

# 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

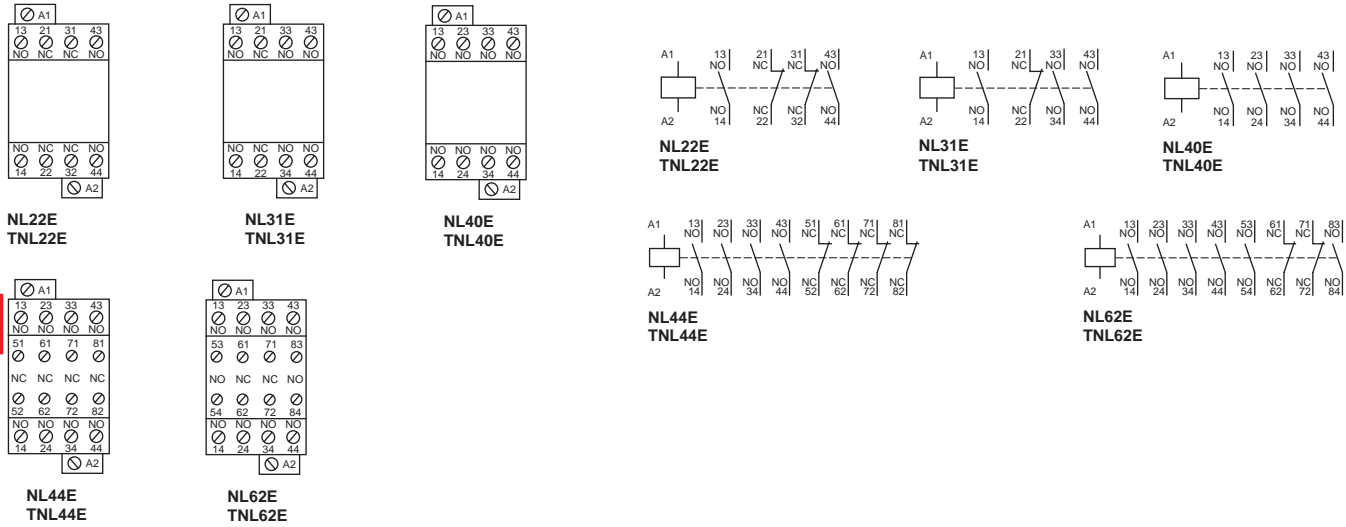
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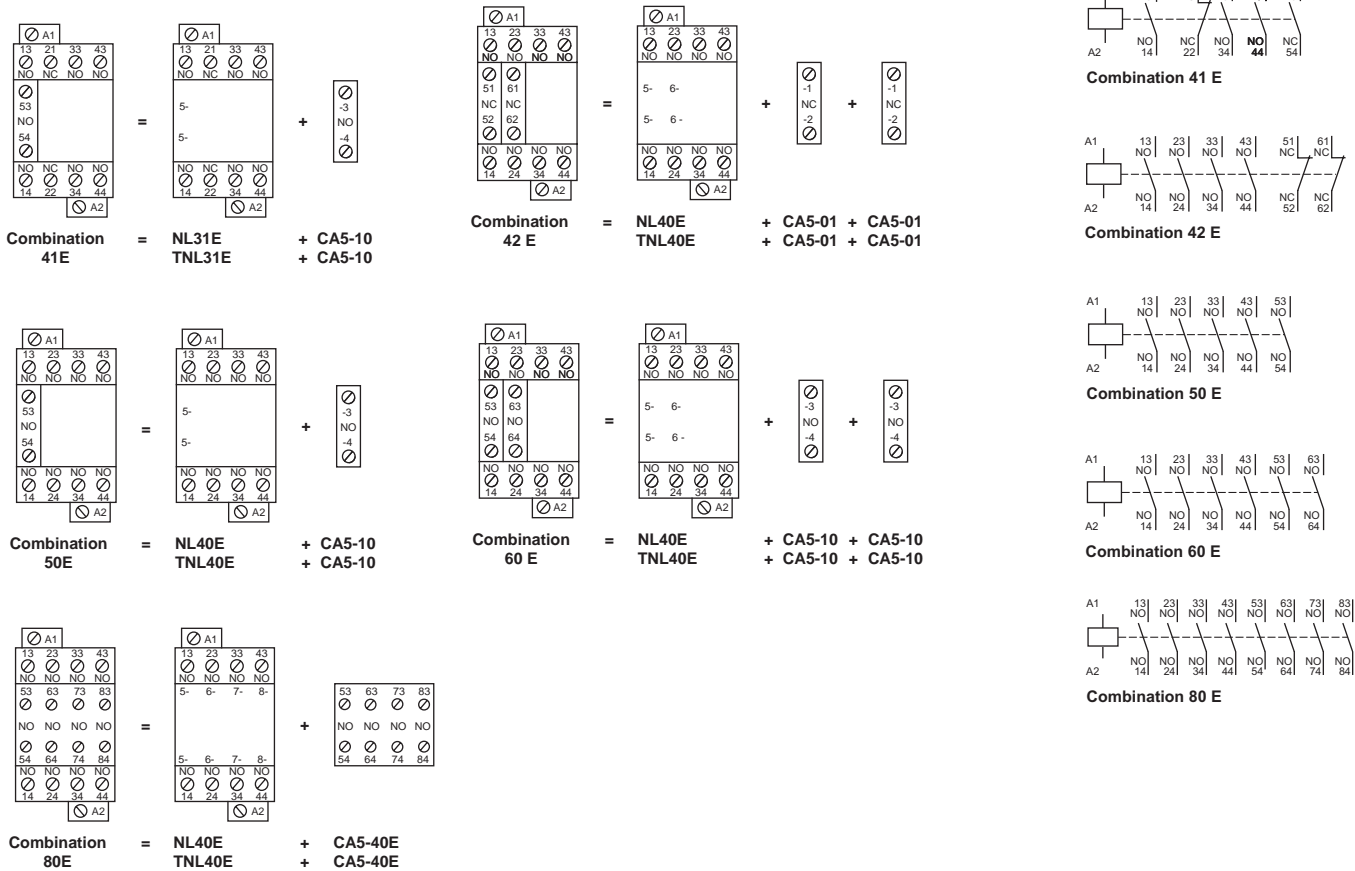
## Terminal marking and positioning

### Type NL & TNL

#### Standard devices without addition of auxiliary contacts

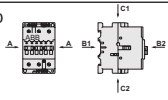


#### Other possible contact combinations with auxiliary contacts added by the user

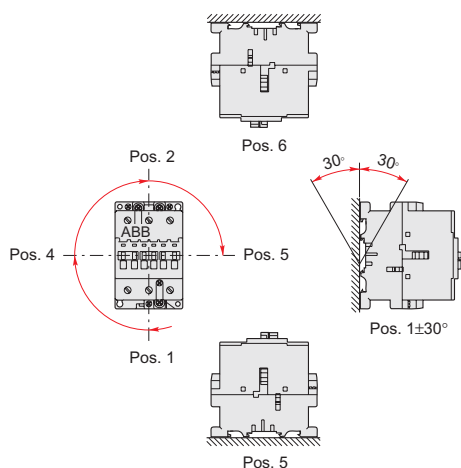


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## IEC

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
<b>Insulation characteristics</b>					
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		
<b>General technical data</b>					
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: — for storage:	°C	-40 to +55 (0.85 – 1.1 $U_c$ ) / +55 to +70 ( $U_c$ )			
	°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 - $\theta \leq 55^\circ\text{C}$ : 0.85 – 1.1 - $\theta = 55 - 70^\circ\text{C}$ :				
(see diagrams below)	Position 6	- $\theta \leq 55^\circ\text{C}$ : 0.95 – 1.1 - $\theta > 55^\circ\text{C}$ : not acceptable	unauthorized		
Operating altitude	m	$\leq 3000$			
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 — with screws (not supplied)	35mm according to IEC715 and EN50022 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 2 x AWG	16 – 12 16 – 12		
Degree of protection according to IEC529, IEC947-1 and EN60529 — Pole terminals — Coil terminals			IP20 IP20	IP20 IP20	

### Mounting positions



### Electrical durability of contacts

utilization category AC – 15 according to IEC947-5-1

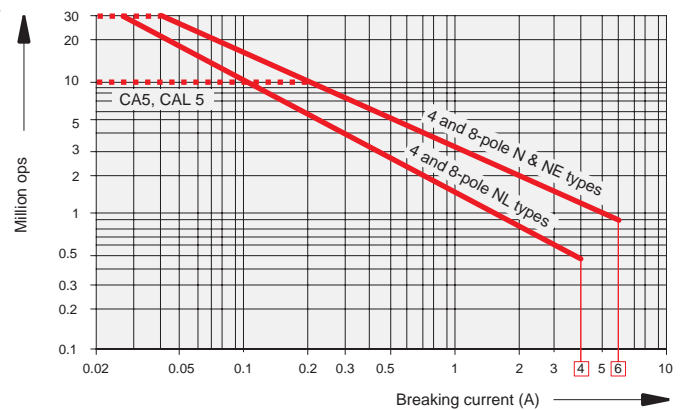
making current: 10 x

breaking current:

$I_e$  with  $\cos \varphi = 0.7$  and  $U_e$

$I_e$  with  $\cos \varphi = 0.4$  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 – 60Hz.



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
<b>Pole utilization characteristics</b>					
Rated operational voltage $U_e$ V	690				
Conventional thermal current in free air $I_{th}$ according to IEC947-5-1 $\theta \leq 40^\circ\text{C}$	A	16		16	
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		1200			
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 M $\Omega$			
Min. switching capacity					
with failure rate below 10 <sup>-6</sup>		17V / 5mA		24V / 5mA	
Non overlapping time between N.O. and N.C. contacts	ms	$\geq 2$			
Power loss per pole at 6A	W	0.10		0.15	
<b>Magnet system characteristics</b>					
Coil operating limits $\theta \leq 40^\circ\text{C}$		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 Hz <sup>①</sup> pull in	VA/VA	—	74/70	—	
50/60Hz holding	VA/W	—	8/2	—	
— d.c. operation: cold pull in	W	90	—	3	
warm holding	W	2	—	3	
Rated control voltage $U_c$					
— AC operation: 50/60 Hz	V	—	20 – 690	—	
— DC operation:	VDC	12 – 250	—	12 – 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	100	
— opening of N.C. contact	ms	8 – 12	7 – 21	20 – 70	
between coil de energization and:					
— opening of N.O. contact	ms	5 – 14	4 – 11	10 – 17	
— closing of N.C. contact	ms	11 – 17	9 – 16	16 – 27	

① 50/60 Hz coils: voltage codes 80 to 88, see page 7.5.