# NFZ 4-pole contactor relays
## 24 V DC operated - low consumption

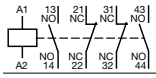
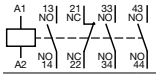
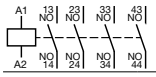
**NFZ22E-30**

### Description

NFZ contactor relays are used for switching auxiliary and control circuits. These contactor relays are of the block type design with:

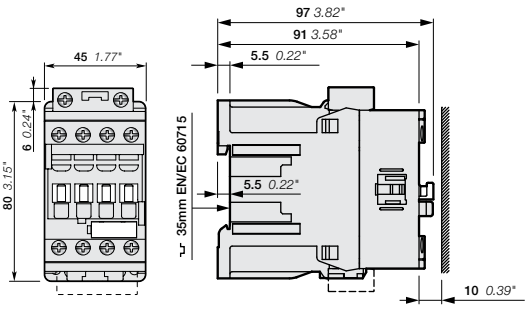
- 4 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: DC operated with electronic coil interface allowing low holding consumption up to 1.7 W and reduced panel energy consumption
- allow direct control by PLC-output ≥ 250 mA 24 V DC
- very distinct closing and opening
- built-in surge suppression
- add-on auxiliary contact blocks for front or side mounting and a wide range of accessories.

### Ordering details

| Number of contacts | Rated control circuit voltage Uc V DC | Type | Order code | | Weight Pkg (1 pce) kg |
|---|---|---|---|---|---|
| **4-pole contactor relays** | | | | | |
|  | 24 | NFZ22E-30 | 1SBH136001R3022 | | 0.430 |
|  | 24 | NFZ31E-30 | 1SBH136001R3031 | | 0.430 |
|  | 24 | NFZ40E-30 | 1SBH136001R3040 | | 0.430 |

Note: NFZ contactor relays with DC control voltage 24 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.

### Main dimensions mm, *inches*

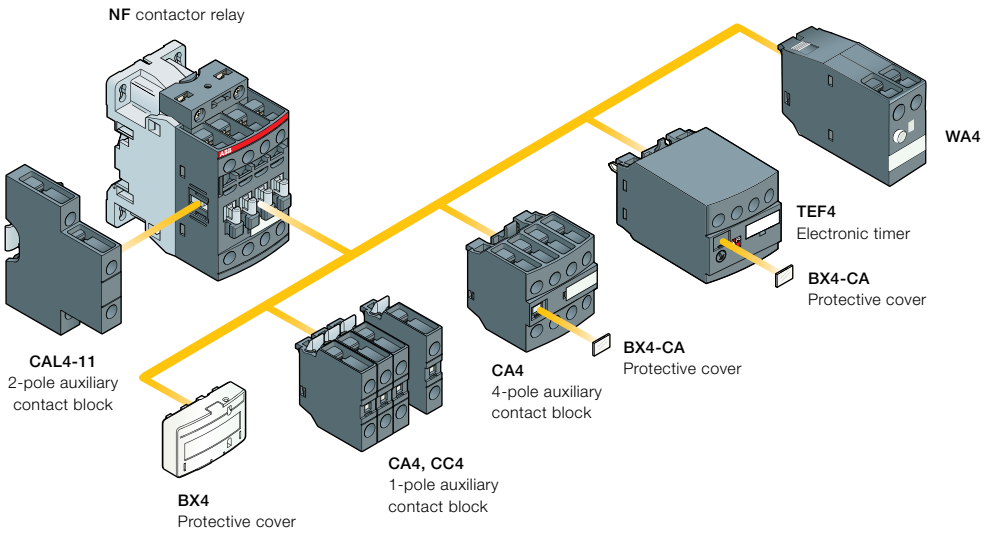



**NFZ22E, NFZ31E, NFZ40E**

1SBC100330S0201

# NF 4-pole contactor relays
## Main accessories

### Contactor relays and main accessories (other accessories available)




### Main accessory fitting details

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

| Contactor relay types | Main poles | | | Front-mounted accessories: Auxiliary contact blocks: 1-pole CA4 / 1-pole CC4 (2) | | Front-mounted accessories: Auxiliary contact blocks: 4-pole CA4 | | Front-mounted accessories: Electronic timer: TEF4 (2) | | Front-mounted accessories: Mechanical latching unit: WA4 (1) (2) | | Side-mounted accessories: Auxiliary contact blocks: Left side: 2-pole CAL4-11 | | Side-mounted accessories: Auxiliary contact blocks: Right side |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | NF..22E, NF..31E: 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<br>NF..40E: max. add-on N.C. auxiliary contacts: 4 N.C. max. on positions 1, 2, 3, 4 and 3 N.C. max. on positions 1 ±30°, 5 | | | | | | | | | | |
| NF | 2 | 2 | E | 4 max. | or | 1 | or | 1 | or | 1 | + | 1 | | |
| | 3 | 2 | E | 2 max. | | – | or | 1 | or | 1 | + | 1 | + | 1 |
| | 4 | 0 | E | | | | | | | | | | | |
| NFZ 24 V DC (coil 30) | | | | NFZ22E, NFZ31E: 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<br>NFZ40E: max. add-on N.C. auxiliary contacts: 4 N.C. max. on positions 1, 2, 3, 4 and 3 N.C. max. on positions 1 ±30°, 5 | | | | | | | | | | |
| NFZ | 2 | 2 | E | 4 max. | or | 1 | | – | | – | or | 1 | + | 1 |
| | 3 | 1 | E | 2 max. | | – | | – | | – | + | 1 | | |
| | 4 | 0 | E | | | | | | | | | | | |

(1) accept 1-pole CA4 auxiliary contacts (1 block on each side of the mechanical latch) in respect to the total number of built-in or additional N.C. auxiliary contacts.
(2) For CC4, CE5, WA4, TEF4 accessory use with contactor relays coil 30, please consult your ABB local sales organization.

1SBC100362S0201 - Rev. A

# NF 4-pole contactor relays
## Main accessories

1SBC101108F0014

CA4-10

1SBC101112F0014

CAL4-11

1SBC101123F0014

CA4-22N

### Ordering details (1)

| For contactor relays | Auxiliary contacts | | Type | Order code | | Pkg qty | Weight (1 pce) kg |
|---|---|---|---|---|---|---|---|
| **Front-mounted instantaneous auxiliary contact blocks** | | | | | | | |
| 4-pole NF | 1 0 | – – | CA4-10 | 1SBN010110R1010 | | 1 | 0.014 |
| | 1 0 | – – | CA4-10-T | 1SBN010110T1010 | | 10 | 0.014 |
| | 0 1 | – – | CA4-01 | 1SBN010110R1001 | | 1 | 0.014 |
| | 0 1 | – – | CA4-01-T | 1SBN010110T1001 | | 10 | 0.014 |
| | 4 0 | – – | CA4-40N | 1SBN010140R1240 | | 1 | 0.055 |
| | 3 1 | – – | CA4-31N | 1SBN010140R1231 | | 1 | 0.055 |
| | 2 2 | – – | CA4-22N | 1SBN010140R1222 | | 1 | 0.055 |
| | 1 3 | – – | CA4-13N | 1SBN010140R1213 | | 1 | 0.055 |
| NF..40E | 0 4 | – – | CA4-04N | 1SBN010140R1204 | | 1 | 0.055 |
| **Front-mounted auxiliary contact blocks with N.O. leading contact and N.C. lagging contact (2)** | | | | | | | |
| 4-pole NF | – – | 1 0 | CC4-10 | 1SBN010111R1010 | | 1 | 0.014 |
| | – – | 0 1 | CC4-01 | 1SBN010111R1001 | | 1 | 0.014 |
| **Side-mounted instantaneous auxiliary contact blocks** | | | | | | | |
| NF | 1 1 | – – | CAL4-11 | 1SBN010120R1011 | | 1 | 0.040 |
| | 1 1 | – – | CAL4-11-T | 1SBN010120T1011 | | 10 | 0.040 |

1SBC101392F0014

TEF4-ON

1SBC101058V0014

WA4-13

1SBC101133F0014

LDC4

1SBC101136F0014

BX4


1SBC101138F0014

BX4-CA

| For contactors | Time delay range selected by switch | Delay type | Auxiliary contacts | Type | Order code | | Pkg qty | Weight (1 pce) kg |
|---|---|---|---|---|---|---|---|---|
| **Electronic timers (2)** | | | | | | | | |
| NF | 0.1...1 s<br>1...10 s<br>10...100 s | ON-delay | 1 1 | TEF4-ON | 1SBN020112R1000 | | 1 | 0.065 |
| | | OFF-delay | 1 1 | TEF4-OFF | 1SBN020114R1000 | | 1 | 0.065 |

Note: Rated control circuit voltage Uc 24...240 V 50/60 Hz or DC.

| | | | | | | |
|---|---|---|---|---|---|---|
| **Mechanical latching unit (2)** | | | | | | |
| 4-pole NF | WA4-13 | 1SBN040100R1013 | | 1 | 0.080 |

Note: coil 13 for Uc 100...250 V 50/60 Hz or DC. For other rated control circuit voltages between 24…500 V 50/60 Hz / DC or 24 V DC - 500 mA PLC control, refer to main catalog "Accessories" section.

| | | | | | |
|---|---|---|---|---|---|
| **Additional coil terminal block** | | | | | |
| NF | LDC4 | 1SBN070156T1000 | | 10 | 0.010 |
| **Protective covers** | | | | | |
| All 1-stack contactor relays | BX4 | 1SBN110108T1000 | | 10 | 0.006 |
| 4-pole CA4 auxiliary contact blocks and TEF4 electronic timer | BX4-CA | 1SBN110109W1000 | | 50 | 0.001 |

(1) For more information, refer to main catalog "Accessories" section.
(2) For CC4, CE5, WA4, TEF4 accessory use with contactor relays coil 30, please consult your ABB local sales organization.



1SBC100363S0201 - Rev. A

# NFZ 8-pole contactor relays
## 24 V DC operated - low consumption

1SBC101535V0014

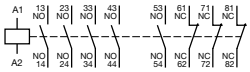
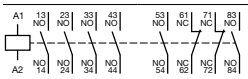
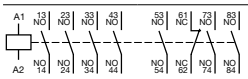
**NFZ44E**

### Description

NFZ contactor relays are used for switching auxiliary and control circuits. These contactor relays are of the block type design with:

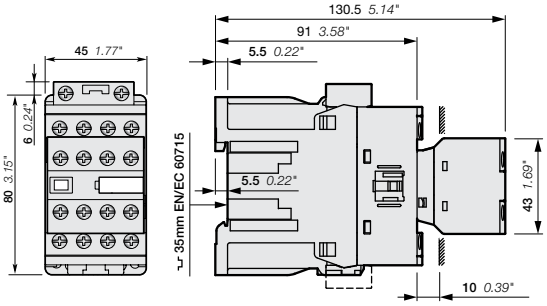
- 8 poles with a permanently fixed 4-pole auxiliary contact block. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- control circuit: DC operated with electronic coil interface allowing low holding consumption up to 1.7 W and reduced panel energy consumption
- allow direct control by PLC-output ≥ 250 mA 24 V DC
- very distinct closing and opening
- built-in surge suppression.

### Ordering details

| Number of contacts | Rated control circuit voltage Uc V DC | Type | Order code | | Weight Pkg (1 pce) kg |
|---|---|---|---|---|---|
| **8-pole contactor relays** | | | | | |
| | 24 | NFZ44E-30 | 1SBH136001R3044 | | 0.490 |
|  | 24 | NFZ53E-30 | 1SBH136001R3053 | | 0.490 |
|  | 24 | NFZ62E-30 | 1SBH136001R3062 | | 0.490 |
|  | 24 | NFZ71E-30 | 1SBH136001R3071 | | 0.490 |
| | 24 | NFZ80E-30 | 1SBH136001R3080 | | 0.490 |

Note: NFZ contactor relays with DC control voltage 24 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.

### Main dimensions mm, *inches*

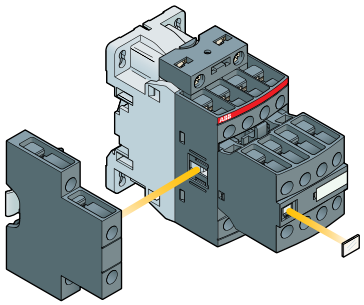



**NFZ44E, NFZ53E, NFZ62E, NFZ71E, NFZ80E**

1SBC100431S0201

# NF 8-pole contactor relays
## Main accessories

### Contactor relays and main accessories (other accessories available)




### Main accessory fitting details

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

| Contactor relay types | Main poles | Front-mounted accessories<br>Auxiliary contact blocks<br>1-pole CA4<br>1-pole CC4 | 4-pole CA4 | | | Side-mounted accessories<br>Auxiliary contact blocks<br>Left side<br>2-pole CAL4-11 (1) | Right side |
|---|---|---|---|---|---|---|---|
| NF | 4 4 E | – | – | | + | 1 | – |
| | 5 3 E | | | | | | |
| | 6 2 E | | | | | | |
| | 7 1 E | | | | | | |
| | 8 0 E | | | | | | |
| | 3 3 / 1 1 | | | | | | |
| | 5 1 / 1 1 | | | | | | |

(1) not allowed for 24 V DC operated contactor relay (coil 30)

1SBC101598S0201 - Rev. C

# NF contactor relays
# Technical data

## Contact utilization characteristics according to IEC

| Contactor relay types | AC / DC operated | NF |
|---|---|---|
| Standards | | IEC 60947-1 / 60947-5-1 and EN 60947-1 / 60947-5-1 |
| Rated operational voltage Ue max. | | 690 V |
| Rated frequency (without derating) | | 50 / 60 Hz |
| Conventional free-air thermal current Ith $\theta \leq 40$ °C | | 16 A |
| Ie / Rated operational current 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 |
| Rated making capacity AC-15 | | 10 x Ie AC-15 acc. to IEC 60947-5-1 |
| Rated breaking capacity AC-15 | | 10 x Ie AC-15 acc. to IEC 60947-5-1 |
| Ie / Rated operational current 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 device gG type fuse | | 10 A |
| Rated short-time withstand current Icw | 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 |
| Power dissipation per pole at 6 A | | 0.1 W |
| Max. electrical switching frequency | AC-15 | 1200 cycles/h |
| | DC-13 | 900 cycles/h |
| Mechanically linked contacts<br>acc. to annex L of IEC 60947-5-1 | | Built-in N.O. or N.C. auxiliary contacts and additional N.O. or N.C. auxiliary contacts (CA4, CAL4 aux. contact blocks) are mechanically linked contacts. |

## Contact utilization characteristics according to UL / CSA

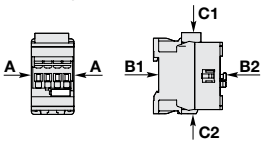
| Contactor relay types | AC / DC operated | NF |
|---|---|---|
| Standards | | UL 508, CSA C22.2 N°14 |
| Max. operational voltage | | 600 V AC, 600 V DC |
| Pilot duty | | A600, Q600 |
| AC thermal rated current | | 10 A |
| AC maximum volt-ampere making | | 7200 VA |
| AC maximum volt-ampere breaking | | 720 VA |
| DC thermal rated current | | 2.5 A |
| DC maximum volt-ampere making-breaking | | 69 VA |



1SBC101562S0201 - Rev. A

# NF contactor relays
# Technical data

## General technical data

| Contactor relay types | AC / DC operated | NF |
|---|---|---|
| **Rated insulation voltage Ui** | | |
| acc. to IEC 60947-5-1 | | 690 V |
| acc. to UL / CSA | | 600 V |
| **Rated impulse withstand voltage Uimp.** | | 6 kV |
| **Electromagnetic compatibility** | | Devices complying with IEC 60947-1 / EN 60947-1 - Environment A and B (1) |
| **Ambient air temperature** close to contactor relay | | |
| Operation in free air | | -40...+70 °C |
| Storage | | -60...+80 °C |
| **Climatic withstand** | | Category B according to IEC 60947-1 Annex Q |
| **Maximum operating altitude (without derating)** | | 3000 m |
| **Mechanical durability** | | |
| Number of operating cycles | | 20 millions operating cycles |
| Max. switching frequency | | 6000 cycles/h |
| **Shock withstand** acc. to 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, closed or open 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<br>4 g closed position / 2 g open position |

(1) Environment B: all NF contactor relays produced since week 08-2013. NF..E-12 (48...130 V 50/60 Hz-DC) compliant to environment A only.
For environment B: select NF..E-22.

## Magnet system characteristics

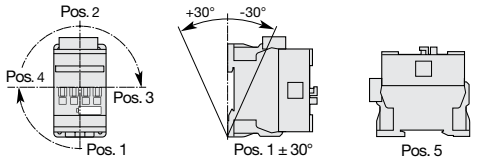
| Contactor relay types | AC / DC operated | NF |
|---|---|---|
| **Coil operating limits** acc. to IEC 60947-5-1 | **AC supply** | At θ ≤ 60 °C 0.85 x Uc min...1.1 x Uc max.<br>At θ ≤ 70 °C 0.85 x Uc min...Uc max. |
| | **DC supply** | at θ ≤ 60 °C 0.85 x Uc min ... 1.1 x Uc max - (NFZ coil 30) 0.85 ... 1.1 Uc<br>at θ ≤ 70 °C (NF) 0.85 x Uc min ... Uc max - (NFZ coil 20, 21, 22, 23) 0.85 x Uc min ... 1.1 x Uc max (NFZ coil 30) Uc |
| **AC control voltage 50/60 Hz** | | |
| Rated control circuit voltage Uc | | 24...500 V AC |
| Coil consumption | **Average pull-in value** | (NF) 50 VA - (NFZ coil 21, 22, 23) 16 VA |
| | **Average holding value** | (NF) 2.2 VA / 2 W - (NFZ coil 21, 22, 23) 1.7 VA / 1.5 W |
| **DC control voltage** | | |
| Rated control circuit voltage Uc | | 12...500 V DC |
| Coil consumption | **Average pull-in value** | (NF) 50 W - (NFZ coil 20, 21, 22, 23) 12 ... 16 W - (NFZ coil 30) 6 W |
| | **Average holding value** | (NF) 2 W - (NFZ) 1.7 W |
| **PLC-output control** | | (NFZ coil 30) ≥ 250 mA 24 V DC for PLCs and safety PLCs using broken wire detection<br>(NFZ coil 21) ≥ 500 mA 24 V DC for PLCs |
| **Drop-out voltage** | | ≤ 60 % of Uc min. |
| **Voltage sag immunity** acc. to SEMI F47-0706 | | (NFZ coil 21, 22, 23) conditions of use on request |
| **Dips withstand** -20 °C ≤ θ ≤ +60 °C | | (NFZ coil 21, 22, 23) 22 ms average for Uc ≥ 24 V 50/60 or Uc ≥ 20 V DC |
| **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 |
| **Operating time with NFZ coil 30 24 V DC** | | |
| Between coil energization and: | **N.O. contact closing** | 27 ... 53 ms |
| | **N.C. contact opening** | 20 ... 35 ms |
| Between coil de-energization and: | **N.O. contact opening** | 17 ... 29 ms |
| | **N.C. contact closing** | 22 ... 57 ms |



1SBC101563S0201 - Rev. B

# NF contactor relays
# Technical data

## Mounting characteristics

| Contactor relay types | AC / DC operated | NF |
|---|---|---|
| **Mounting positions** | |   |
| | | Max. add-on N.C. auxiliary contacts:<br>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 | | 35 x 7.5 mm or 35 x 15 mm |
| By screws (not supplied) | | 2 x M4 screws placed diagonally |

5

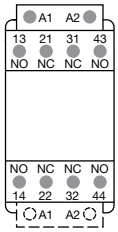
## Connecting characteristics

| Contactor relay types | AC / DC operated | NF |
|---|---|---|
| **Main terminals** | | |
| | | Screw terminals with cable clamp |
| **Connection capacity** (min. ... max.) | | |
| **Pole and coil terminals** | | |
| Rigid | **1 x** | 1...2.5 mm² |
| | **2 x** | 1...2.5 mm² |
| Flexible with non insulated ferrule | **1 x** | 0.75...2.5 mm² |
| | **2 x** | 0.75...2.5 mm² |
| Flexible with insulated ferrule | **1 x** | 0.75...2.5 mm² |
| | **2 x** | 0.75...1.5 mm² |
| Lugs | **L <** | 8 mm |
| Connection capacity acc. to UL/CSA | **1 or 2 x** | AWG 18...14 |
| Stripping length | | 10 mm |
| Tightening torque | | |
| Pole terminals | | 1.2 Nm / 11 lb.in |
| Coil terminals | | 1.2 Nm / 11 lb.in |
| **Degree of protection** | | |
| acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529 | | |
| All terminals | | IP20 |
| **Screw terminals** | | Delivered in open position, screws of unused terminals must be tightened |
| All terminals | | M3.5 |
| | **Screwdriver type** | Flat Ø 5.5 / Pozidriv 2 |

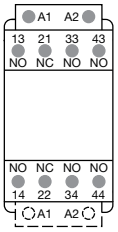
1SBC101564S0201 - Rev. A

# NF contactor relays
## Terminal marking and positioning

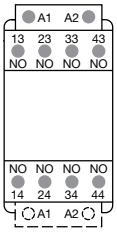
### Standard devices without addition of auxiliary contacts



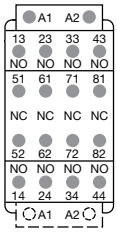
NF..22E



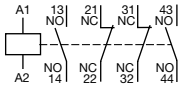
NF..31E



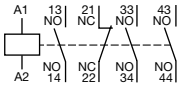
NF..40E



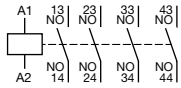
NF..44E



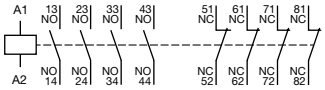
NF..22E



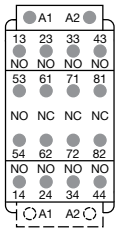
NF..31E



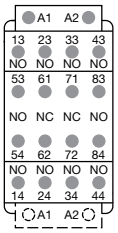
NF..40E



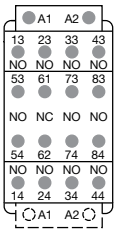
NF..44E



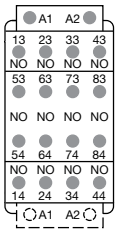
NF..53E



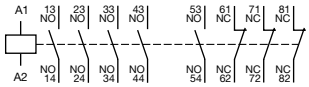
NF..62E



NF..71E

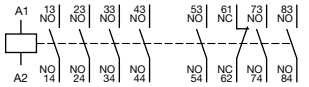


NF..80E

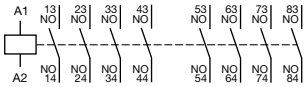


NF..53E

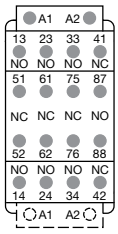
NF..62E



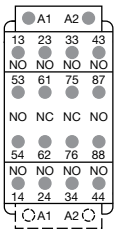
NF..71E



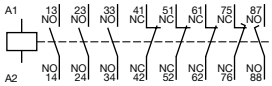
NF..80E



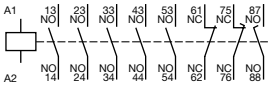
NF..33/11



NF..51/11

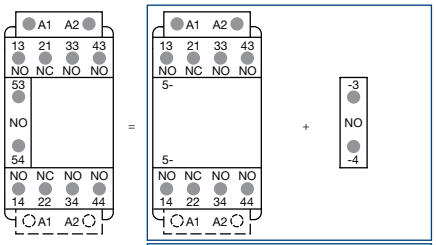


NF..33/11

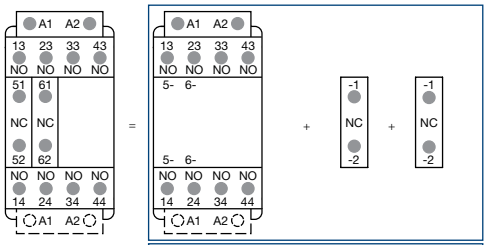


NF..51/11

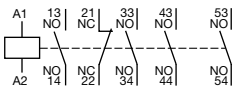
### Other possible contact combinations with auxiliary contacts added by the user



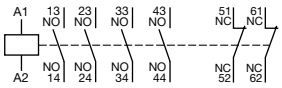
Combination 41 = NF..31E + CA4-10



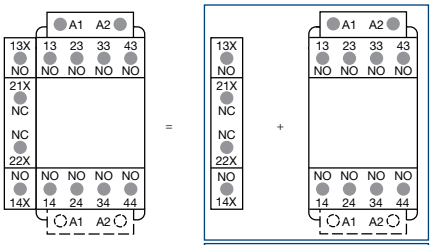
Combination 42 = NF..40E + CA4-01+CA4-01



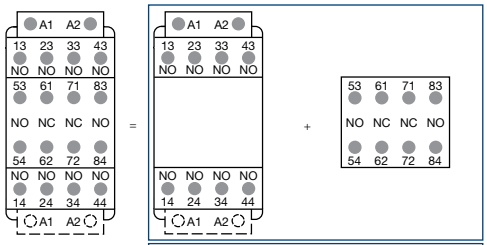
Combination 41 E



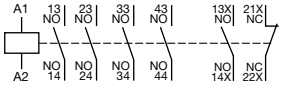
Combination 42 E



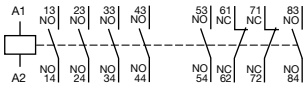
Combination 51 = CAL4-11 + NF..40E



Combination 62 = NF..40E + CA4-22N



Combination 51 E



Combination 62 E

Note: only NFZ contactor relays with DC control voltages 12...20 V DC (coil 20) and 24 V DC (coil 30) need to respect the connection polarities indicated close to the coil terminals: A1+ for the positive pole and A2- for the negative pole.



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# NF add-on auxiliary contacts
## Terminal marking and positioning

### 1-pole auxiliary contacts

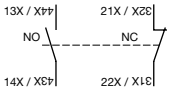
**CA4-01**

**CA4-10**

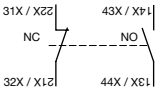
**CC4-01**

**CC4-10**

### 2-pole auxiliary contacts

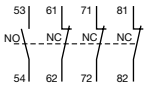



**CAL4-11**
**(Left side-mounted)**

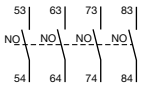



**CAL4-11**
**(Right side-mounted)**

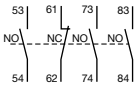
### 4-pole auxiliary contacts



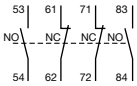

**CA4-13N**



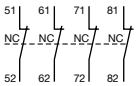

**CA4-40N**




**CA4-31N**




**CA4-22N**




**CA4-04N**

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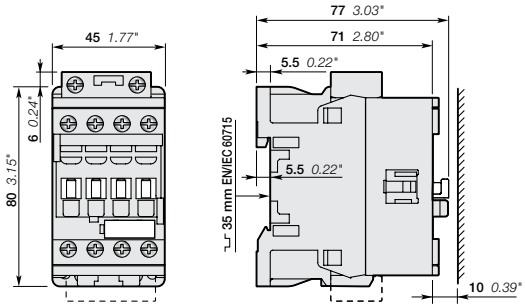
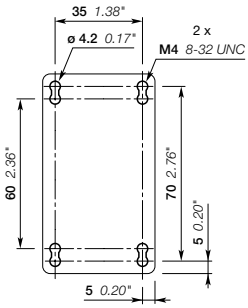
# NF contactor relays

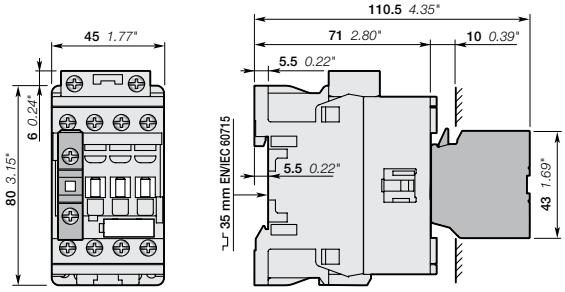
## Main dimensions mm, *inches*



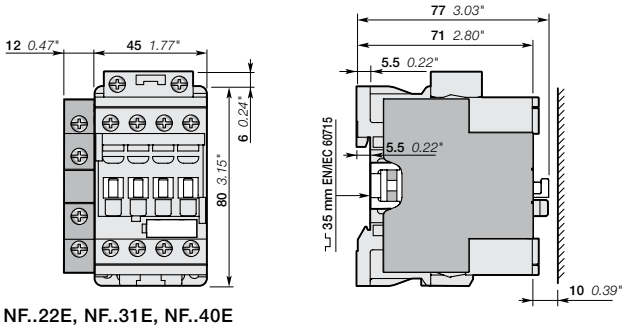

**NF..22E, NF..31E, NF..40E**



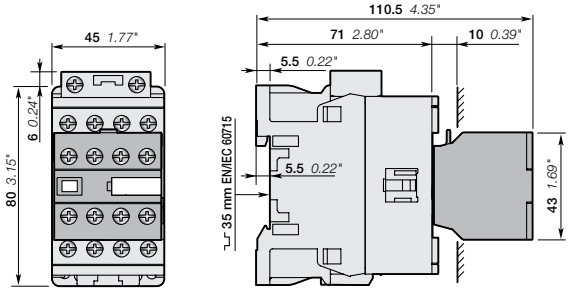

**NF**



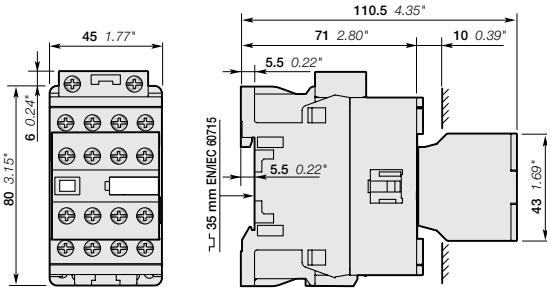

**NF..22E, NF..31E, NF..40E**
**+ CA4, CC4 1-pole auxiliary contact block**



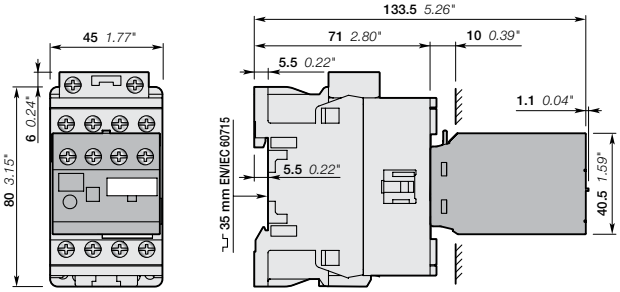

**NF..22E, NF..31E, NF..40E**
**+ CAL4-11 2-pole auxiliary contact block**




**NF..22E, NF..31E, NF..40E**
**+ CA4 4-pole auxiliary contact block**




**NF..44E, NF..53E, NF..62E, NF..71E, NF..80E, NF..33/11, NF..51/11**




**NF..22E, NF..31E, NF..40E**
**+ TEF4 electronic timer**

Note: contactor relay lateral distance to grounded component 2 mm 0.08" min.
24 V DC operated contactor relay (coil 30) depth + 20 mm 0.79".



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