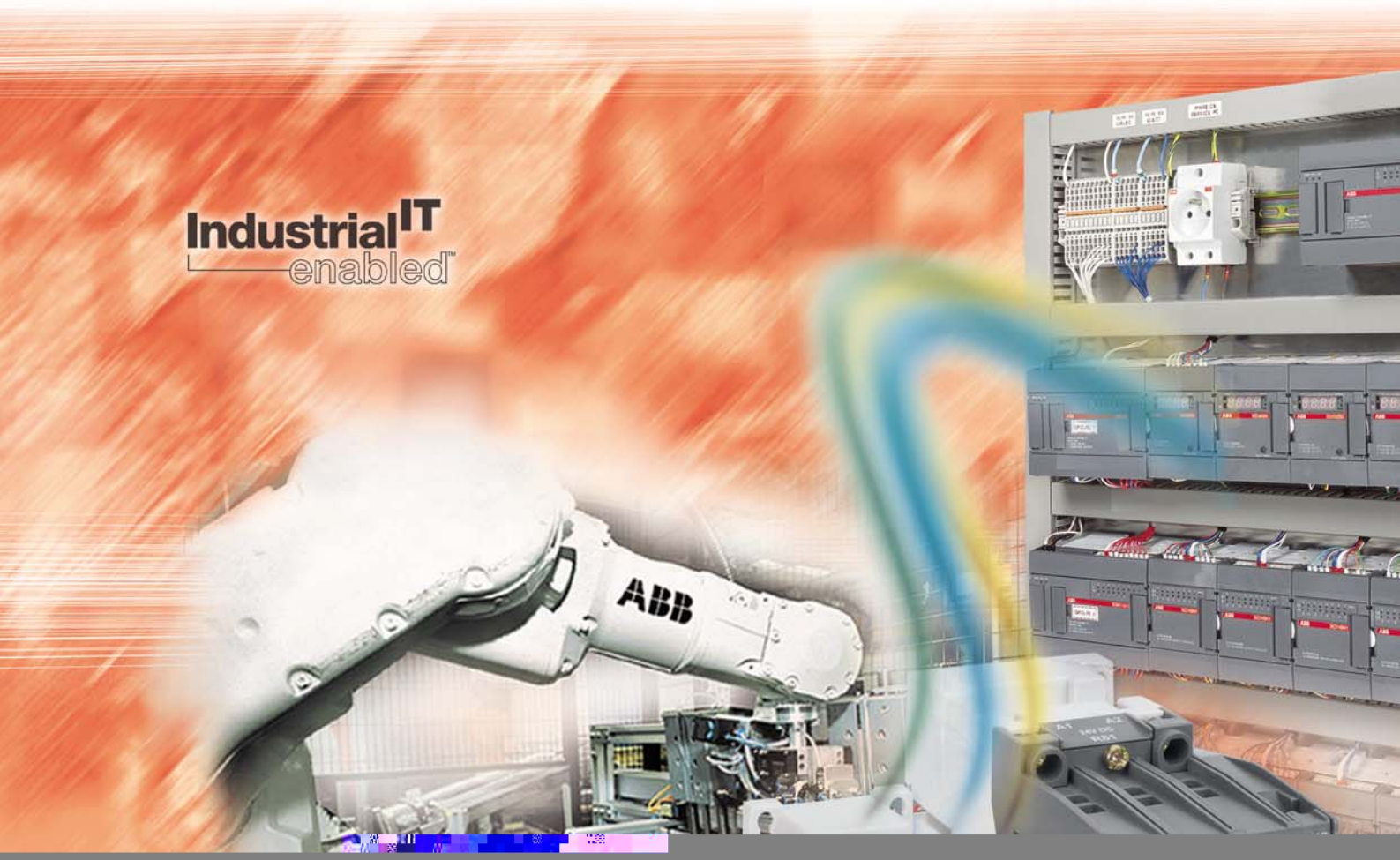
Main Catalogue

Low Consumption d.c. Operated Contactors

AL Contactors
NL Contactor Relays



ABB

AL 9 ... AL 40 Contactors
NL.. Contactor Relays
d.c. Operated

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AL 9 ... AL 40 Contactors

d.c. Coil - Low Consumption

Power rating AC-3, 400 V				4 kW	5.5 kW	7.5 kW	11 kW	15 kW	18.5 kW
			3-pole	**AL 9**	**AL 12**	**AL 16**	**AL 26**	**AL 30**	**AL 40**
Rated current AC-3,	220-240 V	A		9	12	17	26	33	40
	380-400 V	**A**	**IEC**	**9**	**12**	**17**	**26**	**32**	**37**
Rated current AC-1, 40 °C		A		25	27	30	45	55	60
Rated power 3-phase motor	220-240 V	hp		2	3	5	10	10	15
	440-480 V	hp	**UL/CSA**	5	7.5	10	20	25	30
Rated current General use		A		21	25	30	40	50	60
Type (State coil voltage)				AL 9-30-10	AL 12-30-10	AL 16-30-10	AL 26-30-10	AL 30-30-10	AL 40-30-10
Coil consumption, pull-in and holding at 20°C		W		3	3	3	3.5	3.5	3.5

O/L relays

TA 25 DU

0.4 ...**0.63**	2.2...**3.1**	7.5 ...**11**	
0.63 ...**1.0**	2.8...**4.0**	10 ...**14**	
0.10...**0.16**	1.0 ...**1.4**	3.5...**5.0**	13 ...**19**
0.16...**0.25**	1.3 ...**1.8**	4.5...**6.5**	18 ...**25**
0.25...**0.4**	1.7 ...**2.4**	6.0...**8.5**	24 ...**32**

TA 42 DU

22...**32**

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Auxiliary contacts

Front mounting 1 N.O. CA 5-10 1 N.C. CA 5-01 4-pole CA 5

Side mounting 1 N.O. + 1 N.C. CAL 5-11

Timers

Electronic TE5S

Interlocks

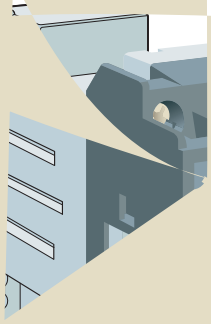
Mechanical VM 5-1 / Electrical VE 5-1

Surge suppressors

Varistor RV5

Transil Diode RT5

Rated current AC-1, 40 °C	**IEC**	25 A	30 A	45 A
Rated current General use	**UL/CSA**	21 A	30 A	40 A
	4-pole	**AL 9**	**AL 16**	**AL 26**
Type (State coil voltage)		AL 9-40-00	AL 16-40-00	AL 26-40-00



AL..ST, AL..Z..ST, TAL..ST 3-pole Contactors

d.c. Operated
Spring Terminals

Application

AL..ST, AL..Z..ST and TAL..ST contactors are the spring terminal version of AL-range.
The ST-range of contactors use ABB Entrelec's proven spring terminal technology giving the following benefits:

- a fast connection on the front face, which saves labour time,
- vibration proof,
- no need to retighten the terminals saving maintenance labour time.

Description

The **AL..ST** series 3-pole contactors are of the block type design.
The **AL..Z..ST** series 3-pole contactors are of the block type design with a very low coil consumption of 2.4 W.
The **TAL..ST** series 3-pole contactors are of the block type design with a large coil voltage range.

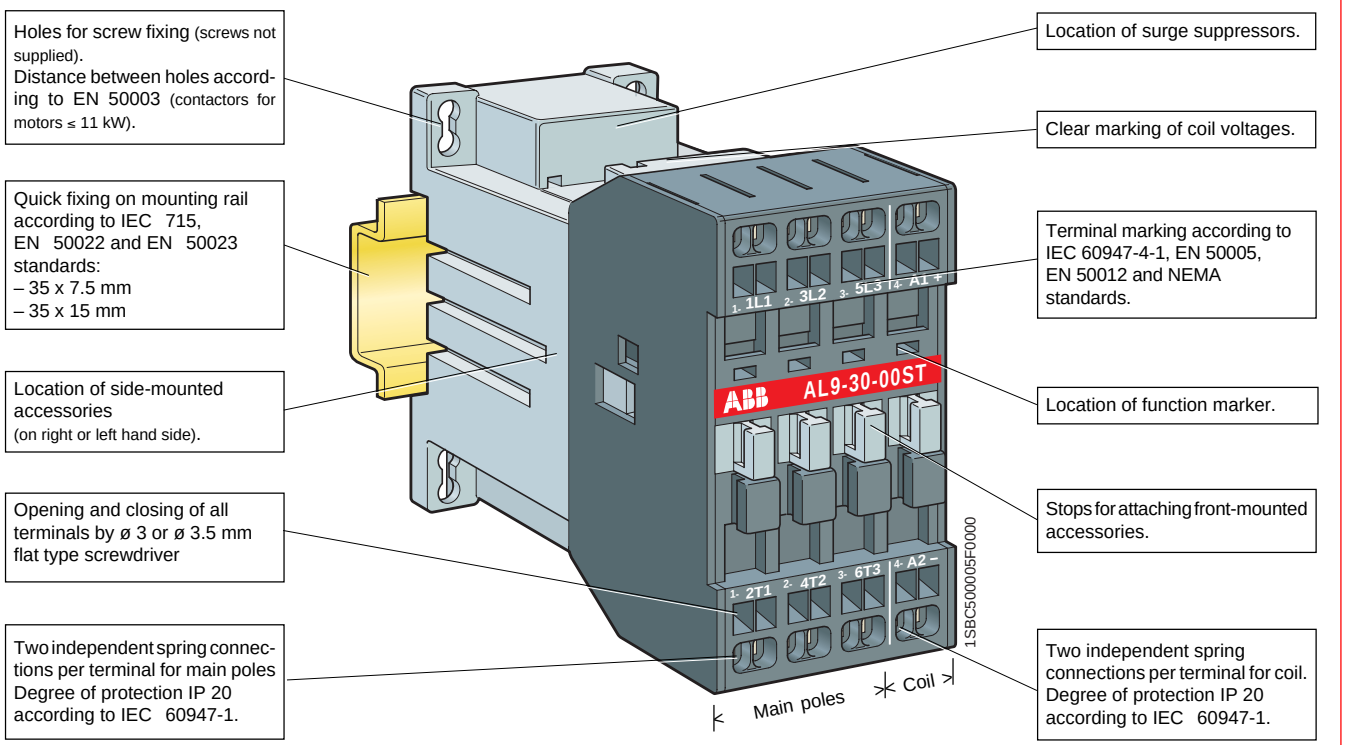
- Main poles and auxiliary contact blocks
  AL..ST, AL..Z..ST, TAL..ST 1-stack contactors:
  – 3 main poles,
  – coil terminals,
  – front mounted add-on auxiliary contact blocks.
- Control circuit: d.c. operated with solid core magnet circuit and low consumption coil. The coil must be energised from a d.c. supply and the polarity (+ and -) must be respected.
- Accessories: a wide range of accessories are available.
- Connection: the cables are connected via the front face with the possibility to use two different types of cables with different cross-sections.

Contactor designation explanation

1) AL 9Z30-00ST
- ST = Spring Terminals
- Z = Version 2.4 W

2) TAL 9-30-00ST
- ST = Spring Terminals
- T = Large voltage range

Blue = Standard contactor features
Black = Different variations according to the application



AL 16-30-10

AL 40-30-10

AL 16-30-00ST

Ordering Details

3-pole Contactors - 3 W and 3.5 W consumption with screw terminals

IEC Rated current AC-3 380V 400V AC-1 415V θ ≤ 40°C A	A	UL Rated power motor 480V hp	Rated current General use 600V A	Aux contacts fitted 1st stk 2nd stk	Type state coil voltage ⌊⌋ (see table below)	Order code state coil voltage code ☐☐ (see table below)	Weight kg Packing 1 piece
9	25	5	21	1 – – –	AL 9-30-10 ⌊⌋	1SBL 14 3001 R ☐☐10	0.520
				– 1 – –	AL 9-30-01 ⌊⌋	1SBL 14 3001 R ☐☐01	0.520
				– – 2 2	AL 9-30-22 ⌊⌋	1SBL 14 3001 R ☐☐22	0.580
12	27	7.5	25	1 – – –	AL 12-30-10 ⌊⌋	1SBL 16 3001 R ☐☐10	0.520
				– 1 – –	AL 12-30-01 ⌊⌋	1SBL 16 3001 R ☐☐01	0.520
				– – 2 2	AL 12-30-22 ⌊⌋	1SBL 16 3001 R ☐☐22	0.580
17	30	10	30	1 – – –	AL 16-30-10 ⌊⌋	1SBL 18 3001 R ☐☐10	0.520
				– 1 – –	AL 16-30-01 ⌊⌋	1SBL 18 3001 R ☐☐01	0.520
				– – 2 2	AL 16-30-22 ⌊⌋	1SBL 18 3001 R ☐☐22	0.580
26	45	20	40	1 – – –	AL 26-30-10 ⌊⌋	1SBL 24 3001 R ☐☐10	0.750
				– 1 – –	AL 26-30-01 ⌊⌋	1SBL 24 3001 R ☐☐01	0.750
				– – 2 2	AL 26-30-22 ⌊⌋	1SBL 24 3001 R ☐☐22	0.810
32	55	25	50	1 – – –	AL 30-30-10 ⌊⌋	1SBL 28 3001 R ☐☐10	0.750
				– 1 – –	AL 30-30-01 ⌊⌋	1SBL 28 3001 R ☐☐01	0.750
				– – 2 2	AL 30-30-22 ⌊⌋	1SBL 28 3001 R ☐☐22	0.810
37	60	30	60	1 – – –	AL 40-30-10 ⌊⌋	1SBL 32 3001 R ☐☐10	0.850
				– 1 – –	AL 40-30-01 ⌊⌋	1SBL 32 3001 R ☐☐01	0.850
				– – 2 2	AL 40-30-22 ⌊⌋	1SBL 32 3001 R ☐☐22	0.910

3-pole Contactors - 3 W consumption with spring terminals

IEC Rated current AC-3 380V 400V AC-1 415V θ ≤ 40°C A	A	Aux contacts fitted 1st stk 2nd stk	Type state coil voltage ⌊⌋ (see table below)	Order code state coil voltage code ☐☐ (see table below)	Weight kg Packing 1 piece
9	23	– – – –	AL 9-30-00ST ⌊⌋	1SBL 14 3004 R ☐☐00	0.580
12	25	– – – –	AL 12-30-00ST ⌊⌋	1SBL 16 3004 R ☐☐00	0.580
17	27	– – – –	AL 16-30-00ST ⌊⌋	1SBL 18 3004 R ☐☐00	0.580

Coil voltages and codes

Voltage - U_c V d.c. ⌊⌋	Code ☐☐
12	8 0
24	8 1
42	8 2
48	8 3
50	2 1
60	8 4
75	8 5
110	8 6
125	8 7
220	8 8
240	8 9
250	3 8

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AL 16Z-30-10

AL 16Z-30-00ST

Ordering Details

3-pole Contactors - 2.4 W consumption with screw terminals

IEC Rated current AC-3 380V 400V AC-1 415V θ ≤ 40°C A	A	UL Rated power motor 480V hp	Rated current General use 600V A	Aux contacts fitted 1st stk	2nd stk	Type state coil voltage (see table below)	Order code state coil voltage code ☐☐ (see table below)	Weight kg Packing 1 piece
9	25	5	21	1	– – –	AL 9Z-30-10	1SBL 14 4001 R ☐☐10	0.520
				–	1 – –	AL 9Z-30-01	1SBL 14 4001 R ☐☐01	0.520
12	27	7.5	25	1	– – –	AL 12Z-30-10	1SBL 16 4001 R ☐☐10	0.520
				–	1 – –	AL 12Z-30-01	1SBL 16 4001 R ☐☐01	0.520
17	30	10	30	1	– – –	AL 16Z-30-10	1SBL 18 4001 R ☐☐10	0.520
				–	1 – –	AL 16Z-30-01	1SBL 18 4001 R ☐☐01	0.520

3-pole Contactors - 2.4 W consumption with spring terminals

IEC Rated current AC-3 380V 400V AC-1 415V θ ≤ 40°C A	A	Aux contacts fitted 1st stk	2nd stk	Type state coil voltage (see table below)	Order code state coil voltage code ☐☐ (see table below)	Weight kg Packing 1 piece
9	23	–	– – –	AL 9Z-30-00ST	1SBL 14 4004 R ☐☐00	0.580
12	25	–	– – –	AL 12Z-30-00ST	1SBL 16 4004 R ☐☐00	0.580
17	27	–	– – –	AL 16Z-30-00ST	1SBL 18 4004 R ☐☐00	0.580

Coil voltages and codes

Voltage - U_c V d.c.	Code ☐☐
24	1 5
48	2 0

>> Technical Data ..... pages 17 ... 27 >> Dimensions ..... pages 47 ... 53

TAL 16-30-10

TAL 40-30-10

TAL 16-30-00ST

Ordering Details

Large coil voltage range with screw terminals

IEC Rated current AC-3 380V 400V AC-1 415V θ ≤ 40°C A	A	UL Rated power motor 480V hp	Rated current General use 600V A	Aux contacts fitted 1st stk 2nd stk	Type state coil voltage ⌊‗‗⌋ (see table below)	Order code state coil voltage code ☐☐ (see table below)	Weight kg Packing 1 piece
				1 – – –	TAL 9-30-10 ⌊‗‗⌋	1SBL 14 3061 R ☐☐10	0.520
9	25	5	21	– 1 – –	TAL 9-30-01 ⌊‗‗⌋	1SBL 14 3061 R ☐☐01	0.520
				1 – – –	TAL 12-30-10 ⌊‗‗⌋	1SBL 16 3061 R ☐☐10	0.520
12	27	7.5	25	– 1 – –	TAL 12-30-01 ⌊‗‗⌋	1SBL 16 3061 R ☐☐01	0.520
				1 – – –	TAL 16-30-10 ⌊‗‗⌋	1SBL 18 3061 R ☐☐10	0.520
17	30	10	30	– 1 – –	TAL 16-30-01 ⌊‗‗⌋	1SBL 18 3061 R ☐☐01	0.520
				1 – – –	TAL 26-30-10 ⌊‗‗⌋	1SBL 24 3061 R ☐☐10	0.750
26	45	20	40	– 1 – –	TAL 26-30-01 ⌊‗‗⌋	1SBL 24 3061 R ☐☐01	0.750
				1 – – –	TAL 30-30-10 ⌊‗‗⌋	1SBL 28 3061 R ☐☐10	0.750
32	55	25	50	– 1 – –	TAL 30-30-01 ⌊‗‗⌋	1SBL 28 3061 R ☐☐01	0.750
				1 – – –	TAL 40-30-10 ⌊‗‗⌋	1SBL 32 3061 R ☐☐10	0.850
37	60	30	60	– 1 – –	TAL 40-30-01 ⌊‗‗⌋	1SBL 32 3061 R ☐☐01	0.850

Large coil voltage range with spring terminals

IEC Rated current AC-3 380V 400V AC-1 415V θ ≤ 40°C A	A	Aux contacts fitted 1st stk 2nd stk	Type state coil voltage ⌊‗‗⌋ (see table below)	Order code state coil voltage code ☐☐ (see table below)	Weight kg Packing 1 piece
9	23	– – – –	TAL 9-30-00ST ⌊‗‗⌋	1SBL 14 3059 R ☐☐00	0.580
12	25	– – – –	TAL 12-30-00ST ⌊‗‗⌋	1SBL 16 3059 R ☐☐00	0.580
17	27	– – – –	TAL 16-30-00ST ⌊‗‗⌋	1SBL 18 3059 R ☐☐00	0.580

Note: For technical data and accessory compatibility on the TAL..ST range, please consult us.

Coil voltages and codes

Voltage - U_c V d.c. ⌊‗‗⌋	Code ☐☐
17 ... 32	5 1
25 ... 45	5 2
36 ... 65	5 4
42 ... 78	5 8
50 ... 90	5 5
77 ... 143	6 2
90 ... 150	6 6
152 ... 264	6 8

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AL.. and TAL.. 4-pole Contactors

d.c. Operated

Screw Terminals

AL 9-40-00

AL 9-22-00

Ordering Details

IEC Rated current AC-1 θ ≤ 40 °C A	UL Rated current General use 600V A	Aux. contacts fitted	Type state coil voltage (see table below)	Order code state coil voltage code (see table below)	Weight kg Packing 1 piece
4 N.O. Main Poles - 3 W and 3.5 W consumption					
25	21	– –	AL 9-40-00	1SBL 14 3201 R□□00	0.520
30	30	– –	AL 16-40-00	1SBL 18 3201 R□□00	0.520
45	40	– –	AL 26-40-00	1SBL 24 3201 R□□00	0.750
2 N.O. + 2 N.C. Main Poles - 3 W and 3.5 W consumption					
25	21	– –	AL 9-22-00	1SBL 14 3501 R□□00	0.520
30	30	– –	AL 16-22-00	1SBL 18 3501 R□□00	0.520
45	40	– –	AL 26-22-00	1SBL 24 3501 R□□00	0.750
4 N.O. Main Poles - Large coil voltage range					
25	21	– –	TAL 9-40-00	1SBL 14 3261 R□□00	0.520
30	30	– –	TAL 16-40-00	1SBL 18 3261 R□□00	0.520
45	40	– –	TAL 26-40-00	1SBL 24 3261 R□□00	0.750
2 N.O. + 2 N.C. Main Poles - Large coil voltage range					
25	21	– –	TAL 9-22-00	1SBL 14 3561 R□□00	0.520
30	30	– –	TAL 16-22-00	1SBL 18 3561 R□□00	0.520
45	40	– –	TAL 26-22-00	1SBL 24 3561 R□□00	0.750

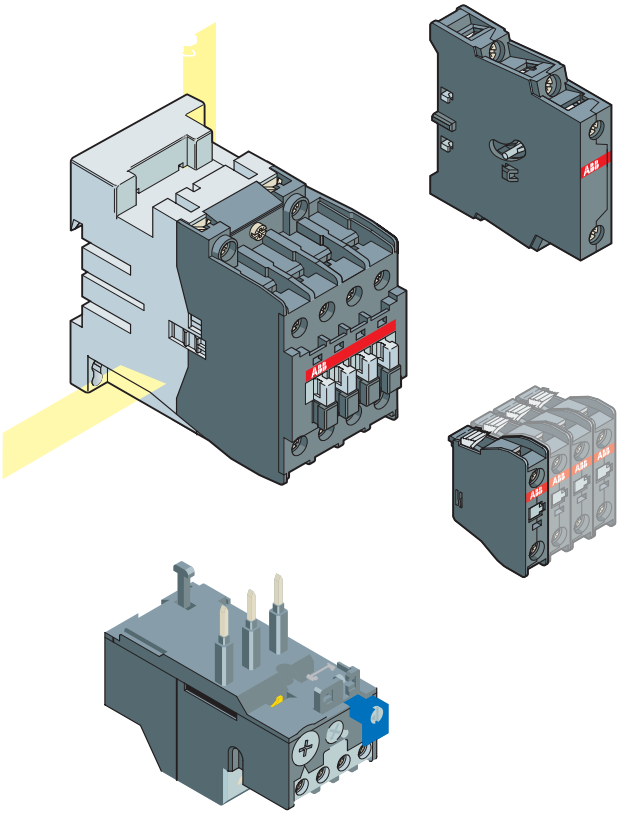
Coil voltages and codes AL..

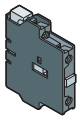
Voltage - U_c V d.c.	Code □□
12	8 0
24	8 1
48	8 3
50	2 1
60	8 4
75	8 5
110	8 6
125	8 7
220	8 8
240	8 9
250	3 8

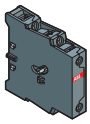
Coil voltages and codes TAL..

Voltage - U_c V d.c.	Code □□
17 ... 32	5 1
25 ... 45	5 2
36 ... 65	5 4
42 ... 78	5 8
50 ... 90	5 5
77 ... 143	6 2
90 ... 150	6 6
152 ... 264	6 8

>> Technical Data ..... pages 17 ... 27 >> Dimensions ..... pages 47 ... 23







Accessory Compatibility for AL..Z.. and TAL.. Contactors

Screw Terminals

Compatibility between the Main Accessories

Many configurations are possible depending upon whether they are front-mounted or side-mounted.

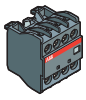
Contactor configuration

Main poles / Available auxiliary contacts

Contactor types

Front-mounted accessories

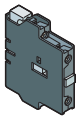
Auxiliary contact 1-pole CA 5-..



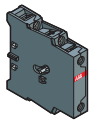
Auxiliary contact 4-pole CA 5-..

Auxiliary contact 1-pole CE 5-..

Side-mounted accessories



Interlock unit 2-pole CAL 5-11



VM 5-.. or VE 5-..

Position 1±30° not permitted

AL..Z.. and TAL 9 to TAL 16 Contactors

AL 9Z ... AL 16Z (9)	**3 0**	**1 0**	1 to 2 x CA 5-..(1)		–	or	1 to 2 x CE 5-.. (2)		–		–
AL 9Z ... AL 16Z (9)	**3 0**	**0 1**	1 to 2 x CA 5-..(1)		–	or	1 to 2 x CE 5-.. (2)		–	or	VM 5-1
TAL 9 ... TAL 16	**3 0**	**1 0**	1 to 4 x CA 5-..(1)	or	1 x CA 5-.. (4-pole) (1)	or	1 to 2 x CE 5-.. (2)	or	1 x CAL 5-11	+	1 x VM 5-1(3) or VE 5-1(3)(5)
TAL 9 ... TAL 16	**3 0**	**0 1**									
TAL 9 ... TAL 16	**4 0**	**0 0**	1 to 4 x CA 5-..(1)	or	1 x CA 5-.. (4-pole) (1)	or	1 to 2 x CE 5-.. (2)	or	1 x CAL 5-11	+	1 x VM 5-1(3) or VE 5-1(3)(5)
TAL 9 ... TAL 16 (8)	**2 2**	**0 0**	1 to 4 x CA 5-..(4)	or	1 x CA 5-.. (4-pole) (4)		–	or	1 x CAL 5-11		–

(1) 2 N.C. auxiliary contacts maximum in all mounting positions except 5. In position 5 no N.C. are allowed.
(2) CE 5-.. not allowed in position 5.
(3) When VM 5-1 or VE 5-1 is used the CAL 5-11 is not permitted in any positions.
(4) 2 N.C. auxiliary contacts maximum.
(5) With VE 5-1 a maximum of 3 N.O. auxiliary contacts are permitted.
(8) Mounting position 5 is not allowed.
(9) Not allowed in position 1±30°.

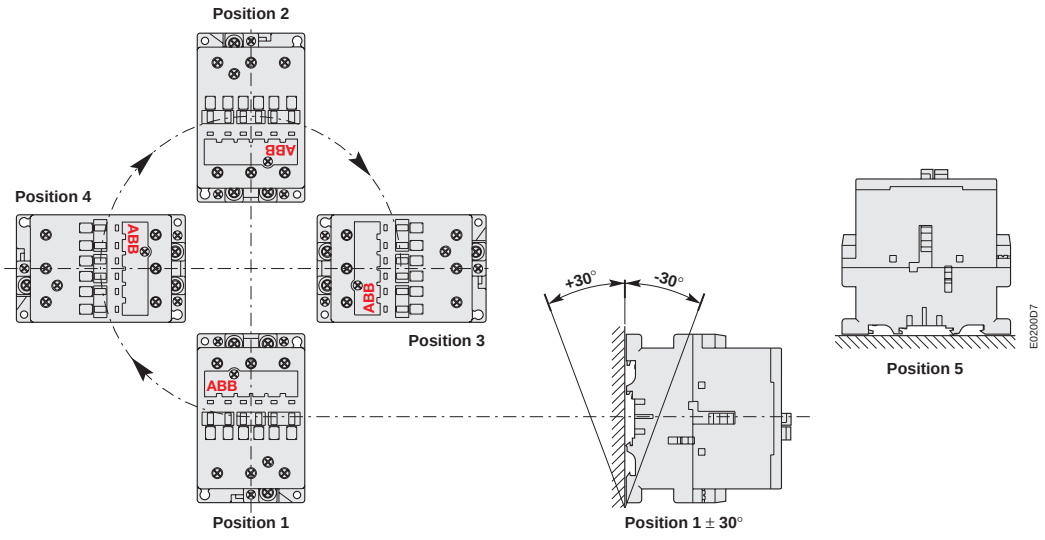
TAL 26 to TAL 40 Contactors

TAL 26	**3 0**	**1 0**	1 to 4 x CA 5-..(6)	or	1 x CA 5-.. (4-pole) (6)	or	1 to 2 x CE 5-..	or	1 x CAL 5-11	+	1 x VM 5-1 or VE 5-1
TAL 26	**3 0**	**0 1**									
TAL 30, AL 40	**3 0**	**1 0**	1 to 5 x CA 5-..(6)	or	1 x CA 5-.. (4-pole) (6) + 1 x CA 5-.. (1-pole)	or	1 to 2 x CE 5-..	or	1 x CAL 5-11	+	1 x VM 5-1 or VE 5-1(5)
TAL 30, AL 40	**3 0**	**0 1**									
TAL 26	**4 0**	**0 0**	1 to 4 x CA 5-..(6)	or	1 x CA 5-.. (4-pole) (6)	or	1 to 2 x CE 5-..	or	1 x CAL 5-11	+	1 x VM 5-1 or VE 5-1
TAL 26 (8)	**2 2**	**0 0**	1 to 4 x CA 5-..(7)	or	1 x CA 5-.. (4-pole) (7)		–	or	1 x CAL 5-11		–

(5) With VE 5-1 a maximum of 3 N.O. auxiliary contacts are permitted.
(6) 2 N.C. auxiliary contacts maximum in position 5.
(7) N.C. auxiliary contacts are not allowed.
(8) Mounting position 5 is not allowed.

Conditions for Use: Please see page 23

Mounting Positions



CAL 5-11

CA 5-10

TE5S-24

VE 5-1

RV 5/50

RT 5/32

BA 5-50

Ordering Details

Auxiliary Contact Blocks

Mounting on contactors	Positioning	Contacts		Type	Order Code	Packing piece	Weight kg 1 piece
AL, AL..Z, TAL (3-pole)	Front face	1	–	CA 5-10	1SBN 01 0010 R1010	10	0.014
		–	1	CA 5-01	1SBN 01 0010 R1001	10	0.014
AL, TAL (3-pole)	Front face	3	1	CA 5-31 M	1SBN 01 0040 R1131	2	0.060
		2	2	CA 5-22 M	1SBN 01 0040 R1122	2	0.060
AL, TAL (4-pole)	Front face	4	0	CA 5-40 E	1SBN 01 0040 R1040	2	0.060
		2	2	CA 5-22 E	1SBN 01 0040 R1022	2	0.060
AL, TAL	Side	1	1	CAL 5-11	1SBN 01 0020 R1011	2	0.050

See the accessory compatibility table pages 10 & 11.

Electronic Timers for star-delta starters (dwelling time 50 ms)

Mounting	Timing range	Supply voltage V	Type	Order Code	Packing piece	Weight kg
Independent	Direct	24 a.c. / d.c.	TE5S-24	1SBN 02 0010 R1001	1	0.080

Interlocks

Mounting on contactors	Feature	Contacts		Type	Order Code	Packing piece	Weight kg
AL, TAL	Mech. / electrical	–	2	VE 5-1	1SBN 03 0110 R1000	1	0.076
AL, AL..Z, TAL	Mechanical	–	–	VM 5-1	1SBN 03 0100 R1000	1	0.066

Surge Suppressors

Mounting on contactors	Feature	Voltage range	Type	Order Code	Packing piece	Weight kg 1 piece
AL, AL..Z, TAL	Varistor	24 ... 50 V a.c. / d.c.	RV 5/50	1SBN 05 0010 R1000	2	0.015
		50 ... 133 V a.c. / d.c.	RV 5/133	1SBN 05 0010 R1001	2	0.015
		110 ... 250 V a.c. / d.c.	RV 5/250	1SBN 05 0010 R1002	2	0.015
		250 ... 440 V a.c. / d.c.	RV 5/440	1SBN 05 0010 R1003	2	0.015
AL, AL..Z, TAL	Transil Diode	12 ... 32 V d.c.	RT 5/32	1SBN 05 0020 R1000	2	0.015
		25 ... 65 V d.c.	RT 5/65	1SBN 05 0020 R1001	2	0.015
		50 ... 90 V d.c.	RT 5/90	1SBN 05 0020 R1002	2	0.015
		77 ... 150 V d.c.	RT 5/150	1SBN 05 0020 R1003	2	0.015
		150 ... 264 V d.c.	RT 5/264	1SBN 05 0020 R1004	2	0.015

Function Marker

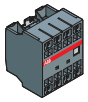
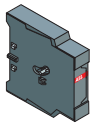
Mounting on contactors	Feature	Type	Order Code	Packing box	Weight kg
AL, AL..Z, TAL	50 Pieces in a box	BA 5-50	1SBN 11 0000 R1000	1	0.017

Accessory Compatibility for AL..ST Contactors

Spring Terminals

Compatibility between the Main Accessories

Many configurations are possible depending upon whether they are front-mounted or side-mounted.

Contactor configuration	Front-mounted accessories		Side-mounted accessory
Main poles / Available auxiliary contacts			
Contactor types	**Auxiliary contact 1-pole CA 5-..ST**	**Auxiliary contact 4-pole CA 5-..ST**	**Mechanical interlock unit VM 5-1**

AL 9..ST to AL 16..ST Contactors

AL 9..ST ... AL 16..ST	**3 0**	**0 0**	1 to 4 x CA 5-..ST(1)	or	1 x CA 5-..ST (4-pole) (1)	+	1 x VM 5-1

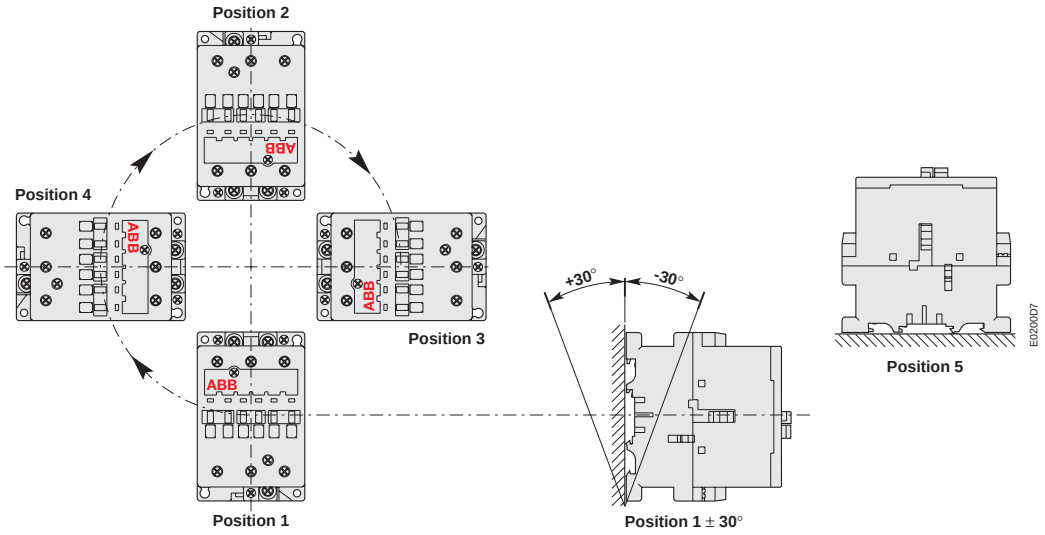
AL 9Z..ST to AL 16Z..ST Contactors

AL 9Z..ST ... AL 16Z..ST(2)	**3 0**	**0 0**	1 to 2 x CA 5-..ST(1)		–	or	1 x VM 5-1

(1) 2 N.C. auxiliary contacts maximum in all mounting positions except 5. In position 5 no N.C. are allowed.
(2) Not allowed in position 1±30°.

Conditions for Use: Please see page 23

Mounting Positions



CA 5-10ST

CA 5-40 EST

VM 5-1

RV 5/50

RT 5/32

BA 5-50

Ordering Details

Auxiliary Contact Blocks

Mounting on contactors	Positioning	Contacts		Type	Order Code	Packing piece	Weight kg 1 piece
AL..ST, AL..Z..ST	Front face	1	–	CA 5-10ST	1SBN 01 1419 R1010	10	0.016
		–	1	CA 5-01ST	1SBN 01 1419 R1001	10	0.016
		4	0	CA 5-40 EST	1SBN 01 1445 R1040	2	0.060
		3	1	CA 5-31 EST	1SBN 01 1445 R1031	2	0.060
		2	2	CA 5-22 EST	1SBN 01 1445 R1022	2	0.060

See the accessory compatibility table page **13**.

Interlocks

Mounting on contactors	Feature	Contacts		Type	Order Code	Packing piece	Weight kg
AL..ST, AL..Z..ST	Mechanical	–	–	VM 5-1	1SBN 03 0100 R1000	1	0.066

Surge Suppressors

Mounting on contactors	Feature	Voltage range	Type	Order Code	Packing piece	Weight kg 1 piece
AL..ST, AL..Z..ST	Varistor	24 ... 50 V a.c. / d.c.	RV 5/50	1SBN 05 0010 R1000	2	0.015
		50 ... 133 V a.c. / d.c.	RV 5/133	1SBN 05 0010 R1001	2	0.015
		110 ... 250 V a.c. / d.c.	RV 5/250	1SBN 05 0010 R1002	2	0.015
		250 ... 440 V a.c. / d.c.	RV 5/440	1SBN 05 0010 R1003	2	0.015
AL...ST, AL..Z..ST	Transil Diode	12 ... 32 V d.c.	RT 5/32	1SBN 05 0020 R1000	2	0.015
		25 ... 65 V d.c.	RT 5/65	1SBN 05 0020 R1001	2	0.015
		50 ... 90 V d.c.	RT 5/90	1SBN 05 0020 R1002	2	0.015
		77 ... 150 V d.c.	RT 5/150	1SBN 05 0020 R1003	2	0.015
		150 ... 264 V d.c.	RT 5/264	1SBN 05 0020 R1004	2	0.015

Function Marker

Mounting on contactors	Feature	Type	Order Code	Packing box	Weight kg
AL..ST, AL..Z..ST	50 Pieces in a box	BA 5-50	1SBN 11 0000 R1000	1	0.017

Note: Some accessories with screw terminals can be used with the ...ST contactors, these include:
– TE5S Electronic timer
– TA25 DU Thermal overload relay with the independent mounting kit DB25.

AL ...

TA 25 DU

TA 42 DU

Fitting Details

The addition of a thermal O/L on the contactor does not prevent fitting of many other accessories as shown and described on pages 9 ... 12.

Contactor type	AL 9 ... AL 26 AL 9Z ... AL 16Z TAL 9 ... TAL 26	AL 30 ... AL 40 TAL 30 ... TAL 40
Thermal O/L relay	TA 25 DU ..	TA 25 DU .. (1) TA 42 DU .. (1)

(1) According to the setting range related to the motor F.L.C.

Ordering Details

Thermal O/L Relays, Class 10A

For contactors:	Setting range A	Type	Order code	Weight kg Packing 1 piece
AL 9 ... AL 30 AL 9Z ... AL 16Z TAL 9 ... TAL 30	0.10 ... 0.16	TA 25 DU 0.16	1SAZ 21 1201 R1005	0.150
	0.16 ... 0.25	TA 25 DU 0.25	1SAZ 21 1201 R1009	0.150
	0.25 ... 0.40	TA 25 DU 0.4	1SAZ 21 1201 R1013	0.150
	0.40 ... 0.63	TA 25 DU 0.63	1SAZ 21 1201 R1017	0.150
	0.63 ... 1.00	TA 25 DU 1.0	1SAZ 21 1201 R1021	0.150
	1.0 ... 1.4	TA 25 DU 1.4	1SAZ 21 1201 R1023	0.150
	1.3 ... 1.8	TA 25 DU 1.8	1SAZ 21 1201 R1025	0.150
	1.7 ... 2.4	TA 25 DU 2.4	1SAZ 21 1201 R1028	0.150
	2.2 ... 3.1	TA 25 DU 3.1	1SAZ 21 1201 R1031	0.150
	2.8 ... 4.0	TA 25 DU 4.0	1SAZ 21 1201 R1033	0.150
	3.5 ... 5.0	TA 25 DU 5.0	1SAZ 21 1201 R1035	0.150
	4.5 ... 6.5	TA 25 DU 6.5	1SAZ 21 1201 R1038	0.150
	6.0 ... 8.5	TA 25 DU 8.5	1SAZ 21 1201 R1040	0.150
	7.5 ... 11	TA 25 DU 11	1SAZ 21 1201 R1043	0.150
	10 ... 14	TA 25 DU 14	1SAZ 21 1201 R1045	0.150
	13 ... 19	TA 25 DU 19	1SAZ 21 1201 R1047	0.150
	18 ... 25	TA 25 DU 25	1SAZ 21 1201 R1051	0.150
	24 ... 32	TA 25 DU 32	1SAZ 21 1201 R1053	0.170
AL 30 ... AL 40 TAL 30 ... TAL 40	18 ... 25	TA 42 DU 25	1SAZ 31 1201 R1001	0.330
	22 ... 32	TA 42 DU 32	1SAZ 31 1201 R1002	0.330
	29 ... 42	TA 42 DU 42	1SAZ 31 1201 R1003	0.330

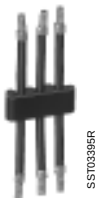
Separate Mounting Kit

For O/L relays:	Type	Order code	Weight kg Packing 1 piece
TA 25 DU ≤ 25	DB 25/25 A	1SAZ 20 1108 R0001	0.050
TA 25 DU 32	DB 25/32 A	1SAZ 20 1108 R0002	0.075
TA 42 DU	DB 80	1SAZ 30 1110 R0001	0.170

D.O.L. Starting with Manual Motor Starter

Screw Terminals

MS 116



BSA

AL 16-30-10

Fitting Details

Direct on line starter with protection against short circuits. To be supplied in kit form and to be assembled by the customer. Coordination Type 1 in accordance with IEC 60947-4-1

kW	I (A)	MMS	Contactor	Connexion Kit	Fixing
4	9	MS 116	AL 9	BSA 325	Rail 35 mm
5.5	12	MS 116	AL 12	BSA 325	Rail 35 mm
7.5	16	MS 116	AL 16	BSA 325	Rail 35 mm
11	26	MS 325	AL 26	BSA 325	Rail 35 mm
15	30	MS 450	AL 30	–	Screws
18.5	40	MS 450	AL 40	–	Screws

400V, 50kA, Normal Start up, Type 1

Manual Motor Starters

Motor		Manuel Motor-Starter				Contactor
Rated Output P_e (kW)	Rated Current I_e (A)	Type	Order Cde	Magnetic Tripping current (A)	O/L Current Setting range (A)	Type
0.37	1.2	MS 116-1.6	1SAM250000R1006	19.2	1 - 1.6	AL 9
0.55	1.5	MS 116-1.6	1SAM250000R1006	19.2	1 - 1.6	AL 9
0.75	2	MS 116-2.5	1SAM250000R1007	30	1.6 - 2.5	AL 9
1.1	2.6	MS 116-4	1SAM250000R1008	48	2.5 - 4	AL 9
1.5	3.5	MS 116-4	1SAM250000R1008	48	2.5 - 4	AL 9
2.2	5	MS 116-6.3	1SAM250000R1009	75.6	4 - 6.3	AL 9
3	6.6	MS 325-9	1SAM150000R1010	135	6.3 - 9	AL 9
4	8.5	MS 325-9	1SAM150000R1010	135	6.3 - 9	AL 9
5.5	11.5	MS 325-12.5	1SAM150000R1011	187.5	9 - 12.5	AL 12
7.5	15.5	MS 325-16	1SAM150000R1012	240	12.5 - 16	AL 16
7.5	15.5	MS 450-20	1SAM450000R1002	240	14 - 20	AL 16
9	18.3	MS 325-20	1SAM150000R1013	300	16 - 20	AL 26
11	22	MS 325-25	1SAM150000R1014	375	20 - 25	AL 26
11	22	MS 450-25	1SAM450000R1003	300	18 - 25	AL 26
15	30	MS 450-32	1SAM450000R1004	384	22 - 32	AL 30
18.5	37	MS 450-40	1SAM450000R1005	480	28 - 40	AL 40

Connection Kit

For motor starters	Type	Order code	Weight kg Packing 1 piece
MS 116, MS 325	BSA 325	FPTN 472772 R0001	0.009

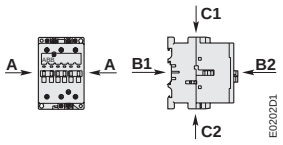
General Technical Data - Contactor with Screw Terminals

Contactor types:	AL.., TAL..	9	12	16	26	30	40
	AL..Z..	9	12	16	–	–	–
Rated insulation voltage U_i							
according to IEC 60947-4-1	V	1000					
according to UL/CSA	V	600					
Rated impulse withstand voltage $U_{imp.}$	kV	8					
Standards		Devices complying with international standards IEC 60947-1 / 60947-4-1 and European standards EN 60947-1 / 60947-4-1					
Certifications - Approvals		UL, CSA					
Air temperature close to contactor		" Conditions for use" page 23, for control voltage limits and authorized mounting positions					
– fitted with thermal O/L relay	°C	-25 to +55					
– without thermal O/L relay	°C	-40 to +70 (55°C for TAL..)					
– for storage	°C	-60 to +80					
Climatic withstand		acc. to IEC 60068-2-30 and 60068-2-11 - UTE C 63-100 specification II					
Operating altitude	m	≤ 3000					

Shock withstand

acc. IEC 60068-2-27 and EN 60068-2-27

Mounting position 1 (page 23)



1/2 sinusoidal shock for 11 ms: no change in contact position

Shock direction	Closed position	Open position
A	20 g	10 g
B1	15 g	5 g
B2	10 g	15 g
C1	20 g	8 g
C2	14 g	8 g

General Technical Data - Contactor with Spring Terminals

Contactor types:	AL..ST, AL..Z..ST	9	12	16	–	–	–
Rated insulation voltage U_i							
according to IEC 60947-4-1	V	690					
Rated impulse withstand voltage $U_{imp.}$	kV	6					
Standards		Devices complying with international standards IEC 60947-1 / 60947-4-1 and European standards EN 60947-1 / 60947-4-1					
Air temperature close to contactor		" Conditions for use" page 23, for control voltage limits and authorized mounting positions					
– without thermal O/L relay	°C	-40 to +70					
– for storage	°C	-60 to +80					
Climatic withstand		acc. to IEC 60068-2-30 and 60068-2-11 - UTE C 63-100 specification II					
Operating altitude	m	≤ 3000					

AL.., AL..Z.., TAL.. Contactors

Technical Data - IEC Ratings

Screw Terminals

Main Pole - Utilization Characteristics

Contactor types:	**AL.., TAL..**		**9**	**12**	**16**	**26**	**30**	**40**
	AL..Z..		**9**	**12**	**16**	—	—	—
Rated operational voltage U_e max.		**V**	690					
Rated frequency limits		**Hz**	25 ... 400					
Conventional free-air thermal current I_{th} acc. to IEC 60947-4-1, open contactors θ ≤ 40 °C		**A**	26	28	30	45	65	65
with conductor cross-sectional area		**mm²**	4	4	4	6	16	16
Rated operational current I_e / AC-1 for air temperature close to contactor								
U_e max. 690 V	**θ ≤ 40 °C**	**A**	**25**	**27**	**30**	**45**	**55**	**60**
	θ ≤ 55 °C	**A**	22	25	27	40	55	60
	θ ≤ 70 °C	**A**	18	20	23	32	39	42
with conductor cross-sectional area		**mm²**	2.5	4	4	6	10	16
Utilization category AC-3 for air temperature close to contactor ≤ 55 °C								
Rated operational current I_e AC-3	220-230-240 V	**A**	9	12	17	26	33	40
3-phase motors	380-400 V	**A**	9	12	17	26	32	37
	415 V	**A**	9	12	17	26	32	37
	440 V	**A**	9	12	16	26	32	37
	500 V	**A**	9	12	14	22	28	33
	690 V	**A**	7	9	10	13	18	21
Rated operational power AC-3								
1500 r.p.m. 50 Hz, 1800 r.p.m. 60 Hz, 3-phase motors	220-230-240 V	**kW**	2.2	3	4	6.5	9	11
	380-400 V	**kW**	4	5.5	7.5	11	15	18.5
	415 V	**kW**	4	5.5	9	11	15	18.5
	440 V	**kW**	4	5.5	9	15	18.5	22
	500 V	**kW**	5.5	7.5	9	15	18.5	22
	690 V	**kW**	5.5	7.5	9	11	15	18,5
Rated making capacity AC-3 according to IEC 60947-4-1			10 x I_e AC-3					
Rated breaking capacity AC-3 according to IEC 60947-4-1			8 x I_e AC-3					
Short-circuit protection for contactors without thermal O/L relay - Motor protection excluded U_e ≤ 500 V a.c. - gG type fuse		**A**	25	32	32	50	63	
Rated short-time withstand current I_{cw} at 40 °C ambient temp., in free air, from a cold state	1 s	**A**	250	280	300	400	600	
	10 s	**A**	100	120	140	210	400	
	30 s	**A**	60	70	80	110	225	
	1 min	**A**	50	55	60	90	150	
	15 min	**A**	26	28	30	45	65	
Maximum breaking capacity cos φ = 0.45 (cos φ = 0.35 for I_e > 100 A)	at 440 V	**A**	250			420	470	
	at 690 V	**A**	100			106	175	
Heat dissipation per pole	**I_e / AC-1**	**W**	0.8	1	1.2	1.8	2.5	3
	I_e / AC-3	**W**	0.1	0.2	0.35	0.6	0.9	1.3
Max. electrical switching frequency								
– for AC-1		**cycles/h**	600					
– for AC-3		**cycles/h**	1200					
– for AC-2, AC-4		**cycles/h**	300					
Mechanical durability								
– millions of operating cycles			10					
– max. mechanical switching frequency		**cycles/h**	3600					

AL..ST, AL..Z..ST Contactors

Technical Data - IEC Ratings

Spring Terminals

Main Pole - Utilization Characteristics

Contactor types: AL..ST, AL..Z..ST		9	12	16	—	—	—
Rated operational voltage U_e max.	**V**	690					
Rated frequency limits	**Hz**	25 ... 400					
Conventional free-air thermal current I_{th} acc. to IEC 60947-4-1,							
open contactors $\theta \leq 40$ °C	**A**	24	25	27			
with conductor cross-sectional area	**mm²**	4	4	4			
Rated operational current I_e / AC-1 for air temperature close to contactor							
U_e max. 690 V $\theta \leq$ **40 °C**	**A**	**23**	**25**	**27**			
U_e max. 690 V $\theta \leq 55$ °C	**A**	18	20	22			
U_e max. 690 V $\theta \leq 70$ °C	**A**	15	16	17			
with conductor cross-sectional area	**mm²**	2.5	4	4			
Utilization category AC-3 for air temperature close to contactor ≤ 55 °C							
Rated operational current I_e AC-3 220-230-240 V	**A**	9	12	17			
3-phase motors 380-400 V	**A**	9	12	17			
415 V	**A**	9	12	17			
440 V	**A**	9	12	16			
500 V	**A**	9	12	14			
690 V	**A**	7	9	10			
Rated operational power AC-3 220-230-240 V	**kW**	2.2	3	4			
1500 r.p.m. 50 Hz, 1800 r.p.m. 60 Hz, 3-phase motors 380-400 V	**kW**	4	5.5	7.5			
415 V	**kW**	4	5.5	9			
440 V	**kW**	4	5.5	9			
500 V	**kW**	5.5	7.5	9			
690 V	**kW**	5.5	7.5	9			
Rated making capacity AC-3 according to IEC 60947-4-1		10 x I_e AC-3					
Rated breaking capacity AC-3 according to IEC 60947-4-1		8 x I_e AC-3					
Short-circuit protection for contactors without thermal O/L relay - Motor protection excluded $U_e \leq 500$ V a.c. - gG type fuse	**A**	25	25	32			
Rated short-time withstand current I_{cw} at 40 °C ambient temp., in free air, from a cold state 1 s	**A**	250	280	300			
10 s	**A**	100	120	140			
30 s	**A**	60	70	80			
1 min	**A**	50	55	60			
15 min	**A**	24	25	27			
Maximum breaking capacity cos φ = 0.45 (cos φ = 0.35 for I_e > 100 A) at 440 V	**A**	250					
at 690 V	**A**	100					
Heat dissipation per pole I_e / AC-1	**W**	1.6	1.8	2.0			
I_e / AC-3	**W**	0.24	0.4	0.8			
Max. electrical switching frequency							
– for AC-1	**cycles/h**	600					
– for AC-3	**cycles/h**	1200					
– for AC-2, AC-4	**cycles/h**	300					
Mechanical durability							
– millions of operating cycles		10					
– max. mechanical switching frequency	**cycles/h**	3600					

AL.., AL..Z.., TAL.. Contactors

Technical Data - UL/CSA Ratings

Screw Terminals

Main Pole - Utilization Characteristics

Contactor types:	AL.., TAL..		9	12	16	26	30	40
	AL..Z..		9	12	16	—	—	—
Rated operational voltage U_e max.		**V**	600					
General use I_e for air temperature close to contactor								
U_e max. 600 V	θ ≤ 40 °C	**A**	21	25	30	40	50	60
Amp motor ratings 3-phase motors								
	240 V	**A**	6.8	9.6	15.2	28	28	42
	480 V	**A**	**7.6**	**11**	**14**	**27**	**34**	**40**
	600 V	**A**	9	11	17	27	32	41
hp motor ratings 3-phase motors								
	240 V	**hp**	2	3	5	10	10	15
	480 V	**hp**	**5**	**7.5**	**10**	**20**	**25**	**30**
	600 V	**hp**	7.5	10	15	25	30	40
Max. electrical switching frequency								
– for General use		**cycles/h**	600					
– for Motor use		**cycles/h**	1200					

Magnet System Characteristics for AL.. and AL..ST Contactors

Contactor types:	AL.. (3 W / 3.5 W)	9	12	16	26	30	40
	AL..ST (3 W)	9	12	16	—	—	—
Rated control circuit voltage U_c							
	V d.c.	12 ... 250					
Coil operating limits							
according to IEC 60947-4-1		See conditions for use page 23					
Drop-out voltage in % of U_c		roughly 10 ... 30 %					
Coil consumption - Average values							
– pull-in value	**W**	3.0			3.5		
– holding value	**W**	3.0			3.5		
Operating time							
between coil energization and:							
– N.O. contact closing	**ms**	50 ... 100			55 ... 110		
– N.C. contact opening	**ms**	20 ... 70			25 ... 75		
between coil de-energization and:							
– N.O. contact opening	**ms**	10 ... 17 (1)			12 ... 18 (1)		
– N.C. contact closing	**ms**	16 ... 27 (1)			18 ... 28 (1)		

(1) The use of surge suppressors increases the opening time on a scale of 1.1 to 1.5 for a varistor suppressor and on a scale of 1.5 to 3 for a transil diode suppressor.

Magnet System Characteristics for AL.. Z and AL..Z..ST Contactors

Contactor types:	AL..Z (2.4 W)	9	12	16	—	—	—
	AL..Z..ST (2.4 W)	9	12	16	—	—	—
Rated control circuit voltage U_c							
	V d.c.	24 and 48					
Coil operating limits							
according to IEC 60947-4-1		See conditions for use page 23					
Drop-out voltage in % of U_c		roughly 10 ... 30 %					
Coil consumption - Average values							
– pull-in value	**W**	2.4					
– holding value	**W**	2.4					
Operating time							
between coil energization and:							
– N.O. contact closing	**ms**	50 ... 100					
– N.C. contact opening	**ms**	20 ... 70					
between coil de-energization and:							
– N.O. contact opening	**ms**	10 ... 17 (1)					
– N.C. contact closing	**ms**	16 ... 27 (1)					

(1) The use of surge suppressors increases the opening time on a scale of 1.1 to 1.5 for a varistor suppressor and on a scale of 1.5 to 3 for a transil diode suppressor.

Magnet System Characteristics for TAL.. Contactors

Contactor types:	TAL..	9	12	16	26	30	40
Rated control circuit voltage U_c							
	V d.c.	9 ... 264					
Coil operating limits							
according to IEC 60947-4-1		See conditions for use page 23					
Drop-out voltage in % of U_c		roughly 20 ... 35 %					
Coil consumption at pull-in and holding							
– **U_c** max.	**W**	8.5			9		
– **U_c** min.	**W**	2.5			2.7		
– **U_c**	**W**	5			5.4		
Operating time							
between coil energization and:							
– N.O. contact closing	**ms**	50 ... 100			55 ... 110		
– N.C. contact opening	**ms**	20 ... 70			25 ... 75		
between coil de-energization and:							
– N.O. contact opening	**ms**	10 ... 17 (1)			12 ... 18 (1)		
– N.C. contact closing	**ms**	16 ... 27 (1)			18 ... 28 (1)		

(1) The use of surge suppressors increases the opening time on a scale of 1.1 to 1.5 for a varistor suppressor and on a scale of 1.5 to 3 for a transil diode suppressor.

Built-in Auxiliary Contacts (1 stack) - Utilization Characteristics

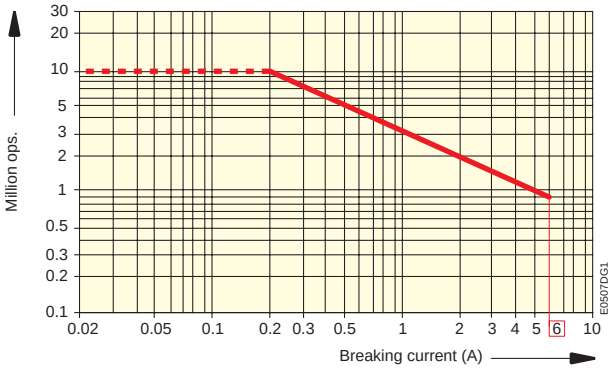
Contactor types: AL.., TAL..		9	12	16	26	30	40
AL..Z.., TAL..Z..		9	12	16	—	—	—
Rated operational voltage U_e max.	**V**	690					
Conventional free air thermal current I_{th} - $\theta \leq 40$ °C	**A**	16					
Rated frequency limits	**Hz**	25 ... 400					
Rated operational current I_e / AC-15 according to IEC 60947-5-1							
24-127 V 50/60 Hz	**A**	6					
220-240 V 50/60 Hz	**A**	4					
380-440 V 50/60 Hz	**A**	3					
500 V 50/60 Hz	**A**	2					
690 V 50/60 Hz	**A**	2					
Rated operational current I_e / DC-13 according to IEC 60947-5-1							
24 V d.c.	**A / W**	6 / 144					
48 V d.c.	**A / W**	2.8 / 134					
72 V d.c.	**A / W**	2 / 144					
125 V d.c.	**A / W**	1.1 / 138					
250 V d.c.	**A / W**	0.55 / 138					
Rated making capacity acc. to IEC 60947-5-1		10 x I_e / AC-15					
Rated breaking capacity acc. to IEC 60947-5-1		10 x I_e / AC-15					
Short-circuit protection gG type fuse	**A**	10					
Rated short-time withstand current I_{cw}							
for 1.0 s	**A**	100					
for 0.1 s	**A**	140					
Minimum switching capacity	**V / mA**	17 / 5 (with a failure rate of 10^{-6} according to IEC 60947-5-4)					
Non-overlapping time between N.O. and N.C. contacts	**ms**	≥ 2					
Heat dissipation per pole at 6 A	**W**	0.10					

Electrical Durability for AC-15 Utilization Category

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

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

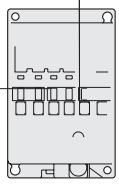
The curve has been drawn for resistive and inductive loads up to 690 V, 40 ... 60 Hz.



– AL.., AL..Z.. and TAL.. contactor built-in auxiliary contacts
– Auxiliary contact blocks CAL 5-.., CA 5-.., CA 5-..ST

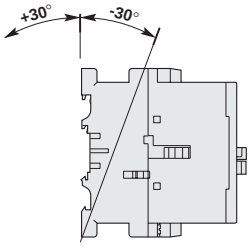
Position 2

Position 4

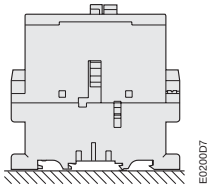


Position 1

Position 3

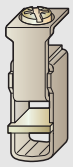


Position 1 ± 30°



Position 5

Connecting Characteristics

Contactor types: AL.., TAL..	9	12	16	26	30	40
AL..Z	9	12	16	—	—	—
Main terminals	 with cable clamp				 with double connector 2 x (5.6 x 6.5 mm)	
Connecting capacity (min. ... max.)						
Main conductors (poles)						
Rigid: solid (≤ 4 mm²) **1 x mm²**	1 ... 4			1.5 ... 6	2.5 ... 16	
stranded (≥ 6 mm²) **2 x mm²**	1 ... 4			1.5 ... 6	2.5 ... 16	
Flexible with cable end **1 x mm²**	0.75 ... 2.5			0.75 ... 4	2.5 ... 10	
2 x mm²	0.75 ... 2.5			0.75 ... 4	2.5 ... 10	
Bars or lugs **L mm ≤**	7.7			10	–	–
l mm >	3.7			4.2	–	–
Auxiliary conductors						
Rigid solid (built-in auxiliary terminals + coil terminals) **1 x mm²**	1 ... 4					
2 x mm²	1 ... 4					
Flexible with cable end (built-in auxiliary terminals + coil terminals) **1 x mm²**	0.75 ... 2.5					
2 x mm²	0.75 ... 2.5					
Lugs						
– built-in aux.terminals **L mm ≤**	7.7			10	8	
l mm >	3.7			4.2	3.7	
– coil terminals **L mm ≤**	8					
l mm >	3.7					
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529	Protection against direct contact acc. to VDE 0106 - Part. 100					
– Main terminals	IP 20					
– Coil terminals	IP 20					
– Built-in auxiliary terminals	IP 20					
Screw terminals	(delivered in open position, screws of unused terminals must be tightened)					
Main terminals	(+,-) pozidriv 2 screws					
	M3.5			M4	M5	
Coil terminals	M3.5 (+,-) pozidriv 2 screws with cable clamp					
Built-in auxiliary terminals	(+,-) pozidriv 2 screws with cable clamp					
	M3.5			M4	M3.5	
Tightening torque						
Main pole terminals						
– recommended **Nm / lb.in**	1.00 / 9			1.7 / 15	2.30 / 20	
– max. **Nm**	1.20			2.20	2.60	
Coil terminals						
– recommended **Nm / lb.in**	1.00 / 9					
– max. **Nm**	1.20					
Built-in auxiliary terminals						
– recommended **Nm / lb.in**	1.00 / 9			1.7 / 15	1.00 / 9	
– max. **Nm**	1.20			2.20	1.20	
Terminal marking and positioning	☞ Page 43					

Connecting Characteristics

Contactor types: AL..ST, AL..Z..ST	9	12	16	—	—	—
Main and coil terminals	 spring terminals					
Connecting capacity (min. ... max.) Main conductors (poles) and coil conductors						
Rigid **1 x mm²**	0.5 ... 4					
2 x mm²	0.5 ... 4					
Flexible **1 x mm²**	0.5 ... 1.5					
with isolated cable end **2 x mm²**	0.5 ... 1.5					
Flexible **1 x mm²**	0.5 ... 2.5					
with non-isolated cable end **2 x mm²**	0.5 ... 2.5					
Flexible **1 x mm²**	0.5 ... 2.5					
without cable end **2 x mm²**	0.5 ... 2.5					
Wire stripping length **mm**	10					
Screwdriver type / size **mm**	Flat / ø 3.0 or 3.5					
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529	Protection against direct contact acc. to VDE 0106 - Part. 100					
– Main terminals	IP 20					
– Coil terminals	IP 20					
Terminal marking and positioning	☞ Page 44					

Auxiliary Contact Blocks

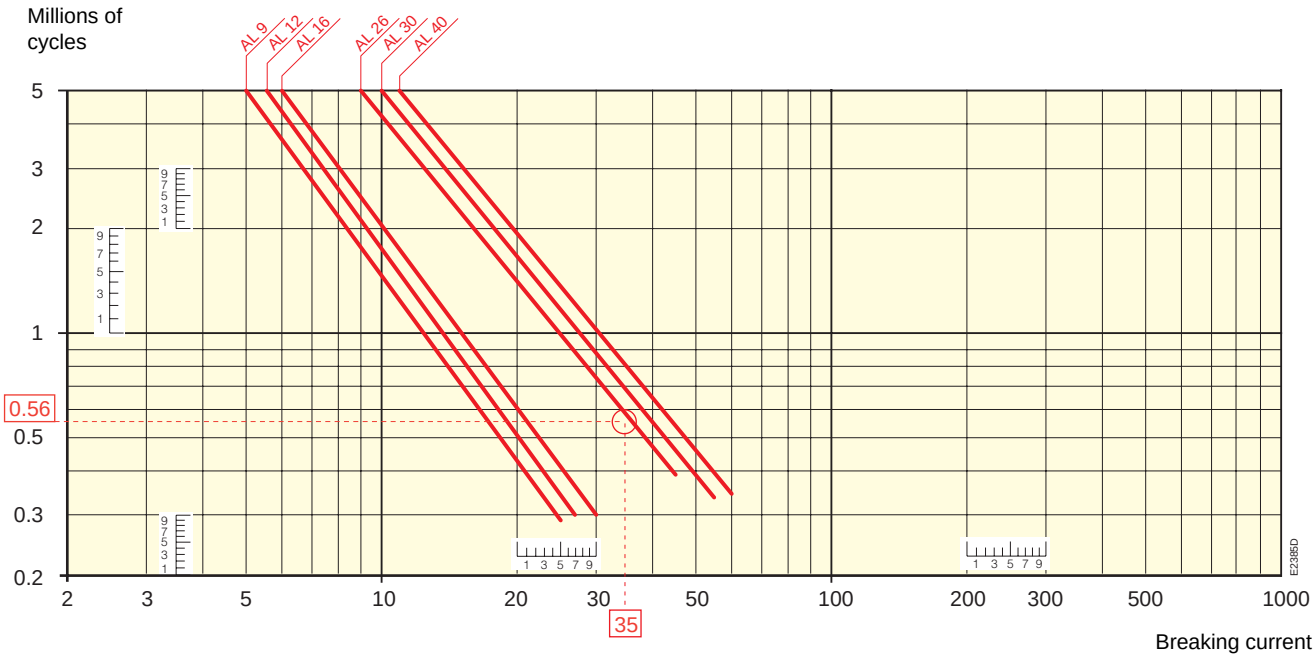
Front Mounting
Spring Terminals

Technical Data

Types		**1-pole CA 5-..ST, 4-pole CA 5-..ST**
Compliance with standards		IEC 60947-5-1 and EN 60947-5-1
Certification and approvals		CE certification
Rated insulation voltage U_i according to IEC 60947-5-1	**V**	690
Rated operational voltage U_e	**V a.c.**	24 to 690
Conventional thermal current I_{th}	**A**	16
Rated operational current I_e according to IEC 60947-5-1		
in a.c.		**AC-15**
24 to 127 V	**A**	6
220 to 240 V	**A**	4
380 to 440 V	**A**	3
500 to 690 V	**A**	2
in d.c.		**DC-13**
24 V	**A**	6
48 V	**A**	2.8
72 V	**A**	1
110 V	**A**	0.55
125 V	**A**	0.55
220 V	**A**	0.3
250 V	**A**	0.3
Short circuit protection	**A**	10 (gG fuses)
Rated making capacity		10 x **I_e** AC-15
Rated breaking capacity		10 x **I_e** AC-15
Rated short-time withstand current I_{cw} 1 s	**A**	100
θ = 40 °C 0.1 s	**A**	140
Mechanical durability		
– millions of operating cycles		10
– max. mech. switching frequency	**cycles/h**	3600
Electrical durability		
– millions of operating cycles		see page 22
– max. elec. switching frequency	**cycles/h**	1200
Connecting capacity (min. ... max.)		
Rigid	**1 x mm²**	0.5 ... 4
	2 x mm²	0.5 ... 4
Flexible	**1 x mm²**	0.5 ... 1.5
with isolated cable end	**2 x mm²**	0.5 ... 1.5
Flexible	**1 x mm²**	0.5 ... 2.5
with non-isolated cable end	**2 x mm²**	0.5 ... 2.5
Flexible	**1 x mm²**	0.5 ... 2.5
without cable end	**2 x mm²**	0.5 ... 2.5
Wiring striping length	**mm**	10
Screwdriver type / size	**mm**	Flat / ø 3.0 or 3.5
Degree of protection acc. to IEC 60529, IEC 60144, DIN 40050 and NFC 20-010		IP 20

Electrical Durability for **AC-1** Utilization Category $U_e \leq 690$ V. Ambient Temperature ≤ 55 °C

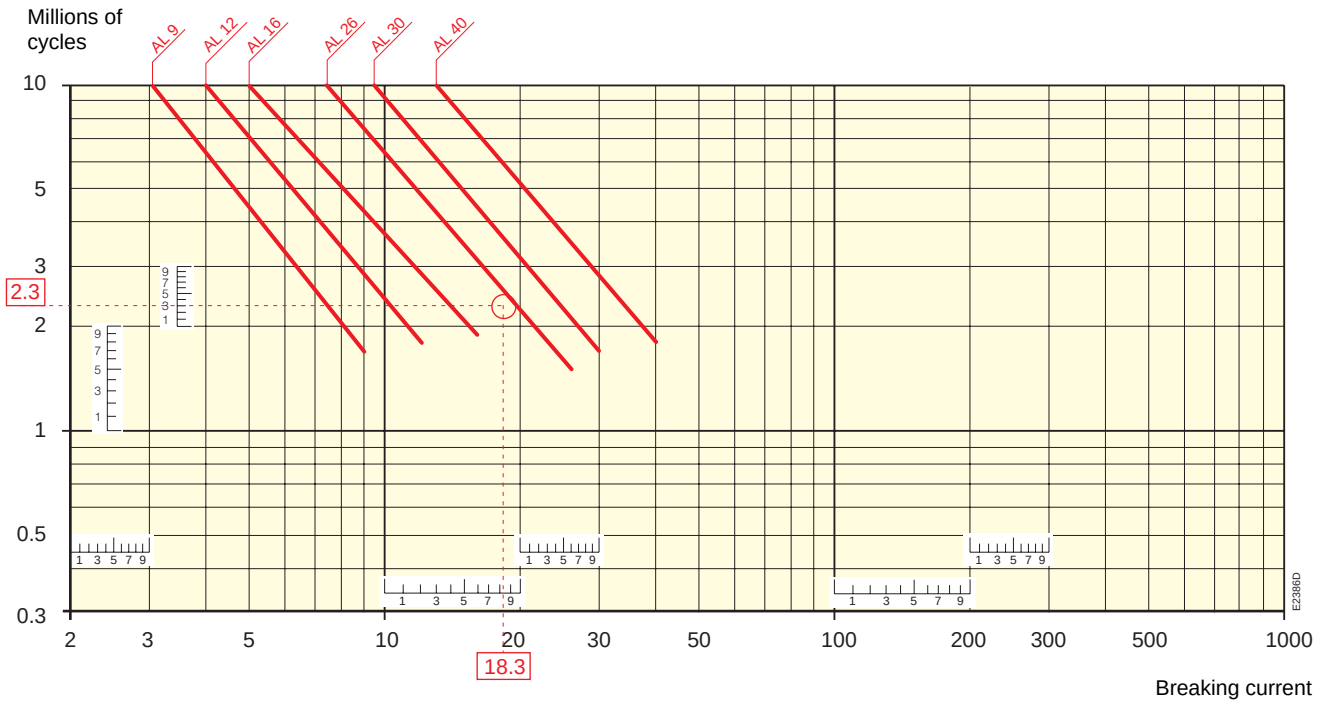
Switching non-inductive or slightly inductive loads. The breaking current I_c for AC-1 is equal to the rated operational current of the load.



Example:
I_c / AC-1 = 35 A – Electrical durability required = 560 000 cycles.
Using the AC-1 curves above select the AL 26 contactor at intersection "○" (35 A / 560 000 cycles).

Electrical Durability for **AC-3** Utilization Category - $U_e \leq 500$ V. Ambient Temperature ≤ 55 °C

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



Example:
Motor power 9 kW for AC-3 - U_e = 400 V utilization – Electrical durability required = 2.3 million cycles.
9 kW, 400 V corresponds to I_e = 18.3 A. For AC-3: $I_c = I_e$. Select the AL 26 contactor at intersection "○" (18.3 A / 2.3 million cycles) on the curves (AC-3 - $U_e \leq 500$ V).

NL.. Contactor Relays

d.c. Coil - Low Consumption

Operated Current AC-15, 400 V		3 A	3 A	3 A
4-pole		**NL 22E**	**NL 31E**	**NL 40E**
Type (State coil voltage)		NL 22 E	NL 31 E	NL 40 E
Rated current AC-15, **240 V**	**A**	**4**	**4**	**4**
690 V	A	2	2	2
Rated current DC-13 **24 V**	**A / W**	**6 /144**	**6 /144**	**6 /144**
250 V	**A / W**	0.3 / 75	0.3 / 75	0.3 / 75
Coil consumption, pull-in and holding at 20 °C	**W**	3	3	3

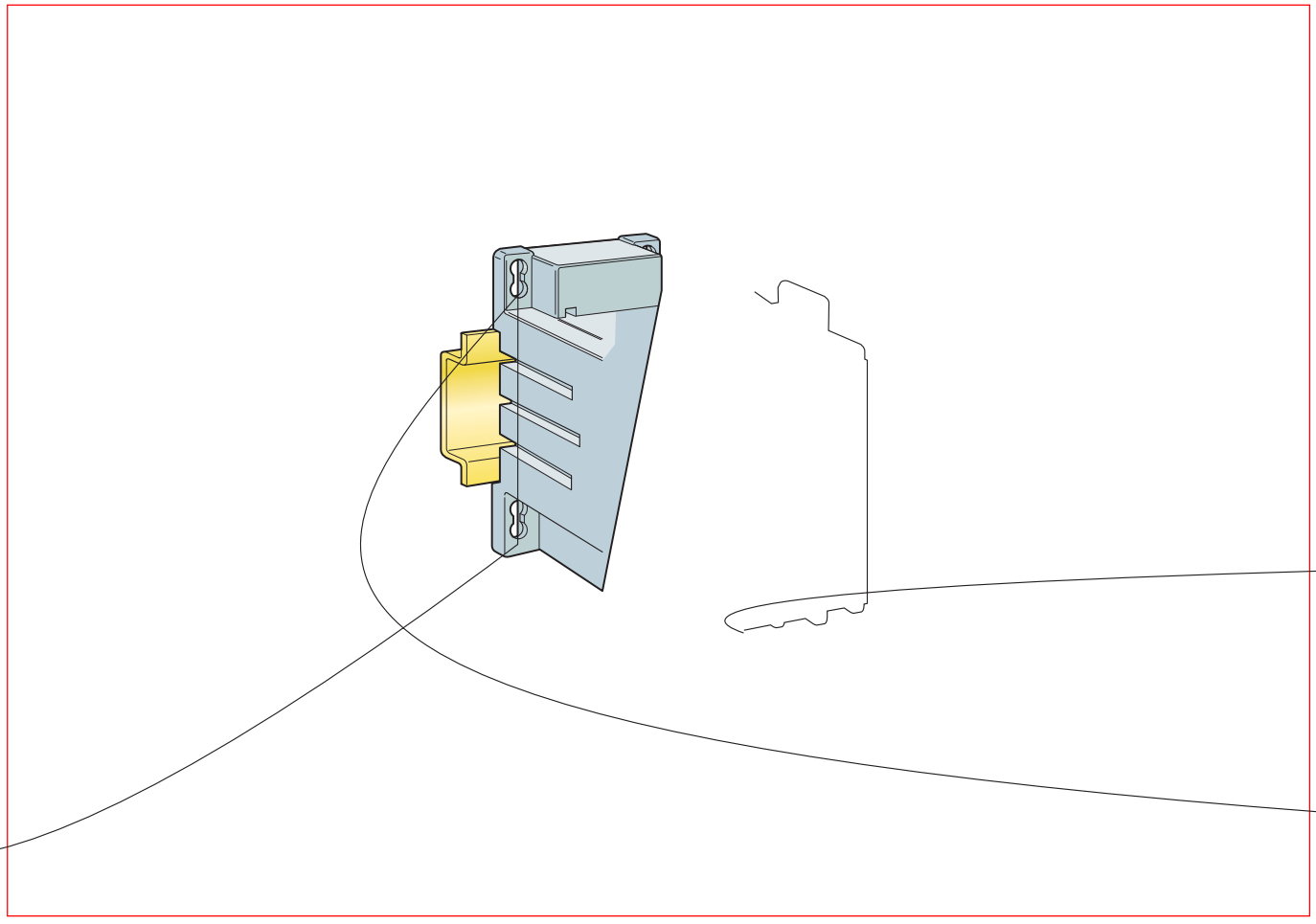
Auxiliary contacts

Front mounting 1 N.O. CA 5-10 1 N.C. CA 5-01 4-pole CA 5
Side mounting 1 N.O. + 1 N.C. CAL 5-11

Surge suppressors

Varistor RV5
Transil Diode RT5

Rated current AC-15, 400V	3 A	3 A	3 A	3 A	3 A
8-pole	**NL44 E**	**NL53 E**	**NL62 E**	**NL71 E**	**NL80 E**
Type (State coil voltage)	NL 44 E	NL 53 E	NL 62 E	NL 71 E	NL 80 E



NL..ST Contactor Relays

d.c. Operated
Spring Terminals

Application

NL..ST, NL Z..ST and TNL..ST contactors are the spring terminal version of the NL-range.
The ST-range of contactor relays use ABB Entrelec's proven spring terminal technology giving the following benefits:

- a fast connection on the front face, which saves labour time,
- vibration proof,
- no need to retighten the terminals saving maintenance labour time.

Description

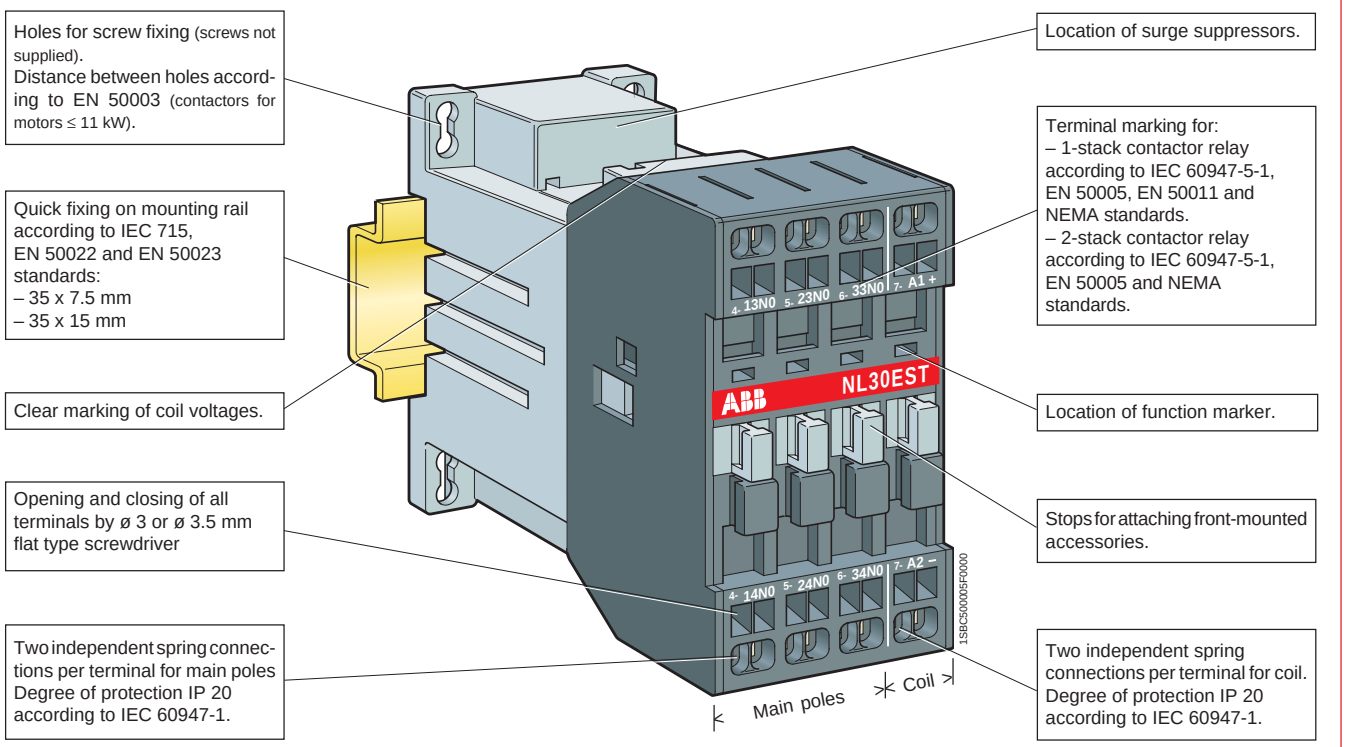
- Poles and coil:
  - 1-stack contactor relays: 3-pole + coil terminals on the same stack.
  - 2-stack contactor relays: 7-pole + coil terminals on the first stack
    The width of 7-pole devices is identical to that of 3-pole devices; only the depth is increased.
- Control circuit: d.c. operated with solid core magnet circuit and low coil consumption coil. The coil must be energised from a d.c. supply and the polarity (+ and –) must be respected.
- Accessories: a wide range of accessories are available (☞ see page 36).
- Connection: the cables are connected via the front face with the possibilitly to use two different types of cables with different cross-sections.

Contactor relays designation explanation

1) NL Z 30 E ST
- ST = Spring terminals
- Z = Version 2.4 W

2) TNL 30 E ST
- ST = Spring terminals
- T = Large voltage range

Blue = Standard contactor relays features
Black = Different variations according to the application



NL 22 E

NL 80 E

NL Z 21 E ST

Ordering Details

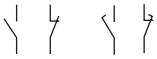
Number of contacts 1st stack		2nd stack				Type	Order code	Weight kg
						state coil voltage ⌊‗⌋ (see table below)	state coil voltage code ☐☐ (see table below)	Packing 1 piece
4-pole, 1-stack - 3 W consumption with screw terminals								
2	2	–	–	–	–	NL 22 E ⌊‗⌋	1SBH 14 3001 R☐☐22	0.520
3	1	–	–	–	–	NL 31 E ⌊‗⌋	1SBH 14 3001 R☐☐31	0.520
4	–	–	–	–	–	NL 40 E ⌊‗⌋	1SBH 14 3001 R☐☐40	0.520
8-pole, 2-stack - 3 W consumption with screw terminals								
4	–	–	4	–	–	NL 44 E ⌊‗⌋	1SBH 14 3001 R☐☐44	0.580
4	–	1	3	–	–	NL 53 E ⌊‗⌋	1SBH 14 3001 R☐☐53	0.580
4	–	2	2	–	–	NL 62 E ⌊‗⌋	1SBH 14 3001 R☐☐62	0.580
4	–	3	1	–	–	NL 71 E ⌊‗⌋	1SBH 14 3001 R☐☐71	0.580
4	–	4	–	–	–	NL 80 E ⌊‗⌋	1SBH 14 3001 R☐☐80	0.580
3-pole, 1-stack - 3 W consumption with spring terminals								
2	1	–	–	–	–	NL 21 E ST ⌊‗⌋	1SBH 14 3004 R☐☐21	0.580
3	0	–	–	–	–	NL 30 E ST ⌊‗⌋	1SBH 14 3004 R☐☐30	0.580
4-pole, 1-stack - 2.4 W consumption with screw terminals								
2	2	–	–	–	–	NL Z 22 E ⌊‗⌋	1SBH 14 4001 R☐☐22	0.520
3	1	–	–	–	–	NL Z 31 E ⌊‗⌋	1SBH 14 4001 R☐☐31	0.520
4	–	–	–	–	–	NL Z 40 E ⌊‗⌋	1SBH 14 4001 R☐☐40	0.520
3-pole, 1-stack - 2.4 W consumption with spring terminals								
2	1	–	–	–	–	NL Z 21 E ST⌊‗⌋	1SBH 14 4004 R☐☐21	0.580
3	0	–	–	–	–	NL Z 30 E ST⌊‗⌋	1SBH 14 4004 R☐☐30	0.580

Coil voltages and codes NL.. and NL..ST

Voltage - U_c V d.c ⌊‗⌋	Code ☐☐
12	8 0
24	8 1
42	8 2
48	8 3
50	2 1
60	8 4
75	8 5
110	8 6
125	8 7
220	8 8
240	8 9
250	3 8

Coil voltages and codes NL Z.. and NL Z..ST

Voltage - U_c V d.c ⌊‗⌋	Code ☐☐
24	1 5
48	2 0



1SBC590194F0304

TNL 22 E

1SBC590203F0304

TNL 80 E

1SBC590003F0304

TNL 21 E ST

CAL 5-11 CA 5-10

TE5S-24

RV 5/50 RT 5/32

BA 5-50

Ordering Details

Auxiliary Contact Blocks

Mounting on contactor relays	Positioning	Contacts		Type	Order Code	Packing piece	Weight kg 1 piece
NL, NL Z, TNL	Front face	1	–	CA 5-10	1SBN 01 0010 R1010	10	0.014
		–	1	CA 5-01	1SBN 01 0010 R1001	10	0.014
NL, TNL	Front face	4	0	CA 5-40 N	1SBN 01 0040 R1240	2	0.060
		2	2	CA 5-22 N	1SBN 01 0040 R1222	2	0.060
NL, TNL	Side	1	1	CAL 5-11	1SBN 01 0020 R1011	2	0.050

See the accessory compatibility table page **33**.

Electronic Timers

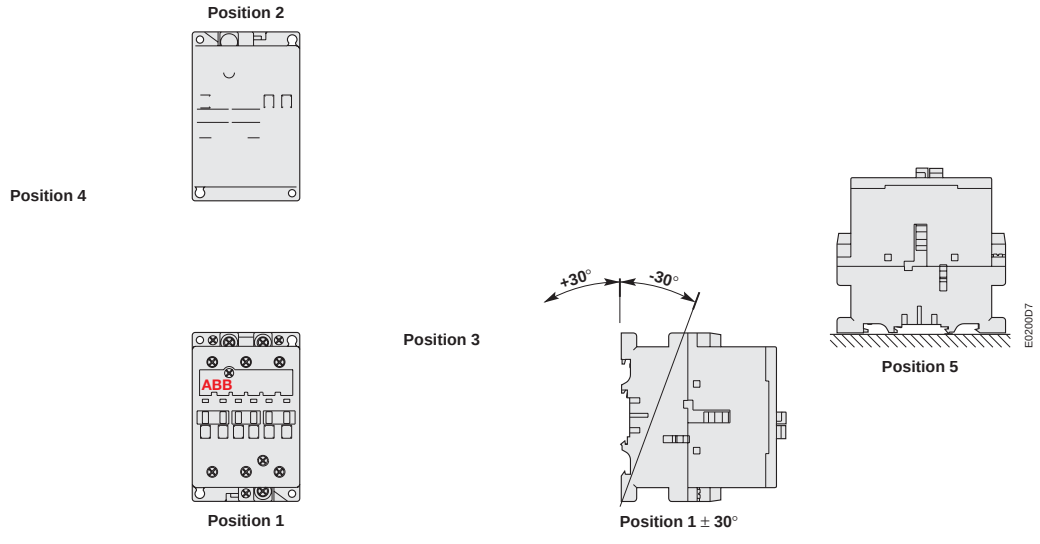
Mounting	Timing range	Supply voltage V	Type	Order Code	Packing piece	Weight kg
Independent	Direct	24 a.c. / d.c.	TE5S-24	1SBN 02 0010 R1001	1	0.080

Surge Suppressors

Mounting on contactor relays	Feature	Voltage range	Type	Order Code	Packing piece	Weight kg 1 piece
NL, NL Z, TNL	Varistor	24 ... 50 V a.c. / d.c.	RV 5/50	1SBN 05 0010 R1000	2	0.015
		50 ... 133 V a.c. / d.c.	RV 5/133	1SBN 05 0010 R1001	2	0.015
		110 ... 250 V a.c. / d.c.	RV 5/250	1SBN 05 0010 R1002	2	0.015
		250 ... 440 V a.c. / d.c.	RV 5/440	1SBN 05 0010 R1003	2	0.015
NL, NL Z, TNL	Transil Diode	12 ... 32 V d.c.	RT 5/32	1SBN 05 0020 R1000	2	0.015
		25 ... 65 V d.c.	RT 5/65	1SBN 05 0020 R1001	2	0.015
		50 ... 90 V d.c.	RT 5/90	1SBN 05 0020 R1002	2	0.015
		77 ... 150 V d.c.	RT 5/150	1SBN 05 0020 R1003	2	0.015
		150 ... 264 V d.c.	RT 5/264	1SBN 05 0020 R1004	2	0.015

Function Marker

Mounting on contactor relalys	Feature	Type	Order Code	Packing box	Weight kg
NL, NL Z, TNL	50 Pieces in a box	BA 5-50	1SBN 11 0000 R1000	1	0.017


Position 2
Position 4
Position 3
Position 5
Position 1
Position 1 ± 30°
+30°
-30°
E020007

CA 5-10ST

CA 5-40 NST

RV 5/50

RT 5/32

BA 5-50

Ordering Details

Auxiliary Contact Blocks

Mounting on contactor relays	Positioning	Contacts		Type	Order Code	Packing piece	Weight kg 1 piece
NL..ST, NL Z..ST	Front face	1	–	CA 5-10ST	1SBN 01 1419 R1010	10	0.016
		–	1	CA 5-01ST	1SBN 01 1419 R1001	10	0.016
		4	0	CA 5-40 NST	1SBN 01 1445 R1240	2	0.060
		2	2	CA 5-22 NST	1SBN 01 1445 R1222	2	0.060

See the accessory compatibility table page **35**.

Surge Suppressors

Mounting on contactor relays	Feature	Voltage range	Type	Order Code	Packing piece	Weight kg 1 piece
NL..ST NL Z..ST	Varistor	24 ... 50 V a.c. / d.c.	RV 5/50	1SBN 05 0010 R1000	2	0.015
		50 ... 133 V a.c. / d.c.	RV 5/133	1SBN 05 0010 R1001	2	0.015
		110 ... 250 V a.c. / d.c.	RV 5/250	1SBN 05 0010 R1002	2	0.015
		250 ... 440 V a.c. / d.c.	RV 5/440	1SBN 05 0010 R1003	2	0.015
N..ST NL Z..ST	Transil Diode	12 ... 32 V d.c.	RT 5/32	1SBN 05 0020 R1000	2	0.015
		25 ... 65 V d.c.	RT 5/65	1SBN 05 0020 R1001	2	0.015
		50 ... 90 V d.c.	RT 5/90	1SBN 05 0020 R1002	2	0.015
		77 ... 150 V d.c.	RT 5/150	1SBN 05 0020 R1003	2	0.015
		150 ... 264 V d.c.	RT 5/264	1SBN 05 0020 R1004	2	0.015

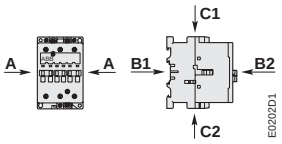
Function Marker

Mounting on contactor relays	Feature	Type	Order Code	Packing	Weight box kg
NL..ST, NL Z..ST	50 Pieces in a box	BA 5-50	1SBN 11 0000 R1000	1	0.017

Note:
Some accessories with screw terminals can be used with the ...ST contactor relays, these include TE5S Electronic Timer

General Technical Data - Contactor relays with Screw Terminals

Contactor relay types		NL.., NL Z.., TNL..
Rated insulation voltage U_i		
according to IEC 60947-4-1	**V**	690
according to UL/CSA	**V**	600
Rated impulse withstand voltage $U_{imp.}$	**kV**	8
Standards		Devices complying with international standards IEC 60947-5-1 / 60947-4-1 and European standards EN 60947-5-1 / 60947-4-1
Certifications - Approvals		UL, CSA, CCC (in progress)
Air temperature close to contactor		☞ " Conditions for use" , page 40, for control voltage limits, and authorized mounting positions
– for operation in free air	**°C**	-40 to +70 (55°C for TNL)
– for storage	**°C**	-60 to +80
Climatic withstand		acc. to IEC 60068-2-30 and 60068-2-11 - UTE C 63-100 specification II
Operating altitude	**m**	≤ 3000
Shock withstand		
acc. IEC 60068-2-27 and EN 60068-2-27		
Mounting position 1 (☞ page 40)		1/2 sinusoidal shock for 11 ms: no change in contact position



Shock direction	Open position	Closed position
A	10 g	20 g
B1	5 g	15 g
B2	10 g	15 g
C1	8 g	20 g
C2	8 g	14 g

General Technical Data - Contactor relays with Spring Terminals

Contactor relay types		NL..ST, NL Z..ST
Rated insulation voltage U_i		
according to IEC 60947-4-1	**V**	690
Rated impulse withstand voltage $U_{imp.}$	**kV**	6
Standards		Devices complying with international standards IEC 60947-5-1 / 60947-4-1 and European standards EN 60947-5-1 / 60947-4-1
Air temperature close to contactor		☞ " Conditions for use" , page 40, for control voltage limits, and authorized mounting positions
– for operation in free air	**°C**	-40 to +70
– for storage	**°C**	-60 to +80
Climatic withstand		acc. to IEC 60068-2-30 and 60068-2-11 - UTE C 63-100 specification II
Operating altitude	**m**	≤ 3000

Contact Utilization Characteristics

Contactor relay types			NL.., NL Z.., TNL.., NL..ST, NL Z..ST
Rated operational voltage U_e max.		**V**	690
Rated frequency limits		**Hz**	25 ... 400
Conventional free-air thermal current I_{th} according to IEC 60947-5-1, open contactors $\theta \leq 40$ °C		**A**	16
Rated operational current I_e / AC-15 according to IEC 60947-5-1 / UL508 (1) / CSA 22.2 (1)			
24-127 V	50/60 Hz	**A**	6
230-240 V	50/60 Hz	**A**	4
400-415 V	50/60 Hz	**A**	3
500 V	50/60 Hz	**A**	2
690 V	50/60 Hz	**A**	2
Rated operational current I_e / DC-13 according to IEC 60947-5-1 / UL508 (1) / CSA 22.2 (1)			
24 V d.c.		**A / W**	6 / 144
48 V d.c.		**A / W**	2.8 / 134
72 V d.c.		**A / W**	1 / 72
125 V d.c.		**A / W**	0.55 / 69
250 V d.c.		**A / W**	0.3 / 75
Rated making capacity according to IEC 60947-5-1			10 x I_e / AC-15
Rated breaking capacity according to IEC 60947-5-1			10 x I_e / AC-15
Short-circuit protection $U_e \leq 500$ V a.c. - gG type fuse		**A**	10
Rated short-time withstand current I_{cw} at 40 °C ambient temp., in free air, from a cold state	1.0 s	**A**	100
	0.1 s	**A**	140
Minimum switching capacity (1) with a failure rate of 10^{-6} acc. IEC 60947-5-4			17 V / 5 mA
Heat dissipation per pole at 6 A (1)		**W**	0.10
Max. electric switching frequency		**cycles/h**	1200
Mechanical durability			
– millions of operating cycles			> 20
– max. mechanical switching frequency		**cycles/h**	6000

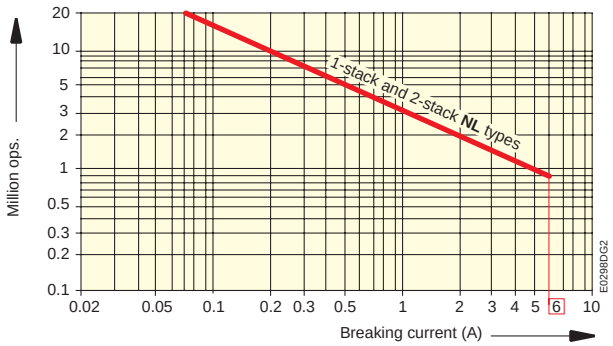
(1) Screw terminal contactors only.

Electrical Durability for AC-15 Utilization Category

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

This curve represents the electrical durability of the contactor relays, in relation to the breaking current.

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



– NL.., NL..ST, NL Z.., NL Z..ST and TNL.. contactor relays.

Magnet System Characteristics for NL... and NL...ST Contactor Relays

Contactor relay types		NL.. and NL..ST - 3 W
Rated control circuit voltage U_c	**V d.c.**	12 ... 250
Coil operating limits acc. to IEC 60947-5-1:		See conditions for use page 40
Drop-out voltage in % of U_c		roughly 10 ... 30 %
Coil consumption - Average values		
– pull-in value	**W**	3.0
– holding value	**W**	3.0
Operating time		
between coil energization and:		
– N.O. contact closing	**ms**	50 ... 100
– N.C. contact opening	**ms**	20 ... 70
between coil de-energization and:		
– N.O. contact opening	**ms**	10 ... 17 (1)
– N.C. contact closing	**ms**	16 ... 27 (1)

(1) the use of surge suppressors increases the opening time on a scale of 1.1 to 1.5 for a varistor suppressor and on a scale of 1.5 to 3 for a transil diode suppressor.

Magnet System Characteristics for NL Z.. and NL Z..ST Contactor Relays

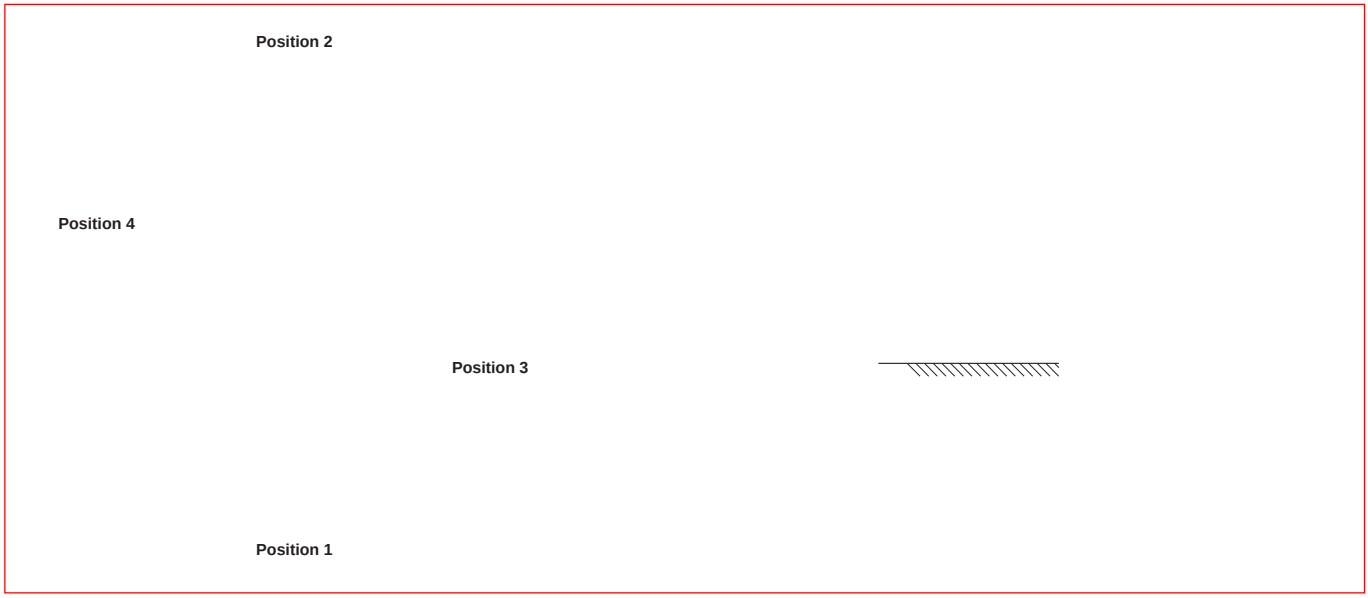
Contactor relay types		NL Z.. and NL Z..ST - 2.4 W
Rated control circuit voltage U_c	**V d.c.**	24 and 48
Coil operating limits acc. to IEC 60947-5-1:		See conditions for use page 40
Drop-out voltage in % of U_c		roughly 10 ... 30 %
Coil consumption - Average values		
– pull-in value	**W**	2.4
– holding value	**W**	2.4
Operating time		
between coil energization and:		
– N.O. contact closing	**ms**	50 ... 100
– N.C. contact opening	**ms**	20 ... 70
between coil de-energization and:		
– N.O. contact opening	**ms**	10 ... 17 (1)
– N.C. contact closing	**ms**	16 ... 27 (1)

(1) the use of surge suppressors increases the opening time on a scale of 1.1 to 1.5 for a varistor suppressor and on a scale of 1.5 to 3 for a transil diode suppressor.

Magnet System Characteristics for TNL.. Contactor Relays

Contactor relay types		TNL..
Rated control circuit voltage U_c	**V d.c.**	9 ... 264
Coil operating limits acc. to IEC 60947-5-1:		See conditions for use page 40
Drop-out voltage in % of U_c		roughly 20 ... 35 %
Coil consumption - at pull-in and holding		
– U_c max	**W**	8.5
– U_c min	**W**	2.5
– U_c	**W**	5
Operating time		
between coil energization and:		
– N.O. contact closing	**ms**	50 ... 100
– N.C. contact opening	**ms**	20 ... 70
between coil de-energization and:		
– N.O. contact opening	**ms**	10 ... 17 (1)
– N.C. contact closing	**ms**	16 ... 27 (1)

(1) the use of surge suppressors increases the opening time on a scale of 1.1 to 1.5 for a varistor suppressor and on a scale of 1.5 to 3 for a transil diode suppressor.


Position 2
Position 4
Position 3
Position 1

Connecting Characteristics

Contactor relay types:		NL..., NL Z..., TNL...
Main terminals		 with cable clamp
Connecting capacity (min. ... max.)		
Main conductors (poles)		
Rigid	**1 x mm²**	1 ... 4
	2 x mm²	1 ... 4
Flexible with cable end	**1 x mm²**	0.75 ... 2.5
	2 x mm²	0.75 ... 2.5
Bars or lugs	**L mm ≤**	7.7
	l mm >	3.7
Auxiliary conductors		
Rigid solid		
(built-in auxiliary terminals + coil terminals)	**1 x mm²**	1 ... 4
	2 x mm²	1 ... 4
Flexible with cable end		
(built-in auxiliary terminals + coil terminals)	**1 x mm²**	0.75 ... 2.5
	2 x mm²	0.75 ... 2.5
Lugs		
– built-in aux. terminals	**L mm ≤**	7.7
	l mm >	3.7
– coil terminals	**L mm ≤**	8
	l mm >	3.7
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529		Protection against direct contact acc. to VDE 0106 - Part. 100
– Main terminals		IP 20
– Coil terminals		IP 20
– Built-in auxiliary terminals		IP 20
Screw terminals		(delivered in open position, screws of unused terminals must be tightened)
Main terminals		M3.5 (+,-) pozidriv 2 screws
Coil terminals		M3.5 (+,-) pozidriv 2 screws with cable clamp
Built-in auxiliary terminals		M3.5 (+,-) pozidriv 2 screws with cable clamp
Tightening torque		
Main pole terminals		
– recommended	**Nm / lb.in**	1.00 / 9
– max.	**Nm**	1.20
Coil terminals		
– recommended	**Nm / lb.in**	1.00 / 9
– max.	**Nm**	1.20
Built-in auxiliary terminals		
– recommended	**Nm / lb.in**	1.00 / 9
– max.	**Nm**	1.20
Terminal marking and positioning		☞ Page 45

Connecting Characteristics

Contactor relay types:		NL.. ST, NL Z..ST
Main and coil terminals		 spring terminals
Connecting capacity (min. ... max.) Main and coil conductors		
Rigid	**1 x mm²**	0.5 ... 4
	2 x mm²	0.5 ... 4
Flexible with isolated cable end	**1 x mm²**	0.5 ... 1.5
	2 x mm²	0.5 ... 1.5
Flexible with non-isolated cable end	**1 x mm²**	0.5 ... 2.5
	2 x mm²	0.5 ... 2.5
Flexible without cable end	**1 x mm²**	0.5 ... 2.5
	2 x mm²	0.5 ... 2.5
Wire stripping length	**mm**	10
Screwdriver type / size	**mm**	Flat / ø 3.0 or ø 3.5
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529		Protection against direct contact acc. to VDE 0106 - Part. 100
– Main terminals		IP 20
– Coil terminals		IP 20
Terminal marking and positioning		☞ Page 46

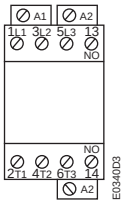
Terminal Marking and Positioning

AL 9 ... AL 40 Contactors

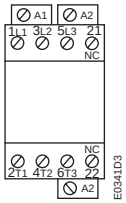
Screw Terminals

3-pole Contactors - d.c. operated

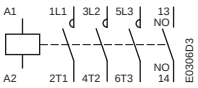
Standard devices without addition of auxiliary contacts



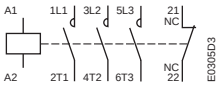
AL9 ... AL40-30-10
AL9 Z ... AL16 Z-30-10
TAL9 ... TAL40-30-10



AL9 ... AL40-30-01
AL9 Z ... AL16 Z-30-01
TAL9 ... TAL40-30-01

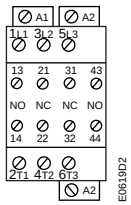


AL9 ... AL40-30-10
AL9 Z ... AL16 Z-30-10
TAL9 ... TAL40-30-10



AL9 ... AL40-30-01
AL9 Z ... AL16 Z-30-01
TAL9 ... TAL40-30-01

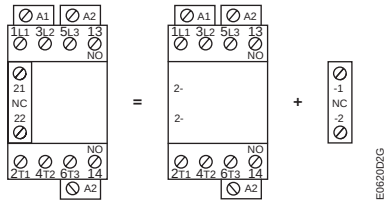
Standard devices with factory mounted auxiliary contacts



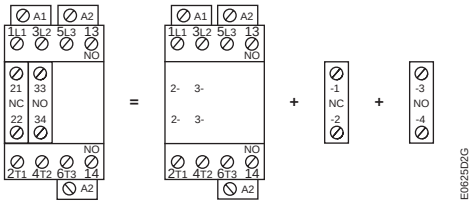
AL9 ... AL40-30-22

AL9 ... AL40-30-22

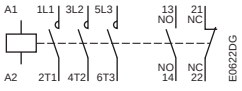
Other possible contact combinations with auxiliary contacts added by the user



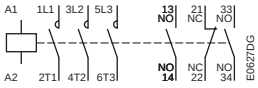
Combination 11
= AL9 ... AL40-30-10 + CA5-01
= AL9 Z ... AL16 Z-30-10 + CA5-01
= TAL9 ... TAL40-30-10 + CA5-01



Combination 21
= AL9 ... AL40-30-10 + CA5-01 + CA5-10
= AL9 Z ... AL16 Z -30-10 + CA5-01 + CA5-10
= AL9 ... AL40-30-10 + CA5-01 + CA5-10

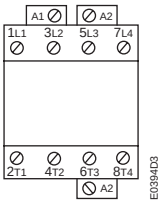


Combination 11

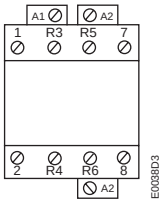


Combination 21

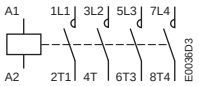
4-pole Contactors - d.c. operated



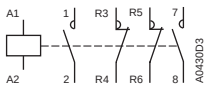
AL9 ... AL26-40-00
TAL9 ... TAL26-40-00



AL9 ... AL26-22-00
TAL9 ... TAL26-22-00



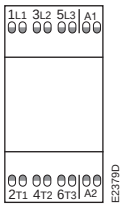
AL9 ... AL26-40-00
TAL9 ... TAL26-40-00



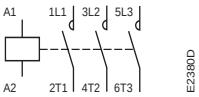
AL9 ... AL26-22-00
TAL9 ... TAL26-22-00

3-pole Contactors - d.c. operated

Standard devices without addition of auxiliary contacts

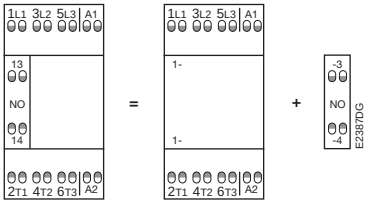


AL9 ... AL16-30-00ST
AL9 Z ... AL16 Z-30-00ST

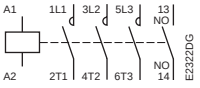


AL9 ... AL16-30-00ST
AL9 Z ... AL16 Z-30-00ST

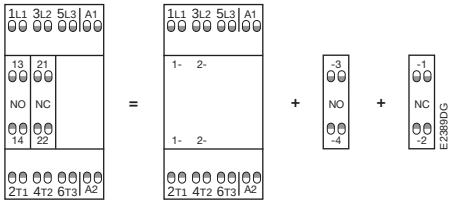
Other possible combinations with auxiliary contacts added by the user.



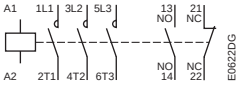
Combination 10 = **AL9 ... AL16-30-00ST + CA5-10ST**
AL9 Z ... AL16 Z-30-00ST + CA5-10ST



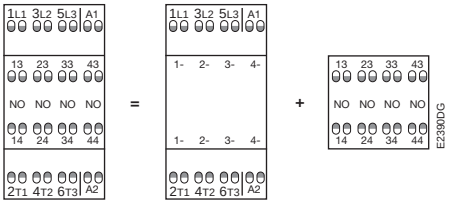
Combination 10



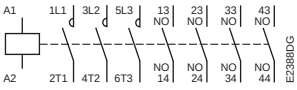
Combination 11 = **AL9 ... AL16-30-00ST + CA5-10ST + CA5-01ST**
AL9 Z ... AL16 Z-30-00ST + CA5-10ST + CA5-01ST



Combination 11



Combination 40 = **AL9 ... AL16-30-00ST + CA5-40EST**



Combination 40

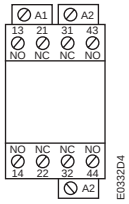
Terminal Marking and Positioning

NL.. Contactor Relays

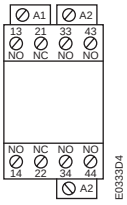
Screw Terminals

NL.. Contactor Relays - d.c. operated

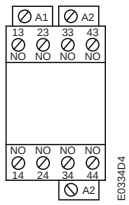
Standard devices without addition of auxiliary contacts



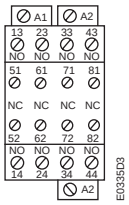
NL 22 E
NL Z 22 E
TNL 22 E



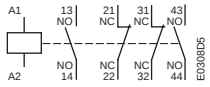
NL 31 E
NL Z 31 E
TNL 31 E



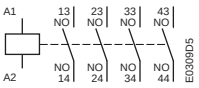
NL 40 E
NL Z 40 E
TNL 40 E



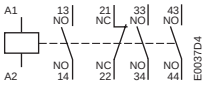
NL 44 E
TNL 44 E



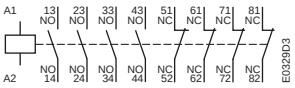
NL 22 E
NL Z 22 E
TNL 22 E



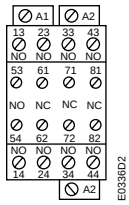
NL 40 E
NL Z 40 E
TNL 40 E



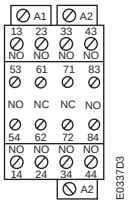
NL 31 E
NL Z 31 E
TNL 31 E



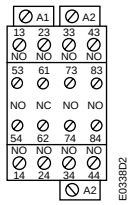
NL 44 E
TNL 44 E



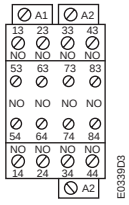
NL 53 E



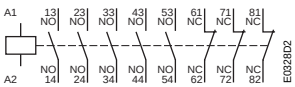
NL 62 E
TNL 62 E



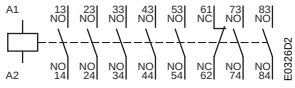
NL 71 E



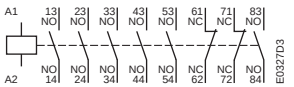
NL 80 E
TNL 80 E



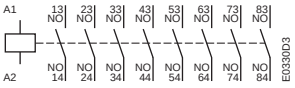
NL 53 E



NL 71 E

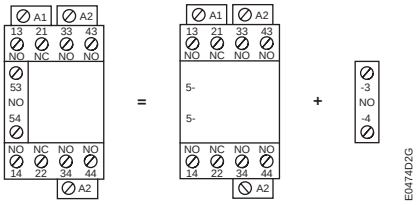


NL 62 E
TNL 62 E

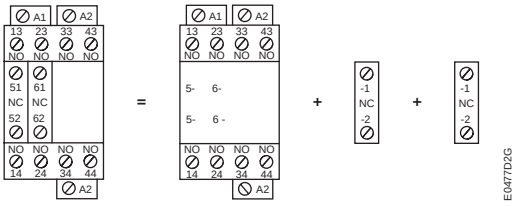


NL 80 E
TNL 80 E

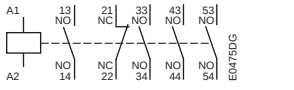
Other possible contact combinations with auxiliary contacts added by the user



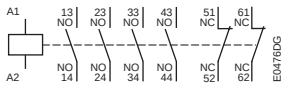
Combination 41 E = **NL 31 E** + **CA5-10**
= **NL Z 31 E** + **CA5-10**
= **TNL 31 E** + **CA5-10**



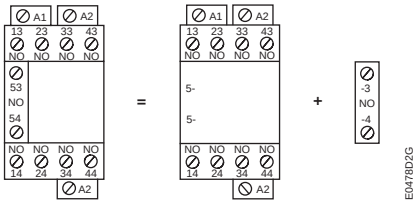
Combination 42 E = **NL 40 E** + **CA5-01** + **CA5-01**
= **NL Z 40 E** + **CA5-01** + **CA5-01**
= **TNL 40 E** + **CA5-01** + **CA5-01**



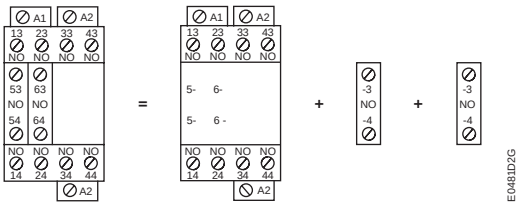
Combination 41E



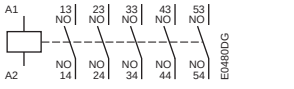
Combination 42 E



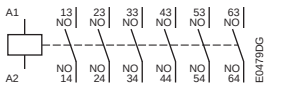
Combination 50 E = **NL 40 E** + **CA5-10**
= **NL Z 40 E** + **CA5-10**
= **TNL 40 E** + **CA5-10**



Combination 60 E = **NL 40 E** + **CA5-10** + **CA5-10**
= **NL Z 40 E** + **CA5-10** + **CA5-10**
= **TNL 40 E** + **CA5-10** + **CA5-10**



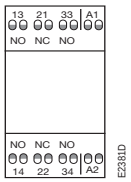
Combination 50 E



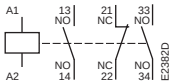
Combination 60 E

Contactor Relays - d.c. operated

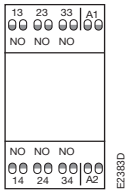
Standard devices without addition of auxiliary contacts



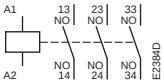
NL 21 EST
NL Z 21 EST



NL 21 EST
NL Z 21 EST

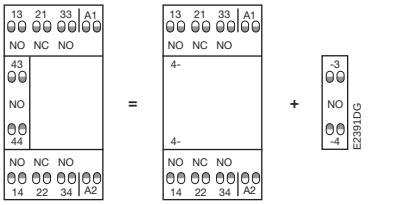


NL 30 EST
NL Z 30 EST

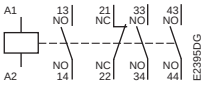


NL 30 EST
NL Z 30 EST

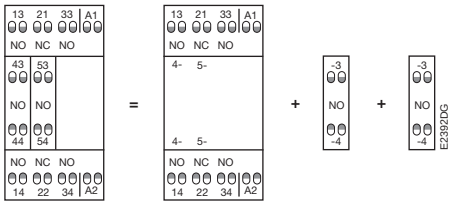
Other possible combinations with auxiliary contacts added by the user.



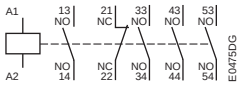
Combination 31E = **NL 21 EST** + **CA5-10ST**
NL Z 21 EST + **CA5-10ST**



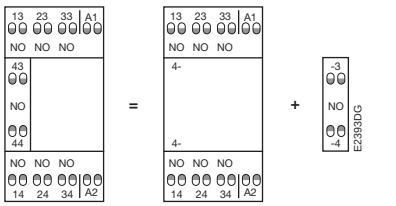
Combination 31E



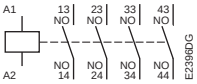
Combination 41E = **NL 21 EST** + **CA5-10ST** + **CA5-10ST**
NL Z 21 EST + **CA5-10ST** + **CA5-10ST**



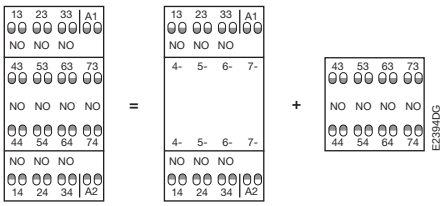
Combination 41E



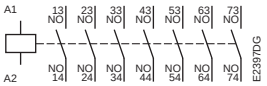
Combination 40E = **NL 30 EST** + **CA5-10ST**
NL Z 30 EST + **CA5-10ST**



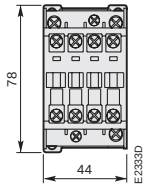
Combination 40E

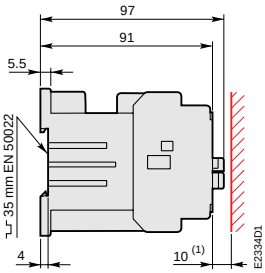


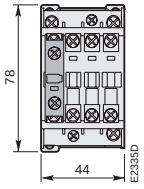
Combination 70 = **NL 30 EST** + **CA5-40NST**

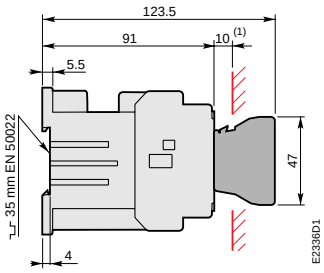


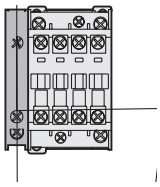
Combination 70

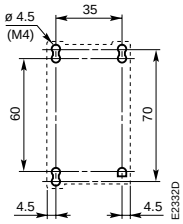

78
44
E2333D


97
91
5.5
35 mm EN 50022
4
10 (1)
E2334D1

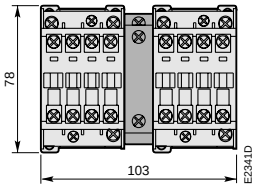

78
44
E2335D

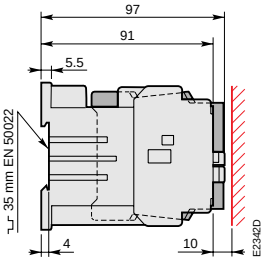

123.5
91
10 (1)
5.5
35 mm EN 50022
47
4
E2336D1

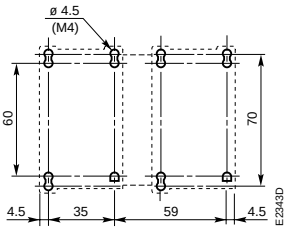



ø 4.5
(M4)
35
60
70
4.5
4.5
E2332D

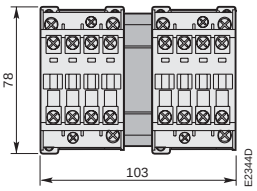
Dimensions (in mm)

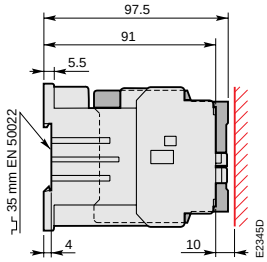


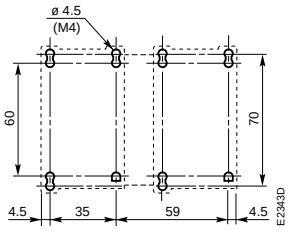




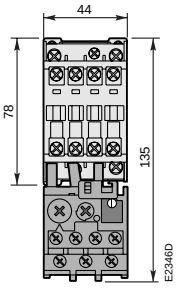
AL 9 ... AL 16
TAL 9 ... TAL 16
+ VE 5-1 electrical and mechanical interlock unit

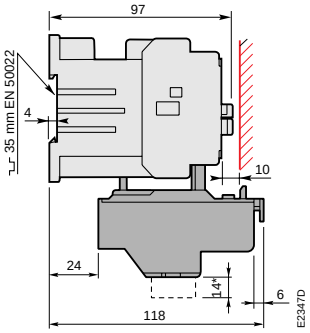


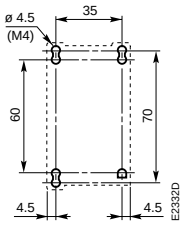




AL 9 ... AL 16
TAL 9 ... TAL 16
+ VM 5-1 mechanical interlock unit

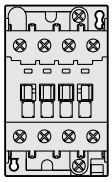


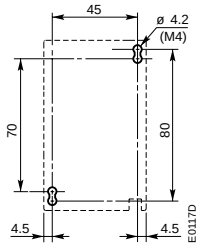




AL 9, AL 12, AL 16 - 3-pole
AL 9 Z, AL 12 Z, AL 16 Z - 3-pole
TAL 9, TAL 12, TAL 16 - 3-pole
+ TA 25 DU thermal O/L relay

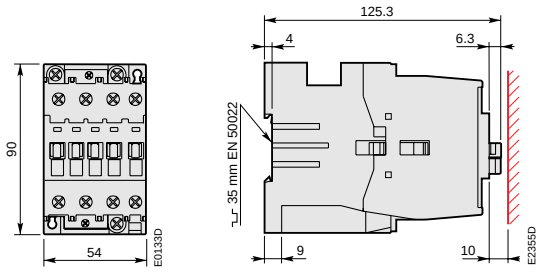
* For TA 25 DU 32 only



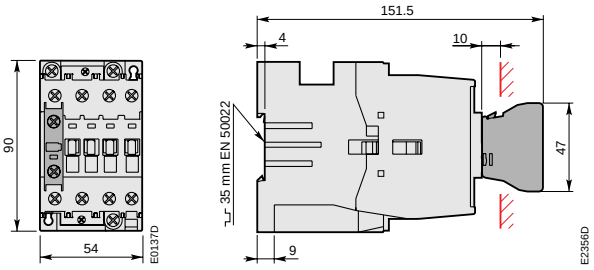

45
ø 4.2
(M4)
70
80
4.5
4.5
E0117D


90
90
110.6
147
4
70
10
E012ED
E012ED

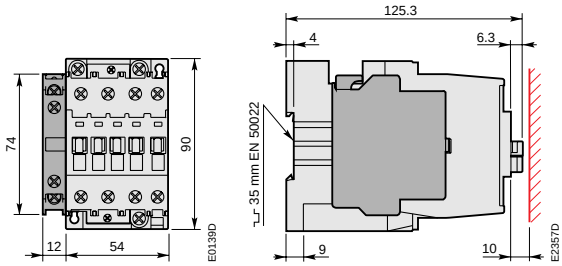
Dimensions (in mm)



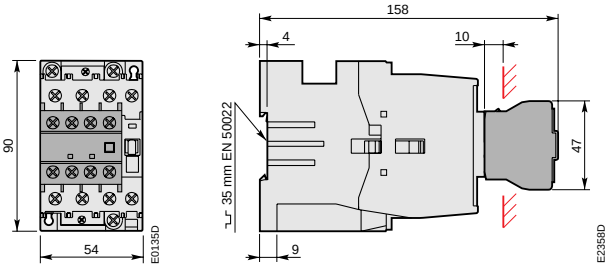
AL 30, AL 40, TAL 30, TAL 40



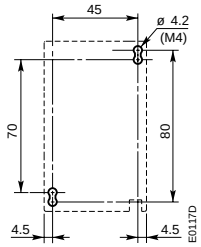
AL 30, AL 40, TAL 30, TAL 40
+ CA 5 front-mounted 1-pole auxiliary contact block



AL 30, AL 40, TAL 30, TAL 40
+ CAL 5 side-mounted 2-pole auxiliary contact block

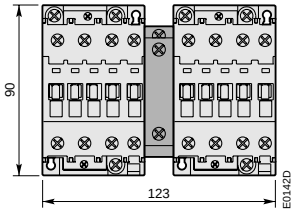


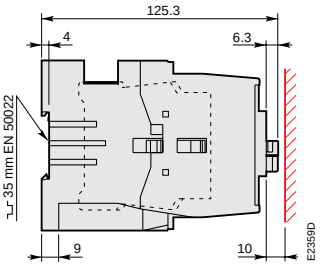
AL 30, AL 40, TAL 30, TAL 40
+ CA 5 front-mounted 4-pole auxiliary contact block

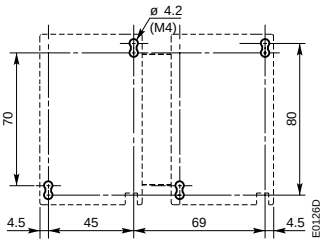


AL 30, AL 40, TAL 30, TAL 40 - drilling plan

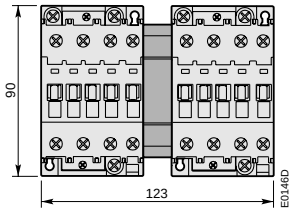
Dimensions (in mm)

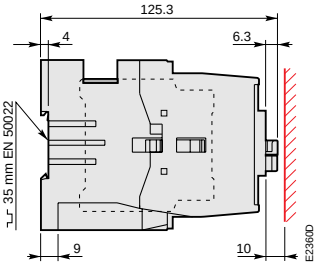


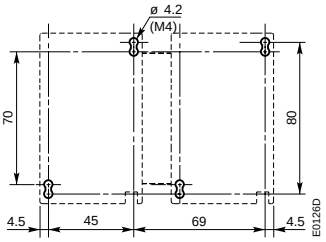




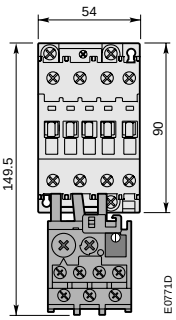
AL 30, AL 40, TAL 30, TAL 40
+ VE 5-1 electrical and mechanical interlock unit

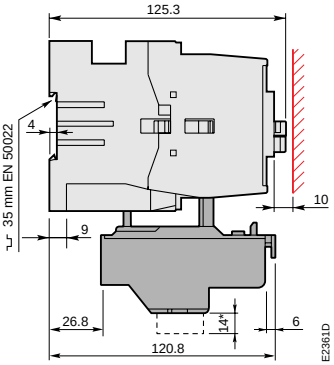


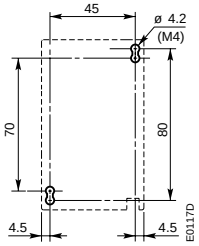




AL 30, AL 40, TAL 30, TAL 40
+ VM 5-1 mechanical interlock unit

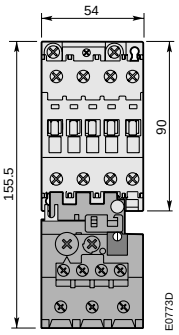


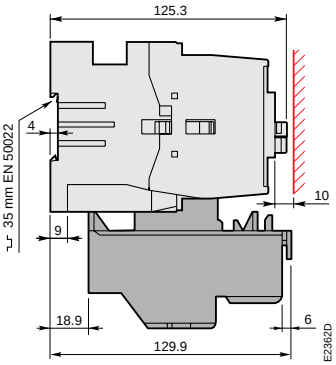


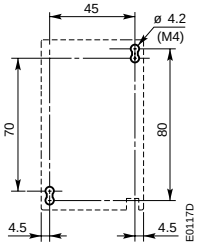


AL 30, AL 40, TAL 30, TAL 40
+ TA 25 DU thermal O/L relay

* For TA 25 DU 32 only

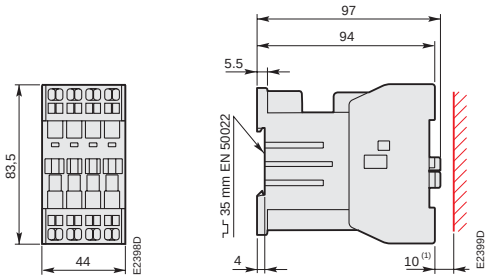




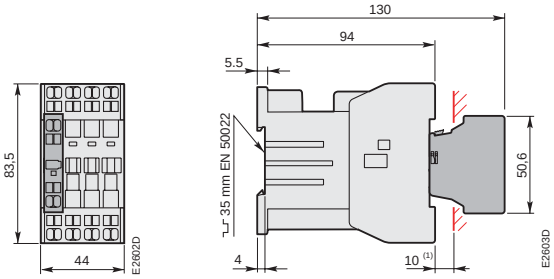


AL 30, AL 40, TAL 30, TAL 40
+ TA 42 DU thermal O/L relay

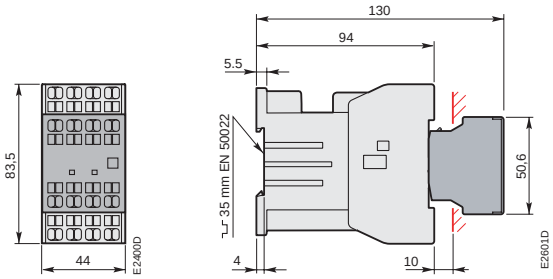
Dimensions (in mm)



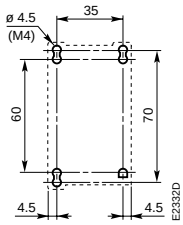
AL..ST, AL..Z..ST
NL..ST, NL..Z..ST



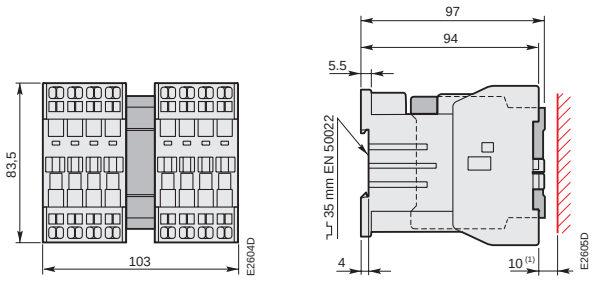
AL..ST, AL..Z..ST
NL..ST, NL..Z..ST
+ CA 5-..ST front-mounted 1-pole auxiliary contact block



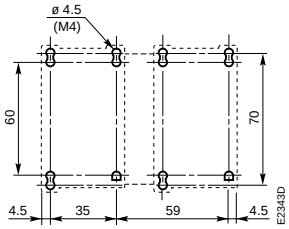
AL..ST
NL..ST
+ CA 5-..ST front-mounted 4-pole auxiliary contact block



AL..ST, AL..Z..ST
NL..ST, NL..Z..ST
drilling plan



AL..ST
+ VM 5-1 mechanical interlock unit



drilling plan

(1) Note: No recommended distance to earth is applicable to " NL..ST" contactor relays.

Notes

Contents

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Industrial^{IT}

As a key element of its business strategy, ABB has committed to a broad program of product development and positioning under the Industrial^{IT} umbrella.

The **Industrial^{IT} Enabled Products** will provide all the relevant information like product identification, documentation, certificates and product data in electronic form in the engineering and work environment.

The **Industrial^{IT} Enabled Products** provide for this purpose all the data you need to do the right selection. Standardized product identification by type designator, identity number and international article number (EAN-code) insure that the right product is handled and delivered. Documentation on-line is available.

Most of the Low Voltage Products have already been Industrial^{IT} enabled among **Control^{IT}** Block Contactors, Mini Contactors and **Control^{IT}** Overload Relays and Electronic Overload Relays.

For further information, please consult the ABB Website
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