

NF31E-.. / NFZ31E-.. Contactor Relays AC / DC Operated - with Screw Terminals

NF(Z) contactor relays are used for switching auxiliary and control circuits.

- NF(Z) contactor relays include an electronic coil interface providing reduced pull-in and holding consumption, particularly for AC control circuits
- Only four coils are needed to cover control voltages between 24...500 V 50/60 Hz or 20...500 V DC
- NF(Z) offer extended operating limits and are suitable worldwide for different control voltages. e.g.: the coil 100...250 V 50/60 Hz - DC is suitable for Europe (230 V 50 Hz) and for North America (120 V 60 Hz and 208 V 60 Hz).
- NF(Z) contactors can manage large control voltage variations.
- NFZ contactor relays equipped with a 24...60 V 50/60 Hz - 20...60 V DC coil allow direct control by 24 V DC 500 mA PLC-output
- NFZ contactor relays withstand short voltage dips and voltage sags (SEMI F47-0706 compliance)
- NF(Z) contactor relays have built-in surge protection and do not require additional surge suppressors
- The contactor relays have mechanically-linked auxiliary contacts compliant with Annex L of IEC 60947-5-1 and include the "Mechanically Linked" symbol on their side.



3D CAD outline drawings available on «Control Product 3D» portal

Ordering Details

Number of contacts 1st stack	Control voltage Uc min. ... Uc max.	Type	Order code	EAN	Weight Pack ^(ing) 1 piece kg
	V 50/60 Hz V DC				

Contactor Relays

	24...60	20...60	NF31E-11	1SBH 137 001 R1131	3471523100213	0.270
	48...130	48...130	NF31E-12	1SBH 137 001 R1231	3471523100220	0.270
	100...250	100...250	NF31E-13	1SBH 137 001 R1331	3471523100237	0.270
	250...500	250...500	NF31E-14	1SBH 137 001 R1431	3471523100244	0.310

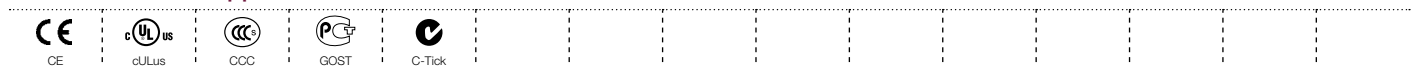
Note: NF31E-11 not suitable for a direct control by PLC-output. NF31E-11 available in some countries: please consult your ABB representative.

Contactor Relays - Low Consumption

	-	12...20	NFZ31E-20	1SBH 136 001 R2031	3471523101807	0.310
	24...60	20...60	NFZ31E-21	1SBH 136 001 R2131	3471523101814	0.310
	48...130	48...130	NFZ31E-22	1SBH 136 001 R2231	3471523101821	0.310
	100...250	100...250	NFZ31E-23	1SBH 136 001 R2331	3471523101838	0.310

Note: Only NFZ contactor relays with DC control voltage 12...20 V DC need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole

Certifications and Approvals



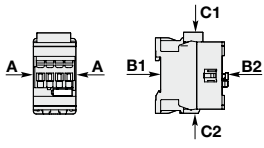
Contact Utilization Characteristics according to IEC

Standards		IEC 60947-1 / 60947-5-1 and EN 60947-1 / 60947-5-1
Rated operational voltage U_e max.		690 V
Conventional free-air thermal current I_{th} θ ≤ 40 °C		16 A
Rated frequency limits		25 ... 400 Hz
Rated operational current I_e / AC-15		
acc. to IEC 60947-5-1	24-127 V 50/60 Hz	6 A
	220-240 V 50/60 Hz	4 A
	400-440 V 50/60 Hz	3 A
	500 V 50/60 Hz	2 A
	690 V 50/60 Hz	2 A
Making capacity AC-15		10 x I _e AC-15 acc. to IEC 60947-5-1
Breaking capacity AC-15		10 x I _e AC-15 acc. to IEC 60947-5-1
Rated operational current I_e / DC-13		
acc. to IEC 60947-5-1	24 V DC	6 A / 144 W
	48 V DC	2.8 A / 134 W
	72 V DC	1 A / 72 W
	110 V DC	0.55 A / 60 W
	125 V DC	0.55 A / 69 W
	220 V DC	0.27 A / 60 W
	250 V DC	0.27 A / 68 W
	400 V DC	0.15 A / 60 W
	500 V DC	0.13 A / 65 W
	600 V DC	0.1 A / 60 W
Short-circuit protection gG type fuse		10 A
Rated short-time withstand current I_{cw}	for 1.0 s	100 A
	for 0.1 s	140 A
Minimum switching capacity		12 V / 3 mA
with failure rate acc. to IEC 60947-5-4		10 ⁻⁷
Non-overlapping time between N.O. and N.C. contacts		≥ 2 ms
Heat dissipation per pole at 6 A		0.1 W
Max. electrical switching frequency	AC-15	1200 cycles/h
	DC-13	900 cycles/h

Main Pole - Utilization Characteristics according to UL / CSA

Standards		UL 508, CSA C22.2 N°14
Rated insulation voltage U_i		600 V
Max. rated voltage		600 V AC, 600 V DC
Pilot duty		A600, Q600
AC thermal rated current		10 A
AC maximum volt-ampere making		7200 VA
AC maximum volt-ampere breaking		720 VA
DC thermal rated current		2.5 A
DC maximum volt-ampere making-breaking		69 VA

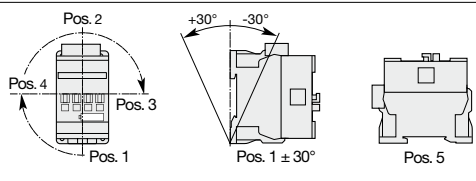
General Technical Data

Rated insulation voltage U_i acc. to IEC 60947-5-1 acc. to UL / CSA	690 V 600 V
Rated impulse withstand voltage U_{imp}	6 kV
Electromagnetic compatibility	Devices complying with IEC 60947-1 / EN 60947-1 - Environment A
Ambient air temperature close to contactor Operation in free air Storage	-40 ... +70 °C -60 ... +80 °C
Climatic withstand	Category B according to IEC 60947-1 Annex Q
Operating altitude	≤ 3000 m
Mechanical durability Number of operating cycles Max. switching frequency	20 millions operating cycles 6000 cycles/h
Shock withstand acc. IEC 60068-2-27 and EN 60068-2-27	
Mounting position 1	
	
Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position
A	30 g
B1	25 g Closed position / 5 g Open position
B2	15 g
C1	25 g
C2	25 g
Vibration withstand acc. to IEC 60068-2-6	5 ... 300 Hz 4 g Closed position / 2 g Open position

Magnet System Characteristics

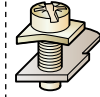
Coil operating limits acc. to IEC 60947-5-1	AC supply	at $\theta \leq 60^\circ\text{C}$ 0.85 x U_c min ... 1.1 x U_c max at $\theta \leq 70^\circ\text{C}$ 0.85 x U_c min ... U_c max
	DC supply	at $\theta \leq 60^\circ\text{C}$ 0.85 x U_c min ... 1.1 x U_c max at $\theta \leq 70^\circ\text{C}$ (NF) 0.85 x U_c min ... U_c max - (NFZ) 0.85 x U_c min ... 1.1 x U_c max
AC control voltage 50/60 Hz	Rated control circuit voltage U_c Coil consumption	24 ... 500 V AC Average pull-in value (NF) 50 VA - (NFZ) 16 VA Average holding value (NF) 2.2 VA / 2 W - (NFZ) 1.7 VA / 1.5 W
DC control voltage	Rated control circuit voltage U_c Coil consumption	12 ... 500 V DC Average pull-in value (NF) 50 W - (NFZ) 12 ... 16 W Average holding value (NF) 2 W - (NFZ) 1.7 W
PLC-Output control		(NFZ) ≥ 500 mA 24 V DC
Drop-out voltage in % of U_c min.		≤ 60 % U_c min
Voltage sag immunity according to SEMI F47-0706		(NFZ) conditions of use on request
Dips withstand (level 0% according to IEC 61000-4-11) -20 °C ≤ θ ≤ +60 °C		(NFZ) 22 ms average for $U_c = 24 \dots 250$ V 50/60Hz
Operating time between coil energization and:	N.O. contact closing	40 ... 95 ms
	N.C. contact opening	38 ... 90 ms
between coil de-energization and:	N.O. contact opening	11 ... 95 ms
	N.C. contact closing	13 ... 98 ms

Mounting Characteristics

Mounting positions	
	Max. add-on N.C. auxiliary contacts: see accessory fitting details for a NF contactor relay
Mounting distances	The contactor relays can be assembled side by side.
Fixing on rail according to IEC 60715, EN 60715 by screws (not supplied)	35 x 7.5 mm or 35 x 15 mm 2 x M4 screws placed diagonally

Connecting Characteristics








Main terminals



Screw terminals with cable clamp

Connecting capacity (min. ... max.)

Pole and coil terminals

	Rigid	1 x	1 ... 2.5 mm ²
		2 x	1 ... 2.5 mm ²
	Flexible with non insulated ferrule	1 x	0.75 ... 2.5 mm ²
		2 x	0.75 ... 2.5 mm ²
	Flexible with insulated ferrule	1 x	0.75 ... 2.5 mm ²
		2 x	0.75 ... 1.5 mm ²
	Bars or lugs	L <	8 mm

Capacity according to UL/CSA 1 or 2 x AWG 18 ... 14

Stripping length 10 mm

Degree of protection

acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529

All terminals IP20

Screw terminals

All terminals (delivered in open position, screws of unused terminals must be tightened)

All terminals M3.5

Screwdriver type

Flat Ø 5.5 / Pozidriv 2

Tightening torque

Pole terminals 1.2 Nm / 11 lb.in

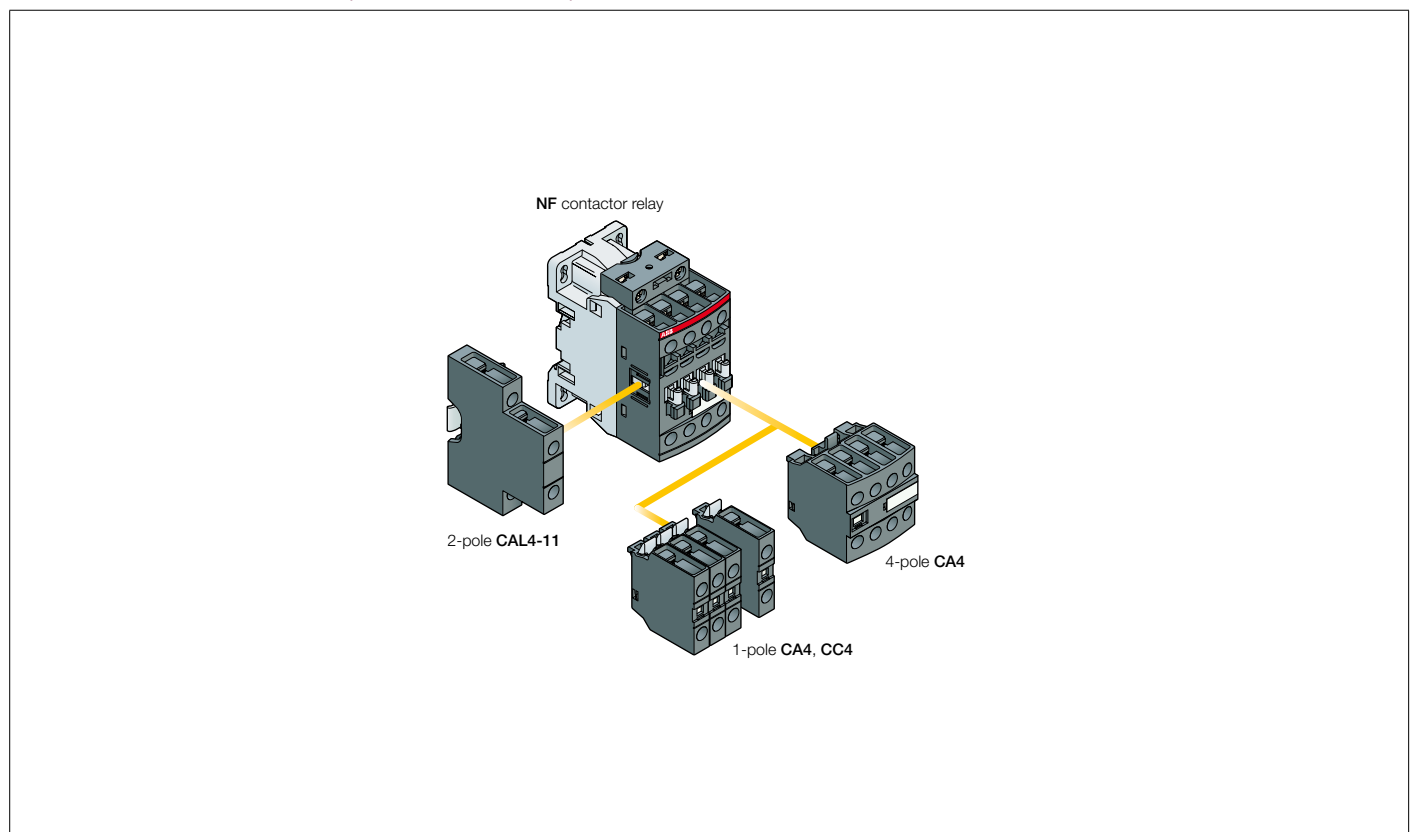
Coil terminals 1.2 Nm / 11 lb.in

Accessory Fitting Details for a NF Contactor Relay

Many configurations of accessories are possible depending on whether these are front-mounted or side-mounted.

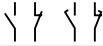
Front-mounted accessories		Side-mounted accessories	
Auxiliary contact blocks		Auxiliary contact blocks	
1-pole CA4	4-pole CA4	Left side	Right side
1-pole CC4		2-pole CAL4-11	
Max. add-on N.C. auxiliary contacts: 3 N.C. max. on positions 1, 2, 3, 4 and 2 N.C. max. on positions 1 ±30°, 5			
4 max.	or 1	+ 1	-
2 max.	-	+ 1	+ 1

Overview of main accessories (other accessories available)



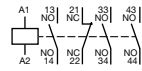
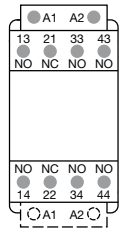
Main Accessories

Ordering Details

Description	Auxiliary contacts 	Type	Order code	EAN	Pack ^(ing) piece	Weight	
						kg <small>(1 pce)</small>	
Additional auxiliary contact blocks	Front-mounted instantaneous auxiliary contact blocks	0 1 - -	CA4-01	1SBN 010 110 R1001	3471523130029	1	0.014
		1 0 - -	CA4-10	1SBN 010 110 R1010	3471523130005	1	0.014
		0 1 - -	CA4-01-T	1SBN 010 110 T1001	3471523130395	10	0.014
		1 0 - -	CA4-10-T	1SBN 010 110 T1010	3471523130371	10	0.014
	Front-mounted auxiliary contact blocks with N.O. leading contact and N.C. lagging contact	- - 0 1	CC4-01	1SBN 010 111 R1001	3471523130432	1	0.014
		- - 1 0	CC4-10	1SBN 010 111 R1010	3471523130425	1	0.014
	Side-mounted instantaneous auxiliary contact blocks	1 1 - -	CAL4-11	1SBN 010 120 R1011	3471523130043	1	0.040
		1 1 - -	CAL4-11-T	1SBN 010 120 T1011	3471523130418	10	0.040
	Front-mounted instantaneous auxiliary contact blocks	1 3 - -	CA4-13N	1SBN 010 140 R1213	3471523130272	1	0.055
		2 2 - -	CA4-22N	1SBN 010 140 R1222	3471523130241	1	0.055
	3 1 - -	CA4-31N	1SBN 010 140 R1231	3471523130258	1	0.055	
	4 0 - -	CA4-40N	1SBN 010 140 R1240	3471523130265	1	0.055	
Additional coil terminal block	Additional coil terminal block		LDC4	1SBN 070 156 T1000	3471523130678	10	0.010
Protective covers	Protective covers		BX4	1SBN 110 108 T1000	3471523130708	10	0.006
			BX4-CA	1SBN 110 109 W1000	3471523130715	50	0.001
Function markers	Function markers		BA4	1SNA 235 156 R2700	3472592351568	16	0.011
			HTP500-BA4	1SNA 235 712 R2400	3472592357126	1	0.220
			SPRC 1	1SNA 360 010 R1500	3472593600108	1	0.290

Terminal Marking and Positioning

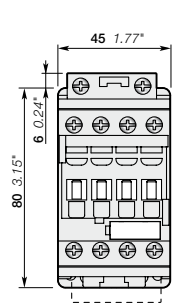
Standard devices without addition of auxiliary contacts



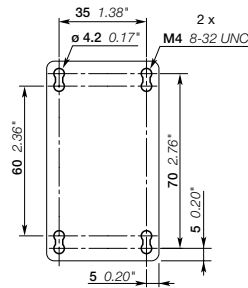
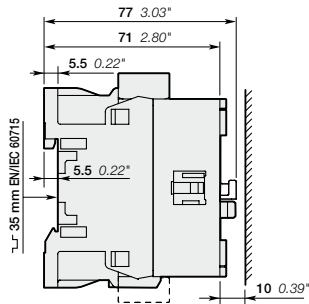
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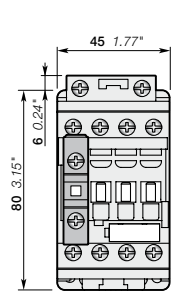
Dimensions mm, inches



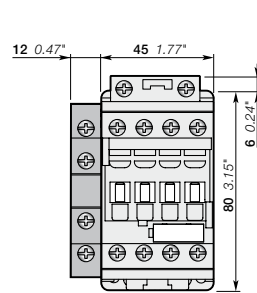
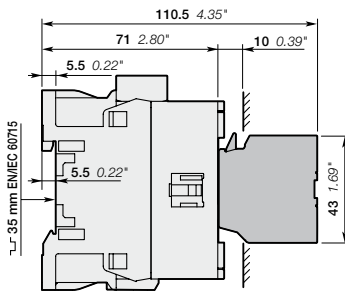
NF31E



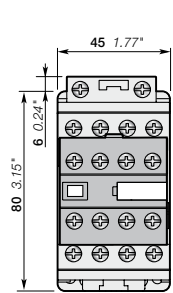
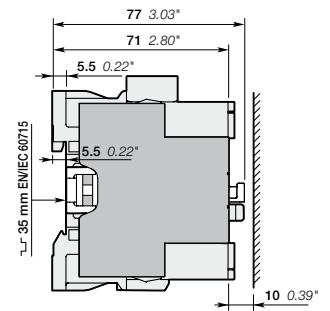
NF31E



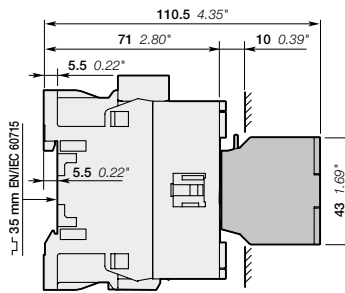
NF31E
+ CA4, CC4 1-pole auxiliary contact block



NF31E
+ CAL4-11 2-pole auxiliary contact block



NF31E
+ CA4 4-pole auxiliary contact block



Note: contactor lateral distance to grounded component 2 mm 0.08" min.