



Main catalogue

Motor protection and control AS contactors, NS contactor relays with spring terminals

Power and productivity
for a better world™



Motor rated operational powers and currents

The currents given below concern standard three-phase four-pole cage motors (1500 r.p.m. at 50 Hz 1800 r.p.m. at 60 Hz). These values are given for guidance and may vary according to the motor manufacturer and depending on the number of poles.

IEC	Motor nominal current: standardized values in blue colour (according to IEC 60947-4-1 Annex G)									
Motor power kW	220 V A	230 V A	240 V A	380 V A	400 V A	415 V A	440 V A	500 V A	660 V A	690 V A
0.06	0.37	0.35	0.34	0.21	0.2	0.19	0.18	0.16	0.13	0.12
0.09	0.54	0.52	0.50	0.32	0.3	0.29	0.26	0.24	0.18	0.17
0.12	0.73	0.7	0.67	0.46	0.44	0.42	0.39	0.32	0.24	0.23
0.18	1	1	1	0.63	0.6	0.58	0.53	0.48	0.37	0.35
0.25	1.6	1.5	1.4	0.9	0.85	0.82	0.74	0.68	0.51	0.49
0.37	2.0	1.9	1.8	1.2	1.1	1.1	1	0.88	0.67	0.64
0.55	2.7	2.6	2.5	1.6	1.5	1.4	1.3	1.2	0.91	0.87
0.75	3.5	3.3	3.2	2.0	1.9	1.8	1.7	1.5	1.15	1.1
1.1	4.9	4.7	4.5	2.8	2.7	2.6	2.4	2.2	1.7	1.6
1.5	6.6	6.3	6	3.8	3.6	3.5	3.2	2.9	2.2	2.1
2.2	8.9	8.5	8.1	5.2	4.9	4.7	4.3	3.9	2.9	2.8
3	11.8	11.3	10.8	6.8	6.5	6.3	5.7	5.2	4	3.8
4	15.7	15	14.4	8.9	8.5	8.2	7.4	6.8	5.1	4.9
5.5	20.9	20	19.2	12.1	11.5	11.1	10.1	9.2	7	6.7
7.5	28.2	27	25.9	16.3	15.5	14.9	13.6	12.4	9.3	8.9
11	39.7	38	36.4	23.2	22	21.2	19.3	17.6	13.4	12.8
15	53.3	51	48.9	30.5	29	28	25.4	23	17.8	17
18.5	63.8	61	58.5	36.8	35	33.7	30.7	28	22	21
22	75.3	72	69	43.2	41	39.5	35.9	33	25.1	24
30	100	96	92	57.9	55	53	48.2	44	33.5	32
37	120	115	110	69	66	64	58	53	40.8	39
45	146	140	134	84	80	77	70	64	49.1	47
55	177	169	162	102	97	93	85	78	59.6	57
75	240	230	220	139	132	127	116	106	81	77
90	291	278	266	168	160	154	140	128	97	93
110	355	340	326	205	195	188	171	156	118	113
132	418	400	383	242	230	222	202	184	140	134
160	509	487	467	295	280	270	245	224	169	162
200	637	609	584	368	350	337	307	280	212	203
250	782	748	717	453	430	414	377	344	261	250
315	983	940	901	568	540	520	473	432	327	313
355	1109	1061	1017	642	610	588	535	488	370	354
400	1255	1200	1150	726	690	665	605	552	418	400
500	1545	1478	1416	895	850	819	745	680	515	493
560	1727	1652	1583	1000	950	916	832	760	576	551
630	1928	1844	1767	1116	1060	1022	929	848	643	615
710	2164	2070	1984	1253	1190	1147	1043	952	721	690
800	2446	2340	2243	1417	1346	1297	1179	1076	815	780
900	2760	2640	2530	1598	1518	1463	1330	1214	920	880
1000	3042	2910	2789	1761	1673	1613	1466	1339	1014	970

UL / CSA	Motor nominal current: standardized values (according to IEC 60947-4-1 Annex G and UL 508)				
Motor power hp	208 V A	220-240 V A	380-415 V A	440-480 V A	550-600 V A
1/2	2.4	2.2	1.3	1.1	0.9
3/4	3.5	3.2	1.8	1.6	1.3
1	4.6	4.2	2.3	2.1	1.7
1-1/2	6.6	6	3.3	3	2.4
2	7.5	6.8	4.3	3.4	2.7
3	10.6	9.6	6.1	4.8	3.9
5	16.7	15.2	9.7	7.6	6.1
7-1/2	24.2	22	14	11	9
10	30.8	28	18	14	11
15	46.2	42	27	21	17
20	59.4	54	34	27	22
25	74.8	68	44	34	27
30	88	80	51	40	32
40	114	104	66	52	41
50	143	130	83	65	52
60	169	154	103	77	62
75	211	192	128	96	77
100	273	248	165	124	99
125	343	312	208	156	125
150	396	360	240	180	144
200	528	480	320	240	192
250	-	604	403	302	242
300	-	722	482	361	289
350	-	828	560	414	336
400	-	954	636	477	382
450	-	1030	-	515	412
500	-	1180	786	590	472

Motor protection and control up to 7.5 kW / 10 hp

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3-pole contactors and contactor relays with spring terminals

3-pole contactors

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Contactor relays

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AS09..S ... AS16..S 3-pole contactors
4 to 7.5 kW
AC operated - with spring terminals



AS09-30-10S

Description

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.

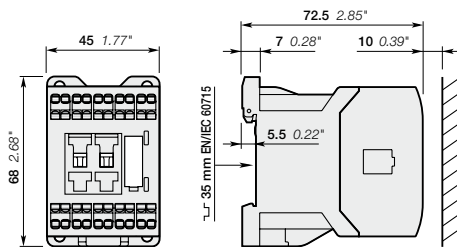
Ordering details

IEC		UL/CSA		Rated control circuit voltage U _c		Auxiliary contacts fitted	Type	Order code	Weight
Rated power	operational current θ ≤ 40 °C	3-phase motor rating 480 V	General use rating 600 V AC	V 50 Hz	V 60 Hz				Pkg (1 pce)
400 V AC-3	AC-1	hp	A						kg
4	20	5	12	24	24	1 0	AS09-30-10S-20	1SBL101004R2010	0.220
						0 1	AS09-30-01S-20	1SBL101004R2001	0.220
				-	120	1 0	AS09-30-10S-16	1SBL101004R1610	0.220
						0 1	AS09-30-01S-16	1SBL101004R1601	0.220
				230	230	1 0	AS09-30-10S-26	1SBL101004R2610	0.220
						0 1	AS09-30-01S-26	1SBL101004R2601	0.220
				400	400	1 0	AS09-30-10S-28	1SBL101004R2810	0.220
						0 1	AS09-30-01S-28	1SBL101004R2801	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
				-	120	1 0	AS12-30-10S-16	1SBL111004R1610	0.220
						0 1	AS12-30-01S-16	1SBL111004R1601	0.220
				230	230	1 0	AS12-30-10S-26	1SBL111004R2610	0.220
						0 1	AS12-30-01S-26	1SBL111004R2601	0.220
				400	400	1 0	AS12-30-10S-28	1SBL111004R2810	0.220
						0 1	AS12-30-01S-28	1SBL111004R2801	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
				-	120	1 0	AS16-30-10S-16	1SBL121004R1610	0.220
						0 1	AS16-30-01S-16	1SBL121004R1601	0.220
				230	230	1 0	AS16-30-10S-26	1SBL121004R2610	0.220
						0 1	AS16-30-01S-26	1SBL121004R2601	0.220
				400	400	1 0	AS16-30-10S-28	1SBL121004R2810	0.220
						0 1	AS16-30-01S-28	1SBL121004R2801	0.220

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

(1) Other control voltages see voltage code table.

Main dimensions mm, inches



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

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

4 to 7.5 kW

DC operated - with spring terminals



ASL09-30-10S

Description

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.

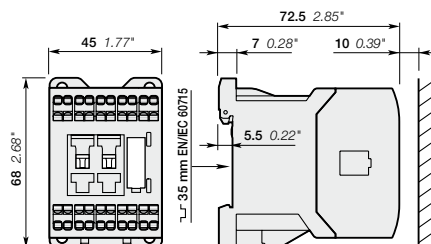
Ordering details

IEC		UL/CSA		Rated control circuit voltage Uc (1)	Auxiliary contacts fitted	Type	Order code	Weight Pkg (1 pce) kg
Rated operational power	Rated operational current θ ≤ 40 °C	3-phase motor rating 480 V	General use rating 600 V AC					
400 V AC-3 kW	AC-1 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
				48	1 0	ASL09-30-10S-83	1SBL103004R8310	0.280
					0 1	ASL09-30-01S-83	1SBL103004R8301	0.280
				110	1 0	ASL09-30-10S-86	1SBL103004R8610	0.280
					0 1	ASL09-30-01S-86	1SBL103004R8601	0.280
				220	1 0	ASL09-30-10S-88	1SBL103004R8810	0.280
					0 1	ASL09-30-01S-88	1SBL103004R8801	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
				48	1 0	ASL12-30-10S-83	1SBL113004R8310	0.280
					0 1	ASL12-30-01S-83	1SBL113004R8301	0.280
				110	1 0	ASL12-30-10S-86	1SBL113004R8610	0.280
					0 1	ASL12-30-01S-86	1SBL113004R8601	0.280
				220	1 0	ASL12-30-10S-88	1SBL113004R8810	0.280
					0 1	ASL12-30-01S-88	1SBL113004R8801	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
				48	1 0	ASL16-30-10S-83	1SBL123004R8310	0.280
					0 1	ASL16-30-01S-83	1SBL123004R8301	0.280
				110	1 0	ASL16-30-10S-86	1SBL123004R8610	0.280
					0 1	ASL16-30-01S-86	1SBL123004R8601	0.280
				220	1 0	ASL16-30-10S-88	1SBL123004R8810	0.280
					0 1	ASL16-30-01S-88	1SBL123004R8801	0.280

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

(1) Other control voltages see voltage code table.

Main dimensions mm, inches



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

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

4 to 7.5 kW

AC operated - with spring terminals



AS09-30-32S

Description

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:

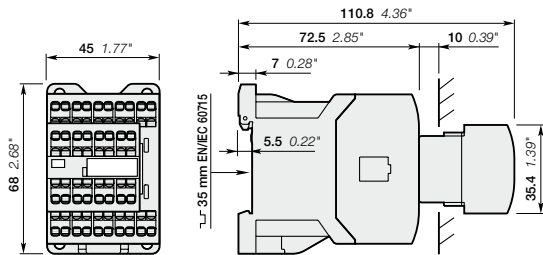
- spring terminals
- 1st stack with 3 main poles and 1 N.O. built-in auxiliary contact
- 2nd stack with permanently fixed 2 N.O. + 2 N.C. auxiliary contact block
- the auxiliary contact elements are mechanically linked (side-marked symbol) and the N.C. auxiliary contacts are mirror contacts
- control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

Ordering details

IEC Rated operational power 400 V AC-3 kW	UL/CSA 3-phase motor rating 480 V AC-1 A	General use rating 600 V AC hp	General use rating 600 V AC A	Rated control circuit voltage Uc (1)		Auxiliary contacts fitted I L	Type	Order code	Weight Pkg (1 pce) kg
				V 50 Hz	V 60 Hz				
4	20	5	12	24	24	3 2	AS09-30-32S-20	1SBL101004R2032	0.260
				-	120	3 2	AS09-30-32S-16	1SBL101004R1632	0.260
				230	230	3 2	AS09-30-32S-26	1SBL101004R2632	0.260
				400	400	3 2	AS09-30-32S-28	1SBL101004R2832	0.260
5.5	22	7.5	12	24	24	3 2	AS12-30-32S-20	1SBL111004R2032	0.260
				-	120	3 2	AS12-30-32S-16	1SBL111004R1632	0.260
				230	230	3 2	AS12-30-32S-26	1SBL111004R2632	0.260
				400	400	3 2	AS12-30-32S-28	1SBL111004R2832	0.260
7.5	22	10	15.2	24	24	3 2	AS16-30-32S-20	1SBL121004R2032	0.260
				-	120	3 2	AS16-30-32S-16	1SBL121004R1632	0.260
				230	230	3 2	AS16-30-32S-26	1SBL121004R2632	0.260
				400	400	3 2	AS16-30-32S-28	1SBL121004R2832	0.260

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

Main dimensions mm, inches



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

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

4 to 7.5 kW

DC operated - with spring terminals



ASL09-30-32S

Description

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:

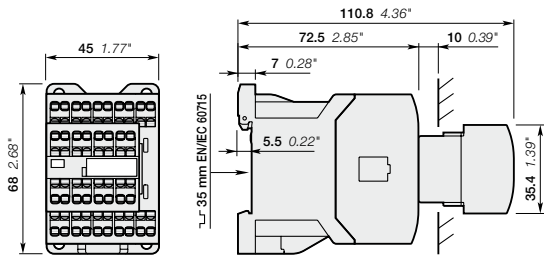
- spring terminals
- 1st stack with 3 main poles and 1 N.O. built-in auxiliary contact
- 2nd stack with permanently fixed 2 N.O. + 2 N.C. auxiliary contact block
- the auxiliary contact elements are mechanically linked (side-marked symbol) and the N.C. auxiliary contacts are mirror contacts
- control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

Ordering details

IEC		UL/CSA		Rated control circuit voltage Uc	Auxiliary contacts fitted	Type	Order code	Weight
Rated power	operational current $\theta \leq 40^{\circ}\text{C}$	3-phase motor rating 480 V	General use rating 600 V AC	(1)				
400 V AC-3 kW	AC-1 A	hp	A	V DC	 			Pkg (1 pce) kg
4	20	5	12	24	3 2	ASL09-30-32S-81	1SBL103004R8132	0.320
				48	3 2	ASL09-30-32S-83	1SBL103004R8332	0.320
				110	3 2	ASL09-30-32S-86	1SBL103004R8632	0.320
				220	3 2	ASL09-30-32S-88	1SBL103004R8832	0.320
5.5	22	7.5	12	24	3 2	ASL12-30-32S-81	1SBL113004R8132	0.320
				48	3 2	ASL12-30-32S-83	1SBL113004R8332	0.320
				110	3 2	ASL12-30-32S-86	1SBL113004R8632	0.320
				220	3 2	ASL12-30-32S-88	1SBL113004R8832	0.320
7.5	22	10	15.2	24	3 2	ASL16-30-32S-81	1SBL123004R8132	0.320
				48	3 2	ASL16-30-32S-83	1SBL123004R8332	0.320
				110	3 2	ASL16-30-32S-86	1SBL123004R8632	0.320
				220	3 2	ASL16-30-32S-88	1SBL123004R8832	0.320

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

Main dimensions mm, inches

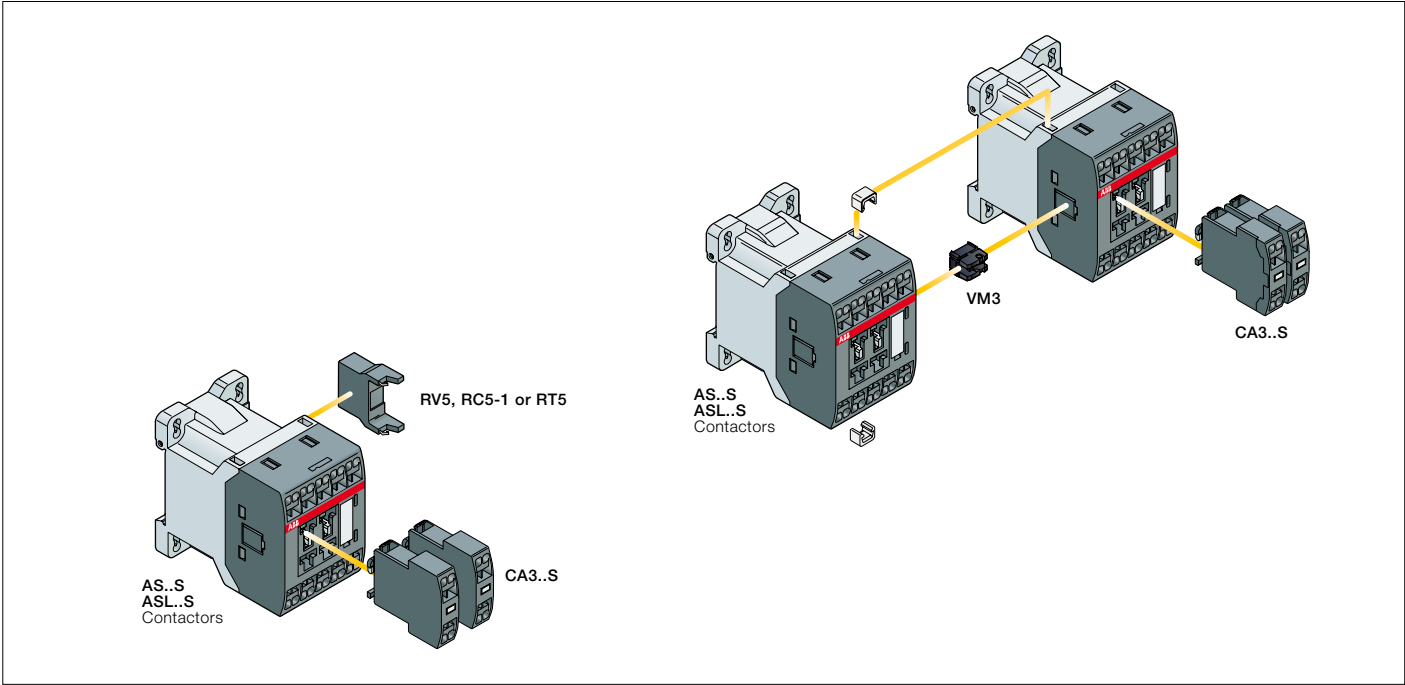


ASL09..S, ASL12..S, ASL16..S

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)				
									
					1-pole CA3..S	VM3	Surge suppressors		
AS09..S ... AS16..S	3 0	1 0	2 max.	+	1	+	RV5	or	RC5-1
AS09..S ... AS16..S	3 0	0 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

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



VM3

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



RV5

Surge suppressors

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



BEA16-3U

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, $\theta \leq 40\text{ °C}$		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	$\theta \leq 40\text{ °C}$	20 A	22 A	22 A
U _e max. $\leq 690\text{ V}$, 50/60 Hz	$\theta \leq 60\text{ °C}$	15 A	17 A	17 A
	$\theta \leq 70\text{ °C}$	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 $\theta \leq 60\text{ °C}$				
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 - $\theta \leq 40\text{ °C}$)				
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,	1 s	230 A	250 A	250 A
in free air from a cold state	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	20 A	22 A	22 A
Maximum breaking capacity				
cos $\varphi = 0.45$	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

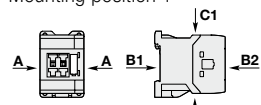
Main pole - Utilization characteristics according to UL / NEMA / CSA

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

Technical data

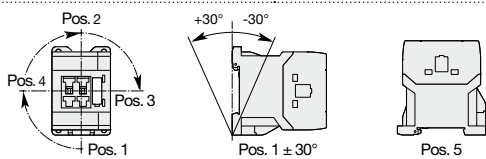
Magnet system characteristics for AS09..S ... AS16..S contactors

Contractor types		AC operated	AS09..S	AS12..S	AS16..S
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..S ... ASL16..S contactors

Contractor types		DC operated	ASL09..S	ASL12..S	ASL16..S
Coil operating limits		DC supply			
acc. to IEC 60947-4-1			0.85...1.1 x Uc (at $\theta \leq 60\text{ }^{\circ}\text{C}$); Uc (at $\theta \leq 70\text{ }^{\circ}\text{C}$)		
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..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 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...1.5 mm²	
		2 x	0.75...1.5 mm²	
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 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...1.5 mm²	
		2 x	0.75...1.5 mm²	
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				
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} - 0 ≤ 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		12 V / 3 m		
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		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.		
acc. to annex L of IEC 60947-5-1				
Mirror contacts		Built-in N.C. auxiliary contacts or additional N.C. auxiliary contacts (CA3 aux. contact blocks) are mirror contacts.		
acc. to annex F of IEC 60947-4-1				

Built-in auxiliary contacts according to UL / CSA

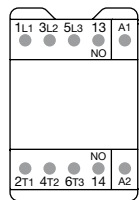
Contactor types	AC operated	AS09..S	AS12..S	AS16..S
	DC operated	ASL09..S	ASL12..S	ASL16..S
Max. operational voltage		600 V AC, 250 V DC		
Pilot duty		A600, Q300		
AC thermal rated current		10 A		
AC maximum volt-ampere making		7200 VA		
AC maximum volt-ampere breaking		720 VA		
DC thermal rated current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

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

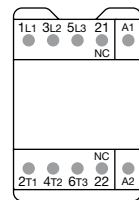
Terminal marking and positioning

AS..S contactors - AC operated

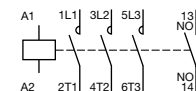
Standard devices without addition of auxiliary contacts



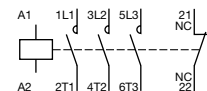
AS09 ... AS16-30-10S



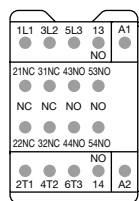
AS09 ... AS16-30-01S



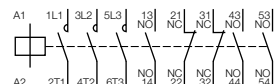
AS09 ... AS16-30-10S



AS09 ... AS16-30-01S

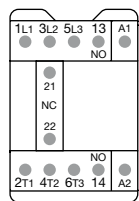


AS09 ... AS16-30-32S

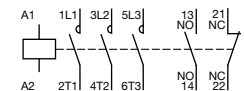
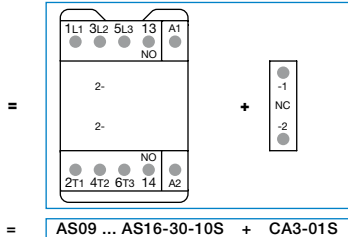


AS09 ... AS16-30-32S

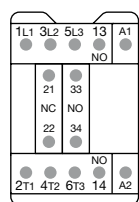
Other possible contact combinations with auxiliary contact blocks added by the user



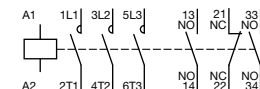
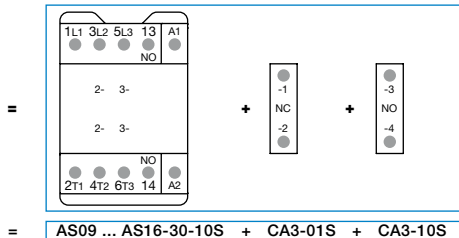
Combination 11



Combination 11

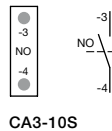


Combination 21

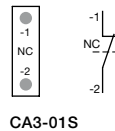


Combination 21

CA3..S 1-pole auxiliary contact blocks



CA3-10S



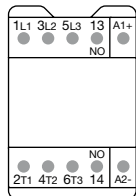
CA3-01S

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

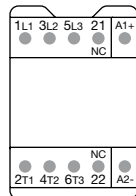
Terminal marking and positioning

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

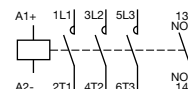
Standard devices without addition of auxiliary contacts



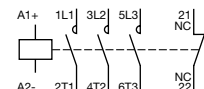
ASL09 ... ASL16-30-10S



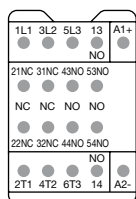
ASL09 ... ASL16-30-01S



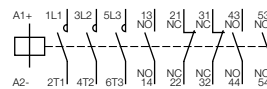
ASL09 ... ASL16-30-10S



ASL09 ... ASL16-30-01S

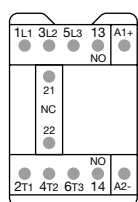


ASL09 ... ASL16-30-32



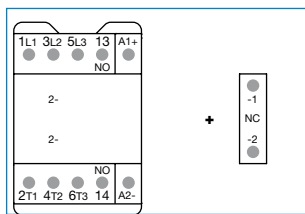
ASL09 ... ASL16-30-32S

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

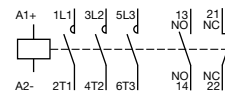


Combination 11

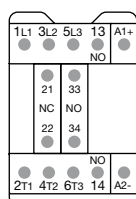
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ASL09 ... ASL16-30-10S + CA3-01S

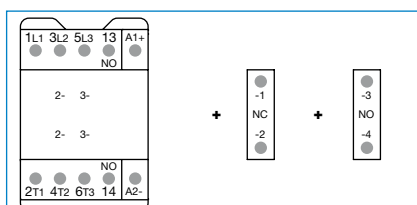


Combination 11

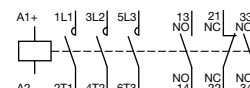


Combination 21

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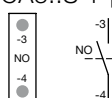


ASL09 ... ASL16-30-10S + CA3-01S + CA3-10S

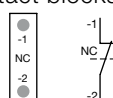


Combination 21

CA3..S 1-pole auxiliary contact blocks



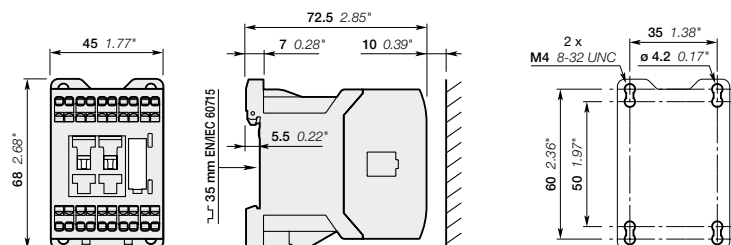
CA3-10S



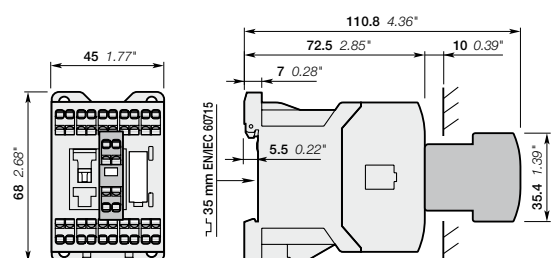
CA3-01S

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

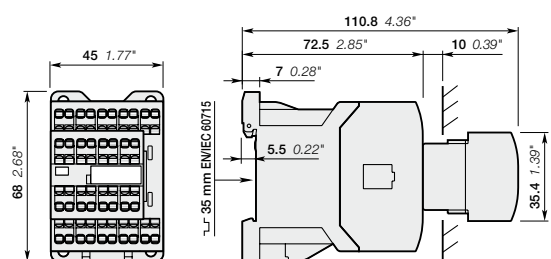
Main dimensions mm, inches



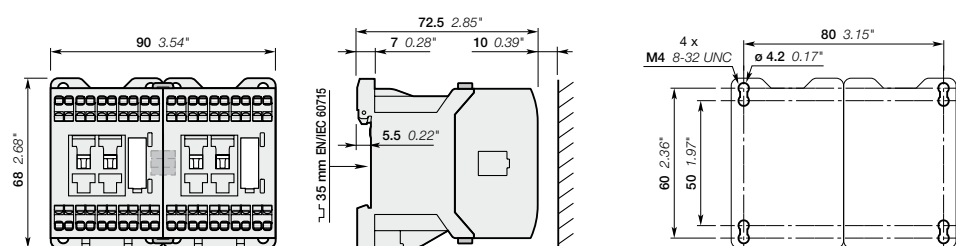
AS09..S, AS12..S, AS16..S



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



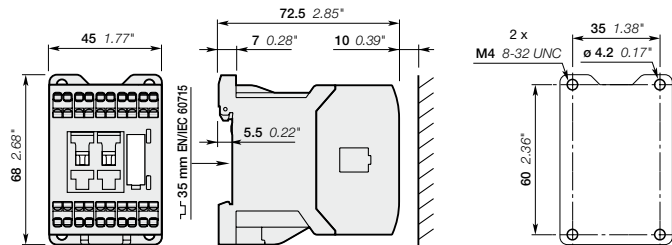
AS09...16-30-32S



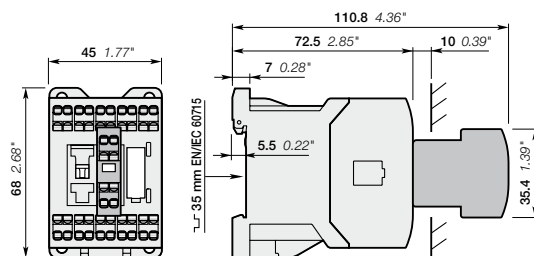
AS09..S, AS12..S, AS16..S
+ VM3 mechanical interlock unit including two BB3 fixing clips

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

Main dimensions mm, inches

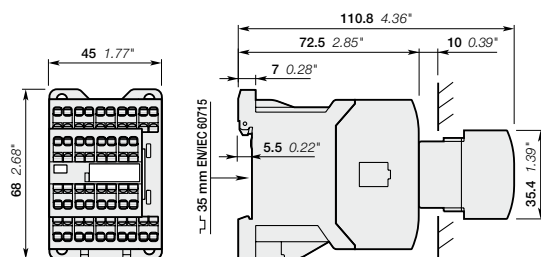


ASL09..S, ASL12..S, ASL16..S

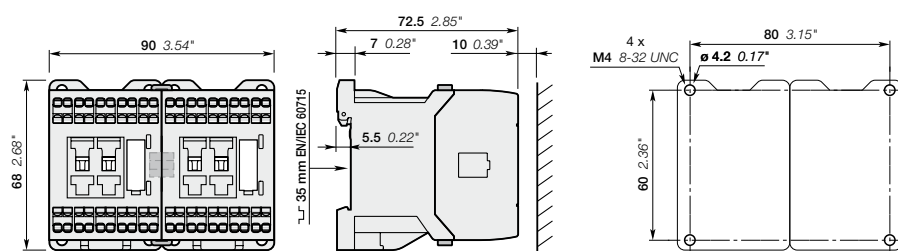


ASL09..S, ASL12..S, ASL16..S

+ 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

Description

NS..S contactor relays are used for switching auxiliary and control circuits. These contactor relays are designed with:

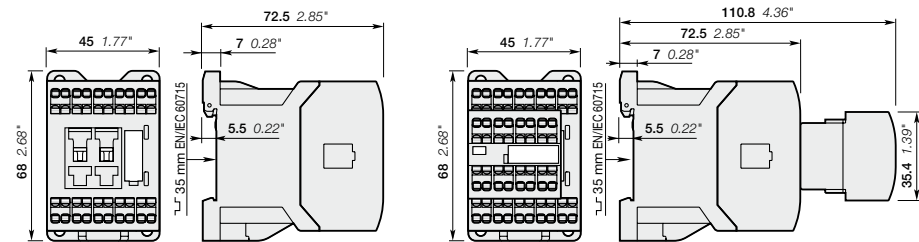
- spring terminals
- 4 poles or 8 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: AC operated
- add-on auxiliary contact blocks for front mounting and a comprehensive range of accessories.

Ordering details

Number of contacts 1st stack	2nd stack	Rated control circuit voltage Uc (1)		Type	Order code	Weight Pkg (1 pce) kg
		V 50 Hz	V 60 Hz			
		24	24	NS22ES-20	1SBH101004R2022	0.220
		-	120	NS22ES-16	1SBH101004R1622	0.220
		230	230	NS22ES-26	1SBH101004R2622	0.220
		400	400	NS22ES-28	1SBH101004R2822	0.220
		24	24	NS31ES-20	1SBH101004R2031	0.220
		-	120	NS31ES-16	1SBH101004R1631	0.220
		230	230	NS31ES-26	1SBH101004R2631	0.220
		400	400	NS31ES-28	1SBH101004R2831	0.220
		24	24	NS40ES-20	1SBH101004R2040	0.220
		-	120	NS40ES-16	1SBH101004R1640	0.220
		230	230	NS40ES-26	1SBH101004R2640	0.220
		400	400	NS40ES-28	1SBH101004R2840	0.220
		24	24	NS44ES-20	1SBH101004R2044	0.260
		-	120	NS44ES-16	1SBH101004R1644	0.260
		230	230	NS44ES-26	1SBH101004R2644	0.260
		400	400	NS44ES-28	1SBH101004R2844	0.260
		24	24	NS53ES-20	1SBH101004R2053	0.260
		-	120	NS53ES-16	1SBH101004R1653	0.260
		230	230	NS53ES-26	1SBH101004R2653	0.260
		400	400	NS53ES-28	1SBH101004R2853	0.260
		24	24	NS62ES-20	1SBH101004R2062	0.260
		-	120	NS62ES-16	1SBH101004R1662	0.260
		230	230	NS62ES-26	1SBH101004R2662	0.260
		400	400	NS62ES-28	1SBH101004R2862	0.260
		24	24	NS71ES-20	1SBH101004R2071	0.260
		-	120	NS71ES-16	1SBH101004R1671	0.260
		230	230	NS71ES-26	1SBH101004R2671	0.260
		400	400	NS71ES-28	1SBH101004R2871	0.260
		24	24	NS80ES-20	1SBH101004R2080	0.260
		-	120	NS80ES-16	1SBH101004R1680	0.260
		230	230	NS80ES-26	1SBH101004R2680	0.260
		400	400	NS80ES-28	1SBH101004R2880	0.260

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

Main dimensions mm, inches



NS22ES, NS31ES, NS40ES

NS44ES, NS53ES, NS62ES, NS71ES, NS80ES

NSL..S contactor relays - with spring terminals

DC operated



NSL22ES

Description

NSL..S contactor relays are used for switching auxiliary and control circuits. These contactor relays are designed with:

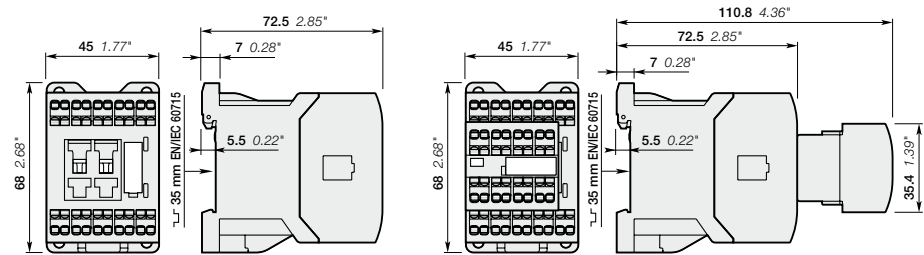
- spring terminals
- 4 poles or 8 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: low coil consumption (3 W at pull-in and holding) DC operated with solid core magnet. Suitable for direct control by PLC outputs (the polarity on the coil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

Ordering details

Number of contacts		Rated control circuit voltage Uc (1) V DC	Type	Order code	Weight Pkg (1 pce) kg
1st stack	2nd stack				
		24	NSL22ES-81	1SBH103004R8122	0.280
		48	NSL22ES-83	1SBH103004R8322	0.280
		110	NSL22ES-86	1SBH103004R8622	0.280
		220	NSL22ES-88	1SBH103004R8822	0.280
		24	NSL31ES-81	1SBH103004R8131	0.280
		48	NSL31ES-83	1SBH103004R8331	0.280
		110	NSL31ES-86	1SBH103004R8631	0.280
		220	NSL31ES-88	1SBH103004R8831	0.280
		24	NSL40ES-81	1SBH103004R8140	0.280
		48	NSL40ES-83	1SBH103004R8340	0.280
		110	NSL40ES-86	1SBH103004R8640	0.280
		220	NSL40ES-88	1SBH103004R8840	0.280
		24	NSL44ES-81	1SBH103004R8144	0.320
		48	NSL44ES-83	1SBH103004R8344	0.320
		110	NSL44ES-86	1SBH103004R8644	0.320
		220	NSL44ES-88	1SBH103004R8844	0.320
		24	NSL53ES-81	1SBH103004R8153	0.320
		48	NSL53ES-83	1SBH103004R8353	0.320
		110	NSL53ES-86	1SBH103004R8653	0.320
		220	NSL53ES-88	1SBH103004R8853	0.320
		24	NSL62ES-81	1SBH103004R8162	0.320
		48	NSL62ES-83	1SBH103004R8362	0.320
		110	NSL62ES-86	1SBH103004R8662	0.320
		220	NSL62ES-88	1SBH103004R8862	0.320
		24	NSL71ES-81	1SBH103004R8171	0.320
		48	NSL71ES-83	1SBH103004R8371	0.320
		110	NSL71ES-86	1SBH103004R8671	0.320
		220	NSL71ES-88	1SBH103004R8871	0.320
		24	NSL80ES-81	1SBH103004R8180	0.320
		48	NSL80ES-83	1SBH103004R8380	0.320
		110	NSL80ES-86	1SBH103004R8680	0.320
		220	NSL80ES-88	1SBH103004R8880	0.320

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

Main dimensions mm, inches



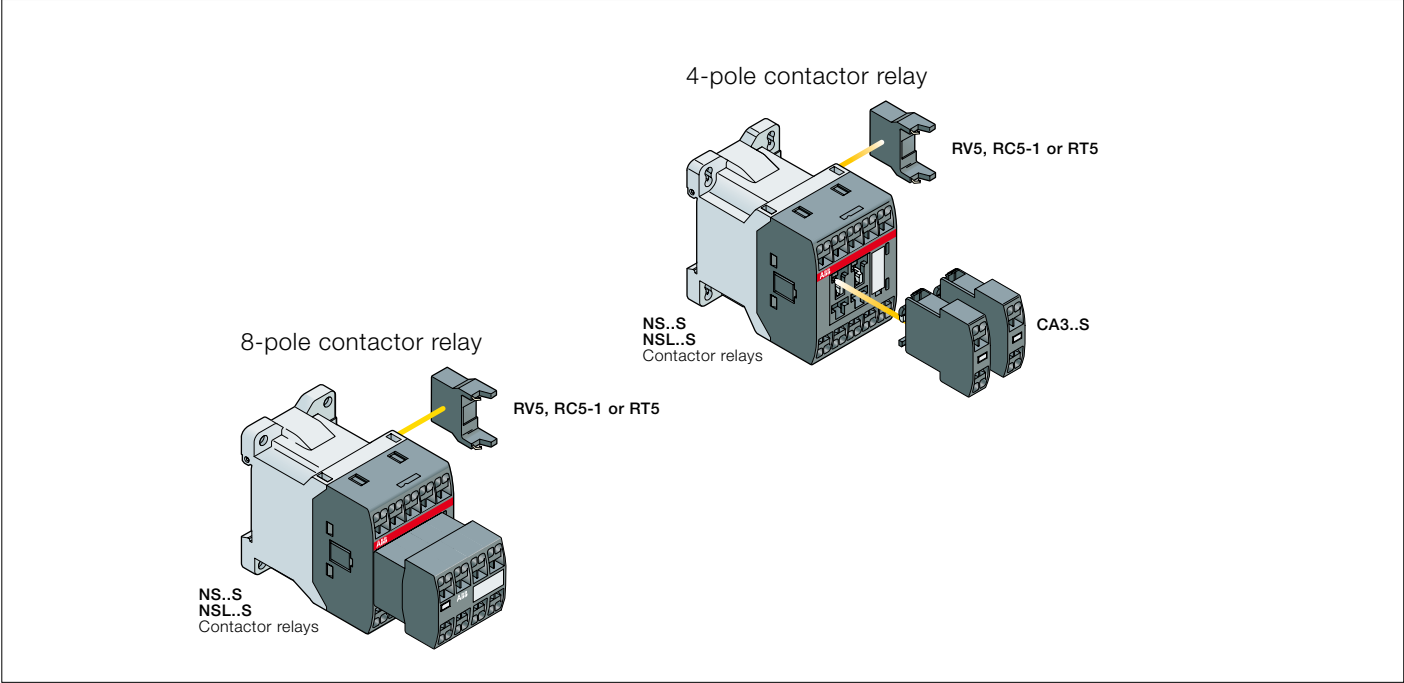
NSL22ES, NSL31ES, NSL40ES

NSL44ES, NSL53ES, NSL62ES, NSL71ES, NSL80ES

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									
			1-pole CA3..S		Surge suppressors							
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										
NS..S	5	3 E										
NS..S	6	2 E	-		RV5	or	RC5-1					
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										
NSL..S	5	3 E										
NSL..S	6	2 E			RV5	or	RT5					
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				kg
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} $\theta \leq 40$ °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 $\leq$ 500 V AC - gG type fuse	10 A	
Rated short-time withstand current I _{cw}	for 1.0 s	100 A
at 40 °C ambient temperature, in free air from a cold state	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	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.	
acc. to annex L of IEC 60947-5-1		

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

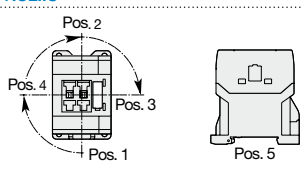
Magnet system characteristics for NS..S contactor relays

Contactor relay types	AC operated	NS..S
Coil operating limits	AC supply	
acc. to IEC 60947-5-1		0.85...1.1 x U _c (at $\theta \leq 60\text{ °C}$); U _c (at $\theta \leq 70\text{ °C}$)
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	DC supply	
acc. to IEC 60947-5-1		0.85...1.1 x U _c (at $\theta \leq 60\text{ °C}$); U _c (at $\theta \leq 70\text{ °C}$)
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.		

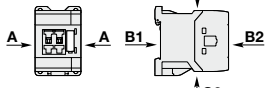
Mounting characteristics and conditions for use

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 U_i			
acc. to IEC 60947-5-1		690 V	
acc. to UL / CSA		600 V	
Rated impulse withstand voltage U_{imp} .		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

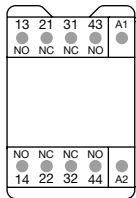
Contactor relay types	AC operated	NS..S
	DC operated	NSL..S
Main terminals		 Spring terminals
Connection capacity (min. ... max.)		
Pole and coil terminals		
 Rigid solid	1 x	0.75...2.5 mm ²
 Flexible with non insulated ferrule	2 x	0.75...2.5 mm ²
 Flexible with non insulated ferrule	1 x	0.75...2.5 mm ²
 Flexible with insulated ferrule	2 x	0.75...2.5 mm ²
 Flexible with insulated ferrule	1 x	0.75...1.5 mm ²
 Flexible with insulated ferrule	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

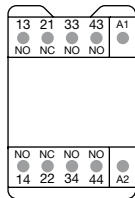
Terminal marking and positioning

NS..S contactor relays - AC operated

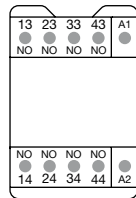
Standard devices without addition of auxiliary contact blocks



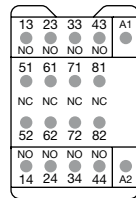
NS22ES



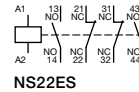
NS31ES



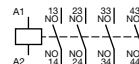
NS40ES



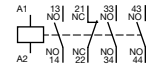
NS44ES



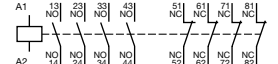
NS22ES



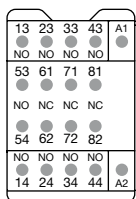
NS40ES



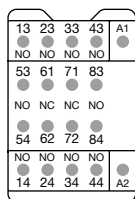
NS31ES



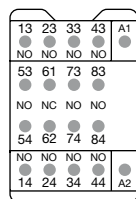
NS44ES



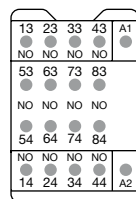
NS53ES



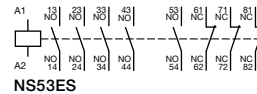
NS62ES



NS71ES



NS80ES



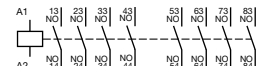
NS53ES



NS71ES

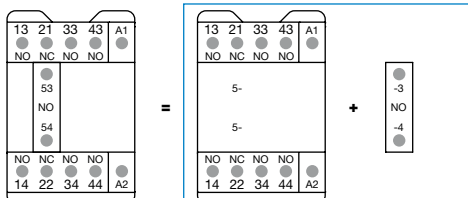


NS62ES

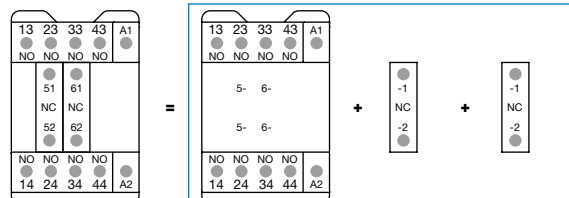


NS80ES

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



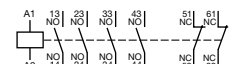
Combination 41E = NS31ES + CA3-10S



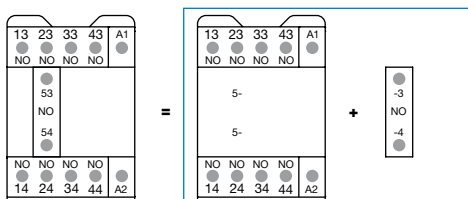
Combination 42E = NS40ES + CA3-01S + CA3-01S



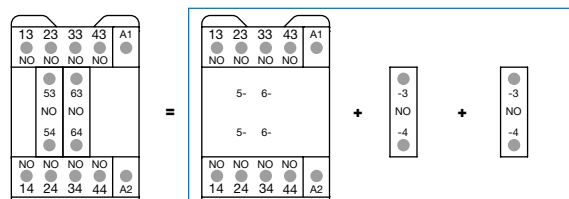
Combination 41E



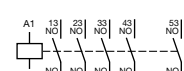
Combination 42E



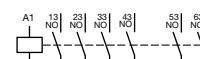
Combination 50E = NS40ES + CA3-10S



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

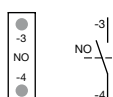


Combination 50E



Combination 60E

CA3..S 1-pole auxiliary contact blocks



CA3-10S



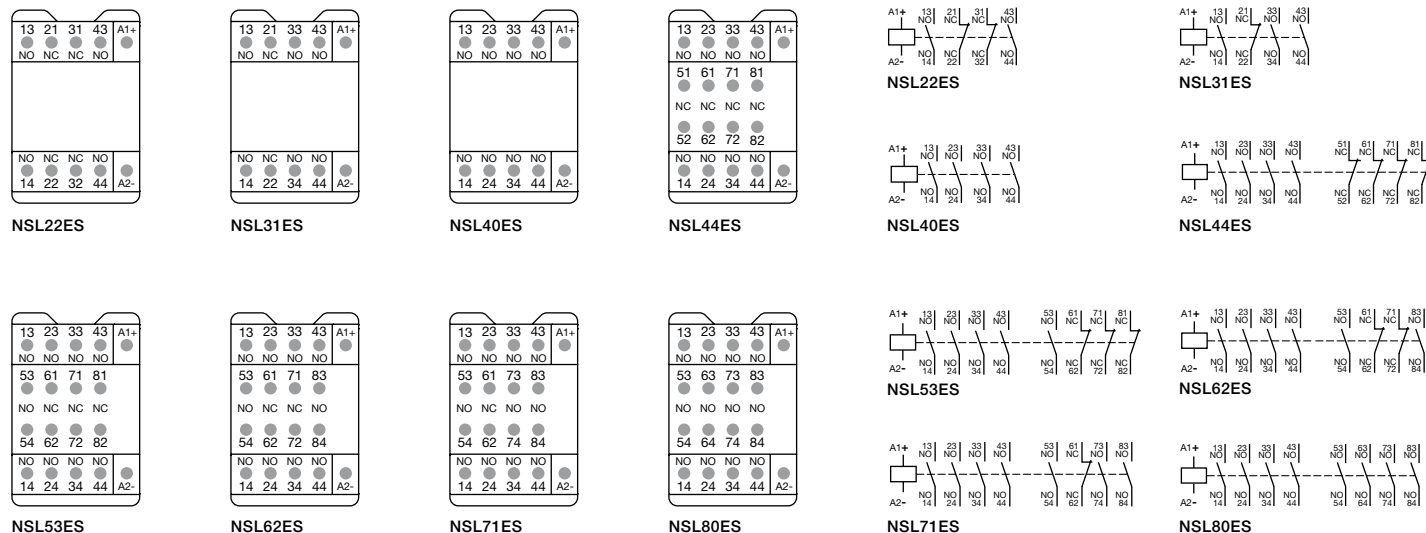
CA3-01S

NSL..S contactor relays - with spring terminals

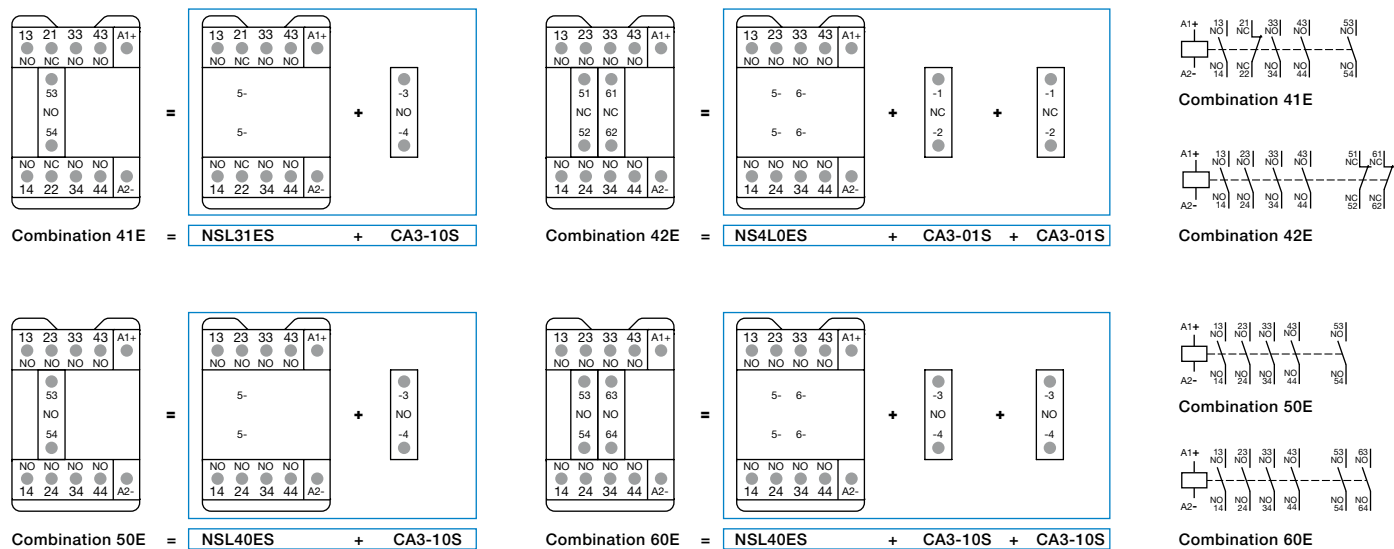
Terminal marking and positioning

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



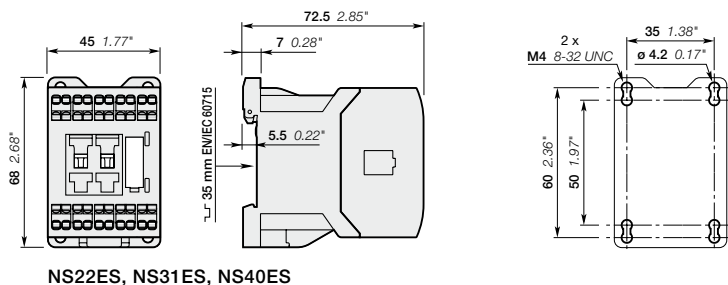
CA3..S 1-pole auxiliary contact blocks



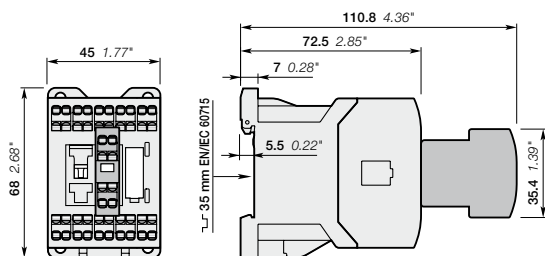
NS..S contactor relays - with spring terminals

Main dimensions mm, inches

4-pole contactor relays

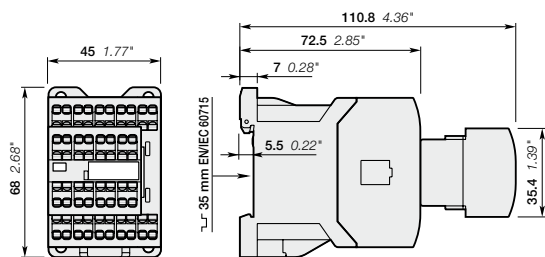


NS22ES, NS31ES, NS40ES



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

8-pole contactor relays

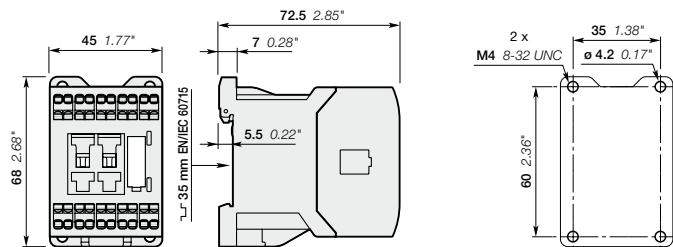


NS44ES, NS53ES, NS62ES, NS71ES, NS80ES

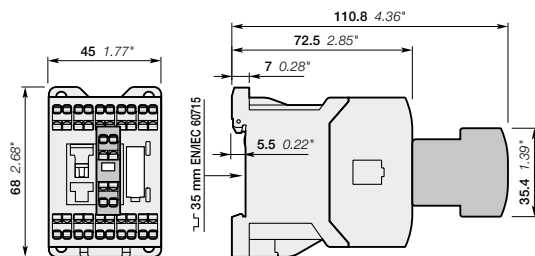
NSL..S contactor relays - with spring terminals

Main dimensions mm, inches

4-pole contactor relays



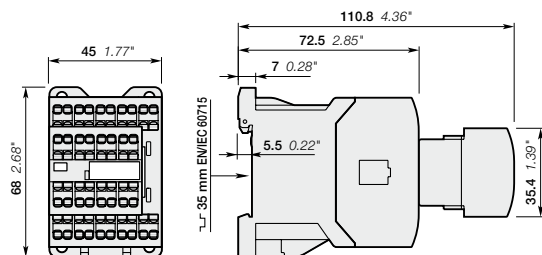
NSL22ES, NSL31ES, NSL40ES



NSL22ES, NSL31ES, NSL40ES

+ CA3..S front-mounted 1-pole auxiliary contact block

8-pole contactor relays



NSL44ES, NSL53ES, NSL62ES, NSL71ES, NSL80ES

Auxiliary contact blocks - with spring terminals

Accessories



CA3-10S

Description

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.
- spring-type connecting terminals.

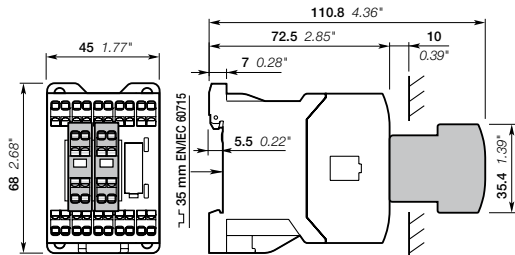
All 1-pole auxiliary contact blocks are protected against accidental direct contact and bear the corresponding function marking.

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

Ordering details

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}	for 1.0 s 100 A
$\theta = 40^\circ\text{C}$	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
	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

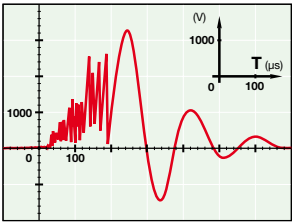
Standards	UL 508, CSA C22.2 N°14
Max. operational voltage	690 V AC, 250 V DC
Pilot duty	A600, Q300
AC thermal rated current	10 A
AC maximum volt-ampere making	7200 VA
AC maximum volt-ampere breaking	720 VA
DC thermal rated current	2.5 A
DC maximum volt-ampere making-breaking	69 VA

Connecting characteristics

Connection capacity (min. ... max.)	
 Rigid solid	1 x 0.75...2.5 mm ²
 Rigid solid	2 x 0.75...2.5 mm ²
 Flexible with non insulated ferrule	1 x 0.75...2.5 mm ²
 Flexible with non insulated ferrule	2 x 0.75...2.5 mm ²
 Flexible with insulated ferrule	1 x 0.75...1.5 mm ²
 Flexible with insulated ferrule	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

Surge suppressors for contactor coils

Accessories



Description

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 :

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

in DC

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

in AC

$$k = \frac{\hat{U}_s \text{ max.}}{U_c \sqrt{2}}$$

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.

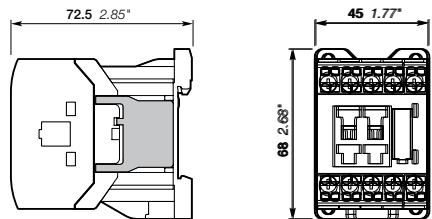
Note: A varistor is a resistor whose value decreases to a very large extent when a certain voltage is applied at its terminals.

Ordering details

For contactors	For contactor relays	Rated control circuit voltage - U_c			Type	Order code	Pkg qty	Weight (1 pce) kg
		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

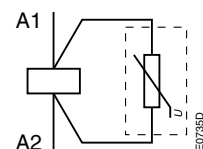
Technical data

Varistor	RV5/50	RV5/133	RV5/250	RV5/440
Rated control circuit voltage U_c	24...50 V AC	50...133 V AC	110...250 V AC	250...440 V AC
Residual overvoltage (clipping voltage)	24...50 V DC	50...133 V DC	110...250 V DC	250...440 V DC
	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 U_{vdr}^* , thus voltage front up to this point.			
	* U_{vdr} = Varistor operating voltage (voltage dependent resistor), tolerance $\pm 10\%$.			

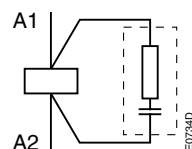
RC type	RC5-1/50	RC5-1/133	RC5-1/250	RC5-1/440
Rated control circuit voltage U_c	24...50 V AC	50...133 V AC	110...250 V AC	250...440 V AC
Residual overvoltage (clipping voltage)	2 to 3 x U_c max.			
Opening time growth factor	2...3			
Operating temperature	-20...+70 °C			
Advantages	Very fast clipping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

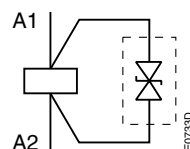
Wiring diagrams



Varistor



RC type



Transil diode

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 1SBL101004R**21**10.

3-pole contactors - with spring terminals

Type

AS16 - 30 - 10S - 26

Auxiliary contacts

N.O. N.C.

N.O. N.C.

Main contacts

AS .. S

ASL .. S

Contactor type

AC operated

DC operated

Order code

1SBL121004R 26 10

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 ES - 26

N.O. N.C.

Number contacts

NS .. S

NSL .. S

Contactor type

AC operated

DC operated

Order code

1SBH101004R 26 40

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

Index

Order code classification

Order code	Type	Page	Order code	Type	Page	Order code	Type	Page
1SBH101004R1622	NS22ES-16	20	1SBL101004R2832	AS09-30-32S-28	6	1SBN050100R1002	RC5-1/250	34
1SBH101004R1631	NS31ES-16	20	1SBL103004R8101	ASL09-30-01S-81	5	1SBN050100R1003	RC5-1/440	34
1SBH101004R1640	NS40ES-16	20	1SBL103004R8110	ASL09-30-10S-81	5	1SBN081020R1000	BEA16-3U	9
1SBH101004R1644	NS44ES-16	20	1SBL103004R8132	ASL09-30-32S-81	7			
1SBH101004R1653	NS53ES-16	20	1SBL103004R8301	ASL09-30-01S-83	5			
1SBH101004R1662	NS62ES-16	20	1SBL103004R8310	ASL09-30-10S-83	5			
1SBH101004R1671	NS71ES-16	20	1SBL103004R8332	ASL09-30-32S-83	7			
1SBH101004R1680	NS80ES-16	20	1SBL103004R8601	ASL09-30-01S-86	5			
1SBH101004R2022	NS22ES-20	20	1SBL103004R8610	ASL09-30-10S-86	5			
1SBH101004R2031	NS31ES-20	20	1SBL103004R8632	ASL09-30-32S-86	7			
1SBH101004R2040	NS40ES-20	20	1SBL103004R8801	ASL09-30-01S-88	5			
1SBH101004R2044	NS44ES-20	20	1SBL103004R8810	ASL09-30-10S-88	5			
1SBH101004R2053	NS53ES-20	20	1SBL103004R8832	ASL09-30-32S-88	7			
1SBH101004R2062	NS62ES-20	20	1SBL111004R1601	AS12-30-01S-16	4			
1SBH101004R2071	NS71ES-20	20	1SBL111004R1610	AS12-30-10S-16	4			
1SBH101004R2080	NS80ES-20	20	1SBL111004R1632	AS12-30-32S-16	6			
1SBH101004R2622	NS22ES-26	20	1SBL111004R2001	AS12-30-01S-20	4			
1SBH101004R2631	NS31ES-26	20	1SBL111004R2010	AS12-30-10S-20	4			
1SBH101004R2640	NS40ES-26	20	1SBL111004R2032	AS12-30-32S-20	6			
1SBH101004R2644	NS44ES-26	20	1SBL111004R2601	AS12-30-01S-26	4			
1SBH101004R2653	NS53ES-26	20	1SBL111004R2610	AS12-30-10S-26	4			
1SBH101004R2662	NS62ES-26	20	1SBL111004R2632	AS12-30-32S-26	6			
1SBH101004R2671	NS71ES-26	20	1SBL111004R2801	AS12-30-01S-28	4			
1SBH101004R2680	NS80ES-26	20	1SBL111004R2810	AS12-30-10S-28	4			
1SBH101004R2822	NS22ES-28	20	1SBL111004R2832	AS12-30-32S-28	6			
1SBH101004R2831	NS31ES-28	20	1SBL113004R8101	ASL12-30-01S-81	5			
1SBH101004R2840	NS40ES-28	20	1SBL113004R8110	ASL12-30-10S-81	5			
1SBH101004R2844	NS44ES-28	20	1SBL113004R8132	ASL12-30-32S-81	7			
1SBH101004R2853	NS53ES-28	20	1SBL113004R8301	ASL12-30-01S-83	5			
1SBH101004R2862	NS62ES-28	20	1SBL113004R8310	ASL12-30-10S-83	5			
1SBH101004R2871	NS71ES-28	20	1SBL113004R8332	ASL12-30-32S-83	7			
1SBH101004R2880	NS80ES-28	20	1SBL113004R8601	ASL12-30-01S-86	5			
1SBH103004R8122	NSL22ES-81	21	1SBL113004R8610	ASL12-30-10S-86	5			
1SBH103004R8131	NSL31ES-81	21	1SBL113004R8632	ASL12-30-32S-86	7			
1SBH103004R8140	NSL40ES-81	21	1SBL113004R8801	ASL12-30-01S-88	5			
1SBH103004R8144	NSL44ES-81	21	1SBL113004R8810	ASL12-30-10S-88	5			
1SBH103004R8153	NSL53ES-81	21	1SBL113004R8832	ASL12-30-32S-88	7			
1SBH103004R8162	NSL62ES-81	21	1SBL121004R1601	AS16-30-01S-16	4			
1SBH103004R8171	NSL71ES-81	21	1SBL121004R1610	AS16-30-10S-16	4			
1SBH103004R8180	NSL80ES-81	21	1SBL121004R1632	AS16-30-32S-16	6			
1SBH103004R8322	NSL22ES-83	21	1SBL121004R2001	AS16-30-01S-20	4			
1SBH103004R8331	NSL31ES-83	21	1SBL121004R2010	AS16-30-10S-20	4			
1SBH103004R8340	NSL40ES-83	21	1SBL121004R2032	AS16-30-32S-20	6			
1SBH103004R8344	NSL44ES-83	21	1SBL121004R2601	AS16-30-01S-26	4			
1SBH103004R8353	NSL53ES-83	21	1SBL121004R2610	AS16-30-10S-26	4			
1SBH103004R8362	NSL62ES-83	21	1SBL121004R2632	AS16-30-32S-26	6			
1SBH103004R8371	NSL71ES-83	21	1SBL121004R2801	AS16-30-01S-28	4			
1SBH103004R8380	NSL80ES-83	21	1SBL121004R2810	AS16-30-10S-28	4			
1SBH103004R8622	NSL22ES-86	21	1SBL121004R2832	AS16-30-32S-28	6			
1SBH103004R8631	NSL31ES-86	21	1SBL123004R8101	ASL16-30-01S-81	5			
1SBH103004R8640	NSL40ES-86	21	1SBL123004R8110	ASL16-30-10S-81	5			
1SBH103004R8644	NSL44ES-86	21	1SBL123004R8132	ASL16-30-32S-81	7			
1SBH103004R8653	NSL53ES-86	21	1SBL123004R8301	ASL16-30-01S-83	5			
1SBH103004R8662	NSL62ES-86	21	1SBL123004R8310	ASL16-30-10S-83	5			
1SBH103004R8671	NSL71ES-86	21	1SBL123004R8332	ASL16-30-32S-83	7			
1SBH103004R8680	NSL80ES-86	21	1SBL123004R8601	ASL16-30-01S-86	5			
1SBH103004R8822	NSL22ES-88	21	1SBL123004R8610	ASL16-30-10S-86	5			
1SBH103004R8831	NSL31ES-88	21	1SBL123004R8632	ASL16-30-32S-86	7			
1SBH103004R8840	NSL40ES-88	21	1SBL123004R8801	ASL16-30-01S-88	5			
1SBH103004R8844	NSL44ES-88	21	1SBL123004R8810	ASL16-30-10S-88	5			
1SBH103004R8853	NSL53ES-88	21	1SBL123004R8832	ASL16-30-32S-88	7			
1SBH103004R8862	NSL62ES-88	21	1SBN011019T1001	CA3-01S	32			
1SBH103004R8871	NSL71ES-88	21	1SBN011019T1010	CA3-10S	32			
1SBH103004R8880	NSL80ES-88	21	1SBN031005T1000	VM3	9			
1SBL101004R1601	AS09-30-01S-16	4	1SBN050010R1000	RV5/50	34			
1SBL101004R1610	AS09-30-10S-16	4	1SBN050010R1001	RV5/133	34			
1SBL101004R1632	AS09-30-32S-16	6	1SBN050010R1002	RV5/250	34			
1SBL101004R2001	AS09-30-01S-20	4	1SBN050010R1003	RV5/440	34			
1SBL101004R2010	AS09-30-10S-20	4	1SBN050020R1000	RT5/32	34			
1SBL101004R2032	AS09-30-32S-20	6	1SBN050020R1001	RT5/65	34			
1SBL101004R2601	AS09-30-01S-26	4	1SBN050020R1002	RT5/90	34			
1SBL101004R2610	AS09-30-10S-26	4	1SBN050020R1003	RT5/150	34			
1SBL101004R2632	AS09-30-32S-26	6	1SBN050020R1004	RT5/264	34			
1SBL101004R2801	AS09-30-01S-28	4	1SBN050100R1000	RC5-1/50	34			
1SBL101004R2810	AS09-30-10S-28	4	1SBN050100R1001	RC5-1/133	34			

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Type classification

Type	Order code	Page
AS09-30-01S-16	1SBL101004R1601	4
AS09-30-01S-20	1SBL101004R2001	4
AS09-30-01S-26	1SBL101004R2601	4
AS09-30-01S-28	1SBL101004R2801	4
AS09-30-10S-16	1SBL101004R1610	4
AS09-30-10S-20	1SBL101004R2010	4
AS09-30-10S-26	1SBL101004R2610	4
AS09-30-10S-28	1SBL101004R2810	4
AS09-30-32S-16	1SBL101004R1632	6
AS09-30-32S-20	1SBL101004R2032	6
AS09-30-32S-26	1SBL101004R2632	6
AS09-30-32S-28	1SBL101004R2832	6
AS12-30-01S-16	1SBL111004R1601	4
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AS12-30-01S-26	1SBL111004R2601	4
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