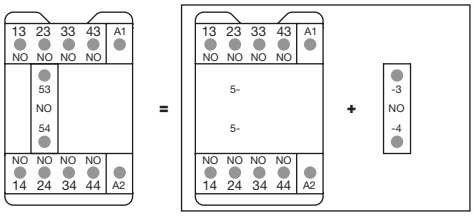


Combination 42E = NS40E + CA3-01 + CA3-01

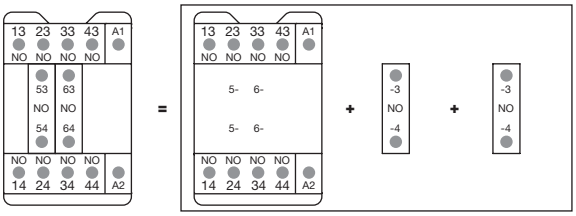


Combination 41E

Combination 42E

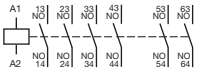


Combination 50E = NS40E + CA3-10



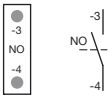
Combination 60E = NS40E + CA3-10 + CA3-10

Combination 50E

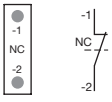


Combination 60E

CA3 1-pole auxiliary contact blocks



CA3-10



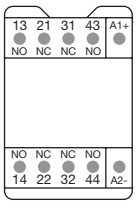
CA3-01

NSL contactor relays

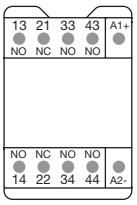
Terminal marking and positioning

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

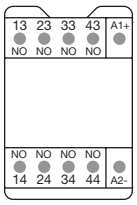
Standard devices without addition of auxiliary contact blocks



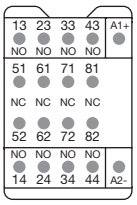
NSL22E



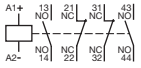
NSL31E



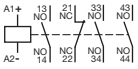
NSL40E



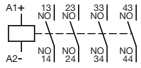
NSL44E



NSL22E

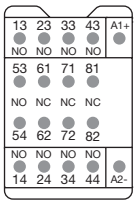


NSL31E

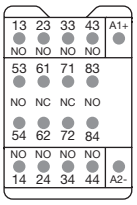


NSL40E

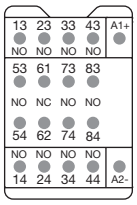
NSL44E



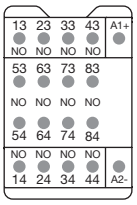
NSL53E



NSL62E



NSL71E



NSL80E

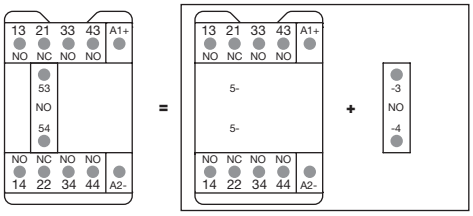
NSL53E

NSL62E

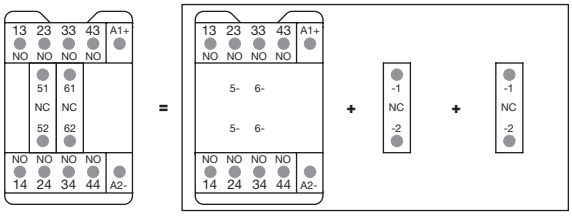
NSL71E

NSL80E

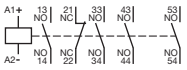
Other possible contact combinations with auxiliary contact blocks added by the user



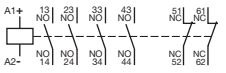
Combination 41E = NSL31E + CA3-10



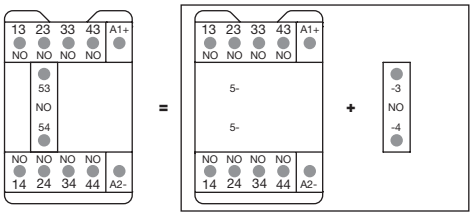
Combination 42E = NSL40E + CA3-01 + CA3-01



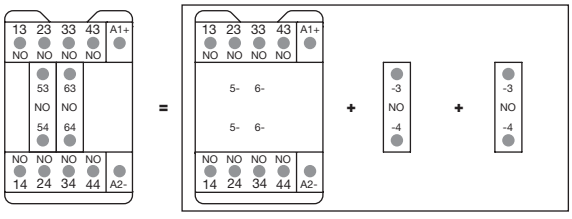
Combination 41E



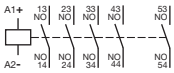
Combination 42E



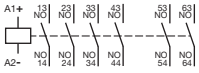
Combination 50E = NSL40E + CA3-10



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

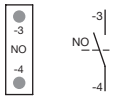


Combination 50E

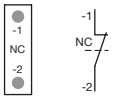


Combination 60E

CA3 1-pole auxiliary contact blocks



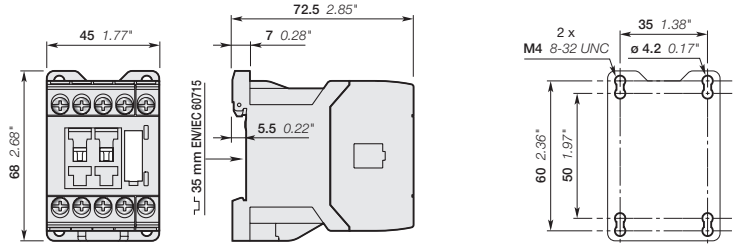
CA3-10



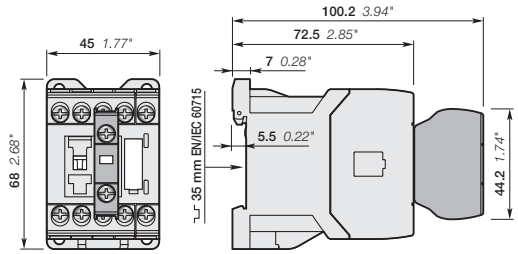
CA3-01

NS contactor relays
Dimensions

4-pole contactor relays

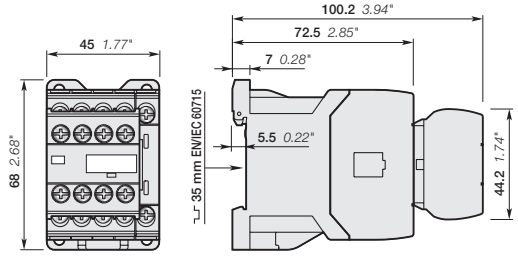


NS22E, NS31E, NS40E



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

8-pole contactor relays

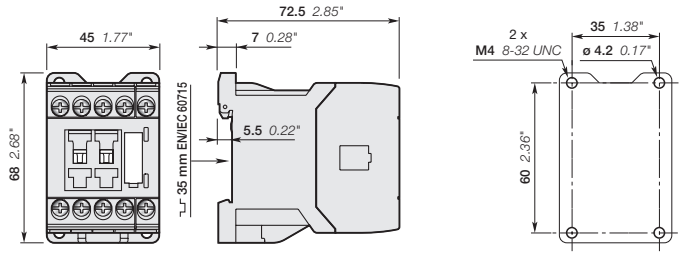


NS44E, NS53E, NS62E, NS71E, NS80E

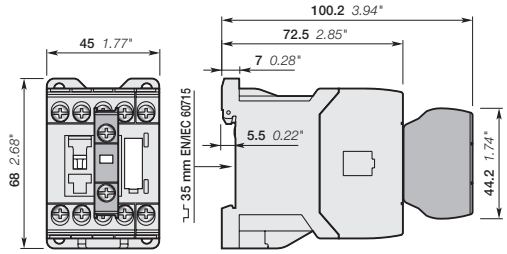
Main dimensions mm, inches

NSL contactor relays
Dimensions

4-pole contactor relays

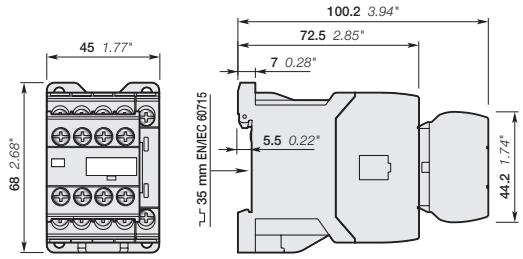


NSL22E, NSL31E, NSL40E



NSL22E, NSL31E, NSL40E
+ CA3 front-mounted 1-pole auxiliary contact block

8-pole contactor relays



NSL44E, NSL53E, NSL62E, NSL71E, NSL80E

Main dimensions mm, inches

Auxiliary contact blocks
Accessories

CA3-10

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

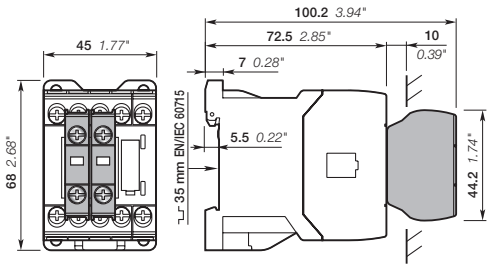
CA3 1-pole auxiliary contact blocks, designed for standard industrial environments, are equipped with:

- 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 Ui acc. to IEC 60947-5-1		690 V
Rated impulse withstand voltage Uimp		6 kV
Pollution degree		3
Rated operational voltage Ue max.		690 V
Conventional thermal current Ith - θ ≤ 40 °C		10 A
Ie / 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 Ie AC-15 acc. to IEC 60947-5-1
Breaking capacity		10 x Ie AC-15 acc. to IEC 60947-5-1
Ie / Rated operational current DC-13	24 V DC	6 A / 144 W
acc. to IEC 60947-5-1	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 Icw	for 1.0 s	100 A
θ = 40 °C	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/Stranded	1 x	0.75...2.5 mm²
		2 x	0.75...2.5 mm²
	Flexible with non insulated ferrule	1 x	0.75...2.5 mm²
		2 x	0.75...2.5 mm²
	Flexible with insulated ferrule	1 x	0.75...2.5 mm²
		2 x	0.75...1.5 mm²
	Lugs	L ≤	7.7 mm
		I >	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 - Ue ≤ 400 V

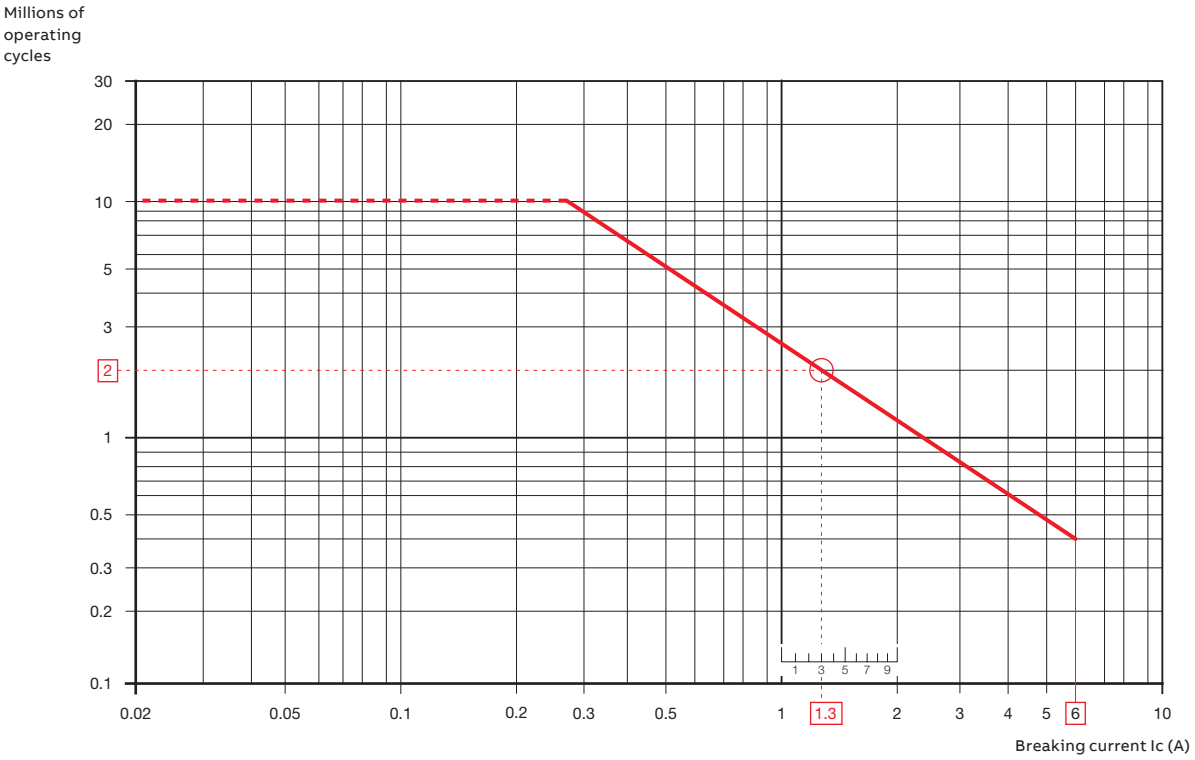
AC-15 utilization category according to IEC 60947-5-1 / EN 60947-5-1:

- making current: 10 x Ie with cos ϕ = 0.7 and Ue
- breaking current: Ie with cos ϕ = 0.4 and Ue.

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.

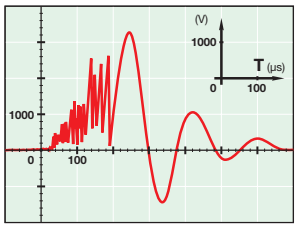


Example:

Breaking current = 1.3 A

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

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 Ûs to the peak value Ûc of the coil rated control voltage Uc:

$$k = \frac{\hat{U}s\ max.}{\hat{U}c} \qquad \text{in DC} \quad k = \frac{\hat{U}s\ max.}{Uc} \qquad \text{in AC} \quad k = \frac{\hat{U}s\ max.}{Uc\sqrt{2}}$$

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.

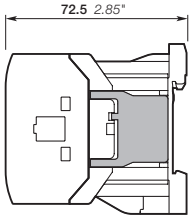
Note: A varistor is a resistor whose value decreases to a very large extent when a certain voltage is applied at its terminals.

RV5

RC5-1

RT5

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

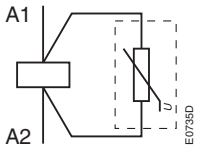
Surge suppressors for contactor coils
Technical data

Varistor	**RV5/50**	**RV5/133**	**RV5/250**	**RV5/440**
Rated control circuit voltage Uc	24...50 V AC	50...133 V AC	110...250 V AC	250...440 V AC
	24...50 V DC	50...133 V DC	110...250 V DC	250...440 V DC
Residual overvoltage (clipping voltage)	132 V AC	270 V AC	480 V AC	825 V AC
	132 V DC	270 V DC	480 V DC	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 Uvdr*, thus voltage front up to this point.			
	*Uvdr = Varistor operating voltage (voltage dependent resistor), tolerance ± 10 %.			

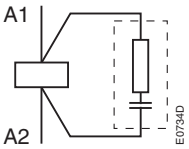
RC type	**RC5-1/50**	**RC5-1/133**	**RC5-1/250**	**RC5-1/440**
Rated control circuit voltage Uc	24...50 V AC	50...133 V AC	110...250 V AC	250...440 V AC
Residual overvoltage (clipping voltage)	2 to 3 x Uc max.			
Opening time growth factor	2...3			
Operating temperature	-20...+70 °C			
Advantages	Very 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 Uc	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.				

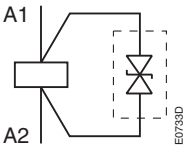
Wiring diagrams



Varistor



RC type



Transil diode

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				
AS	AS	VM3	1SBN031005T1000	10	0.002
ASL	ASL				

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

BB3

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

BDT4

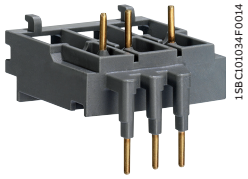
Function markers

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

BA4

Connection accessories for starting solutions



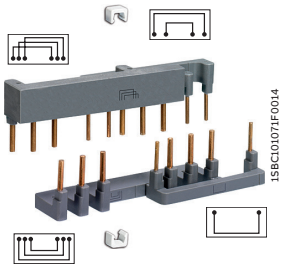
BEA16-3

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

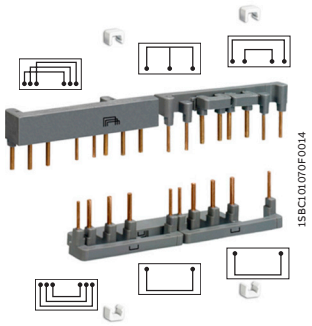
Connection sets for reversing contactors

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:

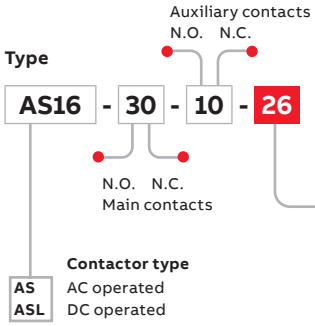
- Line contactor / delta contactor: upstream phase-to-phase connection,
- Delta contactor / star contactor: downstream connection in parallel,
- Star contactor: star point upstream,
- An electrical interlocking between delta and star contactors equipped with built-in N.C. auxiliary contacts,
- 4 fixing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

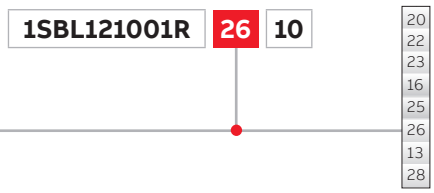
For contactors			Mech. interlock unit between star & delta contactors	Type	Order code	Pkg qty	Weight (1 pce) kg
Line	Delta	Star					
AS09	AS09	AS09	with or without VM3	BEY16C-3	1SBN081018R2000	1	0.041
AS12	AS12	AS09					

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. For detail code information, please contact your ABB local sales organization.

3-pole contactors

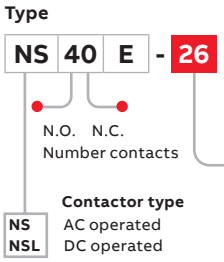


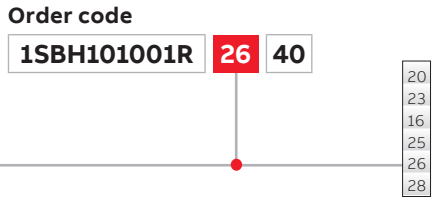


AC coil code		
	50 Hz	**60 Hz**
20	24 V 24 V	
22	48 V 48 V	
23	110 V	110 V
16	– 120 V	
25	220 V	220 V
26	230 V	230 V
13	380 V	–
28	400 V	400 V

DC coil code	
81	24 V
86	110 V
87	125 V
88	220 V

Contactor relays





AC coil code		
	50 Hz	**60 Hz**
20	24 V 24 V	
23	110 V	110 V
16	– 120 V	
25	220 V	220 V
26	230 V	230 V
28	400 V	400 V

DC coil code	
81	24 V
86	110 V
87	125 V
88	220 V