Technical Datasheet **1SBC101433D0201** *28/03/11*

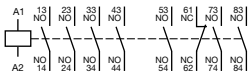
# **NF71E-.. / NFZ71E-..** Contactor Relays AC / DC Operated - with Screw Terminals

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

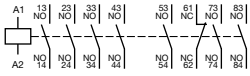
- NF(Z) contactor relays include an electronic coil interface providing reduced pull-in and holding consumption, particularly for AC control circuits
- Only four coils are needed to cover control voltages between 24...500 V 50/60 Hz or 20...500 V DC
  NF(Z) offer extended operating limits and are suitable 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 | | Control voltage | | Type | Order code | EAN | | Weight |
|---|---|---|---|---|---|---|---|---|
| 1st stack | 2nd stack | Uc min. ... Uc max. | | | | | | Pack(ing) 1 piece |
| | | V 50/60 Hz | V DC | | | | | kg |
| **Contactor Relays** | | | | | | | | |
|  | | 24...60 | 20...60 | **NF71E-11** | **1SBH 137 001 R1171** | 3471523100411 | | 0.320 |
| | | 48...130 | 48...130 | **NF71E-12** | **1SBH 137 001 R1271** | 3471523100428 | | 0.320 |
| | | 100...250 | 100...250 | **NF71E-13** | **1SBH 137 001 R1371** | 3471523100435 | | 0.320 |
| | | 250...500 | 250...500 | **NF71E-14** | **1SBH 137 001 R1471** | 3471523100442 | | 0.360 |

Note: NF71E-11 not suitable for a direct control by PLC-output. NF71E-11 available in some countries: please consult your ABB representative.

| **Contactor Relays - Low Consumption** | | | | | | | |
|---|---|---|---|---|---|---|---|
|  | - | 12...20 | **NFZ71E-20** | **1SBH 136 001 R2071** | 3471523102002 | | 0.360 |
| | 24...60 | 20...60 | **NFZ71E-21** | **1SBH 136 001 R2171** | 3471523102019 | | 0.360 |
| | 48...130 | 48...130 | **NFZ71E-22** | **1SBH 136 001 R2271** | 3471523102026 | | 0.360 |
| | 100...250 | 100...250 | **NFZ71E-23** | **1SBH 136 001 R2371** | 3471523102033 | | 0.360 |

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

CE cULus CCC GOST C-Tick

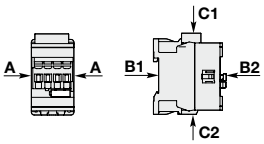
## Contact Utilization Characteristics according to IEC

| | | |
|---|---|---|
| **Standards** | | IEC 60947-1 / 60947-5-1 and EN 60947-1 / 60947-5-1 |
| **Rated operational voltage Ue max.** | | 690 V |
| **Conventional free-air thermal current Ith $\theta \leq 40$ °C** | | 16 A |
| **Rated frequency limits** | | 25 ... 400 Hz |
| **Rated operational current Ie / 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 Ie AC-15 acc. to IEC 60947-5-1 |
| **Breaking capacity AC-15** | | 10 x Ie AC-15 acc. to IEC 60947-5-1 |
| **Rated operational current Ie / 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

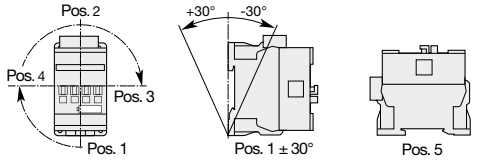
| | | |
|---|---|---|
| **Rated insulation voltage Ui** | | |
| acc. to IEC 60947-5-1 | | 690 V |
| acc. to UL / CSA | | 600 V |
| **Rated impulse withstand voltage Uimp** | | 6 kV |
| **Electromagnetic compatibility** | | Devices complying with IEC 60947-1 / EN 60947-1 - Environment A |
| **Ambient air temperature close to contactor** | | |
| Operation in free air | | -40 ... +70 °C |
| Storage | | -60 ... +80 °C |
| **Climatic withstand** | | Category B according to IEC 60947-1 Annex Q |
| **Operating altitude** | | ≤ 3000 m |
| **Mechanical durability** | | |
| Number of operating cycles | | 20 millions operating cycles |
| Max. switching frequency | | 6000 cycles/h |
| **Shock withstand** acc. IEC 60068-2-27 and EN 60068-2-27 | | |
| Mounting position 1 | | |
|  Closed or open position | **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<br>4 g Closed position / 2 g Open position |



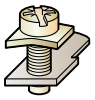
## Magnet System Characteristics

| | | | |
|---|---|---|---|
| **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<br>at θ ≤ 70°C (NF) 0.85 x Uc min ... Uc max - (NFZ) 0.85 x Uc min ... 1.1 x Uc max |
| **AC control voltage** | Rated control circuit voltage Uc | | 24 ... 500 V AC |
| 50/60 Hz | Coil consumption | **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 Uc | | 12 ... 500 V DC |
| | Coil consumption | **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 Uc min.** | | | ≤ 60 % Uc 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 Uc = 24 ... 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 | 35 x 7.5 mm or 35 x 15 mm |
| by screws (not supplied) | 2 x M4 screws placed diagonally |

## Connecting Characteristics

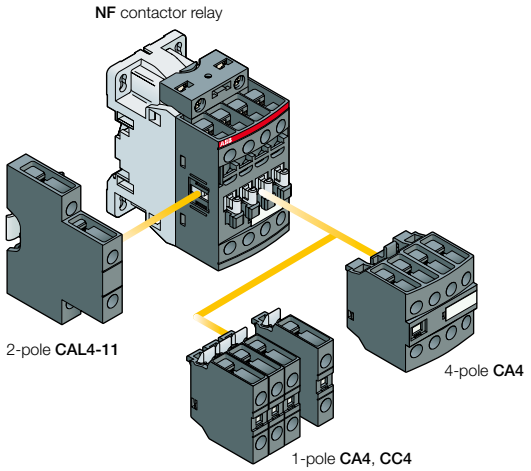
| | | |
|---|---|---|
| **Main terminals** | |  Screw terminals with cable clamp |
| **Connecting capacity (min. ... max.)** | | |
| **Pole and coil terminals** | | |
| Rigid | **1 x** | 1 ... 2.5 mm² |
| | **2 x** | 1 ... 2.5 mm² |
| Flexible with non insulated ferrule | **1 x** | 0.75 ... 2.5 mm² |
| | **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 |
| 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** | | (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** | | | Left side | Right side |
| 1-pole **CC4** | 4-pole **CA4** | | 2-pole **CAL4-11** | |
| – | – | | 1 | – |

## Overview of main accessories (other accessories available)



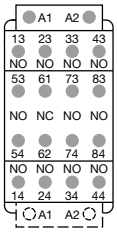
## Main Accessories

## Ordering Details

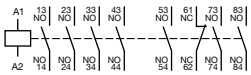
| Description | | Auxiliary contacts | Type | Order code | EAN | Pack(ing) piece | Weight kg (1 pce) |
|---|---|---|---|---|---|---|---|
| **Additional auxiliary contact blocks** | Side-mounted instantaneous auxiliary contact blocks | 1 1 - - | **CAL4-11** | **1SBN 010 120 R1011** | 3471523130043 | 1 | 0.040 |
| | | 1 1 - - | **CAL4-11-T** | **1SBN 010 120 T1011** | 3471523130418 | 10 | 0.040 |
| **Additional coil terminal block** | Additional coil terminal block | | **LDC4** | **1SBN 070 156 T1000** | 3471523130678 | 10 | 0.010 |
| **Protective covers** | Protective covers | | **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

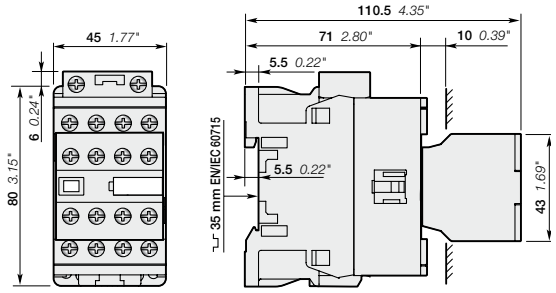



**NF71E-.. / NFZ71E-..**

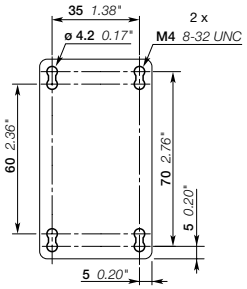



**NF71E-.. / NFZ71E-..**

## Dimensions mm, inches




**NF71E**




**NF71E**

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

# Contact us

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You can find the address of your local sales organisation on the ABB home page
http://www.abb.com/contacts -> Low Voltage products

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