

Type N, NE, NL & TNL Control relays

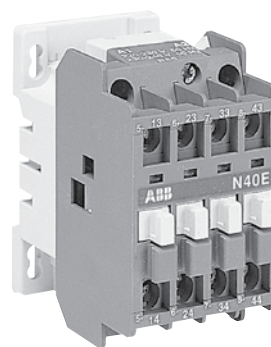


Industrial control relays

Type N, NE, NL & TNL

Positive safety

AC/DC operated



7

Description

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% V_c 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.

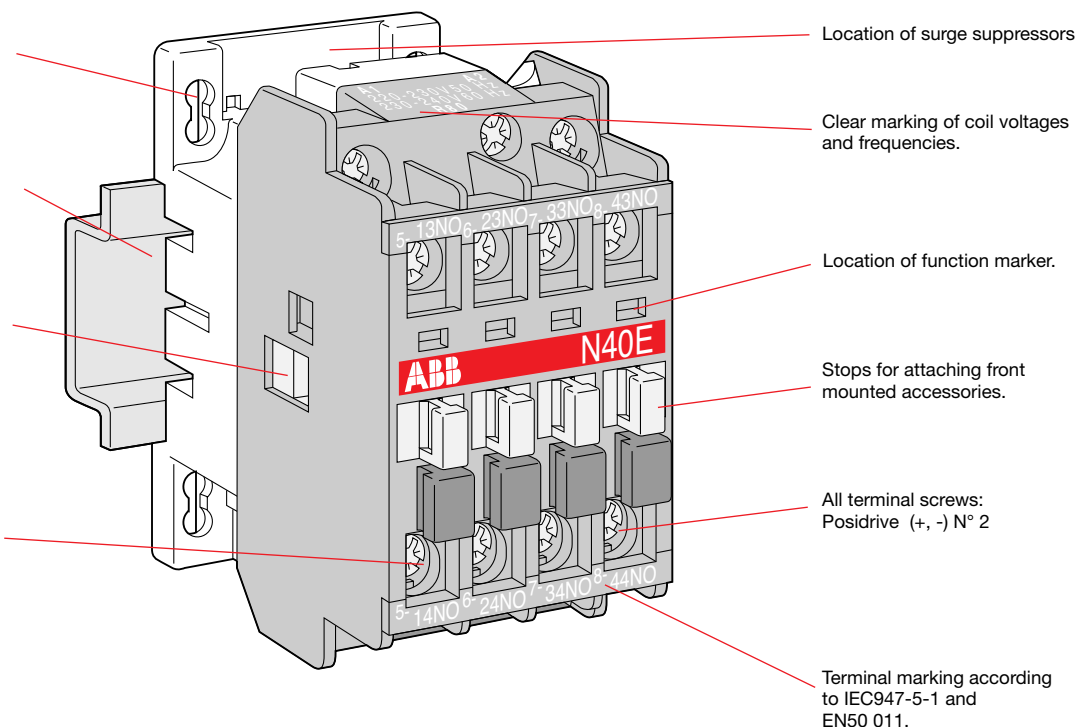
Quick mounting on 35 x 7.5mm DIN mounting rail according to IEC715 and EN50 022.

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.



Catalog number explanation

N 40E-84

Frame type

Coil voltage

(see coil voltage chart below)

Contact configuration

Coil voltage selection chart

Hz	Relay 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							

General information

Type NE, DC operated

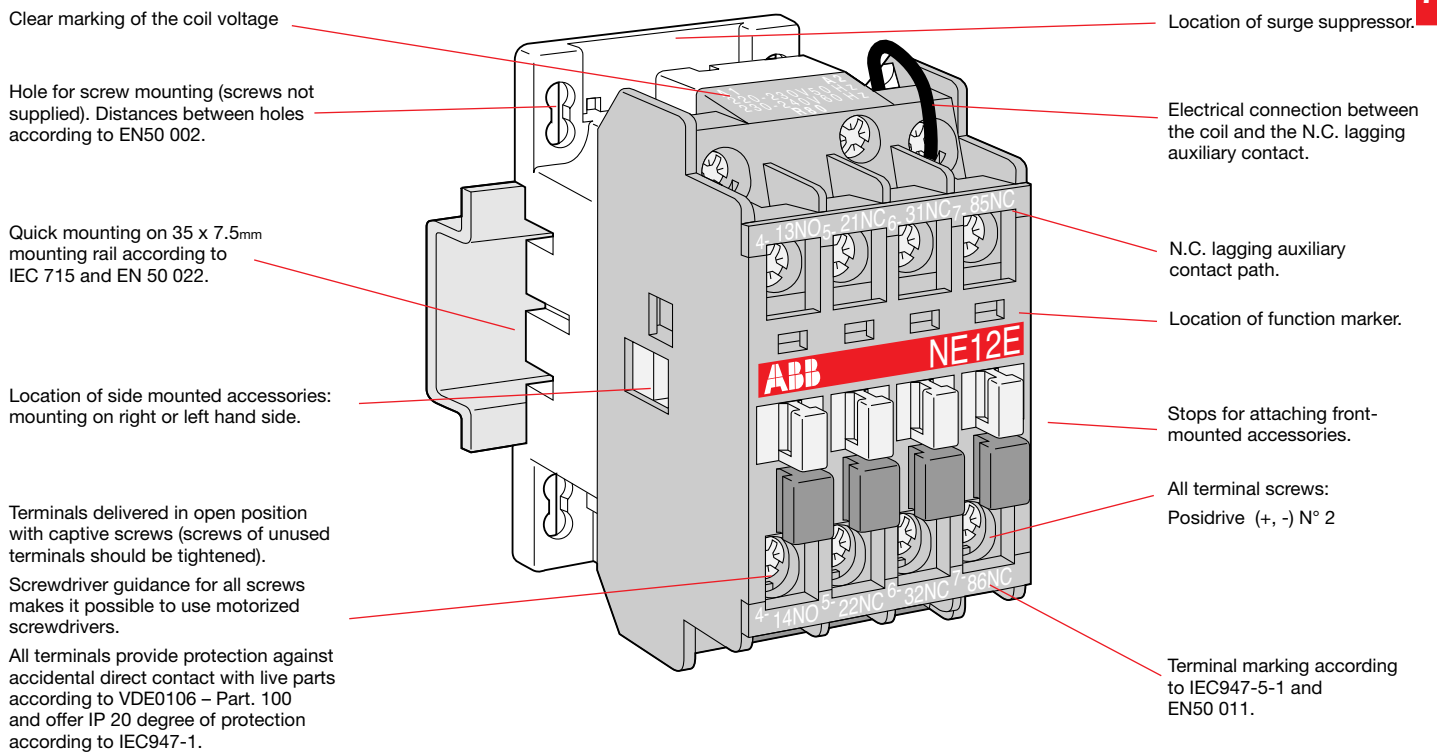
Control relays

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 auxiliary 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 IEC947-5-1 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.

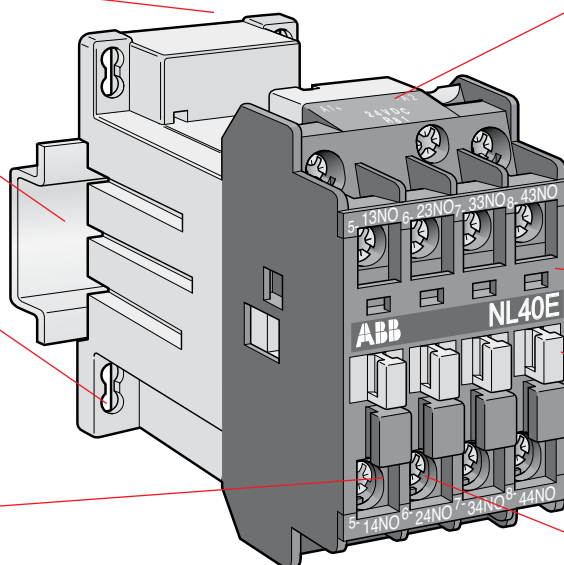
Clear marking of coil voltages.

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

Coil voltage

(see coil voltage chart below.)

Contact configuration

Coil voltage selection chart

Hz	Relay 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

Control relays



N40E-1



NE12E-1

A.C. operated

Contact configuration		AC inductive current	DC inductive current	Catalog number	List price
N.O.	N.C.				
4	0	10A	5A	N40E-84	\$ 60
3	1			N31E-84	
2	2			N22E-84	
4	4	10A	5A	N44E-84	120
5	3			N53E-84	
6	2			N62E-84	
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

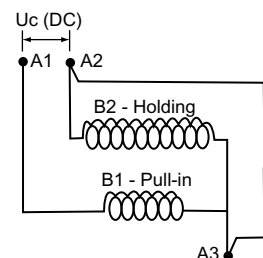
Coil voltage selection chart

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							

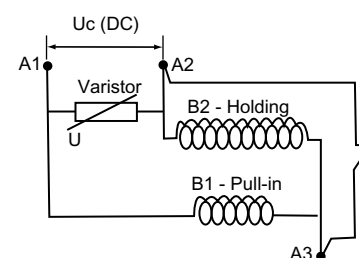
D.C. operated

Contact configuration		AC inductive current	DC inductive current	Catalog number	List price
N.O.	N.C.				
4	0	10A	5A	NL40E-86	\$ 72
3	1			NL31E-86	
2	2			NL22E-86	
4	4	10A	5A	NL44E-86 ①	144
5	3			NL53E-86 ①	
6	2			NL62E-86 ①	
7	1			NL71E-86	
8	0			NL80E-86	
1	2	10A	5A	NE12E-86	72
2	1			NE21E-86	
3	0			NE30E-86	
4	3	10A	5A	NE43E-86 ①	144
5	2			NE52E-86 ①	
6	1			NE61E-86 ①	
7	0			NE70E-86 ①	

Block diagrams for NE... contactor relay coil supply



Coil supply $U_c < 110$ VDC



Coil supply via built-in varistor $U_c \leq 110$ VDC

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

Type TNL

4 Pole & 8 Pole



TNL22E

4 Pole, 1 stack

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

8 Pole, 2 stack

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

Δ - Substitute the Δ 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

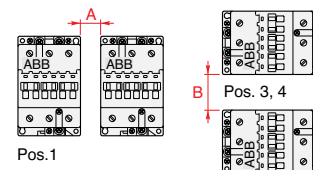
- Coil consumption at U_c max. $q = 20^\circ\text{C}$: 9 W pull-in/holding
- Replacement coils: consult us (standard coils used on NL control relays are not suitable for TNL control relays).

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.

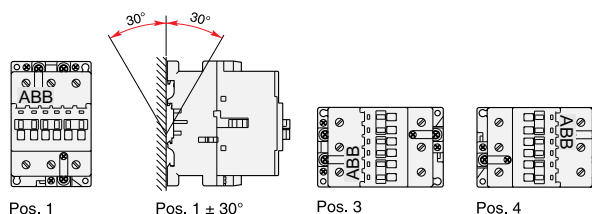
A mm	B mm	Ambient temp. $^\circ\text{C}$	Max. switching frequency Operating cycles/h
2	20	≤ 20	1200
5	20	≤ 55	1200



Add-on accessories

Control relays	Max. number of auxiliary contact blocks						Timer TP	Mechanical interlock	Label marker
	CA5-10	CA5-01	CA5-40	CA5-31	CA5-22	CA5-04			
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 $\pm 30^\circ$ TNL - all types	–	–	–	–	–	–	–	VBC 30	BA 5-50

Mounting positions



Accessories Type N, NL & TNL

Control relays



CAL5-11 CA5-10



TP40DA



VE5-1



BA5-50

Auxiliary contact blocks

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

Pneumatic timers

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

Interlocks

Feature		Contacts		Catalog number	List price
		N.O.	N.C.		
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-Δ	\$ 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



RV5/50



RC5-1/50

Coils

Relay type	Catalog number	List price
N	ZA16-Δ	\$ 24
NE	ZAE16-Δ	24

Δ Select the coil voltage from the Control Relay Coil Voltage Selection chart and substitute the letter code for the Δ 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	

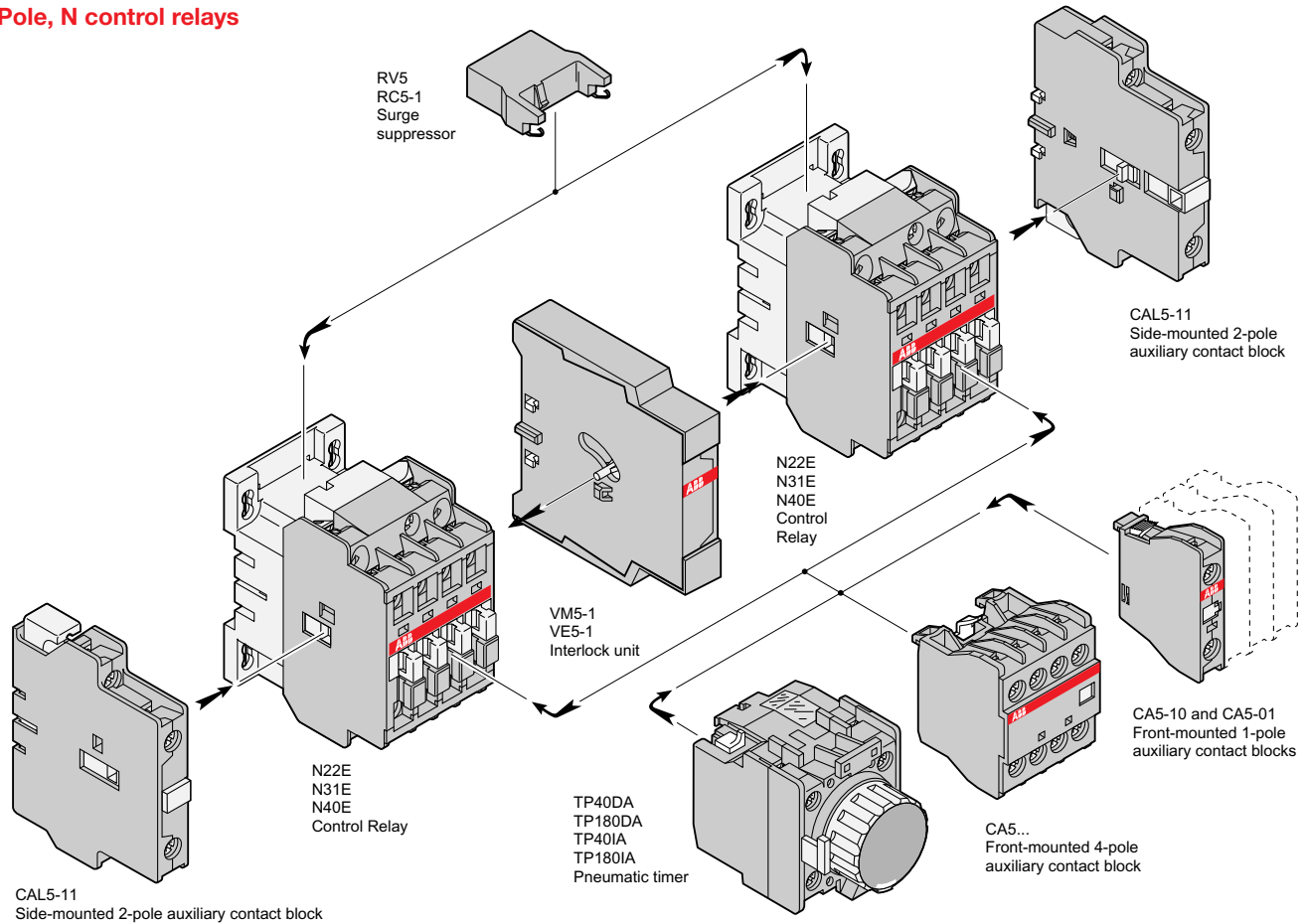
Technical data

Type	Control circuit	Opening time growth factor	Residual overvoltage or clipping voltage	Remarks
RV5/... ing				Advantages • Good energy absorption & damp-
50	AC/DC	1.1 to 1.5	132V	Disadvantages • Unpolarized system • Clipping from U_{vdr} thus voltage front up to this point
133	AC/DC	1.1 to 1.5	270V	
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

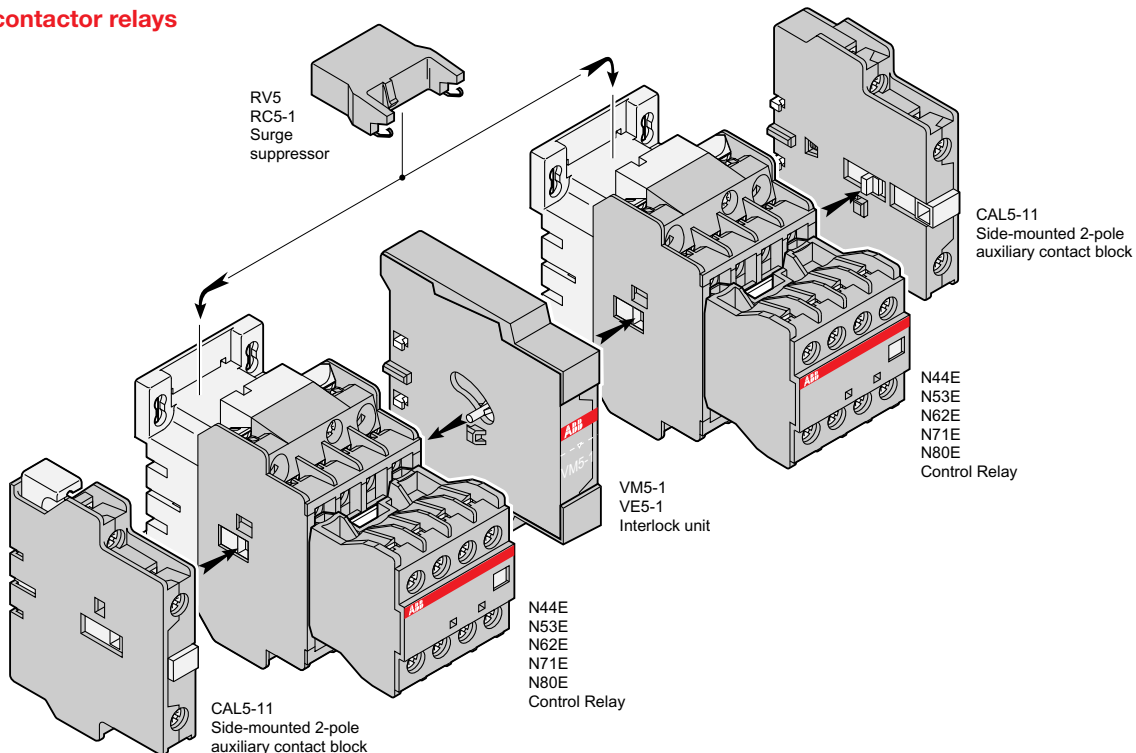
Accessory mounting information Type N, NE, NL & TNL

Control relays

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			Accessories — Side mounting	
			Auxiliary contact blocks 1-pole CA5-	4-pole CA5-	TP - A Pneumatic timer block	Auxiliary contact Blocks 2-pole CAL5-11	Interlock units
							
N ①	2	2 E	1 to 4 CA5- 1-pole blocks	1 CA5- 4-pole block	or 1 TP - A block	+ 1 to 2 CAL5-11 blocks	or 1 VM/ε5-1 block + 1 CAL5-11 block
N ①	3	1 E					
N ①	4	0 E					
N ①	4	4 E					
N ①	5	3 E					
N ①	6	2 E	—	—	—	+ 1 to 2 CAL5-11 blocks	or 1 VM/ε5-1 block + 1 CAL5-11 block
N ①	7	1 E					
N ①	8	0 E					
NE ①	2	2 E	1 to 4 CA5- 1-pole blocks	1 CA5- 4-pole block	or 1 TP - A block	+ 1 to 2 CAL5-11 blocks	or 1 VM/ε5-1 block + 1 CAL5-11 block
NE ①	3	1 E					
NE ①	4	0 E					
NE ①	4	4 E					
NE ①	5	3 E					
NE ①	6	2 E	—	—	—	+ 1 to 2 CAL5-11 blocks	or 1 VM/ε5-1 block + 1 CAL5-11 block
NE ①	7	1 E					
NE ①	8	0 E					
NL ①	2	2 E	1 to 4 CA5- 1-pole blocks	1 CA5- 4-pole block	or —	or 1 CAL5-11 block	or 1 VM/ε5-1 block + 1 CAL5-11 block
NL ①	3	1 E					
NL ①	4	0 E					
NL ①	4	4 E					
NL ①	5	3 E					
NL ①	6	2 E	—	—	—	or 1 CAL5-11 block	or 1 VM/ε5-1 block + 1 CAL5-11 block
NL ①	7	1 E					
NL ①	8	0 E					
TNL ①	2	2 E	1 to 4 CA5- 1-pole blocks	1 CA5- 4-pole block	or —	or 1 CAL5-11 block	or 1 VM/ε5-1 block + 1 CAL5-11 block
TNL ①	3	1 E					
TNL ①	4	0 E					
TNL ①	4	4 E					
TNL ①	5	3 E					
TNL ①	6	2 E	—	—	—	or 1 CAL5-11 block	or 1 VM/ε5-1 block + 1 CAL5-11 block
TNL ①	7	1 E					
TNL ①	8	0 E					

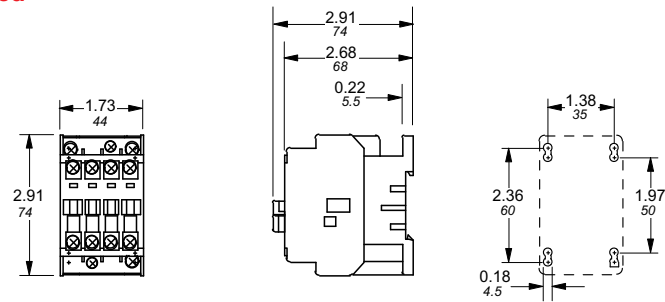
Approximate dimensions

Type N, NE, NL, & TNL

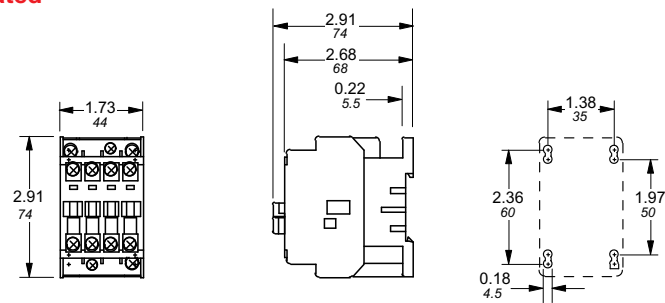
AC & DC operated

00.00 Inches
00.00 [Millimeters]

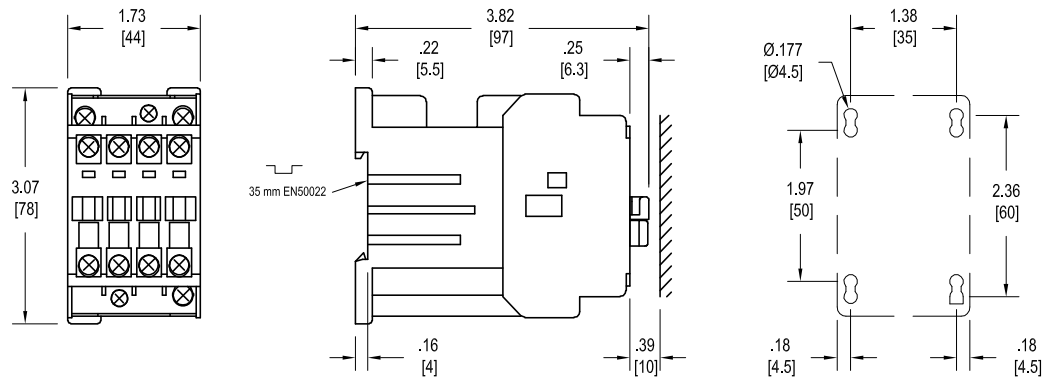
Type N, 4 Pole, AC operated



Type NE, 4 Pole, DC operated

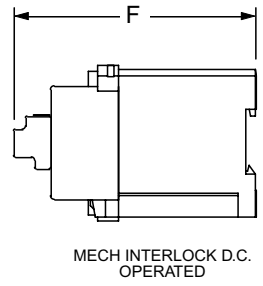
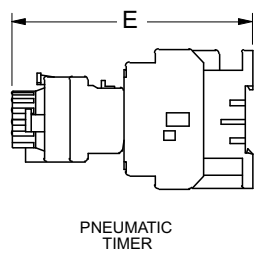
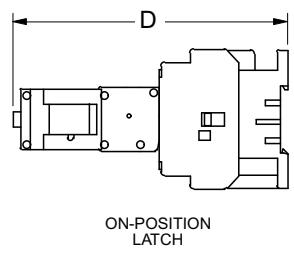
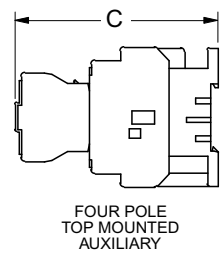
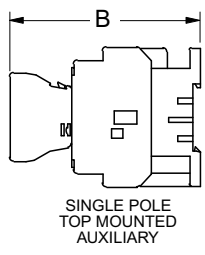
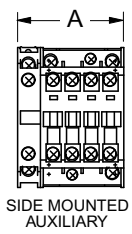


Type NL, TNL



Approximate dimensions Accessories for Type N & NE

N & NE



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	—