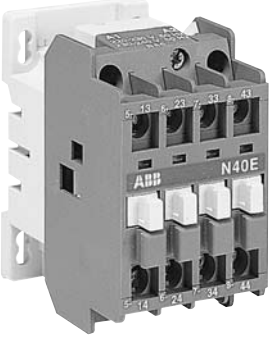
Control relays
Type N, NE, NL & TNL
Positive safety
AC/DC operated

Type N, NE, NL & TNL
Control Relays



Positive safety relays

There are many applications where safety is very critical and it is important to use electrical equipment which ensures that dangerous machine movement cannot occur when a fault is detected with the moving contacts during the cycle which the fault is indicated.

Regulations and standards have been written to ensure that safety is maintained:

- United States — ANSI B11.19-1990, ANSI B11.20-1991
- Germany — SÜVA, ZH1/457
- France — INRS
- United Kingdom — BIA
- Switzerland — SA

The ABB Type N & NL 4 and 8 pole relays are designed with “Positive Guided” contacts and fulfill the regulations or standards shown. The relays can provide positive safety for the N.O. and N.C. contacts which assure that the N.O. contacts will not close before any N.C. contact opens. Therefore, if one of the contacts weld due to abnormal conditions in the control circuit, the other contacts will also remain in the same position as when the welding occurred. This means that the open contacts must maintain an air distance 0.5mm when the coil is energized at 110% Vc or when it is de-energized.

UL File No: E39231 (N & NL)

General information
Type N, AC operated

Description

- AC operated with laminated magnetic circuit.
- 2 versions: 4 pole or 8 pole. The width of 8 pole devices is identical to that of 4 pole devices; only the depth is increased.
- Side by side mounting possible.
- Self cleaning auxiliary contacts.
- Alone or by itself or with a 4 pole CA5 auxiliary contact block, these devices offer “positive safety” between their auxiliary contacts.

Application

Type N control relays are used for switching auxiliary circuits and control circuits.

7

Holes for screw mounting (screws not supplied). Distances between holes according to EN50 002.

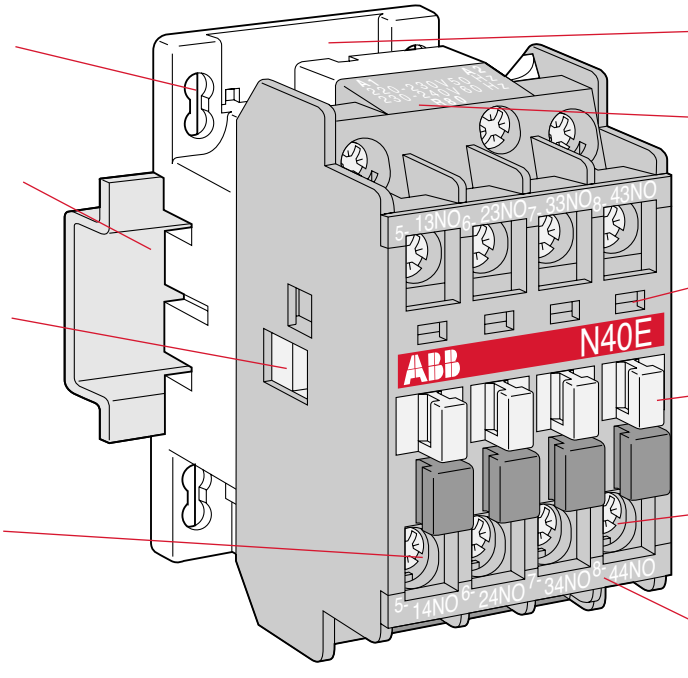
Quick mounting on 35 x 7.5mm DIN mounting rail according to IEC715 and EN50 022.

Location of side mounted accessories: mounting on right or left hand side.

Terminals delivered in open position with captive screws (screws of unused terminals should be tightened).

Screwdriver guidance for all screws makes it possible to use motorized screwdrivers.

All terminals provide protection against accidental direct contact with live parts according to VDE0106 – Part. 100 and offer IP 20 degree of protection according to IEC947-1.



Location of surge suppressors

Clear marking of coil voltages and frequencies.

Location of function marker.

Stops for attaching front mounted accessories.

All terminal screws: Posidrive (+, -) N° 2

Terminal marking according to IEC947-5-1 and EN50 011.

Catalog number explanation

N 40E–84

Frame type

Contact configuration

Coil voltage
(see coil voltage chart below)

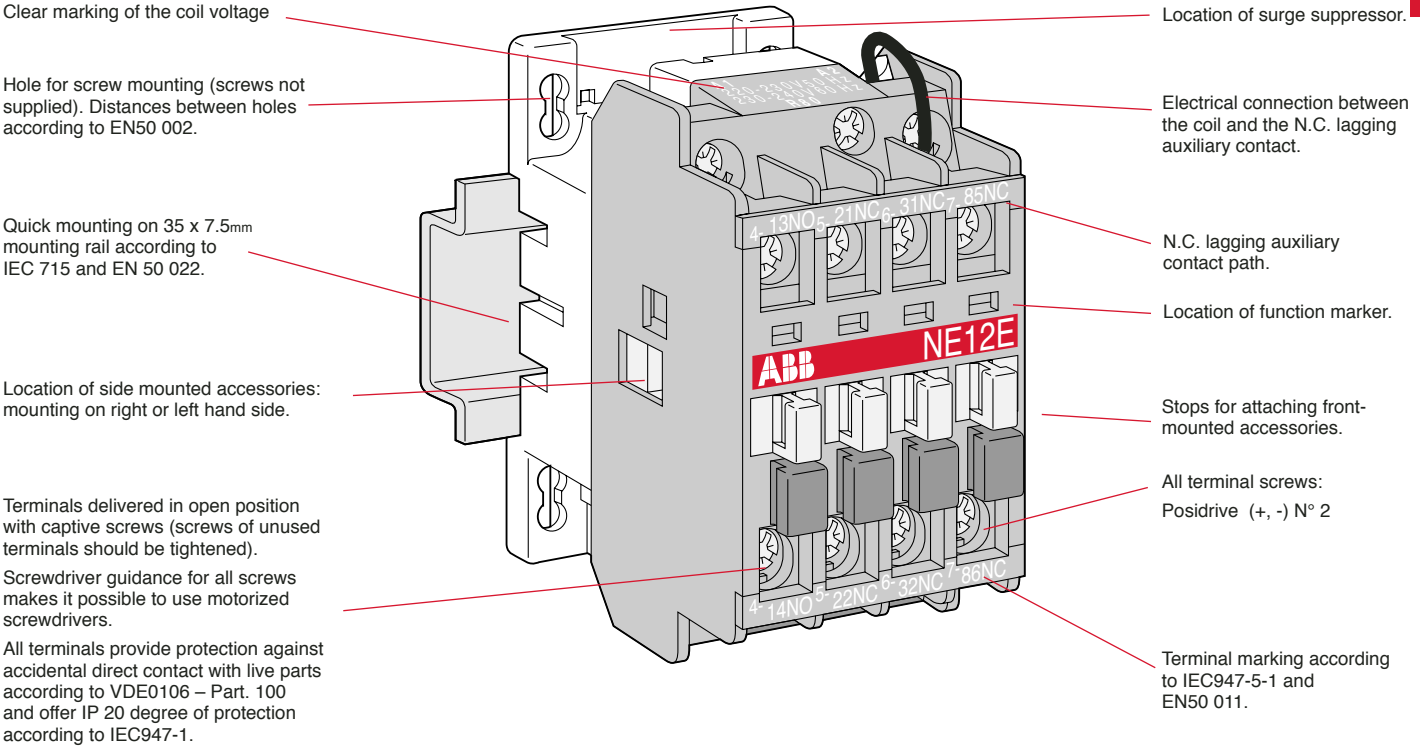
Coil voltage selection chart

Hz	Relay type	Volts															
		12	24	48	110	120	125	208	220	240	277	380	415	440	480	500	600
60	N		81	83	84	84		34	36	80	42		86	86	51	53	55
50	N		81	83	84				80			85	86			55	
DC	NE, NL	80	81	83	86		87		88	89							

General information
Type NE, DC operated

Description
- Contactor relays with laminated magnet circuit and double-winding coil fed from a DC supply via a built-in N.C. lagging auxiliary contact.
- 1-stack version with three built-in auxiliary contacts.
- Self-cleaning auxiliary contacts
- Alone or fitted with a 4-pole CA5 auxiliry contact block, these devices offer mechanically linked contacts.
- Side by side mounting possible.

Application
NE... contactor relays are used for switching auxiliary circuits and control circuits.



Catalog number explanation

NE 12E–84

Frame type

Contact configuration

Coil voltage
(see coil voltage chart below)

Coil voltage selection chart

Hz	Relay type	Volts															
		12	24	48	110	120	125	208	220	240	277	380	415	440	480	500	600
60	N		81	83	84	84		34	36	80	42		86	86	51	53	55
50	N		81	83	84				80			85	86			55	
DC	NE, NL	80	81	83	86		87		88	89							

General information
Type NL & TNL, DC operated

Type NL

Description

- Magnetic circuit variants: NL types: d.c. operated with solid magnetic circuits.
- 2 versions: 4 pole or 8 pole

  The width of 8 pole devices is identical to that of 4 pole devices; only the depth is increased.
- Bifurcated auxiliary contacts.
- Alone or mounted with a 4 pole CA5 auxiliary contact block, these devices offer “positive safety” between their auxiliary contacts.

Application

Type NL control relays are used for switching auxiliary circuits and control circuits.

Type TNL

Description

- Magnetic circuit variants
  – NL types: D.C. operated with solid magnetic circuits.
  – TNL types: D.C. operated with solid magnetic circuit and large coil voltage range.
- 2 versions
  – 4-pole/1-stack or 8-pole/2-stack
  – The width of 8-pole devices is identical to that of 4 pole devices; only the depth is increased.
- Double sharp auxiliary contacts.
- Alone or mounted with a 4-pole CA 5 auxiliary contact block, these devices offer "positive safety" between their auxiliary contacts.

Application

Type NL and TNL control relays are used for switching auxiliary circuits and control circuits.

Location of surge suppressors.

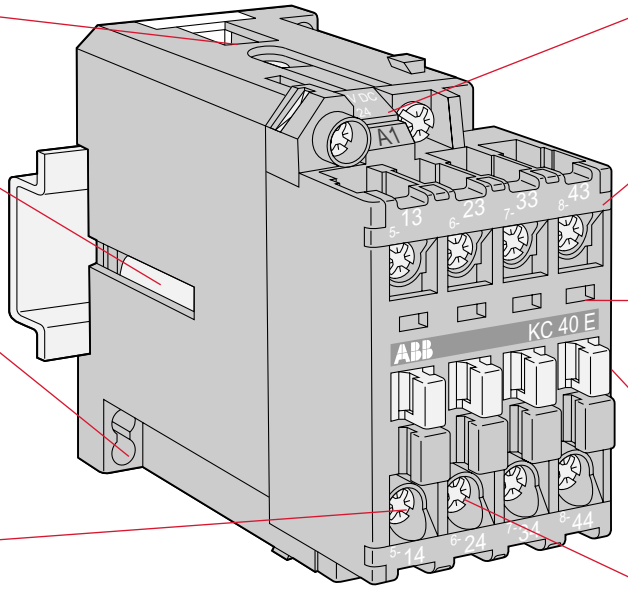
Quick mounting on 35 x 7.5mm or 35 x 15mm DIN mounting rail according to IE715 and EN50022.

Holes for screw mounting (screws not supplied). Distances between holes according to EN50002.

Terminals delivered in open position with captive screws (screws of unused terminal should be tightened).

Screwdriver guidance for all screws makes it possible to use motorized screwdrivers.

All terminals provide protection against accidental direct contact with live parts according to VDE0106 – Part. 100.



Clear marking of coil voltages.

Terminal marking according to IEC947-5-1 and EN50 011.

Location of function marker and surge suppressor.

Stops for attaching front mounted accessories.

All terminal screws:
M 3.5, posidrive (+,-) N° 2

Catalog number explanation

(T)NL 44E–84

Frame type

Contact configuration

Coil voltage
(see coil voltage chart below.)

Coil voltage selection chart

Hz	Relay	Volts															
	type	12	24	48	110	120	125	208	220	240	277	380	415	440	480	500	600
60	N		81	83	84	84		34	36	80	42		86	86	51	53	55
50	N		81	83	84				80			85	86			55	
DC	NE, NL	80	81	83	86		87		88	89							

Type N & NL
AC & DC operated

N40E-1

NE12E-1

A.C. operated

Contact configuration N.O.	N.C.	Catalog number	List price
4	0	N40E-84	
3	1	N31E-84	**$ 60**
2	2	N22E-84	
4	4	N44E-84	
5	3	N53E-84	
6	2	N62E-84	**120**
7	1	N71E-84	
8	0	N80E-84	

Coil voltage selection

All AC operated catalog numbers include a 120VAC coil. All DC operated catalog numbers include a 110VDC coil. To select other coil voltages, substitute the code from the Coil Voltage Selection Chart for the first digit after the last dash in the catalog number.

Ex.: A 240V coil is required for an N80 control relay: N80E-80

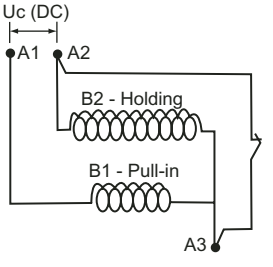
Coil voltage selection chart

Hz	Relay type	Volts 12	24	48	110	120	125	208	220	240	277	380	415	440	480	500	600
60	N		81	83	84	84		34	36	80	42		86	86	51	53	55
50	N		81	83	84				80			85	86			55	
DC	NE, NL	80	81	83	86		87		88	89							

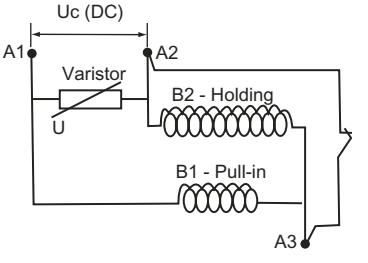
D.C. operated

Contact configuration N.O.	N.C.	Catalog number	List price
4	0	NL40E-86	
3	1	NL31E-86	**$ 72**
2	2	NL22E-86	
4	4	NL44E-86 ①	
5	3	NL53E-86	
6	2	NL62E-86	**144**
7	1	NL71E-86	
8	0	NL80E-86	
1	2	NE12E-86	
2	1	NE21E-86	**72**
3	0	NE30E-86	
4	3	NE43E-86 ①	
5	2	NE52E-86	
6	1	NE61E-86	**144**
7	0	NE70E-86	

Block diagrams for NE... contactor relay coil supply



Coil supply Uc <110 VDC



Coil supply via built-in varistor UC ≤ 110 VDC

① NE43 – NE70 and NL44 – NL62 control relays cannot accept any front mounted auxiliary contact blocks.

Type NL and TNL
AC & DC operated

TNL22E

7

4 Pole, 1 stack

Number of contacts 1st stack N.O.	1st stack N.C.	2nd stack N.O.	2nd stack N.C.	Weight	Catalog number	List price
2	2	–	–	0.540	TNL22E-★	$ 121
3	1	–	–	0.540	TNL31E-★	
4	–	–	–	0.540	TNL40E-★	

8 Pole, 2 stack

Number of contacts 1st stack N.O.	1st stack N.C.	2nd stack N.O.	2nd stack N.C.	Weight	Catalog number	List price
4	–	–	4	0.600	TNL44E-★	$ 180
4	–	2	2	0.600	TNL62E-★	

★ - Substitute the ★ for the coil voltage code. See the Type TNL Coil voltage Selection chart beneath the photos.

Coil characteristics

No extra tolerances applicable to the U_c min. ... max. values quoted in the Coil voltage selection table

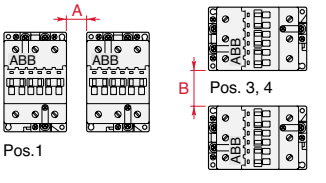
- Coil consumption at U_c max. q = 20 °C: 9 W pull-in/holding
- Replacement coils: consult us (standard coils used on NL control relays are not suitable for TNL control relays).

Coil voltage selection

Min. U_C	Max	Voltage
17	32	51
24	45	52
36	65	54
42	78	58
50	90	55
77	143	62
90	150	66
152	264	68

Mounting distance – for coil operating limits U_c min. … U_c max.

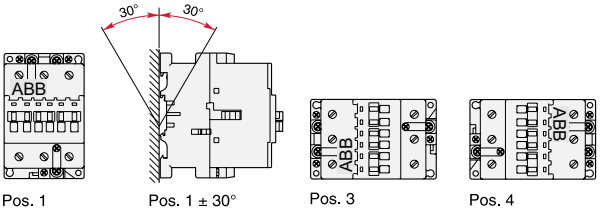
A mm	B mm	Ambient temp. °C	Max. switching frequency Operating cycles/h
2	20	≤ 20	1200
5	20	≤ 55	1200



Add-on accessories

Control relays	Max. number of auxiliary contact blocks CA5-10	CA5-01	CA5-40	CA5-31	CA5-22	CA5-04	Timer TP	Mechanical interlock	Label marker
Pos. 1, 3 or 4 TNL 40-E	4	2	1	1	1	–	–	VBC 30	BA 5-50
Pos. 1, 3 or 4 TNL 31-E	4	1	1	1	–	–	–	VBC 30	BA 5-50
Pos. 1, 3 or 4 TNL 22-E	4	–	1	–	–	–	–	VBC 30	BA 5-50
Pos. 1 ±30° TNL - all types	–	–	–	–	–	–	–	VBC 30	BA 5-50

Mounting positions



Accessories
Type N, NL & TNL


CAL5-11


CA5-10


TP40DA


VE5-1


RV5/50


RC5-1/50


BA5-50


ZA16-84

Auxiliary contact blocks

Positioning	Contacts N.O.	Contacts N.C.	Catalog number	List price
N, NE, NL, TNL (front mount)	1	—	CA5-10	$ 15
	—	1	CA5-01	
N, NL, NE, TNL (4 pole)	4	—	CA5-40N	30
	2	2	CA5-22N	
	—	4	CA5-04N	
N, NE, NL, TNL (side mount)	1	1	CAL5-11	

Pneumatic timers

	Timing range	Contacts N.O.	Contacts N.C.	Catalog number	List price
N, NL	On delay 0.1 – 40s	1	1	TP40DA	$ 108
N, NL	On delay 10 – 180s	1	1	TP180DA	
NE, TNL	Off delay 0.1 – 40s	1	1	TP40IA	
NE, TNL	Off delay 10 – 180s	1	1	TP180IA	

Interlocks

Feature		Contacts N.O.	Contacts N.C.	Catalog number	List price
N, NE, NL, TNL	Mechanical/electrical	—	2	VE5-1	$ 45
N, NE, NL, TNL	Mechanical	—	—	VM5-1	21

Mechanical latches

Feature	Catalog number	List price
N, NL (4 pole only)	WB75A-★	$ 84

Coil voltage selection chart — mechanical latches

50 Hz	60 Hz	Voltage code
24	24 – 28	**01**
42	42 – 48	**02**
48	48 – 55	**03**
110	110 – 127	**04**
220 – 230	220 – 255	**06**
230 – 240	230 – 277	**05**
380 – 415	380 – 440	**07**
415 – 440	440 – 480	**08**

Identification markers

Feature	Catalog number	List price
Pack of 50	BA5-50	$ 15

Accessories
Type N, NL, NE & TNL

ZA16-84

Coils

Relay type	Catalog number	List price
N	ZA16-★	**$ 24**
NE	ZAE16-★	**24**

★ Select the coil voltage from the Control Relay Coil Voltage Selection chart and substitute the letter code for the ★ as the last digit in the catalog number.

Coil voltage selection chart

Hz	Relay type	Volts															
		12	24	48	110	120	125	208	220	240	277	380	415	440	480	500	600
60	N		81	83	84	84		34	36	80	42		86	86	51	53	55
50	N		81	83	84				80			85	86			55	
DC	NE, NL	80	81	83	86		87		88	89							

Surge suppressors — for Type N control relays

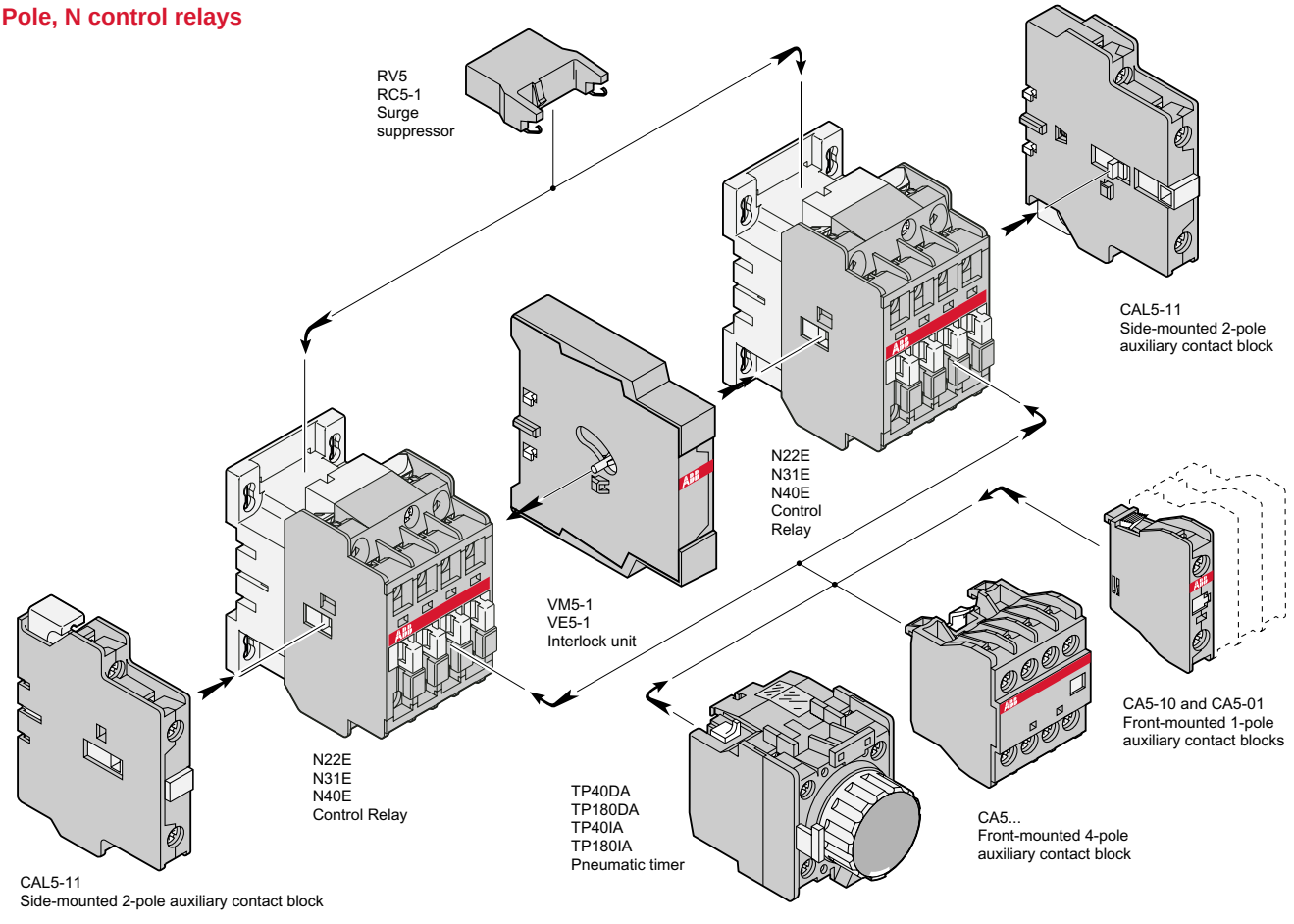
Feature	Type	Voltage range	Catalog number	List price
Varistor	N, NE NL, TNL	24 – 50 VAC/DC 50 – 133 VAC/DC 110 – 250 VAC/DC 250 – 440 VAC/DC	RV5/50 RV5/133 RV5/250 RV5/440	**$ 30**
RC	N	24 – 50 VAC 50 – 133 VAC 110 – 250 VAC 250 – 440 VAC	RC5-1/50 RC5-1/133 RC5-1/250 RC5-1/440	

Technical data

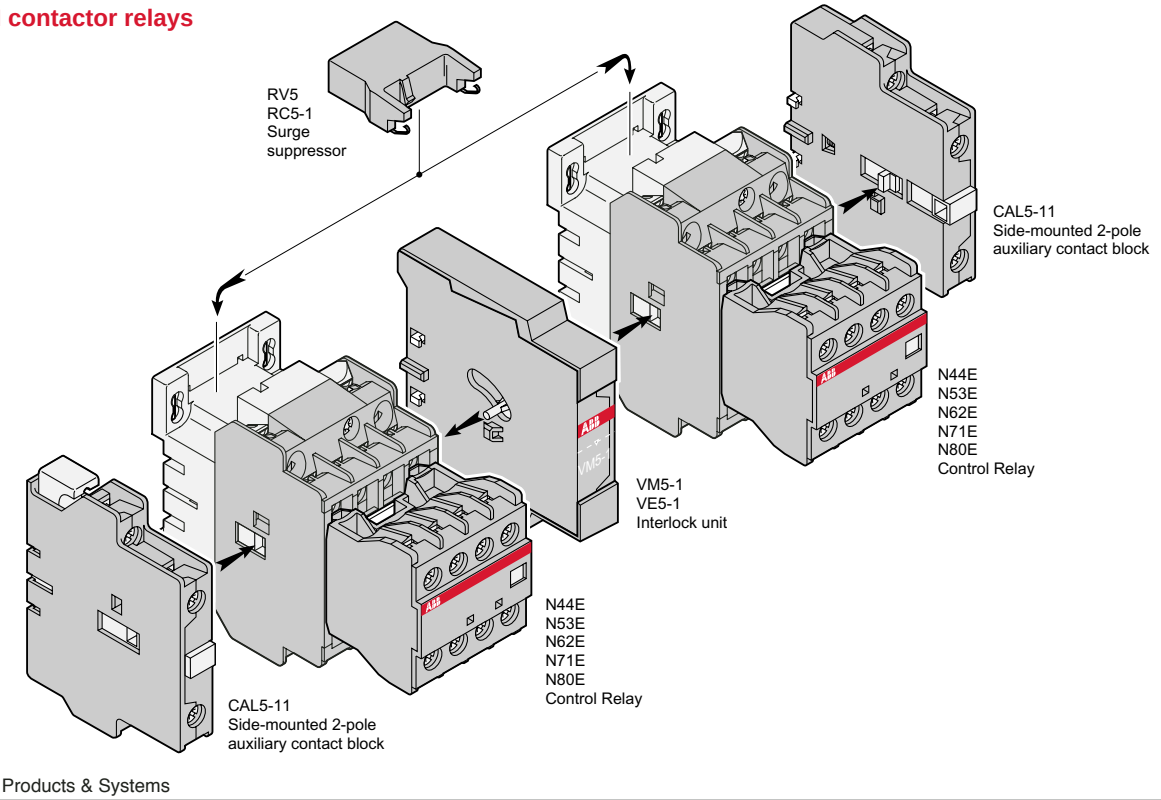
Type	Control circuit	Opening time growth factor	Residual overvoltage or clipping voltage	Remarks	
RV5/...				Advantages	• Good energy absorption & damping • Unpolarized system
50	AC/DC	1.1 to 1.5	132V		
133	AC/DC	1.1 to 1.5	270V	Disadvantages	• Clipping from U_{vdr} thus voltage front up to this point
250	AC/DC	1.1 to 1.5	480V		
440	AC/DC	1.1 to 1.5	825V		
RC5-1/... or RC5-2/... RC-EH300/...	AC	1.2 to 3	2 to 3 x U_c	Advantages	• Very fast clipping • Attenuation of steep fronts and therefore, high frequencies • No operating delays

Accessory mounting information
Type N, NE, NL & TNL

4 Pole, N control relays

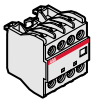
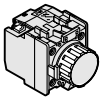
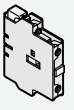
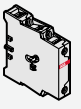


8 Pole, N contactor relays



Possible accessory combinations
Type N, NE, NL, TNL

Configurations of accessories are different depending on whether front or side mounted.

Type	Main poles	Built-in auxiliary contacts	Accessories — Front mounting: Auxiliary contact blocks 1-pole CA5-		Accessories — Front mounting: Auxiliary contact blocks 4-pole CA5-		Accessories — Front mounting: TP - A Pneumatic timer block		Accessories — Side mounting: Auxiliary contact Blocks 2-pole CAL5-11		Accessories — Side mounting: Interlock units	
												
N ①	**2**	**2 E**	1 to 4 **CA5-** 1-pole blocks	or	1 **CA5-** 4-pole block	or	1 **TP - A** block	+	1 to 2 **CAL5-11** blocks	or	1 **V^{M}/$_{E}$5-1** block + 1 **CAL5-11** block	
N ①	**3**	**1 E**										
N	**4**	**0 E**										
N	**4**	**4 E**	—		—		—	+	1 to 2 **CAL5-11** blocks	or	1 **V^{M}/$_{E}$5-1** block + 1 **CAL5-11** block	
N	**5**	**3 E**										
N	**6**	**2 E**										
N	**7**	**1 E**										
N	**8**	**0 E**										
NE ①	**2**	**2 E**	1 to 4 **CA5-** 1-pole blocks	or	1 **CA5-** 4-pole block	or	1 **TP - A** block	+	1 to 2 **CAL5-11** blocks	or	1 **V^{M}/$_{E}$5-1** block + 1 **CAL5-11** block	
NE ①	**3**	**1 E**										
NE	**4**	**0 E**										
NE	**4**	**4 E**	—		—		—	+	1 to 2 **CAL5-11** blocks	or	1 **V^{M}/$_{E}$5-1** block + 1 **CAL5-11** block	
NE	**5**	**3 E**										
NE	**6**	**2 E**										
NE	**7**	**1 E**										
NE	**8**	**0 E**										
NL ①	**2**	**2 E**	1 to 4 **CA5-** 1-pole blocks	or	1 **CA5-** 4-pole block	or	1 **TP - A** block	+	1 to 2 **CAL5-11** blocks	or	1 **V^{M}/$_{E}$5-1** block + 1 **CAL5-11** block	
NL ①	**3**	**1 E**										
NL	**4**	**0 E**										
NL	**4**	**4 E**	—		—		—	+	1 to 2 **CAL5-11** blocks	or	1 **V^{M}/$_{E}$5-1** block + 1 **CAL5-11** block	
NL	**5**	**3 E**										
NL	**6**	**2 E**										
NL	**7**	**1 E**										
NL	**8**	**0 E**										
TNL ①	**2**	**2 E**	1 to 4 **CA5-** 1-pole blocks	or	1 **CA5-** 4-pole block	or	1 **TP - A** block	+	1 to 2 **CAL5-11** blocks	or	1 **V^{M}/$_{E}$5-1** block + 1 **CAL5-11** block	
TNL ①	**3**	**1 E**										
TNL	**4**	**0 E**										
TNL	**4**	**4 E**	—		—		—	+	1 to 2 **CAL5-11** blocks	or	1 **V^{M}/$_{E}$5-1** block + 1 **CAL5-11** block	
TNL	**5**	**3 E**										
TNL	**6**	**2 E**										
TNL	**7**	**1 E**										
TNL	**8**	**0 E**										

Technical data
UL & CSA

AC inductive ratings — NEMA A600

Voltage	Continuous current	Maximum make	Maximum break
120V 240V 480V 600V	10	7200VA	720VA

DC inductive ratings — NEMA P300

Voltage	Continuous current	Maximum make	Maximum break
120V 250V 300-600V	5	138VA	138VA

AC coil consumption

In rush	Sealed
80VA	8VA

DC coil consumption

In rush	Sealed
7.0W	7.0W

AC operating time

Pickup	Dropout
10 – 20ms	10 – 20ms

DC operating time

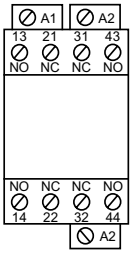
Pickup	Dropout
30 – 90ms	10 – 20ms

AC mechanical endurance
30 million operations

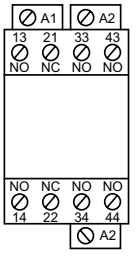
DC mechanical endurance
30 million operations

Technical data
Terminal marking and positioning
Type N

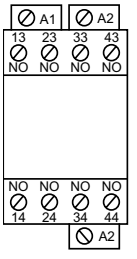
N control relays
Pole configuration schematics



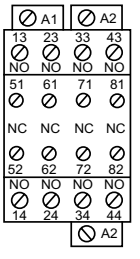
N22E



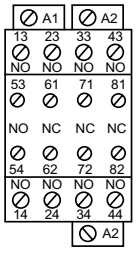
N31E



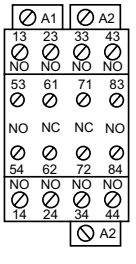
N40E



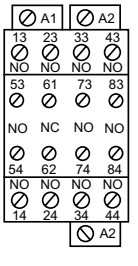
N44E



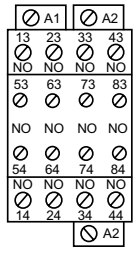
N53E



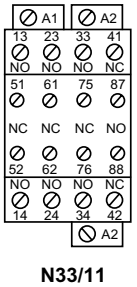
N62E



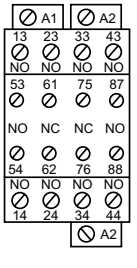
N71E



N80E

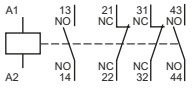


N33/11

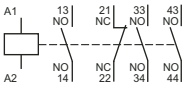


N51/11

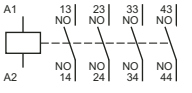
4 Pole control relay



N22E

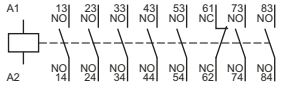


N31E

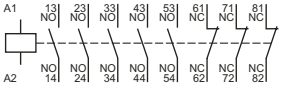


N40E

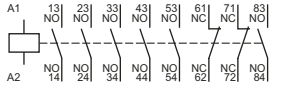
4 Pole control relay with 4 pole adder deck



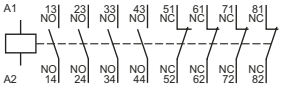
N71E



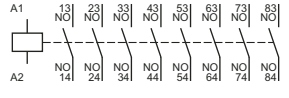
N53E



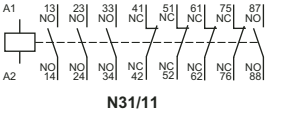
N62E



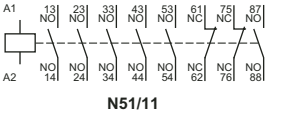
N44E



N80E

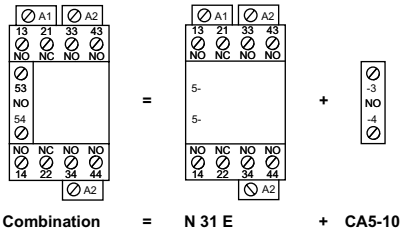


N31/11

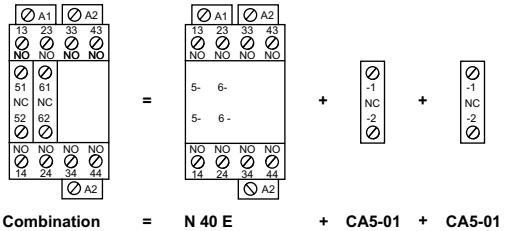


N51/11

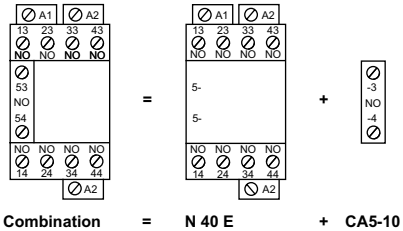
Other possible contact combinations with auxiliary contacts added by the user



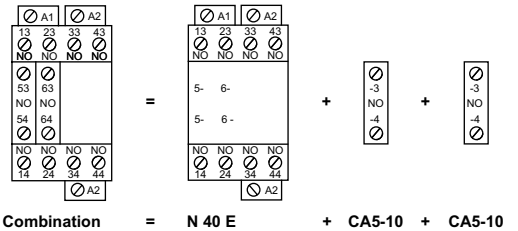
Combination 41 E = N 31 E + CA5-10



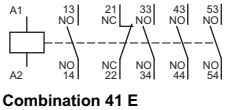
Combination 42 E = N 40 E + CA5-01 + CA5-01



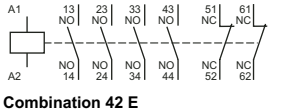
Combination 50 E = N 40 E + CA5-10



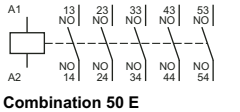
Combination 60 E = N 40 E + CA5-10 + CA5-10



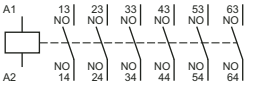
Combination 41 E



Combination 42 E



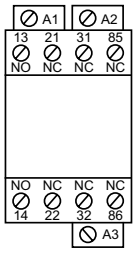
Combination 50 E



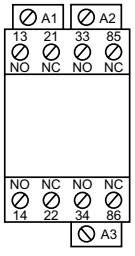
Combination 60 E

NE control relays

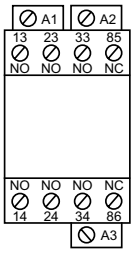
Pole configuration schematics



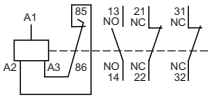
NE12E



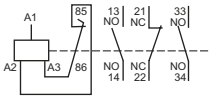
NE21E



NE30E



NE12E



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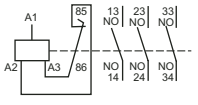
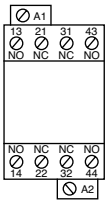


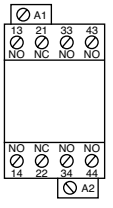
NE30E

Technical data
Terminal marking and positioning
Type NL & TNL

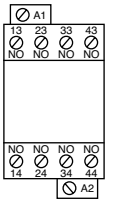
Standard devices without addition of auxiliary contacts



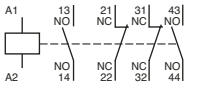
NL22E
TNL22E



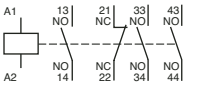
NL31E
TNL31E



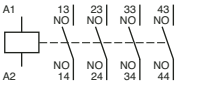
NL40E
TNL40E



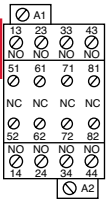
NL22E
TNL22E



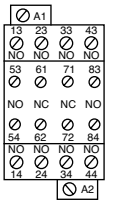
NL31E
TNL31E



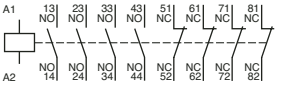
NL40E
TNL40E



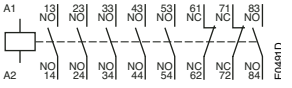
NL44E
TNL44E



NL62E
TNL62E

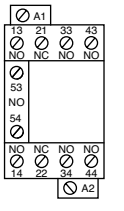


NL44E
TNL44E



NL62E
TNL62E

Other possible contact combinations with auxiliary contacts added by the user



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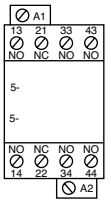

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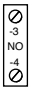
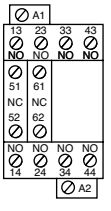


Combination 41E = **NL31E TNL31E** + **CA5-10** + **CA5-10**



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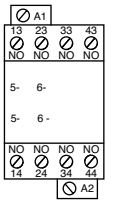

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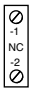

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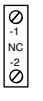
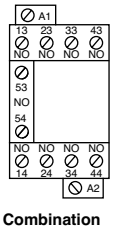


Combination 42 E = **NL40E TNL40E** + **CA5-01** + **CA5-01** + **CA5-01** + **CA5-01**



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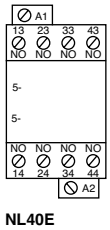

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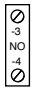
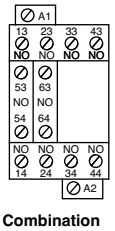


Combination 50E = **NL40E TNL40E** + **CA5-10** + **CA5-10**



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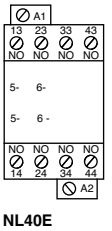

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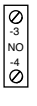

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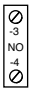
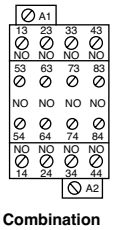


Combination 60 E = **NL40E TNL40E** + **CA5-10** + **CA5-10** + **CA5-10** + **CA5-10**



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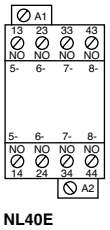

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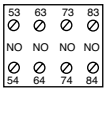
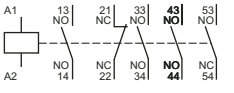
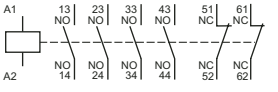


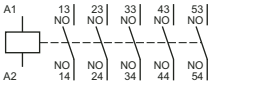
Combination 80E = **NL40E TNL40E** + **CA5-40E** + **CA5-40E**



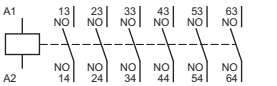
Combination 41 E



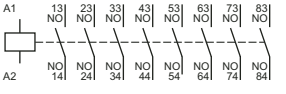
Combination 42 E



Combination 50 E



Combination 60 E

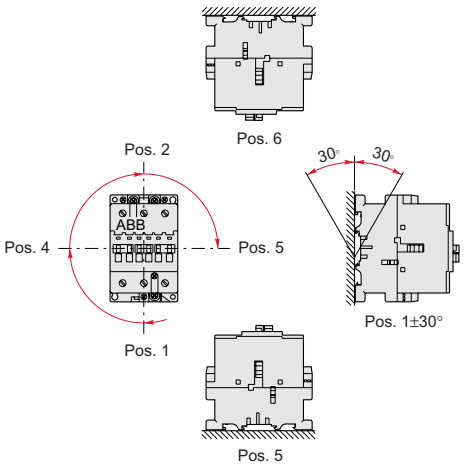


Combination 80 E

Technical data
IEC

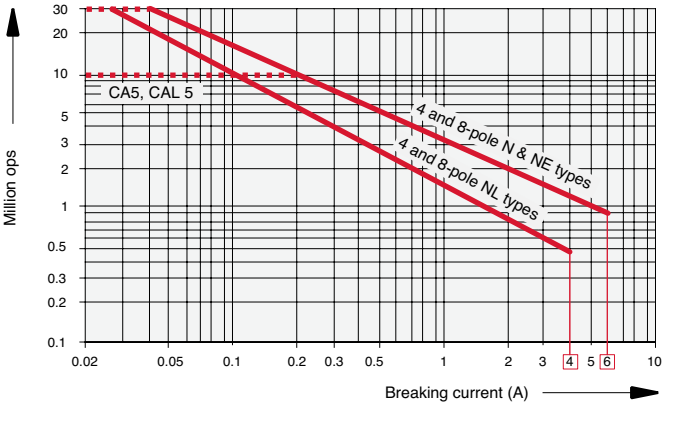
Type		NE12, NE 21, NE 30	N22, N31, N40	N44, N53, N62, N71, N80	NL22, NL31, NL40	NL44, NL62
Number of poles		3	4	8	4	8
Insulation characteristics						
Rated insulation voltage U_i						
acc. to IEC947-5-1 and VDE0110 (Gr. C)	V			690		
acc. to UL/CSA	V			600		
Rated impulse withstand voltage U_{imp}						
acc. to IEC947-5-1	kV			8		
General technical data						
Standards		Devices complying with international standards IEC947-5-1/947-4-1 and European standards EN60 947-5-1/60 947-4-1 Electromagnetic compatibility (EMC) according to amendment A11 to IEC947-1; EN60 947-1 and amendment 2 to IEC947-4-1				
Air temperature near contactor						
— for operation in free air:	°C	-40 to +55 (0.85 – 1.1 U_c) / +55 to +70 (U_c)				
— for storage:	°C	-60 to +80				
Climatic withstand		according to IEC68-2-30 and 68-2-11 – UTE C63-100, Specification II				
Mounting positions		Positions 1 to 5	- $\theta \leq 55$°C : 0.85 – 1.1			U_c
			- $\theta = 55$ - 70°C :	—		U_c
		Position 6	- $\theta \leq 55$°C : 0.95 – 1.1			U_c
(see diagrams below)			- $\theta > 55$°C : not acceptable			
Operating altitude	m	≤ 3000				
Shock withstand according to IEC 68-2-27 and EN 60068-2-27 Mounting pos. 1 (see below)		1/2 sinusoidal shock, 11ms: no change in contact position Shock direction: A, C1, C2 : 20 g B1 : 5 g B2 : 15 g				
Mounting						
— on mounting rail		35mm according to IEC715 and EN50022				
— with screws (not supplied)		2 x M4				
Connection terminals (delivered in open position, screws of unused terminals must be tightened)		M 3.5 (+,-) posidrive 2 screw with cable clamp				
Connection capacity						
Rigid solid	1 x AWG	16 – 12				
	2 x AWG	16 – 12				
Degree of protection according to IEC529, IEC947-1 and EN60529						
— Pole terminals		IP20			IP10	
— Coil terminals		IP20			IP20	

Mounting positions



Electrical durability of contacts
utilization category AC – 15 according to IEC947-5-1
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

The curves opposite show the electrical durability of the control relays as well as the add-on auxiliary contact blocks in relation to the breaking current I_c. These curves have been drawn for resistive and inductive loads up to 690V, 40 – 60 Hz.



Technical data
IEC

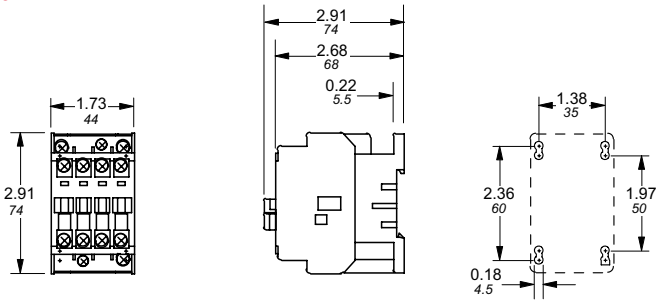
Type			NE12, NE21, NE30	N22, N31, N40	N44, N53, N62, N71, N80	NL22, NL31, NL40	NL44, NL62
Number of poles			3	4	8	4	8
Pole utilization characteristics							
Rated operational voltage U_eV					690		
Conventional thermal current in free air I_{th}							
according to IEC947-5-1	$\theta \leq 40°C$	A		16		10	
Rated operating current I_e							
in AC-15 according to IEC947-5-1							
24 – 127 V 50/60 Hz		A		6		6	
230 – 240 V 50/60 Hz		A		4		4	
400 – 415 V 50/60 Hz		A		3		3	
500 V 50/60 Hz		A		2		2	
690 V 50/60 Hz		A		2		2	
in DC-13 according to IEC947-5-1							
24VDC		A/W		6/144		6/144	
48VDC		A/W		2.8/134		2.8/134	
72VDC		A/W		1/72		1/72	
125VDC		A/W		0.55/69		0.55/69	
250VDC		A/W		0.3/75		0.3/75	
Field of rated frequencies		Hz			25 – 400		
Mechanical durability in operating cycles			10 million	> 20 million		30 million	
Max. switching frequency		cycles/h	3000	6000		6000	
Electrical durability in operating cycles							
Max. switching frequency		cycles/h			1200		
Rated making capacity according to IEC947-5-1					10 x I_e /AC-15		
Rated breaking capacity according to IEC947-5-1					10 x I_e /AC-15		
gG (gl) protection fuse		A			10		
Rated short time withstand current							
at ambient temp. of 40 °C,		1.0 s		100A		50A	
in free air, from cold state		0.1 s		140A		100A	
Insulation resistance at 500 VDC					after durability test: 5 MΩ		
Min. switching capacity							
with failure rate below 10^{-6}				17V / 5mA		24V / 5mA	
Non overlapping time between N.O. and N.C. contacts		ms			≥ 2		
Power loss per pole at 6A		W		0.10		0.15	
Magnet system characteristics							
Coil operating limits $\theta \leq 40°C$					according to IEC 947-5-1 : 0.85 - 1.1 U_c		
Drop out voltage in % of U_c			10 – 30%	roughly 40 – 65%		roughly 10 – 30%	
Coil consumption (average value)							
— a.c. operation: 50 Hz pull in		VA	—	70		—	
60 Hz pull in		VA	—	80		—	
50/60 Hz① pull in		VA/VA	—	74/70		—	
50/60Hz holding		VA/W	—	8/2		—	
— d.c. operation: cold pull in		W	90	—		7	
warm holding		W	2	—		7	
Rated control voltage U_c							
— AC operation: 50/60 Hz		V	—	20 – 690		—	
— DC operation:		VDC	12 – 250	—		24 – 240	
Max. permissible short supply interruption							
without opening of contacts		ms	2	2		2	
Operating time							
between coil energization and:							
— closing of N.O. contact		ms	10 – 16	10 – 26		50 – 75	
— opening of N.C. contact		ms	8 — 12	7 – 21		45 – 70	
between coil de energization and:							
— opening of N.O. contact		ms	5 — 14	4 – 11		15 – 30 ②	
— closing of N.C. contact		ms	11 — 17	9 – 16		17 – 32 ②	

① 50/60 Hz coils: voltage codes 80 to 88, see page 7.5.
② Using surge suppressors increases the opening time on a scale/ratio of 1.1 to 1.5 for a varistor suppressor and by 4 to 8 for a diode suppressor.

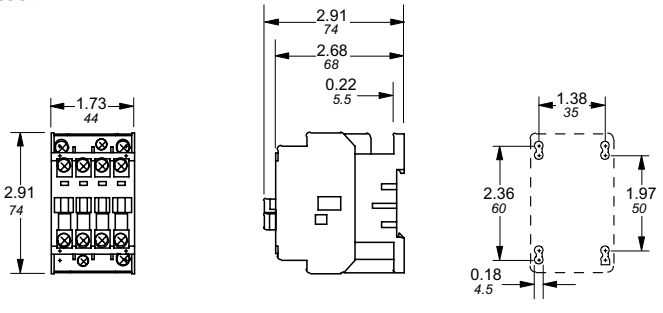
Approximate dimensions
Type N, NE, NL, & TNL
AC & DC operated

00.00 Inches
00.00 [Millimeters]

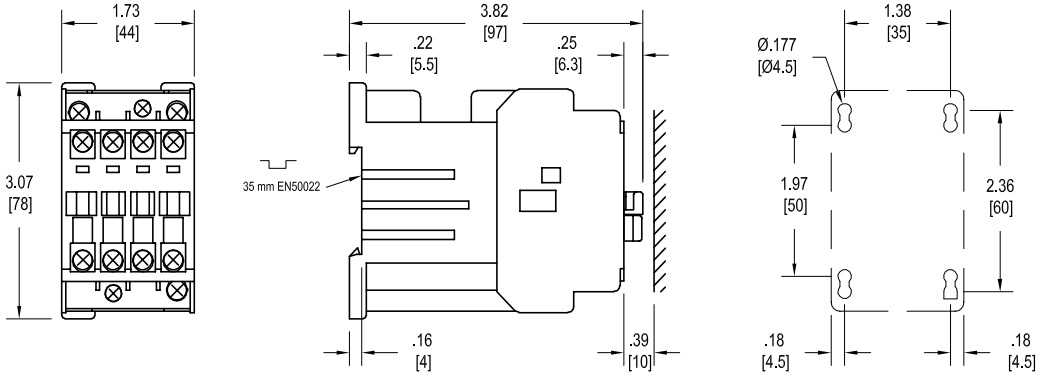
Type N, 4 Pole, AC operated



Type NE, 4 Pole, DC operated

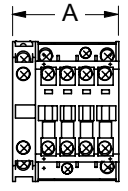


Type NL, TNL

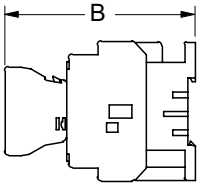


Approximate dimensions
Accessories for Type N & NE

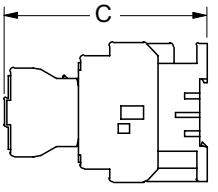
N & NE



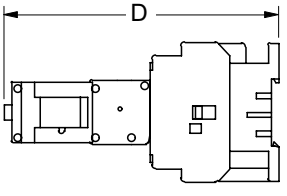
SIDE MOUNTED
AUXILIARY



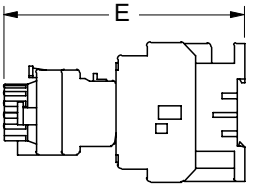
SINGLE POLE
TOP MOUNTED
AUXILIARY



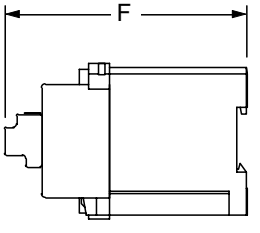
FOUR POLE
TOP MOUNTED
AUXILIARY



ON-POSITION
LATCH



PNEUMATIC
TIMER



MECH INTERLOCK D.C.
OPERATED

Type		A	B	C	D	E	F
N	IN	2.20	3.96	4.21	5.71	5.00	—
	MM	*56*	*100.5*	*107*	*145*	*127*	—
NE	IN	2.20	3.96	4.21	5.71	5.00	—
	MM	*56*	*100.5*	*107*	*145*	*127*	—