Industrial control relays

Pilot duty rated for control circuits
Positively guided, AC & DC controlled

Control relays

NF / NFZ control relays

- 4 & 8 pole control relays
- Pilot duty rated up to 10 A
- For AC & DC control circuit switching
- Electronic AC/DC coil input voltages
- NFZ with low power consumption coils
- Direct PLC control ≥ 24VDC, 500mA (NFZ)
- Mechanically linked contacts for safety
- Wide variety of accessories

NS / NSL control relays

- 4 & 8 pole control relays
- For high-volume applications
- Pilot duty rated up to 10 A
- Bulk packaging available
- Screw & spring termination
- Mechanically linked contacts for safety
- AC or DC coil input voltages

K / KC control & interface relays

- 4 pole miniature control relays
- Compact solutions up to 10 A
- Quick-connect & PCB mount options
- Interface relays for PLC control
- Mechanically linked contacts for safety
- AC or DC coil input voltages

Standards & approvals	NF / NFZ	NS / NSL	K / KC
UL	E252354	E252354	E48139
CSA	c UL us	c UL us	LR56745
CE	✓	✓	✓
CCC	✓	✓	✓

NOTE: K/C6 quick-connect and PCB-mount versions are UL recognized.

General information
Panorama

Control relays

Mini control relays – 4 pole

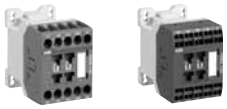
IEC	AC-15 Rated operational current	400 V	A	3			
UL/CSA	Pilot duty			A 600			
				2 2	3 1	4 0	
AC Control supply			Type	K6-22Z	K6-31Z	K6-40E	
DC Control supply			Type	KC6-22Z	KC6-31Z	KC6-0E	
AC / DC Control supply			Type	–	–	–	

See pages 6.12...6.14

IEC	AC-15 Rated operational current	400 V	A	–			
UL/CSA	Pilot duty			–			
AC Control supply			Type	–	–	–	
DC Control supply			Type	–	–	–	
AC / DC Control supply			Type	–	–	–	

General information
Panorama

Control relays – 4 pole



	3			3		
	A 600, Q 300			A 600, Q 600		
	2 2	3 1	4 0	2 2	3 1	4 0
	NS22E NS22ES	NS31E NS31ES	NS40E NS40ES	NF22E NFZ22E	NF31E NFZ31E	NF40E NFZ40E
	NSL22E NSL22ES	NSL31E NSL31ES	NSL40E NSL40ES	NF22E NFZ22E	NF31E NFZ31E	NF40E NFZ40E
	–	–	–	NF22E NFZ22E	NF31E NFZ31E	NF40E NFZ40E
	See pages 6.10...6.11			See pages 6.8...6.9		

Control relays – 8 pole

	3					3				
	A 600, Q 300					A 600, Q 600				
	4 4	5 3	6 2	7 1	8 0	4 4	5 3	6 2	7 1	8 0
	NS44E NS44ES	NS53E NS53ES	NS62E NS62ES	NS71E NS71ES	NS80E NS80ES	NF44E NFZ44E	NF53E NFZ53E	NF62E NFZ62E	NF71E NFZ71E	NF80E NFZ80E
	NSL44E NSL44ES	NSL53E NSL53ES	NSL62E NSL62ES	NSL71E NSL71ES	NSL80E NSL80ES	NF44E NFZ44E	NF53E NFZ53E	NF62E NFZ62E	NF71E NFZ71E	NF80E NFZ80E
	–	–	–	–	–	NF44E NFZ44E	NF53E NFZ53E	NF62E NFZ62E	NF71E NFZ71E	NF80E NFZ80E
	See pages 6.10...6.11					See pages 6.8...6.9				

General information
Technical terms and definitions

Altitude
Refers to the height of the site where the equipment is located, expressed in meters above the sea level.

Ambient temperature
Temperature of the air surrounding the unit.

Circuits
• Auxiliary circuit

All the conducting parts of a contactor, intended to be included in a circuit different from the main circuit and the control circuit of the contactor e.g. signalization, interlocking circuits etc …

• Control circuit

All the conducting parts of a contactor (other than the main circuit) included in a circuit used for the closing operation, or opening operation, or both, of the contactor.

• Main circuit

All the conducting parts of a contactor included in the circuit which it is designed to close or open.

Coil operating range
Expressed as a multiple of the rated control circuit voltage Uc for the lower and upper limits.

Cycle duration
Total time of the on-load + off-load period.

Endurance / durability
• Electrical endurance

Number of on-load operating cycles (i.e. with current on the main contacts) a contactor can achieve, varies depending on the utilization category.

• Mechanical endurance

Number of off-load operating cycles (i.e. without current on the main contacts) a contactor can achieve.

Inching
Energizing a motor once or repeatedly for short periods to obtain small movements of the driven mechanism.

Insulation class according to the VDE 0110 and NFC 20-040
Characterizes contactors suitability in accordance with environment and utilization conditions. A contactor can be classified depending on its own clearance and creepage distances in the insulation classes A, B, C, D which correspond to different insulation voltage values.

The insulation class C is applicable to most of the industrial applications. Equipment described in this catalogue correspond to insulation class C.

Intermittent duty
Duty in which the main contacts of a contactor remain closed for periods of time insufficient to allow the contactor to reach thermal equilibrium, the current-carrying periods being separated by off-load periods of sufficient duration to restore equality of temperature with the cooling medium.

Mounting positions
Stated by the manufacturer. Please note restrictions when applicable.

On-load factor
Ratio of the current flow time to the total time of the cycle x 100.

Plugging
Stopping or reversing a motor quickly by interchanging two supply leads whilst the motor is running.

Rated breaking capacity; Rated making capacity
Value of r.m.s current a contactor can break or make at a fixed voltage value, within the conditions specified by the standards, depending on the utilization category.

Rated control circuit voltage Uc
Control voltage value for which the control circuit of the unit is sized.

Rated insulation voltage U_i
Voltage value which designates the unit and to which dielectric tests, clearance and creepage distances are referred.

Rated impulse withstand voltage U_{imp}
The highest peak value of an impulse voltage of prescribed form 1.2/50, which does not cause breakdown under specified conditions of test.

Rated operating current I_e
Current value stated by the manufacturer and taking into account the rated operating voltage U_e, the rated frequency, the rated duty, the utilization category, the electrical contact life and the type of the protective enclosure.

Rated operating voltage U_e
Voltage value to which utilization characteristics of the contactor are referred, i.e. phase to phase voltage in 3 phase circuits.

Conventional thermal current I_{th}
Value of current the contactor can withstand with poles in closed position, in free air for an eight hour duty, without the temperature rise of its various parts exceeding the limits specified by the standards.

Resistance to shocks
Requirements applicable for instance to vehicles, crane operation or switchgear slide-in module systems.

At the quoted permissible «g» values, contactors must not undergo a change in switching state and O/L relays must not trip.

Resistance to vibrations
Requirements applicable to all the vehicles, vessels and other similar transport systems. At the quoted amplitude and vibration frequency values, the unit must be capable to achieve the required duty.

Short-circuit protection coordination
Achieved by using back-up protection devices such as circuit-breakers, H.R.C. fuses or standard fuses.

Co-ordination types a, b, c are defined in IEC 292-1 publication, VDE 0660, NFC 63-650 standards. Co-ordination types "1" and "2" are defined in IEC 947-4-1.

• Type 1 co-ordination

There has been no discharge of parts beyond the enclosure. Damage to the contactor and the overload relay is acceptable.

• Type 2 co-ordination

No damage to the overload relay or other parts has occurred, except that welding of contactor or starter contacts is permitted, if they are easily separated.

Switching frequency
Number of operating cycles per hour.

Time
• Closing time

Time between energization of the coil until the moment the contacts of the first current path to be closed actually close.

• Opening time

Time from the beginning of state causing breaking until the moment when the contacts of the last current path to be opened are open.

• Minimal operation time

Shortest control duration to ensure complete closing or opening of a contactor.

• Short time current permissible

Value of current which the contactor can withstand in closed position for a short time period and within specified conditions.

• Time constant

Ratio of inductance to the resistance : L/R = mH/Ohm = ms.

General information
IEC Standards, utilization categories

Standards

• IEC standards 158-1: “Contactors” and series IEC 292 :

“Motor-starters” have been revised and replaced by the new IEC 947-4-1 (1990-05): “Contactors and Motor-starters” referring to IEC 947-1 (1988): “General rules”

The new standards will constitute the basis of the future European and National standards, not yet revised.

Therefore the ratings indicated in this catalog are established according to the former and the future standards.

• Main changes and additions in the new standards are:

• Revision and extension of the utilization categories (see hereafter)

• Replacement of the coordination classes types a, b, c by new types: “1” (approximately equivalent to former class “a”) and “2” (approximately equivalent to former class “c”) with additional requirements.

• Classification of the thermal overload relays in tripping classes: 10 A; 10; 20 and 30 depending on their tripping times, at 1.5 and 7.2 times their setting current, in order to cover motor applications depending on their starting times. Class 10 A is adapted for motors according to IEC 34-1.

• Introduction of tests to verify the connecting capability and the mechanical strength of terminals.

Utilization categories

A contactor duty is characterized by the utilization category plus indication of the rated operating voltage and the rated operating current (see at Rated …), or the motor characteristics.

Utilization categories for contactors according to IEC 947-4-1

Alternating current:	AC-1	Non-inductive or slightly inductive loads, resistance furnaces. Power factor 0.7 - 0.8 (slightly inductive).
	AC-2	Slip-ring motors: starting, switching-off.
	AC-3	Squirrel-cage motors: starting, switching-off motors during running. Power factor 0.4 - 0.5 (AC-3).
	AC-4	Squirrel-cage motors: starting, plugging, inching.
	AC-5a	Switching of electric discharge lamp controls.
	AC-5b	Switching of incandescent lamps.
	AC-6a	Switching of transformers.
	AC-6b	Switching of capacitor banks
	AC-8a	Hermetic refrigerant compressor motor control with manual resetting of overload releases
	AC-8b	Hermetic refrigerant compressor motor control with automatic resetting of overload releases.
Direct current:	DC-1	Non-inductive or slightly inductive loads, resistance furnaces.
	DC-3	Shunt motors: starting, plugging, inching. Dynamic breaking of d.c. motors.
	DC-5	Series motors: starting, plugging, inching. Dynamic breaking of d.c. motors.
	DC-6	Switching of incandescent lamps

Utilization categories for contactor relays according to IEC 947-5-1

Alternating current:	AC-12	Control of resistive loads and solid state loads with isolation by opto couplers.
	AC-13	Control of solid state loads with transformer isolation.
	AC-14	Control of small electromagnetic loads (≤ 72 VA).
	AC-15	Control of electromagnetic loads (> 72 VA).
Direct current:	DC-12	Control of resistive loads and solid state loads with isolation by opto couplers.
	DC-13	Control of electromagnets.
	DC-14	Control of electromagnetic loads having economy resistors in circuit.

Utilization categories AC-1, AC-2, AC-3, AC-4 and DC-1, DC-3, DC-5 are maintained with slightly more severe tests.

Other categories have been added in order to standardize specific applications. In fact some contactor applications and the specific criteria characterizing the types of load controlled can modify the recommended utilization characteristics. These major applications are, for example :

Switching of capacitor banks

This application is characterized by high current peaks when switching-on the contactor and presence of harmonic currents on uninterrupted duty. For this application, IEC 947-4-1 has defined an utilization category AC-6b. Practical ratings have to be defined according to tests or, in absence of tests, by a calculation indicated in IEC 947-4-1.

Switching of transformers

This application is characterized by high current peaks on contactor closing due to magnetization phenomena. The corresponding utilization category according to IEC 947-4-1 is AC-6a. Ratings are derived from test-values for AC-3 or AC-4 according to formula given in IEC 947-4-1.

Switching of lighting circuits

The current peaks on contactor closing and power factor vary depending on the type of lamps, the switching method used and if compensation systems are fitted or not.

IEC 947-4-1 contains two standard utilization categories

AC-5a for switching of the electric discharge lamps.
AC-5b for switching of incandescent lamp.

General information
Pilot duty ratings and overload trip classes

Pilot duty ratings for AC control circuit contacts

Contact rating designation	Continuous thermal, test current (A)	Maximum current, 50/60 Hz (A)									
		120 v ac		240 v ac		480 v ac		600 v ac		Volt-amperes	
		Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
A150	10	60	6.00	-	-	-	-	-	-	7200	720
A300	10	60	6.00	30	3.00	-	-	-	-	7200	720
A600	10	60	6.00	30	3.00	15	1.50	12	1.20	7200	720
B150	5	30	3.00	-	-	-	-	-	-	3600	360
B300	5	30	3.00	15	1.50	-	-	-	-	3600	360
B600	5	30	3.00	15	1.50	7.5	0.75	6	0.60	3600	360
C150	2.5	15	1.5	-	-	-	-	-	-	1800	180
C300	2.5	15	1.5	7.5	0.75	-	-	-	-	1800	180
C600	2.5	15	1.5	7.5	0.75	3.75	0.375	3.00	0.30	1800	180
D150	1.0	3.60	0.60	-	-	-	-	-	-	432	72
D300	1.0	3.60	0.60	1.80	0.30	-	-	-	-	432	72
E150	0.5	1.80	0.30	-	-	-	-	-	-	216	36

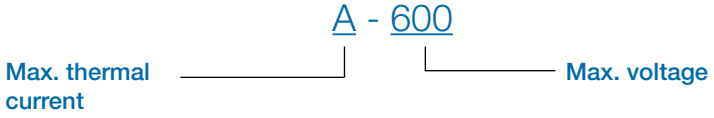
Mechanical switching ratings and test values as published in Table 1-4-1 of NEMA ICS 5-2000 (R2005, R2010)

Pilot duty ratings for DC control circuit contacts

Contact rating designation	Continuous thermal, test current (A)	Maximum current, 50/60 Hz (A)			
		120 v dc	250 v dc	301 to 600 v dc	Volt-amperes
		Make / Break	Make / Break	Make / Break	Make / Break
N150	10	2.2	-	-	275
N300	10	2.2	1.1	-	275
N600	10	2.2	1.1	0.40	275
P150	5.0	1.1	-	-	138
P300	5.0	1.1	0.55	-	138
P600	5.0	1.1	0.55	0.20	138
Q150	2.5	0.55	-	-	69
Q300	2.5	0.55	0.27	-	69
Q600	2.5	0.55	0.27	0.10	69
R150	1.0	0.22	-	-	28
R300	1.0	0.22	0.11	-	28

Mechanical switching ratings and test values as published in Table 1-4-1 of NEMA ICS 5-2000 (R2005, R2010)

Pilot duty rating explanation



General information
NF/NFZ control relays
4 & 8 pole

Description
NF / NFZ control relays are provided in either four or eight auxiliary pole configurations with a variety of accessories including additional auxiliary contacts and electronic timers.

Application
NF / NFZ control relays are pilot duty rated and primarily used for switching both AC and DC control circuits.

Control circuit types
NF / NFZ coils are designed to utilize both AC (50/60 Hz) and DC control circuit inputs ranging from 12…500V. Surge suppression is included. NFZ types offer low power consumption coils.

Control relay types
4-pole: NF(Z)22E, NF(Z)31E, NF(Z)40E

8-pole: NF(Z)44E, NF(Z)53E, NF(Z)62E
NF(Z)71E, NF(Z)80E

Quick DIN-rail mount & dismount, no tools required
- 35 x 7.5mm &
- 35 x 15mm

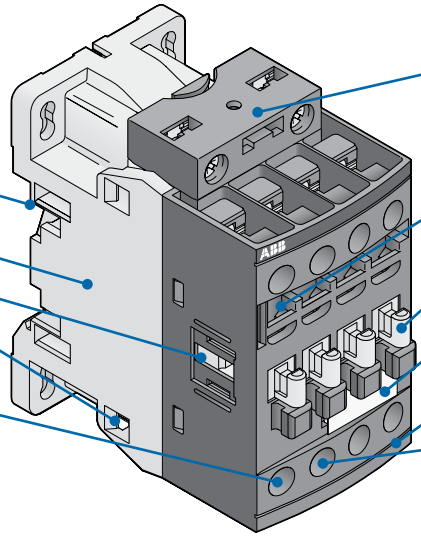
Integral surge suppression

Actuator for side-mount accessories

Contoured sides for easy access to panel mounting holes

Terminals on NF / NFZ control relays are delivered in open position with captive screws (screws of unused terminals must be tightened)

IP20 degree protection according to IEC/EN 60947-1; protection from live parts according to VDE0106 Part. 100.



Detachable coil terminals
- Can be pre-wired prior to installation
- Can easily be rotated from top (standard) to bottom

Front-mount coil termination available (4-pole only)

Stops for attaching front-mount accessories (4-pole only)

Function markers included as standard on NF / NFZ control relays

Clear indication of coil voltages and frequencies

Terminal screws:
- Posidrive (+,-) No 2

Catalog number explanation
For reference only – not all combinations will produce valid catalog numbers

NF 31 E - 13

Control relay type

Control relay type
- 22 = 2 NO / 2 NC
- 31 = 3 NO / 1 NC
- 40 = 4 NO
- 44 = 4 NO / 4 NC
- 53 = 5 NO / 3 NC
- 62 = 6 NO / 2 NC
- 71 = 7 NO / 1 NC
- 80 = 8 NO

Coil voltage code
(see product selection pages)

NF, 4 & 8 pole
For pilot duty applications up to 10 A
Electronic AC/DC operated coils

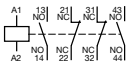
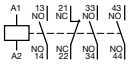
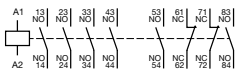
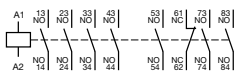
NF22E

NF44E

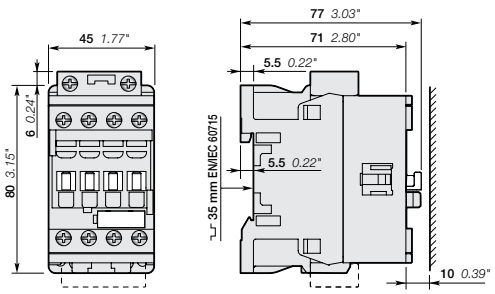
Description

- **NF** control relays include an electronic coil interface accepting a wide control voltage **U_c** min. ... **U_c** max. Only four coils cover control voltages between 24...500 V 50/60 Hz or 20...500 V DC
- **NF** control relays can manage large control voltage variations. One coil (i.e. 100...250 V 50/60 Hz - DC) can be used for different control voltages used worldwide without any coil change
- **NF** control relays have built-in surge protection and do not require additional surge suppressors
- The control relays have mechanically-linked auxiliary contacts compliant with Annex L of IEC 60947-5-1 and include the "Mechanically Linked" symbol on their side
- 8-pole control relays are mounted with a non-removable auxiliary contact block (2nd stack).

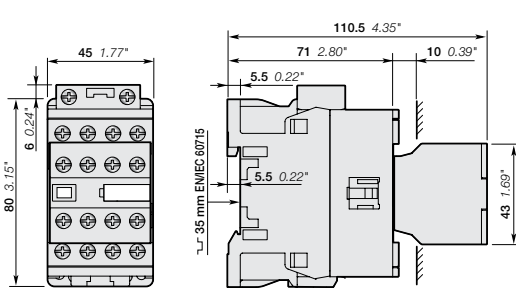
Ordering Details

Number of contacts 1st stack	2nd stack	Control voltage Range U_c min. ... U_c max. V 50/60 Hz	V DC	Catalog number
		24...60	20...60	NF22E-11
		48...130	48...130	NF22E-12
		100...250	100...250	NF22E-13
2 NO / 2 NC		250...500	250...500	NF22E-14
		24...60	20...60	NF31E-11
		48...130	48...130	NF31E-12
		100...250	100...250	NF31E-13
3 NO / 1 NC		250...500	250...500	NF31E-14
		24...60	20...60	NF40E-11
		48...130	48...130	NF40E-12
		100...250	100...250	NF40E-13
4 NO		250...500	250...500	NF40E-14
		24...60	20...60	NF44E-11
		48...130	48...130	NF44E-12
		100...250	100...250	NF44E-13
4 NO / 4 NC		250...500	250...500	NF44E-14
		24...60	20...60	NF53E-11
		48...130	48...130	NF53E-12
		100...250	100...250	NF53E-13
5 NO / 3 NC		250...500	250...500	NF53E-14
		24...60	20...60	NF62E-11
		48...130	48...130	NF62E-12
		100...250	100...250	NF62E-13
6 NO / 2 NC		250...500	250...500	NF62E-14
		24...60	20...60	NF71E-11
		48...130	48...130	NF71E-12
		100...250	100...250	NF71E-13
7 NO / 1 NC		250...500	250...500	NF71E-14
		24...60	20...60	NF80E-11
		48...130	48...130	NF80E-12
		100...250	100...250	NF80E-13
8 NO		250...500	250...500	NF80E-14

Main dimensions mm, *inches*



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



NF...44E, NF...53E, NF...62E, NF...71E, NF...80E

NFZ, 4 & 8 pole

For pilot duty applications up to 10 A
Low power consumption, electronic AC/DC operated coils

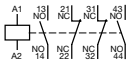
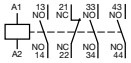
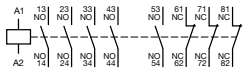
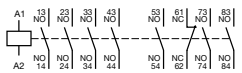
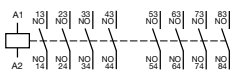
NFZ22E

NFZ44E

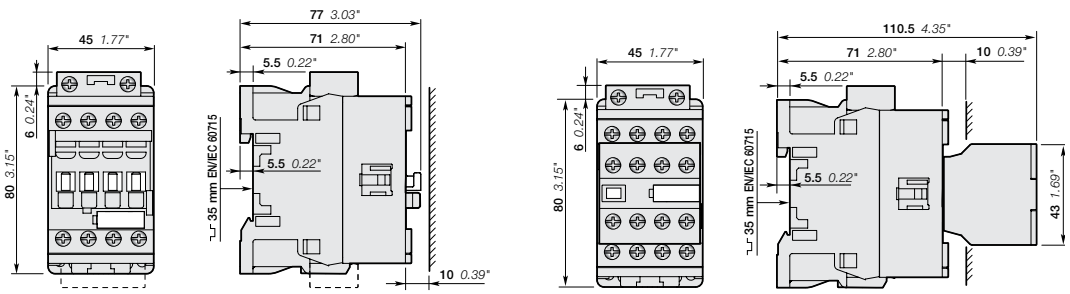
Description

- **NFZ** control relays include an electronic coil interface accepting a wide control voltage **U_c** min. ... **U_c** max. and managing large control voltage variations.
  NFZ control relays cover control voltages between 24...250 V 50/60 Hz or 12...250 V DC
- **NFZ** control relays allow direct control by PLC-output ≥ 24 V DC 500 mA and obtain a reduced holding coil consumption.
  NFZ control relays withstand short dips and voltage interruptions (SEMI F47-0706 compliance)
- **NFZ** control relays have built-in surge protection and do not require additional surge suppressors
- The control relays have mechanically-linked auxiliary contacts compliant with Annex L of IEC 60947-5-1 and include the "Mechanically Linked" symbol on their side
- 8-pole control relays are mounted with a non-removable auxiliary contact block (2nd stack).

Ordering Details

Number of contacts 1st stack	2nd stack	Control voltage Range U_c min. ... U_c max. V 50/60 Hz	V DC	Catalog number
 2 NO / 2 NC		-	12...20	NFZ22E-20
		24...60	20...60	NFZ22E-21
		48...130	48...130	NFZ22E-22
		100...250	100...250	NFZ22E-23
 3 NO / 1 NC		-	12...20	NFZ31E-20
		24...60	20...60	NFZ31E-21
		48...130	48...130	NFZ31E-22
		100...250	100...250	NFZ31E-23
 4 NO		-	12...20	NFZ40E-20
		24...60	20...60	NFZ40E-21
		48...130	48...130	NFZ40E-22
		100...250	100...250	NFZ40E-23
 4 NO / 4 NC		-	12...20	NFZ44E-20
		24...60	20...60	NFZ44E-21
		48...130	48...130	NFZ44E-22
		100...250	100...250	NFZ44E-23
 5 NO / 3 NC		-	12...20	NFZ53E-20
		24...60	20...60	NFZ53E-21
		48...130	48...130	NFZ53E-22
		100...250	100...250	NFZ53E-23
 6 NO / 2 NC		-	12...20	NFZ62E-20
		24...60	20...60	NFZ62E-21
		48...130	48...130	NFZ62E-22
		100...250	100...250	NFZ62E-23
 7 NO / 1 NC		-	12...20	NFZ71E-20
		24...60	20...60	NFZ71E-21
		48...130	48...130	NFZ71E-22
		100...250	100...250	NFZ71E-23
 8 NO		-	12...20	NFZ80E-20
		24...60	20...60	NFZ80E-21
		48...130	48...130	NFZ80E-22
		100...250	100...250	NFZ80E-23

Main dimensions mm, *inches*



NS/NSL 4 & 8 pole

For pilot duty applications up to 10 A
AC or DC operated coils, bulk packaged for high volume

4 pole

8 pole

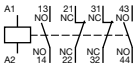
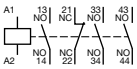
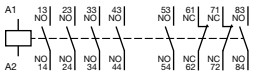
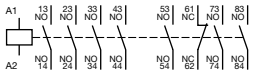
Description

NS/NSL contactor relays are used for switching auxiliary and control circuits.

These contactor relays are designed with:

- 4 poles or 8 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- Suitable for direct PLC control (DC 3W)
- add-on auxiliary contact blocks for front mounting and a comprehensive range of accessories.

Ordering details

Number of contacts 1st stack	Number of contacts 2nd stack	Rated control circuit voltage U_c V 50 Hz	Rated control circuit voltage U_c V 60 Hz	Catalog number, AC controlled	Rated control circuit voltage U_c V-DC	Catalog number, DC controlled
 2 NO / 2 NC		24	24	NS22E-20M	24	NSL22E-81M
		-	120	NS22E-16M	48	NSL22E-83M
		230	230	NS22E-26M	110	NSL22E-86M
		400	400	NS22E-28M	220	NSL22E-88M
 3 NO / 1 NC		24	24	NS31E-20M	24	NSL31E-81M
		-	120	NS31E-16M	48	NSL31E-83M
		230	230	NS31E-26M	110	NSL31E-86M
		400	400	NS31E-28M	220	NSL31E-88M
 4 NO		24	24	NS40E-20M	24	NSL40E-81M
		-	120	NS40E-16M	48	NSL40E-83M
		230	230	NS40E-26M	110	NSL40E-86M
		400	400	NS40E-28M	220	NSL40E-88M
 4 NO / 4 NC		24	24	NS44E-20M	24	NSL44E-81M
		-	120	NS44E-16M	48	NSL44E-83M
		230	230	NS44E-26M	110	NSL44E-86M
		400	400	NS44E-28M	220	NSL44E-88M
 5 NO / 3 NC		24	24	NS53E-20M	24	NSL53E-81M
		-	120	NS53E-16M	48	NSL53E-83M
		230	230	NS53E-26M	110	NSL53E-86M
		400	400	NS53E-28M	220	NSL53E-88M
 6 NO / 2 NC		24	24	NS62E-20M	24	NSL62E-81M
		-	120	NS62E-16M	48	NSL62E-83M
		230	230	NS62E-26M	110	NSL62E-86M
		400	400	NS62E-28M	220	NSL62E-88M
 7 NO / 1 NC		24	24	NS71E-20M	24	NSL71E-81M
		-	120	NS71E-16M	48	NSL71E-83M
		230	230	NS71E-26M	110	NSL71E-86M
		400	400	NS71E-28M	220	NSL71E-88M
 8 NO		24	24	NS80E-20M	24	NSL80E-81M
		-	120	NS80E-16M	48	NSL80E-83M
		230	230	NS80E-26M	110	NSL80E-86M
		400	400	NS80E-28M	220	NSL80E-88M

NOTE: For DC operated devices, the polarity of A1+ and A2- must be respected.

Standard bulk pack quantities (M)

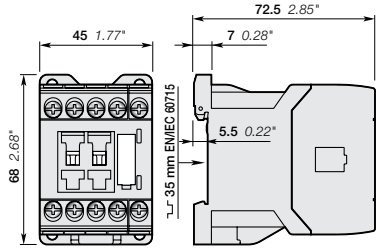
Control relays	Quantity
NS/L22E NS/L31E NS/L40E	40
NS/L44E NS/L53E NS/L62E NS/L71E NS/L80E	20

Additional coil voltage codes

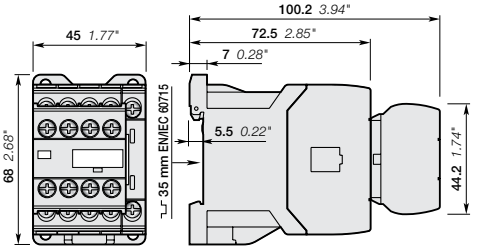
AC voltages		Coil code
V - 50 Hz	V - 60 Hz	
42	42	21
48	48	22
110	110	23
115	115	24
220	220	25
240	240	27
-	277	17
380	-	13
415	415	29

DC voltages	Coil code
V - DC	
12	80
60	84
125	87
240	89

Main dimensions mm, *inches*



NS22E, NS31E, NS40E



NS44E, NS53E, NS62E, NS71E, NS80E

NS/NSL 4 & 8 pole, spring terminated

For pilot duty applications up to 10 A
AC or DC operated coils, bulk packaged for high volume

4 pole

8 pole

Description

NS/NSL contactor relays are used for switching auxiliary and control circuits.

These contactor relays are designed with:

- 4 poles or 8 poles. Contactor relays have mechanically linked auxiliary contact elements (side-marked symbol)
- Suitable for direct PLC control (DC 3W)
- add-on auxiliary contact blocks for front mounting and a comprehensive range of accessories.

Standard bulk pack quantities (M)

Control relays	Quantity
NS/L22ES NS/L31ES NS/L40ES	40
NS/L44ES NS/L53ES NS/L62ES NS/L71ES NS/L80ES	20

Additional coil voltage codes

AC voltages		Coil code
V - 50 Hz	V - 60 Hz	
42	42	21
48	48	22
110	110	23
115	115	24
220	220	25
240	240	27
-	277	17
380	-	13
415	415	29

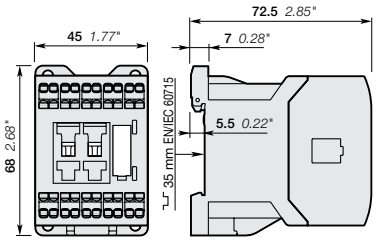
DC voltages	Coil code
V - DC	
12	80
60	84
125	87
240	89

Ordering details

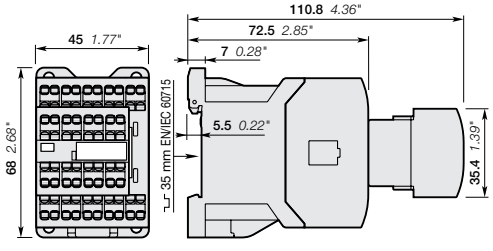
Number of contacts 1st stack	Number of contacts 2nd stack	Rated control circuit voltage U_c V 50 Hz	Rated control circuit voltage U_c V 60 Hz	Catalog number, AC controlled	Rated control circuit voltage U_c V-DC	Catalog number, DC controlled
2 NO / 2 NC		24	24	NS22ES-20M	24	NSL22ES-81M
		-	120	NS22ES-16M	48	NSL22ES-83M
		230	230	NS22ES-26M	110	NSL22ES-86M
		400	400	NS22ES-28M	220	NSL22ES-88M
3 NO / 1 NC		24	24	NS31ES-20M	24	NSL31ES-81M
		-	120	NS31ES-16M	48	NSL31ES-83M
		230	230	NS31ES-26M	110	NSL31ES-86M
		400	400	NS31ES-28M	220	NSL31ES-88M
4 NO		24	24	NS40ES-20M	24	NSL40ES-81M
		-	120	NS40ES-16M	48	NSL40ES-83M
		230	230	NS40ES-26M	110	NSL40ES-86M
		400	400	NS40ES-28M	220	NSL40ES-88M
4 NO / 4 NC		24	24	NS44ES-20M	24	NSL44ES-81M
		-	120	NS44ES-16M	48	NSL44ES-83M
		230	230	NS44ES-26M	110	NSL44ES-86M
		400	400	NS44ES-28M	220	NSL44ES-88M
5 NO / 3 NC		24	24	NS53ES-20M	24	NSL53ES-81M
		-	120	NS53ES-16M	48	NSL53ES-83M
		230	230	NS53ES-26M	110	NSL53ES-86M
		400	400	NS53ES-28M	220	NSL53ES-88M
6 NO / 2 NC		24	24	NS62ES-20M	24	NSL62ES-81M
		-	120	NS62ES-16M	48	NSL62ES-83M
		230	230	NS62ES-26M	110	NSL62ES-86M
		400	400	NS62ES-28M	220	NSL62ES-88M
7 NO / 1 NC		24	24	NS71ES-20M	24	NSL71ES-81M
		-	120	NS71ES-16M	48	NSL71ES-83M
		230	230	NS71ES-26M	110	NSL71ES-86M
		400	400	NS71ES-28M	220	NSL71ES-88M
8 NO		24	24	NS80ES-20M	24	NSL80ES-81M
		-	120	NS80ES-16M	48	NSL80ES-83M
		230	230	NS80ES-26M	110	NSL80ES-86M
		400	400	NS80ES-28M	220	NSL80ES-88M

NOTE: For DC operated devices, the polarity of A1+ and A2- must be respected.

Main dimensions mm, *inches*



NSL22E, NSL31E, NSL40E



NSL44E, NSL53E, NSL62E, NSL71E, NSL80E

K6 miniature, 4 pole

For compact pilot duty applications up to 10 A
AC operated coils

K6

K6...F

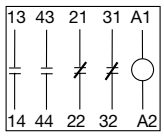
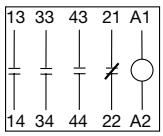
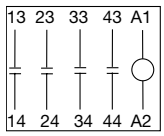
K6...P

Description

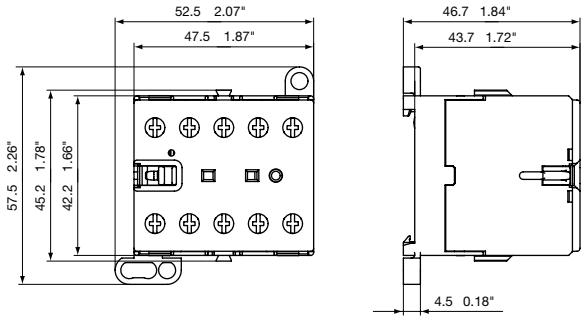
These contactors are designed with:

- 4 poles with various contact combinations
- control circuit: AC operated, low coil consumption (3.5 VA at pull-in and at holding)
- hum-free coil
- add-on auxiliary contact blocks for front or side mounting
- designed for rail or wall mounting

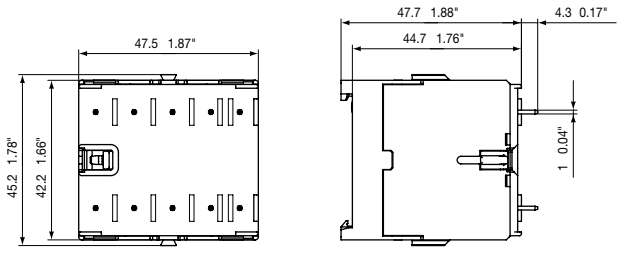
Ordering details

Number of contacts	Rated control circuit voltage U_c		Catalog number, screw termination	Catalog number, quick-connect termination	Catalog number, PCB-mount termination
	V-50 Hz	V-60 Hz			
 2 NO / 2 NC	24	24	K6-22Z-01	K6-22Z-F01	K6-22Z-P01
	42	42	K6-22Z-02	K6-22Z-F02	K6-22Z-P02
	48	48	K6-22Z-03	K6-22Z-F03	K6-22Z-P03
	110…127	110…127	K6-22Z-84	K6-22Z-F84	K6-22Z-P84
	220…240	220…240	K6-22Z-80	K6-22Z-F80	K6-22Z-P80
	380…415	380…415	K6-22Z-85	K6-22Z-F85	K6-22Z-P85
 3 NO / 1 NC	24	24	K6-31Z-01	K6-31Z-F01	K6-31Z-P01
	42	42	K6-31Z-02	K6-31Z-F02	K6-31Z-P02
	48	48	K6-31Z-03	K6-31Z-F03	K6-31Z-P03
	110…127	110…127	K6-31Z-84	K6-31Z-F84	K6-31Z-P84
	220…240	220…240	K6-31Z-80	K6-31Z-F80	K6-31Z-P80
	380…415	380…415	K6-31Z-85	K6-31Z-F85	K6-31Z-P85
 4 NO	24	24	K6-40E-01	K6-40E-F01	K6-40E-P01
	42	42	K6-40E-02	K6-40E-F02	K6-40E-P02
	48	48	K6-40E-03	K6-40E-F03	K6-40E-P03
	110…127	110…127	K6-40E-84	K6-40E-F84	K6-40E-P84
	220…240	220…240	K6-40E-80	K6-40E-F80	K6-40E-P80
	380…415	380…415	K6-40E-85	K6-40E-F85	K6-40E-P85

Main dimensions mm, inches



K6, K6...F



K6...P

KC6 miniature, 4 pole

For compact pilot duty applications up to 10 A
DC operated coils

KC6

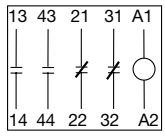
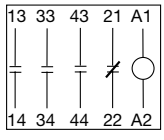
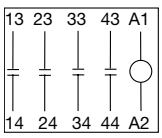
KC6...F

Description

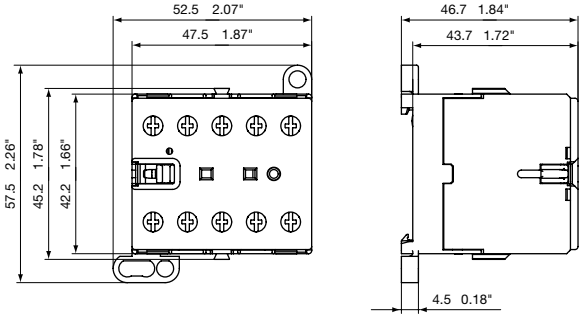
These contactors are designed with:

- 4 poles with various contact combinations
- control circuit: DC operated, low coil consumption (3.5 W at pull-in and at holding)
- hum-free coil
- add-on auxiliary contact blocks for front or side mounting
- designed for rail or wall mounting

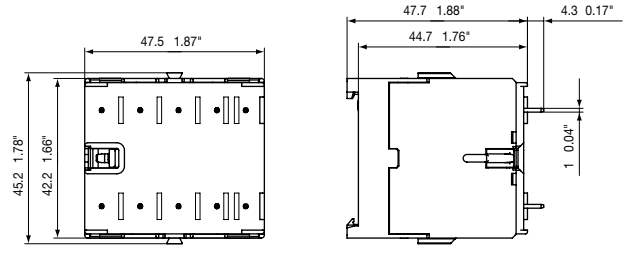
Ordering details

Number of contacts	Rated control circuit voltage U_c V-DC	Catalog number, screw termination	Catalog number, quick-connect termination	Catalog number, PCB-mount termination
 2 NO / 2 NC	12	KC6-22Z-07	KC6-22Z-F07	KC6-22Z-P07
	24	KC6-22Z-01	KC6-22Z-F01	KC6-22Z-P01
	48	KC6-22Z-16	KC6-22Z-F16	KC6-22Z-P16
	60	KC6-22Z-13	KC6-22Z-F13	KC6-22Z-P13
	110…125	KC6-22Z-04	KC6-22Z-F04	KC6-22Z-P04
	220…240	KC6-22Z-05	KC6-22Z-F05	KC6-22Z-P05
 3 NO / 1 NC	12	KC6-31Z-07	KC6-31Z-F07	KC6-31Z-P07
	24	KC6-31Z-01	KC6-31Z-F01	KC6-31Z-P01
	48	KC6-31Z-16	KC6-31Z-F16	KC6-31Z-P16
	60	KC6-31Z-13	KC6-31Z-F13	KC6-31Z-P13
	110…125	KC6-31Z-04	KC6-31Z-F04	KC6-31Z-P04
	220…240	KC6-31Z-05	KC6-31Z-F05	KC6-31Z-P05
 4 NO	12	KC6-40E-07	KC6-40E-F07	KC6-40E-P07
	24	KC6-40E-01	KC6-40E-F01	KC6-40E-P01
	48	KC6-40E-16	KC6-40E-F16	KC6-40E-P16
	60	KC6-40E-13	KC6-40E-F13	KC6-40E-P13
	110…125	KC6-40E-04	KC6-40E-F04	KC6-40E-P04
	220…240	KC6-40E-05	KC6-40E-F05	KC6-40E-P05

Main dimensions mm, inches



KC6, KC6...F



KC6...P

KC6 interface relays, 4 pole

For interface applications up to 4 A
Low power consumption, DC operated coils

KC6

KC6...F

KC6...P

Description

KC6 4-pole interface mini contactor relays are space optimized control products mainly used for control functions or for small loads up to 4 A.

These contactors are designed with:

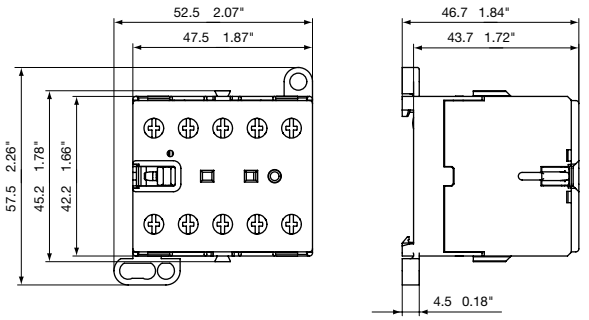
- 4 poles with various contact combinations
- control circuit: DC operated, low coil consumption (1.4 ... 2.8 W at pull-in and at holding)
- hum-free coil
- no auxiliary contact block permitted for mounting
- designed for rail or wall mounting

Ordering details

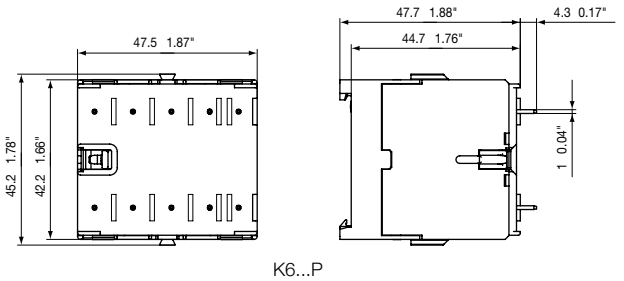
Rated control circuit voltage U_c	Auxiliary contacts fitted		Catalog number, screw termination	Catalog number, quick-connect termniation	Catalog number, PCB-mount termination
VDC					
DC operation 24 V / 1.4 W					
24	3	1	KC6-31Z-1.4	KC6-31Z-F1.4	KC6-31Z-P1.4
24	4	0	KC6-40E-1.4	KC6-40E-F1.4	KC6-40E-P1.4
DC operation 17…32 V / 2.4 W					
17…32 (1)	3	1	KC6-31Z-2.4	KC6-31Z-F2.4	KC6-31Z-P2.4
17…32 (1)	4	0	KC6-40E-2.4	KC6-40E-F2.4	KC6-40E-P2.4
DC operation 24 V / 1.7 W					
24	2	2	K6S-22Z-1.7	K6S-22Z-F1.7	K6S-22Z-P1.7
24	3	1	K6S-31Z-1.7	K6S-31Z-F1.7	K6S-31Z-P1.7
24	4	0	K6S-40E-1.7	K6S-40E-F1.7	K6S-40E-P1.7
DC operation 17…32 V / 2.8 W					
17…32 (1)	2	2	K6S-22Z-2.8	K6S-22Z-F2.8	K6S-22Z-P2.8
17…32 (1)	3	1	K6S-31Z-2.8	K6S-31Z-F2.8	K6S-31Z-P2.8
17…32 (1)	4	0	K6S-40E-2.8	K6S-40E-F2.8	K6S-40E-P2.8

(1) Uc min. and Uc max. limit values, including the voltage variation tolerances (-15 % and +10 %).

Main dimensions mm, inches



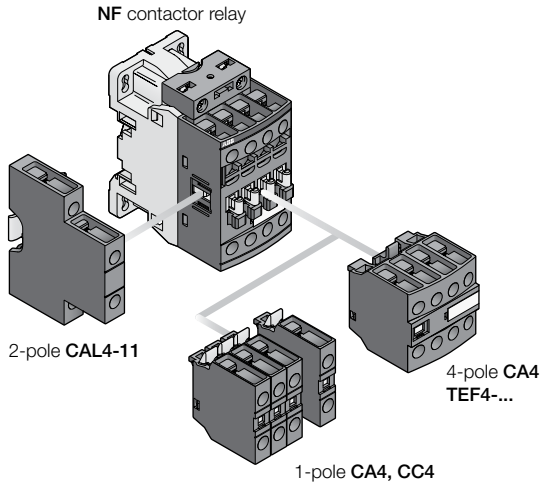
KC6, KC6...F



K6...P

NF(Z), 4 & 8 pole
Accessory fitting details

Contactor relays and main accessories (other accessories available)



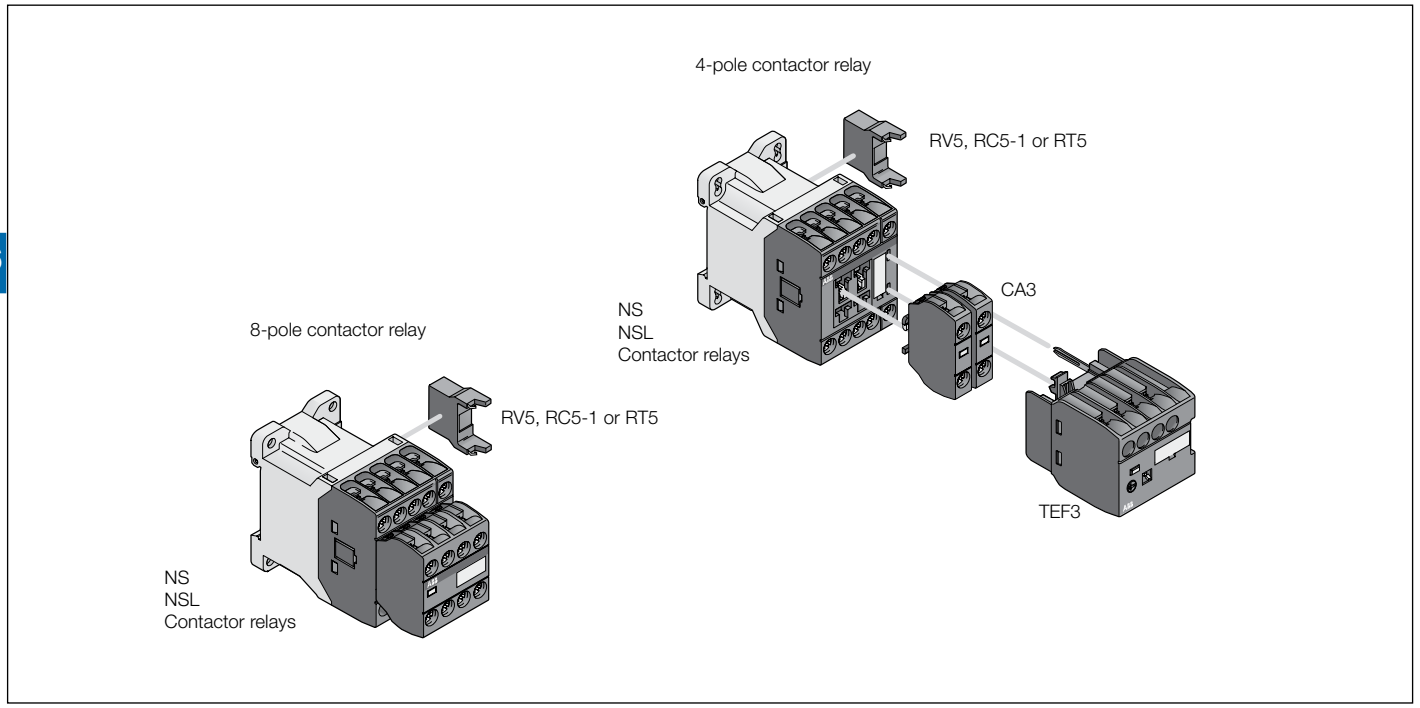
Accessory fitting details for a NF control relay

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

Control relay types	Main poles	Front-mounted accessories						Side-mounted accessories		
		Auxiliary contact blocks				Timers		Auxiliary contact blocks		
								Left side		Right side
		1-pole **CA4** / 1-pole **CC4**		4-pole **CA4**		**TEF4-...**		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								
NF..	2 2 E	4 max.	**or**	1	**or**	1	**+**	1		–
NF..	3 1 E	2 max.		–		–	**+**	1	**+**	1
		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..	4 0 E	4 max.	**or**	1	**or**	1	**+**	1		–
		2 max.		–		–	**+**	1	**+**	1
NF..	4 4 E									
NF..	5 3 E									
NF..	6 2 E	–		–		–		1		–
NF..	7 1 E									
NF..	8 0 E									

NS/L 4 & 8 pole, screw terminated
Accessory fitting details

Contactor relays and main accessories (other accessories available)

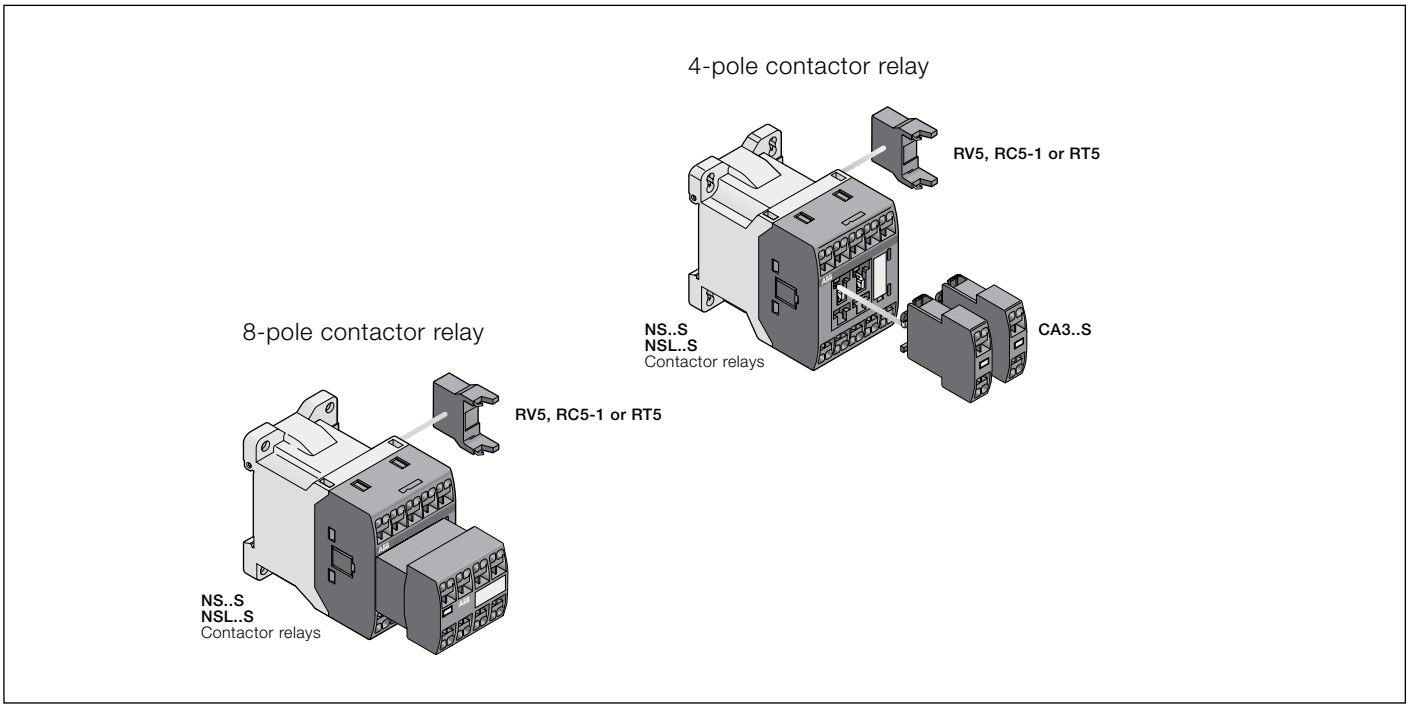


Main accessory fitting details

Contactor types	Main poles			Front-mounted accessories: Auxiliary contact blocks 1-pole CA3		Front-mounted accessories: Electronic timer TEF3		Side-mounted accessories: Surge suppressors		
NS..	2	2	E	2 max.	**or**	1	**+**	RV5	**or**	RC5-1
NS..	3	1	E							
NS..	4	0	E							
NS..	4	4	E	–		–		RV5	**or**	RC5-1
NS..	5	3	E							
NS..	6	2	E							
NS..	7	1	E							
NS..	8	0	E							
NSL..	2	2	E	2 max.	**or**	1	**+**	RV5	**or**	RT5
NSL..	3	1	E							
NSL..	4	0	E							
NSL..	4	4	E	–		–		RV5	**or**	RT5
NSL..	5	3	E							
NSL..	6	2	E							
NSL..	7	1	E							
NSL..	8	0	E							

NS/L 4 & 8 pole, spring terminated
Accessory fitting details

Contactor relays and main accessories



Main accessory fitting details

Contactor types	Main poles			Front-mounted accessories Auxiliary contact blocks 1-pole CA3..S		Side-mounted accessories Surge suppressors		
NS..S	2	2	E	2 max.	+	RV5	or	RC5-1
NS..S	3	1	E					
NS..S	4	0	E					
NS..S	4	4	E	–		RV5	or	RC5-1
NS..S	5	3	E					
NS..S	6	2	E					
NS..S	7	1	E					
NS..S	8	0	E					
NSL..S	2	2	E	2 max.	+	RV5	or	RT5
NSL..S	3	1	E					
NSL..S	4	0	E					
NSL..S	4	4	E	–		RV5	or	RT5
NSL..S	5	3	E					
NSL..S	6	2	E					
NSL..S	7	1	E					
NSL..S	8	0	E					

Auxiliary contact blocks & interlocks
NF(Z), NS/L & K/C6


CA4-10


CA4-22N


CAL4-11


CA3-10

CAF6-11K

CA6-11K


CA6-11K-P


VM4


BB4

Ordering details (1)

For contactor relays	Auxiliary contacts				Catalog number

Front-mounted instantaneous auxiliary contact blocks

NF(Z), 4-pole	1	0	-	-	CA4-10
	0	1	-	-	CA4-01
	4	0	-	-	CA4-40N
	3	1	-	-	CA4-31N
	2	2	-	-	CA4-22N
	1	3	-	-	CA4-13N
NF(Z)40E only	0	4	-	-	CA4-04N
NS/L, 4-pole	1	0	-	-	CA3-10
	0	1	-	-	CA3-01
NS/L, 4-pole, spring terminated	1	0	-	-	CA3-10S
	0	1	-	-	CA3-01S
K/C6, 4-pole	1	1	-	-	CAF6-11K
	2	0	-	-	CAF6-20K
	0	2	-	-	CAF6-02K

Front-mounted auxiliary contact blocks with N.O. leading (early make) contact & N.C. lagging (late break) contact

NF(Z), 4-pole	–	–	1	0	CC4-10
	–	–	0	1	CC4-01

Side-mounted instantaneous auxiliary contact blocks

NF(Z), 4- & 8-pole	1	1	-	-	CAL4-11
K/C6, 4-pole	1	1	-	-	CA6-11K
K/C6…F, 4-pole	1	1	-	-	CA6-11K-F
K/C6…P, 4-pole	1	1	-	-	CA6-11K-P

Mechanical interlocks

For control relays		Catalog number
Left side	Right side	
NF(Z)	NF(Z)	VM4
NS/L	NS/L	VM3

NOTE: Includes two fixing clips.

Mechanical & electrical interlocks

For control relays		Catalog number
Left side	Right side	
NF(Z)	NF(Z)	VEM4

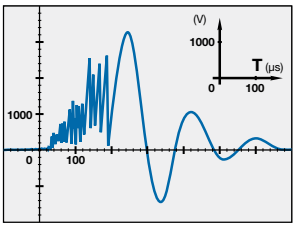
Fixing clips

For control relays	Catalog number
NF(Z)	BB4
NS/L	BB3

1) See accessory fitting details for maximum quantities.

Surge suppression for control relay coils
NS/L & K/C6

NOTE: Surge suppression integral for NF / NFZ and AC operated K6 control relays; no accessory required.



Description

The operation of inductive circuits causes overvoltages, in particular on opening the contactor coil.
The electromagnetic energy stored in the coil during contactor closing is restored on opening in the form of surges, the slope and amplitude of which may rise to several kilovolts. A number of drawbacks are observed ranging from interference on the electronic devices to the breakdown of insulators and even the destruction of certain sensitive components.
The graph opposite reproduces the oscillogram showing voltage discharges at the terminals of a 42 V / 50 Hz coil without peak clipping. The coil was switched by 8 series-connected poles of a contactor relay.
Following a burst of discharges with a very steep slope, a damped oscillation emerges with a peak value of 3500 V.

Overvoltage Factor
The overvoltage factor k is defined as the ratio of the maximum overvoltage peak value Ûs to the peak value Ûc of the coil rated control voltage Uc:

$$k = \frac{\hat{U}s\ max.}{\hat{U}c} \qquad \text{in DC} \quad k = \frac{\hat{U}s\ max.}{Uc} \qquad \text{in AC} \quad k = \frac{\hat{U}s\ max.}{Uc\ \sqrt{2}}$$

For example the following is obtained for the above graph: $k = \frac{3500}{42\ \sqrt{2}} \approx 60$

To reduce the harmful effects of these overvoltages, ABB has developed a range of surge suppressors designed to reduce the k factor defined above and to limit or even completely eliminate the high pre-damping voltage frequencies.
Each case is different, but the technical data tolerances and generous sizing of parts have enabled us to reduce the number of variants.
We have chosen the following solutions: transil diodes, varistors and RC blocks.
Note: A varistor is a resistor whose value decreases to a very large extent when a certain voltage is applied at its terminals.


RV5


RC5-1

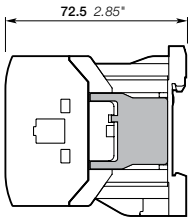

RT5

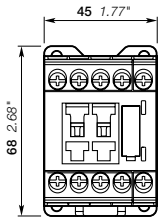
Ordering details

For contactor relays	Rated control circuit voltage - Uc V	AC	DC	Catalog number
NS, NSL	24...50	●	●	RV5/50
	50...133	●	●	RV5/133
	110...250	●	●	RV5/250
	250...440	●	●	RV5/440
NS	24...50	●	–	RC5-1/50
	50...133	●	–	RC5-1/133
	110...250	●	–	RC5-1/250
	250...440	●	–	RC5-1/440
NSL	12...32	–	●	RT5/32
	25...65	–	●	RT5/65
	50...90	–	●	RT5/90
	77...150	–	●	RT5/150
	150...264	–	●	RT5/264
KC6	24…60	-	●	RV-BC6/60
	50…250	-	●	RV-BC6/250
	380	-	●	RV-BC6/380
KC6…F (2.8mm)	24…60	-	●	RV-BC6-F/60
	50…250	-	●	RV-BC6-F/250
	380	-	●	RV-BC6-F/380


RV-BC6/250

Main dimensions mm, *inches*





Easy connection to the coil terminals
(parallel mounting)
Clip-on for both fixing and connection.

No additional space
Clipped onto the right side part of the contactor base without changing contactor overall dimensions and keeping a free access to coil terminals.

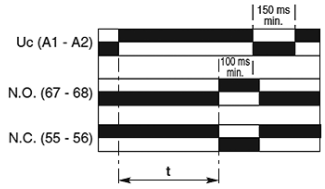
Electronic timers
NF(Z) & NS/L, 4 pole

TEF3

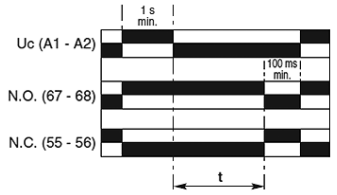
TEF4

Ordering details

For contactors, contactor relays	Time delay range selected by switch	Delay type	Rated control circuit voltage Uc V 50/60 Hz or DC	Auxiliary contacts		Catalog number
NS(L)	0.1...1 s	ON-delay	24…240	1	1	TEF3-ON
		OFF-delay	24…240	1	1	TEF3-OFF
	1...10 s					
NF(Z)		ON-delay	24…240	1	1	TEF4-ON
	10...100 s	OFF-delay	24…240	1	1	TEF4-OFF



ON-delay



OFF-delay

Function markers, protective covers & coil terminal blocks
NF(Z), NS/L & K/C6


LDC4


BX4


LT6-B


BA4

Ordering details

For control relays	Catalog number

Additional coil terminal block

Additional coil terminal block for a bottom access to the coil terminals of contactors or contactor relays.

NF	LDC4

Protective covers

Sealable and transparent protective covers BX4 and non-removable BX4-CA to protect the devices against accidental contact.

All 1-stack contactors and contactor relays	BX4
For 4-pole CA4 and 2-pole CAT4 auxiliary contact blocks	BX4-CA
For control relays K/C6	LT6-B

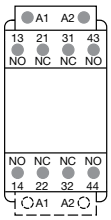
Function markers

Box of 16 blank cards (16 markers by card) printable on HTP500 thermal transfer printer and AMS 500 marking table to identify your contactors, overload relays or manual motor starters.
Marker dimensions: 7 x 20 mm (.276" x .787").

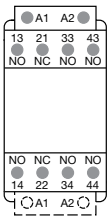
Box of 16 blank cards	BA4
AMS 500 support plate for 8 BA4	XUSP02633
HTP500 support plate	1SNA235712R2400

Terminal marking & positioning
NF(Z), 4 & 8 pole
Control relays

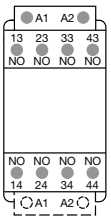
Standard devices without addition of auxiliary contacts



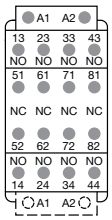
NF(Z)22E



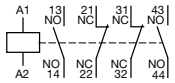
NF(Z)31E



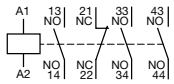
NF(Z)40E



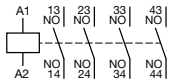
NF(Z)44E



NF(Z)22E

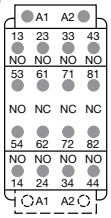


NF(Z)31E

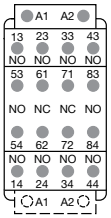


NF(Z)40E

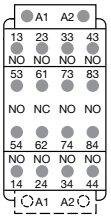
NF(Z)44E



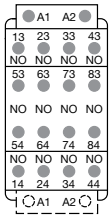
NF(Z)53E



NF(Z)62E

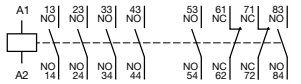


NF(Z)71E



NF(Z)80E

NF(Z)53E

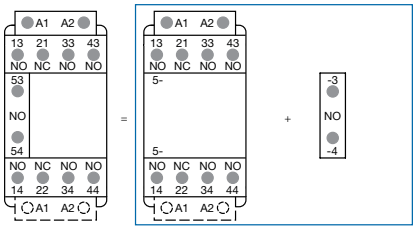


NF(Z)62E

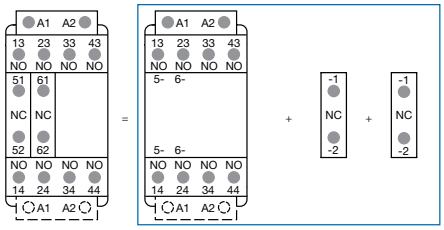
NF(Z)71E

NF(Z)80E

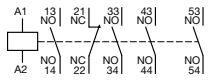
Other possible contact combinations with auxiliary contacts



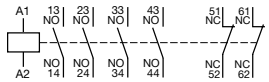
Combination 41 = **NF(Z)31E + CA4-10**



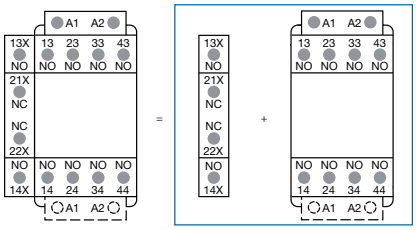
Combination 42 = **NF(Z)40E + CA4-01+CA4-01**



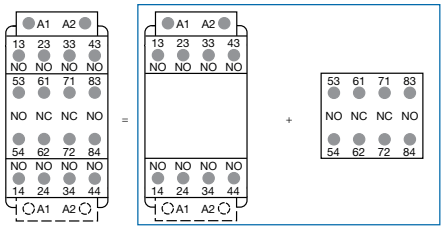
Combination 41 E



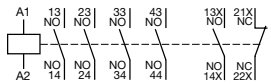
Combination 42 E



Combination 51 **=** **CAL4-11 + NF(Z)40E**



Combination 62 = **NF(Z)40E + CA4-22N**



Combination 51 E

Combination 62 E

Note: Only NF(Z)Z 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.

Terminal marking & positioning
CA4, CC4, CAL4 & CAT4
Auxiliary contacts

1-pole auxiliary contacts

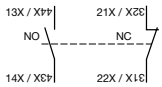
CA4-01

CA4-10

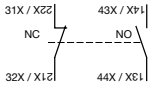
CC4-01

CC4-10

2-pole auxiliary contacts

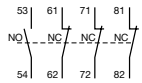


CAL4-11
(Left side-mounted)

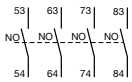


CAL4-11
(Right side-mounted)

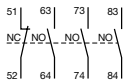
4-pole auxiliary contacts



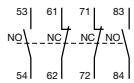
CA4-13N



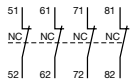
CA4-40N



CA4-31N



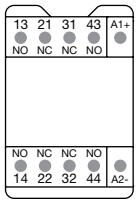
CA4-22N



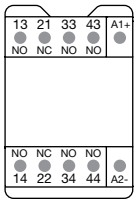
CA4-04N

Terminal marking & positioning
NS/L 4 & 8 pole & CA3
Control relays & auxiliary contacts

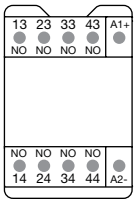
Standard devices without addition of auxiliary contact blocks



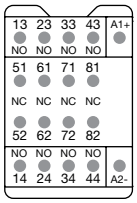
NS/L22E/S



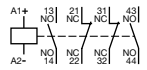
NS/L31E/S



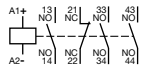
NS/L40E/S



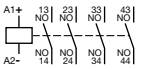
NS/L44E/S



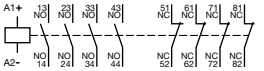
NS/L22E/S



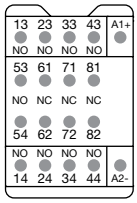
NS/L31E/S



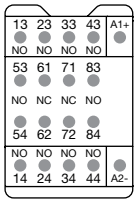
NS/L40E/S



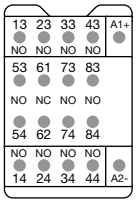
NS/L44E/S



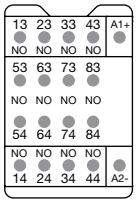
NS/L53E/S



NS/L62E/S

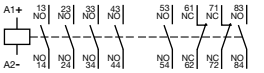


NS/L71E/S

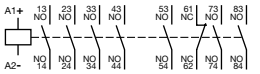


NS/L80E/S

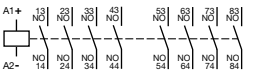
NS/L53E/S



NS/L62E/S



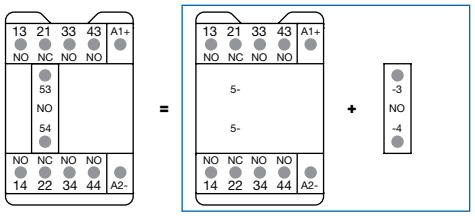
NS/L71E/S



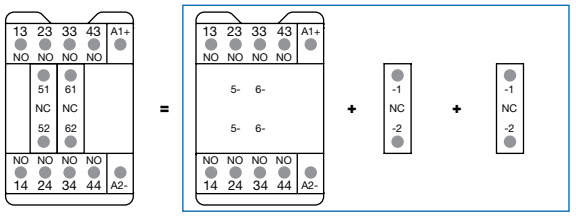
NS/L80E/S

NOTE: For DC operated devices, polarity A1+, A2- must be respected.

Other possible contact combinations with auxiliary contact blocks added by the user

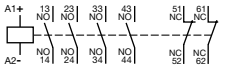


Combination 41E = NS/L31E/S + CA3-10/S

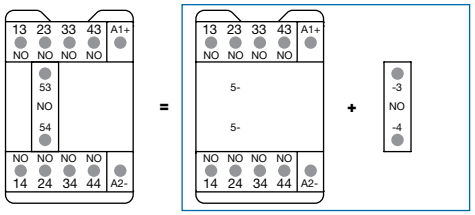


Combination 42E = NS/L40E/S + CA3-10/S + CA3-01/S

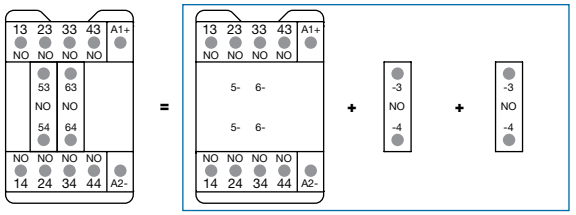
Combination 41E



Combination 42E

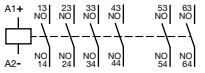


Combination 50E = NS/L40E/S + CA3-10/S



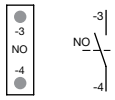
Combination 60E = NS/L40E/S + CA3-10/S + CA3-10/S

Combination 50E

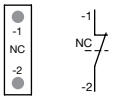


Combination 60E

1-pole auxiliary contact blocks



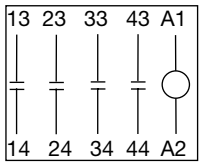
CA3-10/S



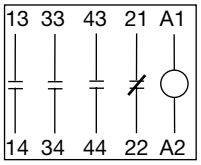
CA3-01S

Terminal marking & positioning
K/C6, CA6 & CAF6
Control relays & auxiliary contacts

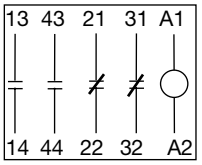
Miniature control relays



K6-40 E ...
KC6-40 E ...

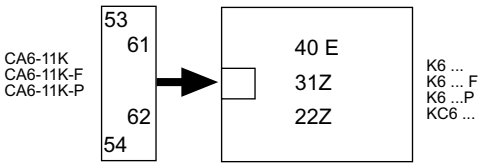


K6-31 Z ...
KC6-31 Z ...

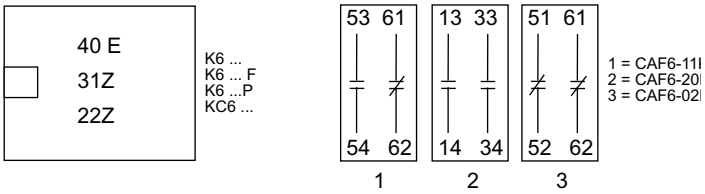


K6-22 Z ...
KC6-22 Z ...

Side mounted auxiliary contact blocks



Front mounted auxiliary contact blocks



NOTE: Only side mounted type or front mounted type auxiliary contact blocks can be used at one time. Auxilliary contact blocks must not be mounted on Interface contactors, Interface control relays or contactors for connection to PLCs. Two CAF 6 front mounted auxiliary contact blocks can installed on the mechanically interlocked contactors VB(C)6(7).

IEC / UL / CSA technical data
NF(Z), 4 & 8 pole
Utilization characteristics

Contact utilization characteristics according to IEC

Contactor relay types	AC / DC operated	NF(Z)
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 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.

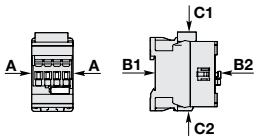
Contact utilization characteristics according to UL / CSA

Contactor relay types	AC / DC operated	NF(Z)
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

General technical data
NF(Z) 4 & 8 pole
Coil, mounting & operating characteristics

General technical data

Contactor types	AC / DC operated	NF(Z)
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
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		



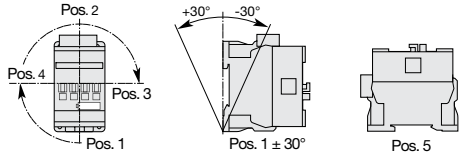
Shock direction	1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position
A	30 g
B1	25 g closed position / 5 g open position
B2	15 g
C1	25 g
C2	25 g

Vibration withstand	5...300 Hz
acc. to IEC 60068-2-6	4 g closed position / 2 g open position

Magnet system characteristics

Contactor relay types		AC / DC operated	NF(Z)
Coil operating limits		AC supply	At θ ≤ 60 °C 0.85 x Uc min...1.1 x Uc max.
acc. to IEC 60947-5-1			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.
			At θ ≤ 70 °C (AF) 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			≤ 60 % of Uc min.
Voltage sag immunity acc. to SEMI F47-0706			(NFZ) conditions of use on request
Dips withstand			
-20 °C ≤ θ ≤ +60 °C			(NFZ) 22 ms average
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

Contactor types		AC / DC operated	NF(Z)
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

General technical data
NF(Z), 4 & 8 pole
Terminal characteristics

Connecting characteristics

Contactor types	AC / DC operated		NF(Z)
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

IEC / UL / CSA technical data
NS/L, 4 & 8 pole, screw terminated
Utilization characteristics

Contact utilization characteristics according to IEC

Contactor relay types	AC operated	NS
	DC operated	NSL
Standards		IEC 60947-5-1 and EN 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		10 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
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
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
Short-circuit protection device for contactors		
Ue ≤ 500 V AC - 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		1.5 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 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 (CA3 aux. contact blocks) are mechanically linked contacts.

Contact utilization characteristics according to UL / CSA

Contactor relay types	AC operated	NS
	DC operated	NSL
Standards		UL 508, CSA C22.2 N°14
Max. operational voltage		600 V AC, 250 V DC
Pilot duty		A600, Q300
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
NS/L, 4 & 8 pole, screw terminated
Coil & mounting characteristics

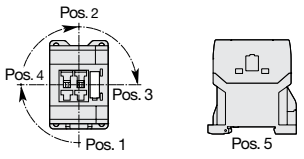
Magnet system characteristics for NS contactor relays

Contactor relay types			AC operated	NS
Coil operating limits			AC supply	
acc. to IEC 60947-5-1				0.85...1.1 x Uc (at θ ≤ 60 °C); Uc (at θ ≤ 70 °C)
AC control voltage	Rated control circuit voltage Uc		at 50 Hz	24...415 V
			at 60 Hz	24...415 V
	Coil consumption	**Average pull-in value**	50 Hz	33 VA
			60 Hz	33 VA
			50/60 Hz	33 VA
		Average holding value	50 Hz	6.5 VA / 1.5 W
			60 Hz	5 VA / 1.2 W
			50/60 Hz	6.5 VA / 1.5 W
Drop-out voltage				Approx. 30...50 % of Uc
Operating time				
Between coil energization and:			N.O. contact closing	9...24 ms
			N.C. contact opening	6...18 ms
Between coil de-energization and:			N.O. contact opening (1)	5...19 ms
			N.C. contact closing (1)	7...22 ms
				(1) The use of RC5-1 surge suppressor increases opening time by a factor of 2 to 3.

Magnet system characteristics for NSL contactor relays

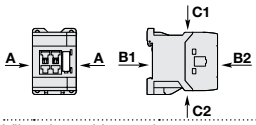
Contactor relay types			DC operated	NSL
Coil operating limits			DC supply	
acc. to IEC 60947-5-1				0.85...1.1 x Uc (at θ ≤ 60 °C); Uc (at θ ≤ 70 °C)
DC control voltage	Rated control circuit voltage Uc			12...240 V DC
	Coil consumption		**Average pull-in value**	3 W
			Average holding value	3 W
Drop-out voltage				Approx. 10...40 % of Uc
Coil time constant	Open		L/R	12 ms
	Closed		L/R	40 ms
Operating time				
Between coil energization and:			N.O. contact closing	36...59 ms
			N.C. contact opening	31...53 ms
Between coil de-energization and:			N.O. contact opening (1)	13...17 ms
			N.C. contact closing (1)	15...20 ms
				(1) The use of RT5 surge suppressor increases opening time by a factor of 1.1 to 1.2.

Mounting characteristics and conditions for use

Contactor relay types		AC operated	NS
		DC operated	NSL
Mounting positions			
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

General technical data
NS/L, 4 & 8 pole, screw terminated
Operating & terminal characteristics

General technical data

Contactor relay types	AC operated	NS	
	DC operated	NSL	
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	
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		3600 cycles/h	
Shock withstand		1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position	
acc. to IEC 60068-2-27 and EN 60068-2-27	Shock direction	**NS contactor relays - AC operated**	**NSL contactor relays - DC operated**
Mounting position 1	A	20 g	20 g closed position / 10 g open position
	B1	5 g	15 g closed position / 5 g open position
	B2	15 g	10 g
	C1	19 g closed position / 8 g open position	19 g closed position / 8 g open position
	C2	16 g closed position / 13 g open position	14 g closed position / 8 g open position
Vibration withstand acc. to IEC 60068-2-6		5...300 Hz / 3 g closed position / 2 g open position	

Connecting characteristics

Contactor relay types	AC operated	NS	
	DC operated	NSL	
Main terminals		 Screw terminals with cable clamp	
Connection capacity (min. ... max.)			
Pole and coil terminals			
Rigid solid	1 x	0.75...2.5 mm²	
	2 x	0.75...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 ≤	7.7 mm	
	l >	3.2 mm	
Connection capacity acc. to UL / CSA	1 or 2 x	AWG 18...14	
Stripping length		9 mm	
Tightening torque Recommended		1.00 Nm / 9 lb.in	
Max.		1.20 Nm	
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	
Screwdriver type		Flat Ø 5.5 / Pozidriv 2	

IEC / UL / CSA technical data
NS/L, 4 & 8 pole, spring terminated
Utilization characteristics

Contact utilization characteristics according to IEC

Contactor relay types	AC operated	NS..S
	DC operated	NSL..S
Standards		IEC 60947-5-1 and EN 60947-5-1
Rated operational voltage Ue max.		690 V
Rated frequency (without derating)		50 / 60 Hz
Conventional free-air thermal current Ith θ ≤ 40 °C		10 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
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
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
Short-circuit protection device for contactors		
Ue ≤ 500 V AC - gG type fuse		10 A
Rated short-time withstand current Icw	for 1.0 s	100 A
at 40 °C ambient temperature,in free air from a cold state	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		1.5 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 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 (CA3..S aux. contact blocks) are mechanically linked contacts.

Contact utilization characteristics according to UL / CSA

Contactor relay types	AC operated	NS..S
	DC operated	NSL..S
Standards		UL 508, CSA C22.2 N°14
Max. operational voltage		600 V AC, 250 V DC
Pilot duty		A600, Q300
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
NS/L, 4 & 8 pole, spring terminated
Coil & mounting characteristics

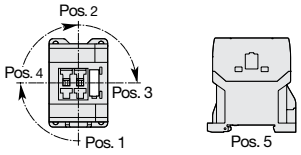
Magnet system characteristics for NS..S contactor relays

Contactor relay types		**AC operated**	**NS..S**
Coil operating limits		**AC supply**	
acc. to IEC 60947-5-1			0.85...1.1 x Uc (at θ ≤ 60 °C); Uc (at θ ≤ 70 °C)
AC control voltage	Rated control circuit voltage Uc	**at 50 Hz**	24...415 V
		at 60 Hz	24...415 V
	Coil consumption	**Average pull-in value 50 Hz**	33 VA
		60 Hz	33 VA
		50/60 Hz	33 VA
		Average holding value 50 Hz	6.5 VA / 1.5 W
		60 Hz	5 VA / 1.2 W
		50/60 Hz	6.5 VA / 1.5 W
Drop-out voltage			Approx. 30...50 % of Uc
Operating time			
	Between coil energization and:	**N.O. contact closing**	9...24 ms
		N.C. contact opening	6...18 ms
	Between coil de-energization and:	**N.O. contact opening (1)**	5...19 ms
		N.C. contact closing (1)	7...22 ms
			(1) The use of RC5-1 surge suppressor increases opening time by a factor of 2 to 3.

Magnet system characteristics for NSL..S contactor relays

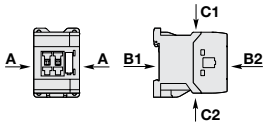
Contactor relay types		**DC operated**	**NSL..S**
Coil operating limits		**DC supply**	
acc. to IEC 60947-5-1			0.85...1.1 x Uc (at θ ≤ 60 °C); Uc (at θ ≤ 70 °C)
DC control voltage			
	Rated control circuit voltage Uc		12...240 V DC
	Coil consumption	Average pull-in value	3 W
		Average holding value	3 W
Drop-out voltage			Approx. 10...40 % of Uc
Coil time constant	Open	**L/R**	12 ms
	Closed	**L/R**	40 ms
Operating time			
	Between coil energization and:	**N.O. contact closing**	36...59 ms
		N.C. contact opening	31...53 ms
	Between coil de-energization and:	**N.O. contact opening (1)**	13...17 ms
		N.C. contact closing (1)	15...20 ms
			(1) The use of RT5 surge suppressor increases opening time by a factor of 1.1 to 1.2.

Mounting characteristics and conditions for use

Contactor relay types		**AC operated**	**NS..S**
		DC operated	**NSL..S**
Mounting positions			
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

General technical data
NS/L, 4 & 8 pole, spring terminated
Operating & terminal characteristics

General technical data

Contactor relay types	**AC operated**	**NS..S**	
	DC operated	**NSL..S**	
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	
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		3600 cycles/h	
Shock withstand		1/2 sinusoidal shock for 11 ms: no change in contact position, closed or open position	
acc. to IEC 60068-2-27 and EN 60068-2-27	**Shock direction**		
Mounting position 1		**NS contactor relays - AC operated**	**NSL contactor relays - DC operated**
	**A**	20 g	20 g closed position / 10 g open position
	B1	5 g	15 g closed position / 5 g open position
	B2	15 g	10 g
	C1	19 g closed position / 8 g open position	19 g closed position / 8 g open position
	C2	16 g closed position / 13 g open position	14 g closed position / 8 g open position
Vibration withstand		5...300 Hz	
acc. to IEC 60068-2-6		3 g closed position / 2 g open position	

Connecting characteristics

Contactor relay types	**AC operated**	**NS..S**
	DC operated	**NSL..S**
Main terminals		 Spring terminals
Connection capacity (min. ... max.)		
Pole and coil terminals		
Rigid solid	**1 x**	0.75...2.5 mm²
	2 x	0.75...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...1.5 mm²
	2 x	0.75...1.5 mm²
Connection capacity acc. 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
Screwdriver type		Flat Ø 3.5

IEC / UL / CSA technical data
K/C6, 4 pole
Utilization characteristics

Main pole – Utilization characteristics according to IEC

Contactor types	AC operated	K6
	DC operated	KC6, TKC6
Standards		IEC 60947-1 / 60947-5-1 and EN 60947-1 / 60947-5-1
Rated operational voltage U_{emax}		690 V
Rated frequency (without derating)		DC or 50 / 60 Hz
Conventional free-air thermal current I_{th} ⊠ ≤ 40 °C		6 A
I_e / Rated operational current AC-15 acc. to IEC 60947-5-1	24 V 50/60 Hz	4 A
	110-120 V 50/60 Hz	4 A
	220-230-240 V 50/60 Hz	4 A
	380-400 V 50/60 Hz	3 A
	440 V 50/60 Hz	3 A
	480-500 V 50/60 Hz	2 A
I_e / Rated operational current DC-13 acc. to IEC 60947-5-1	24 V DC	2.5 A
	110 V DC	0.7 A
	220 - 240 V DC	0.4 A
Short-circuit protection device for contactors U_e ≤ 500 V AC, gG fuse type		6 A
Minimum switching capacity		17 V / 5 mA
Maximum electrical switching frequency	AC-15	600 cycles/h
	DC-13	600 cycles/h

Main pole – Utilization characteristics according to UL / CSA

Contactor types	AC operated	K6
	DC operated	KC6
Standards		UL 508, CSA C22.2 No14
Maximum operational voltage		600 V AC
Pilot duty		A600

General technical data
K/C6, 4 pole
Coil & operating characteristics

General technical data

Contactor relay types	AC operated	K6
	DC operated	KC6
Rated insulation voltage U_i		
acc. to IEC 60947-5-1		690 V
acc. to UL/CSA		600 V
Rated impulse withstand voltage U_{imp}		6 kV
Electromagnetic compatibility		
Ambient air temperature close to contactor relay	Operation in free air	-25 ... +55 °C
	Storage	-40 ... +80 °C
Climatic withstand		acc. to IEC 60068-2-30
Maximum operating altitude (without derating)		2000 m
Mechanical durability		10^7 operating cycles
Resistance to shock		Half-sine
acc. IEC 60068-2-27 and EN 60068-2-27		15 g / 11ms
acc. to IEC/EN 60947-1 Annex. Q		Category E
Resistance to vibrations		Sinusoidal
acc. IEC 60068-2-27 and EN 60068-2-27		5 g / 3 ... 150 Hz
acc. to IEC/EN 60947-1 Annex. Q		Kategorie E

Magnet system characteristics for K6 contactor relays

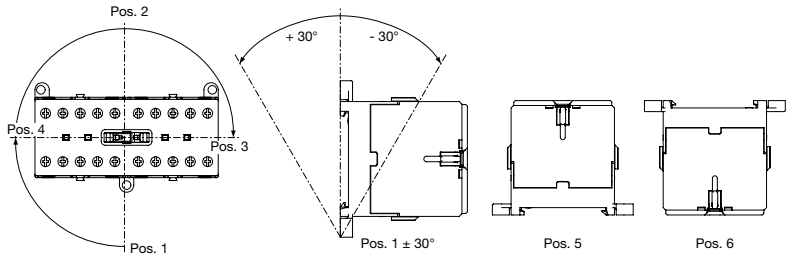
Contactor relay types		AC operated	K6
Coil operating limits acc. to IEC 60947-4-1		AC supply	0.85 ... 1.1 x U_C
AC control voltage			
Coil consumption	Average pull-in value		3.5 VA / 3.5 W
	Average holding value		3.5 VA / 3.5 W
Drop-out voltage in % of U_C min.			Approx. 20 ... 75%

Magnet system characteristics for KC6, TKC6 contactor relays

Contactor relay types		DC operated	KC6	TKC6
Coil operating limits acc. to IEC 60947-5-1		DC supply	0.85 ... 1.1 x U_C	See ordering details
DC control voltage				
Coil consumption	Average pull-in value		3.5 VA / 3.5 W	5 VA / 5 W
	Average holding value		3.5 VA / 3.5 W	5 VA / 5 W
Drop-out voltage in % of U_C min.			10 ... 75 %	10 ... 75 %

General technical data
K/C6, 4 pole
Terminal & mounting characteristics

Mounting characteristics and conditions for use

Contactor types	AC operated	K6
	DC operated	KC6
Mounting positions		
Mounting distances		The contactors can be assembled side by side.
Fixing		
On rail acc. 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

Contactor relay types	AC operated	K6
	DC operated	KC6, TKC6
Main terminals [1]		 Screw terminals with cable clamp
Connection capacity		
Main conductors (poles)		
Rigid: solid	1 or 2 x	1 ... 4 mm²
Flexible without ferrule	1 or 2 x	1 ... 2.5 mm²
Connection capacity acc. to UL/CSA	1 or 2 x	AWG 22 ... 10
Stripping length		9 mm
Tightening torques		0.8 ... 1.1 Nm / 7 lb.in
Degree of protection acc. to IEC 60947-1 / EN 60947-1 and IEC 60529 / EN 60529		
All		IP20
Screw terminals		(Delivered in open position, screws of unused terminals must be tightened)
All terminals		M3
Screwdriver type		Flat Ø 5.5 / Pozidriv 1

[1] Soldering pin connection acc. to DIN 40801: 0.8 x 1 mm / 0.8 x 2.54 mm
Flat pin connection acc. to DIN 46248: 1 x 6.3 mm / 1 x 2.8 mm

Notes