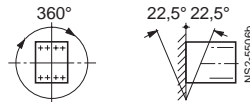




Permissible mounting position

The contactors are designed for operation on a vertical mounting surface.

AC and DC operation



Upright mounting position



AC operation

Special design required:
The Order No. is to be suffixed from position 13 to 16 with **-1AA0**.

DC operation

Standard version (does not apply for coupling relays; please enquire)

Positively driven contacts

The 3RH11 contactor relays fulfill the conditions for positively driven operations as required by the safety rules for control units on power-operated presses in the metal-working industry (ZH1/457) or correspond to the accident prevention regulations of the Schweizer Unfallversicherungsanstalt (Swiss Institute for accident insurance). There is a positively driven operation if it is ensured that the NC and NO contacts cannot be closed at the same time.

Positive driving, both in the basic unit and in the auxiliary switch block, as well as between the basic unit and the mounted auxiliary switch block ZH 1/457, SUVA.

Note: There is no positive driving in the case of 3RH19 11-NF.. electronically compatible auxiliary switch blocks.

Contact reliability

Contact reliability at 17 V, 1 mA acc. to DIN 19 240

Frequency of contact faults < 10^{-8} , i.e. < 1 fault per 100 million operating cycles

Contact endurance at utilization categories

AC-15/AC-14 and DC-13

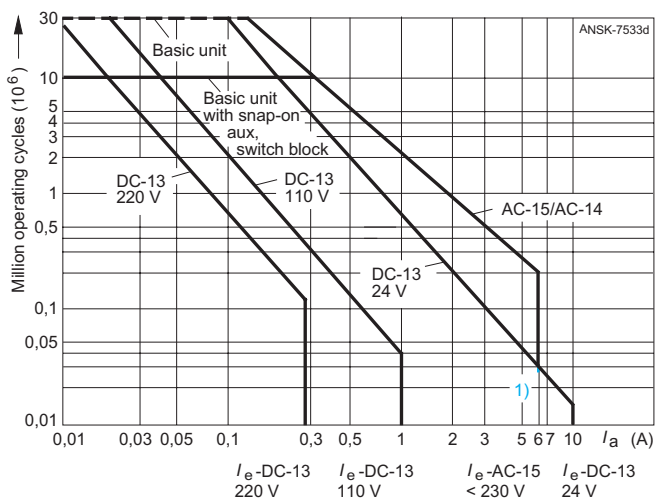
The contact endurance is mainly dependent on the break-current, provided the command devices operate randomly, i.e. not synchronized with the phase angle of the supply system.

If magnetic circuits other than contactor operating mechanisms or solenoid valves are present, e.g. magnetic brakes, protective measures for the load circuits are necessary.

RC elements and freewheeling diodes would be suitable as protective features.

The characteristic curves apply to

- 3RH11 contactor relays
- 3RH14 latched contactor relays
- 3RH19 11 auxiliary switch blocks.



1) Mountable auxiliary switch blocks: I_e /DC-13 max. 6 A.

3RH1. Contactor Relays

Size S00

SIRIUS 3R



Technical data

Ⓢ and Ⓢ-rated data

Basic units and auxiliary switch blocks

Rated control supply voltage	max. 600 V AC
Rated voltage	600 V AC
Making/breaking capacity	A 600, Q 600
Continuous current	10 A at 240 V AC

General data

Mechanical endurance	Basic units	30 million operating cycles
	Basic units with mounted auxiliary switch block	10 million operating cycles
	Basic units with mounted electronically compatible auxiliary switch block	5 million operating cycles

Rated insulation voltage U_i (pollution degree 3)		V	690
Permissible ambient temperature		during operation °C when stored °C	-25 to +60 -55 to +80
Degree of protection acc. to IEC 60 947-1 and DIN 40 050			IP 20, coil system IP 40
Shock resistance	Rectangular pulse	AC/DC operation	g/ms
	Sine pulse	AC/DC operation	g/ms
			10/5 and 5/10 15/5 and 8/10

Conductor cross-sections

Screw connection (1 or 2 conductor connections possible)	Auxiliary conductor and coil terminals		
	solid	mm ²	2 x (0.5 to 1.5); 2 x (0.75 to 2.5) acc. to IEC 60 947; max. 2 x (0.75 to 4)
	finely stranded with end sleeve	mm ²	2 x (0.5 to 1.5); 2 x (0.75 to 2.5)
	AWG conductor connections, solid or stranded	AWG	2 x (18 to 14)
	Terminal screws		M3
	Tightening torque	Nm	0.8 to 1.2 (7 to 10.3 lb.in)

Cage Clamp connection (1 or 2 conductor connections possible)	Auxiliary conductor and coil terminals:		
	solid	mm ²	2 x (0.5 to 2.5)
	finely stranded with end sleeve	mm ²	2 x (0.5 to 1.5)
	finely stranded without end sleeve	mm ²	2 x (0.5 to 2.5)
	AWG conductor connections, solid or stranded	AWG	2 x (18 to 14)

- For conductor cross-sections $\leq 1 \text{ mm}^2$ an "insulation-stop" has to be used, see Accessories, page 6/13.
- Max. outside diameter of conductor insulation: 3.6 mm.
- For notes on Cage Clamp connection, see page 0/6.

Short-circuit protection

(weld-free protection at $I_k \geq 1 \text{ kA}$)

Fuses, utilization category gL/gG

DIAZED	Type 5SB		
NEOZED	Type 5SE	A	10

or miniature circuit-breakers with C-characteristic (short-circuit current $I_k < 400 \text{ A}$) A 6

**Control circuit****Coil voltage tolerance**

AC operation	at 50 Hz:	0.8 to $1.1 \times U_s$
	at 60 Hz:	0.85 to $1.1 \times U_s$
DC operation	at +50 °C:	0.8 to $1.1 \times U_s$
	at +60 °C:	0.85 to $1.1 \times U_s$

Power consumption of the coils(with cold coil and $1.0 \times U_s$)

			at 50 Hz	at 60 Hz
AC operation	closing	VA	27	24
	p.f.		0.8	0.75
	closed	VA	4.6	3.5
	p.f.		0.27	0.27
DC operation	closing = closed	W	3.2	

Permissible residual current of the electronics

(at 0 signal)

AC operation	mA	$< 3 \text{ mA} \times \left(\frac{230\text{V}}{U_s} \right)$
DC operation	mA	$< 10 \text{ mA} \times \left(\frac{24\text{V}}{U_s} \right)$

In the case of higher residual currents it is recommended that the 3RT19 16-1GA00 additional load module be used²⁾.**Operating times¹⁾**

Break-time = opening time + arcing time

The values are valid with the coil in cold state and at operating temperature for coil voltage tolerance:

AC operation			0.8 to $1.1 \times U_s$	$1.0 \times U_s$
Closing	closing delay	ms	8 to 35	10 to 25
	opening delay	ms	6 to 20	7 to 20
Opening	opening delay	ms	4 to 18	5 to 18
	closing delay	ms	5 to 30	7 to 20
DC operation			Coil voltage tolerance: 0.85 to $1.1 \times U_s$	$1.0 \times U_s$
Closing	closing delay	ms	25 to 100	30 to 50
	opening delay	ms	20 to 90	25 to 45
Opening	opening delay	ms	7 to 10	7 to 9
	closing delay	ms	13 to 16	13 to 15
Arcing time		ms	10 to 15	

Load side**Rated operational currents**

I_e /AC-12		A	10		
I_e /AC-15/AC-14 at rated operational voltage U_e	to 230 V	A	6		
	400 V	A	3		
	500 V	A	2		
	690 V	A	1		
				Number of conducting paths in series	
			1	2	3
I_e /DC-12 at rated operational voltage U_e	24 V	A	10	10	10
	60 V	A	6	10	10
	110 V	A	3	4	10
	220 V	A	1	2	3.6
	440 V	A	0.3	1.3	2.5
	600 V	A	0.15	0.65	1.8
I_e /DC-13 at rated operational voltage U_e	24 V	A	10 ³⁾	10	10
	60 V	A	2	3.5	4.7
	110 V	A	1	1.3	3
	220 V	A	0.3	0.9	1.2
	440 V	A	0.14	0.2	0.5
	600 V	A	0.1	0.1	0.26

Operating frequency z

in operating cycles/hour

at rated operation

for utilization category

AC-12/DC-12	1/h	1000
AC-15/AC-14	1/h	1000
DC-13	1/h	1000

Non-load operating frequency

1/h 10000

Interdependence of the operating frequency z'
on rated operational current and
rated operational voltage

$$z' = z \cdot \frac{I_e}{I'} \cdot \left(\frac{U_e}{U} \right)^{1.5} \text{ 1/h}$$

1) The opening times of the NC contacts and the closing times of the NO contacts are increased when the contactor coil is protected against voltage peaks (suppression diode 6 to 10 times; diode assemblies 2 to 6 times; varistor +2 to 5 ms).

2) See Accessories, page 6/12.

3) Mountable auxiliary switch blocks: 6 A.

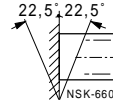
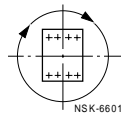
3TH43 Contactor Relays with 10 Contacts

Technical data

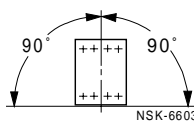
Permissible mounting position

The contactors are designed for operation on vertical mounting surface.

AC operation



DC operation



Upright mounting position



AC and DC operation

Special design required
The Order No. is to be suffixed with "-Z" and the order code **"B01"**.

Positively driven contacts

The 3TH43 contactor relays fulfill the conditions for positively driven operations as required by the safety rules for control units on power-operated presses in the metal-working industry (ZH 1/457) or correspond to the accident prevention regulations of the Schweizer Unfallversicherungsanstalt (Swiss Institute for accident insurance). There is a positively driven operation if it is ensured that the NC and NO contacts cannot be closed at the same time.

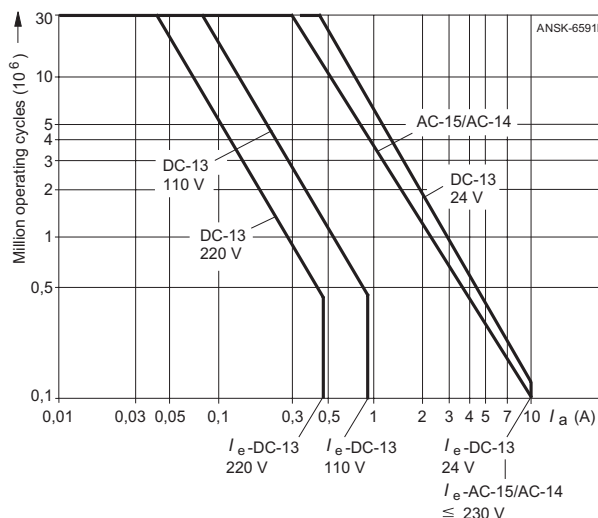
Complete unit
ZH 1/457, SUVA

Contact endurance at utilization categories AC-15/AC-14 and DC-13

The contact endurance is mainly dependent on the break-current, provided the command devices operate randomly, i.e. not synchronized with the phase angle of the supply system.

If magnetic circuits other than contactor operating mechanisms or solenoid valves are present, e.g. magnetic brakes, protective measures for the load circuits are necessary.

RC elements and freewheeling diodes would be suitable as protective features.



3TH43 Contactor Relays with 10 Contacts

Technical data

Ⓢ and Ⓢ-rated data

Basic units

Rated control supply voltage	max. 600 V AC, 230 V DC (acc. to Ⓢ 240 V DC)
Rated voltage	600 V AC, 600 V
Making/breaking capacity	A 600, P 600

General data

Mechanical endurance	Basic units auxiliary switch blocks	Oper- ating cycles	30 million 10 million
Rated insulation voltage U_i (pollution degree 3)		V	690
Rated impulse withstand voltage U_{imp}		kV	8
Permissible ambient temperature	during operation when stored	°C	-25 to +55 -55 to +80
Degree of protection acc. to IEC 60 947-1 and EN 60 529 (VDE 0470 Part 1)			IP 20
Shock resistance	Rectangular pulse	AC operation DC operation	g/ms 7.7/5 and 4.4/10 g/ms 9.3/5 and 5.4/10
	Sine pulse	AC operation DC operation	g/ms 12/5 and 6.8/10 g/ms 14.7/5 and 8.5/10

Conductor cross-sections

Terminal screws	M 3.5
solid	mm ² 2 x (0.5 to 1); 2 x (1 to 2.5); 1 x 4
finely stranded with end sleeve	mm ² 2 x (0.75 to 2.5)

Short-circuit protection

(weld-free protection at $I_k \geq 1$ kA)

Fuses, utilization category gL/gG

NH	Type 3NA	A	16
DIAZED	Type 5SB	A	16
NEOZED	Type 5SE, quick response	A	20
Miniature circuit-breakers	C-characteristic	A	16
	B-characteristic	A	16

Control circuit

Coil voltage tolerance	AC operation DC operation (except 24 V) at 24 V DC	0.8 to 1.1 x $U_s^{1)}$ 0.8 to 1.1 x U_s 0.8 to 1.2 x U_s
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Power consumption of the coils (with cold coil and 1.0 x U_s)

AC operation	Standard version	50 Hz	50/60 Hz
	closing	VA 68	77/71
	p.f.	0.82	0.81/0.75
	closed	VA 10	11/9
	p.f.	0.29	0.28/0.27
	For USA and Canada	50 Hz	60 Hz
	closing	VA 68	75
	p.f.	0.82	0.76
	closed	VA 10	9.4
	p.f.	0.29	0.29 to 0.3
	For Japan	50 Hz	60 Hz
	closing	VA 80	75 to 90
	p.f.	0.8	0.73
	closed	VA 10.7	8.5 to 10.7
	p.f.	0.29	0.29 to 0.3
DC operation to 250 V	closing = closed	W 6.2	

Permissible residual current of the electronics

AC operation (at 0 signal)	mA	$\leq 8 \text{ mA} \times \left(\frac{220\text{V}}{U_s} \right)$
DC operation	mA	$\leq 1.25 \text{ mA} \times \left(\frac{220\text{V}}{U_s} \right)$

1) With coils for USA, Canada and Japan:
0.85 to 1.1 x U_s at 60 Hz.

3TH43 Contactor Relays

with 10 Contacts

Technical data

Control circuit

Operating times¹⁾

Break-time = opening time + arcing time (the values are valid up to 20% undervoltage, 10% overvoltage and with the coil in cold state and at operating temperature)

				operation	AC	DC		
Closing				ON-delay	NO	ms	8 to 35	20 to 170
				OFF-delay	NC	ms	6 to 20	18 to 110
Opening				OFF-delay	NO	ms	4 to 18	10 to 25
				ON-delay	NC	ms	5 to 30	15 to 30
Arcing time						ms	10	10

Operating times¹⁾ at 1.0 x U_s

				operation	AC	DC
Closing				ON-delay	NO	ms
				OFF-delay	NC	ms
Opening				OFF-delay	NO	ms
				ON-delay	NC	ms

Load side

Rated operational currents

I_e /AC-12			A	16		
I_e /AC-15/AC-14 at U_e		to 230/220 V	A	10		
		at 400/380 V	A	6		
		500 V	A	4		
		690/660 V	A	2		
				Conducting paths in series		
				1	2	3
I_e /DC-12 at U_e	24/48 V	A	10	10	10	
	110 V	A	2.1	10	10	
	220 V	A	0.8	1.6	10	
	440 V	A	0.6	0.8	1.3	
	600 V	A	0.6	0.7	1	
I_e /DC-13 at U_e	24 V	A	10	10	10	
	48 V	A	5	10	10	
	110 V	A	0.9	2.5	10	
	220 V	A	0.45	0.75	2	
	440 V	A	0.25	0.5	0.9	
	600 V	A	0.2	0.4	0.8	

Three-phase motor ratings

at utilization category AC-2 and AC-3				230/220 V	kW	2.4
				400/380 V	kW	4
				500 V	kW	4
				690/660 V	kW	4

Operating frequency z

in operating cycles/hour
at rated operation in utilization category

AC-12/DC-12	1/h	1000
AC-2	1/h	500
AC-3	1/h	1000
AC-15/AC-14 and DC-13	1/h	3600

Interdependence of the operating frequency z'
on rated operational current
and rated operational voltage

$$z' = z \cdot \frac{I_e}{I'} \cdot \left(\frac{U_e}{U} \right)^{1.5} \text{ 1/h}$$

Non-load operating frequency	1/h	10 000
------------------------------	-----	--------

1) The opening times of the NC contacts and the closing time of the NO contacts are increased when the contactor coil is protected against voltage peaks (suppression diode 6 to 9 times; diode assemblies 2 to 6 times; varistor +2 to 5 ms).

Accessories for 3RH1. Contactor Relays

SIRIUS 3R



Technical data
acc. to IEC 61 812-1/DIN VDE 0435 Part 2021

Type		Solid-state time-delay blocks with semiconductor output 3RT19 .6-2C 2D	Solid-state time-delay auxiliary switch blocks 3RT19 .6-2E 2F 2G
Rated insulation voltage Pollution degree 3 Overvoltage category III acc. to DIN VDE 0110	V AC	250	250
Coil voltage tolerance for energizing		0.8 to 1.1 × U_s 0.95 to 1.05 times the rated frequency	0.85 to 1.1 × U_s 0.95 to 1.05 times the rated frequency
Rated output Power consumption at 230 V AC, 50 Hz	W VA	1 1	2 4
Rated operational currents I_o AC-140, DC-13	A	0.3 at 3RT19 16 0.5 at 3RT19 26	–
AC-15 at 230 V AC, 50 Hz	A	–	3
DC-13 at 24 V	A	–	1
DC-13 at 110 V	A	–	0.2
DC-13 at 230 V	A	–	0.1
Protection DIAZED Utilization category	gL/gG A	–	4
Operating frequency at load with I_o 230 V AC at load with 3RT1016 contactor, 230 V AC	1/h 1/h	2500 2500	2500 5000
Recovery time	ms	50	150
Minimum ON period	ms	35	200 (OFF-delay)
Residual current	mA	≤ 5	–
Voltage drop switched through	V	≤ 3.5	–
Short-time loading capacity	A	10 (up to 10 ms)	–
Setting accuracy referred to end scale value		≤ ± 15%	≤ ± 15%
Repeat accuracy		≤ ± 1%	≤ ± 1%
Mechanical endurance	Operating cycles	100 × 10 ⁶	30 × 10 ⁶
Permissible ambient temperature	during operation °C when stored °C	–25 to +60 –40 to +85	–25 to +60 –40 to +85
Degree of protection acc. to EN 60 529		IP 40 IP 20 terminals	IP 40 IP 20 terminals
Conductor cross- sections	solid mm ² finely stranded with end sleeve mm ² solid or stranded AWG	2 x (0.5 to 1.5) 2 x (0.75 to 4) 2 x (0.5 to 2.5) 2 x (18 to 14)	2 x (0.5 to 1.5) 2 x (0.75 to 4) 2 x (0.5 to 2.5) 2 x (18 to 14)
Terminal screw		M3	M3
Tightening torque	Nm	0.8 to 1.2	0.8 to 1.2
Permissible mounting position		any	any
Shock resistance half-wave sine acc. to IEC 60 068-2-27	g/ms	15/11	15/11
Vibration resistance acc. to IEC 60 068-2-6	Hz/mm	10 to 55/0.35	10 to 55/0.35
EMC tests	Basic specification	EN 50081-1; EN 50082-2	EN 50081-1; EN 50082-2
Overvoltage protection		Varistor integrated in time relay	–



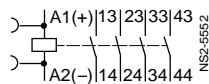
Internal circuit diagrams

Terminal designations acc. to EN 50 011

3RH11 contactor relays

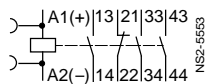
4 NO

Ident. No.: 40E



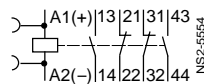
3 NO + 1 NC

31E



2 NO + 2 NC

22E

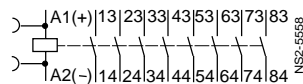


3RH11 40 contactor relays

with front snappable 3RH19 11-1GA.. auxiliary switch blocks

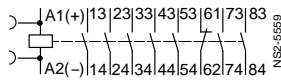
8 NO

Ident. No.: 80E



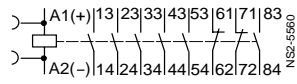
7 NO + 1 NC

71E



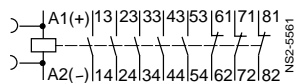
6 NO + 2 NC

62E



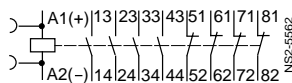
5 NO + 3 NC

Ident. No.: 53E



4 NO + 4 NC

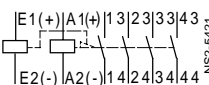
44E



3RH14 latched contactor relays

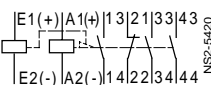
4 NO

Ident. No.: 40E



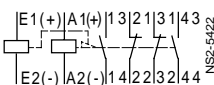
3 NO + 1 NC

31E



2 NO + 2 NC

22E



Surge suppressors (plug-in direction coded)

Diode



Diode assembly



Varistor



RC element



Diode with LED



Varistor with LED





Terminal designations acc. to EN 50 005

3RH19 11-1F... auxiliary switch blocks, front snappable and 3RH19 11-1NF.. electronically compatible auxiliary switch blocks

2 NO
Ident. No.: 20



1 NO + 1 NC
11



2 NC
02



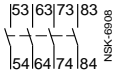
1 NO lead. + 1 NC lag.
11U



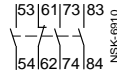
NO lead. = NO contact leading
NC lag. = NC contact lagging

with make-before-break contacts

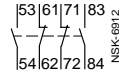
4 NO
Ident. No.: 40



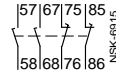
3 NO + 1 NC
31



2 NO + 2 NC
22

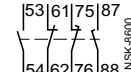


2 NO lead. + 2 NC lag.
22U



with make-before-break contacts

1 NO + 1 NC + 1 NOlead. + 1 NC lag.
11/11U



with make-before-break contacts

3RH19 11-1AA.. and 3RH19 11-1BA.. auxiliary switch blocks, front snappable, lateral conductor entry

1 NO



1 NC



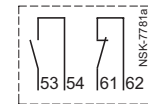
2 NO



1 NO + 1 NC



Wiring

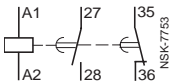


Example 1 NO + 1 NC

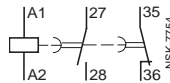
Terminal designations acc. to DIN 46 199 Part 5

3RT19 16-2E...; -2F...; -2G... solid-state time-delay auxiliary switch blocks for contactor relays size S00

1 NO + 1 NC
ON-delay

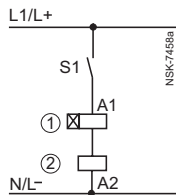


1 NO + 1 NC
OFF-delay



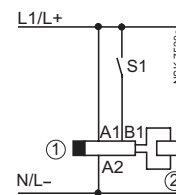
Solid-state time-delay blocks for 3RH1. contactor relays
(see also Configuration Note, page 6/4).

3RT19 16-2C...
ON-delay



① Time-delay relay block
② Contactor

3RT19 16-2D...
OFF-delay (with auxiliary voltage)



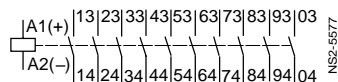
3TH43 Contactor Relays with 10 Contacts

Internal circuit diagrams

Terminal designations acc. to EN 50 011

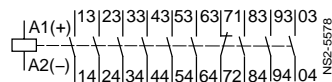
10 NO

Ident. No.: 100E



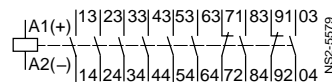
9 NO + 1 NC

91E



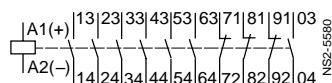
8 NO + 2 NC

82E



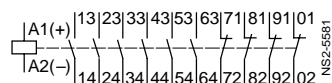
7 NO + 3 NC

Ident. No.: 73E



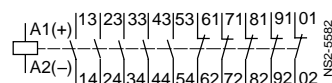
6 NO + 4 NC

64E



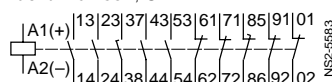
5 NO + 5 NC

55E



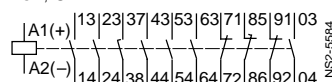
4 NO + 4 NC, 1 NO + 1 NC make-before-break

Ident. No.: 55E; U



6 NO + 2 NC, 1 NO + 1 NC make-before-break

73E; U

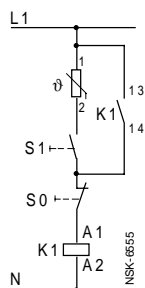


Circuit diagrams

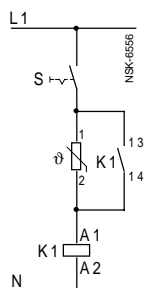
3TX4 180-0A NTC thermistor module

Typical circuit diagrams

Momentary-contact operation



Maintained-contact operation

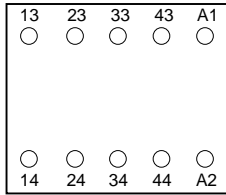




Terminal designations acc. to EN 50 011

3RH11 contactor relays**4 NO**

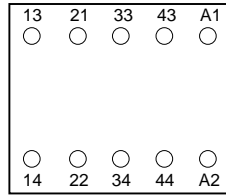
Ident. No.: 40E



NSK-7027

3 NO + 1 NC

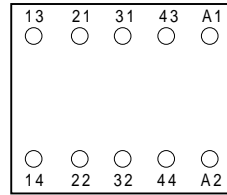
31E



NSK-7028

2 NO + 2 NC

22E



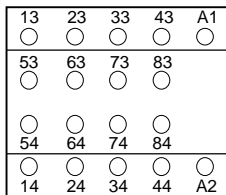
NSK-6557

3RH11 40 contactor relays

with front snappable 3RH19 11-1GA.. auxiliary switch blocks

8 NO

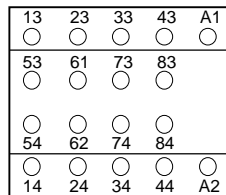
Ident. No.: 80E



NSK-7029

7 NO + 1 NC

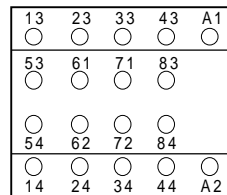
71E



NSK-7030

6 NO + 2 NC

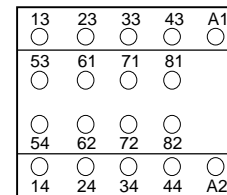
62E



NSK-6558

5 NO + 3 NC

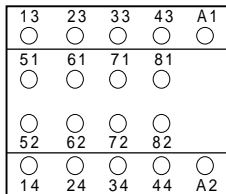
53E



NSK-6562

4 NO + 4 NC

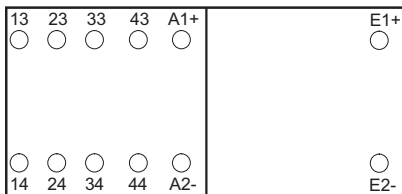
Ident. No.: 44E



NSK-6559

3RH14 latched contactor relays**4 NO**

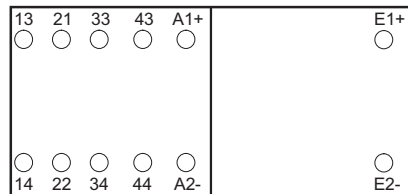
Ident. No.: 40E



NSK-7031b

3 NO + 1 NC

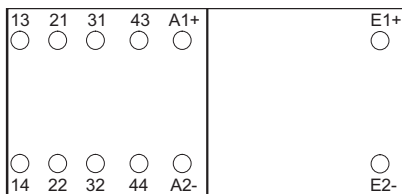
31E



NSK-6561b

2 NO + 2 NC

Ident. No.: 22E



NSK-6145a

Accessories for 3RH1. Contactor Relays

SIRIUS 3R



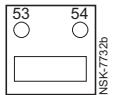
Position of terminals

Terminal designations acc. to EN 50 005

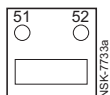
Front snappable 3RH19 11-1AA.. auxiliary switch blocks

Conductor entry from above

1 NO



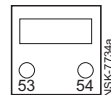
1 NC



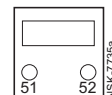
Front snappable 3RH19 11-1BA.. auxiliary switch blocks

Conductor entry from below

1 NO



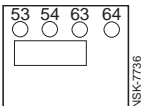
1 NC



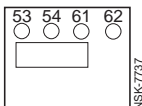
Front snappable 3RH19 11-1LA.. auxiliary switch blocks

Conductor entry from above

2 NO



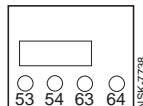
1 NO + 1 NC



Front snappable 3RH19 11-1MA.. auxiliary switch blocks

Conductor entry from below

2 NO



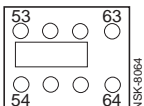
1 NO + 1 NC



electronically compatible 3RH19 11-1NF.. auxiliary switch blocks, front snappable

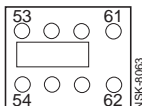
2 NO

Ident. No.: 20



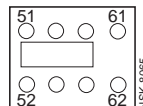
1 NO + 1 NC

11



2 NC

02

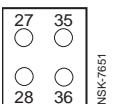


Terminal designations acc. to DIN 46 199 Part 5

3RT19 16-2E..., -2F... solid-state time-delay auxiliary switch blocks

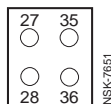
1 NO + 1 NC

ON-delay



1 NO + 1 NC

OFF-delay

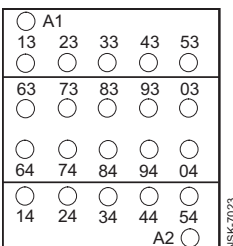


3TH43 Contactor Relays with 10 Contacts

Position of terminals

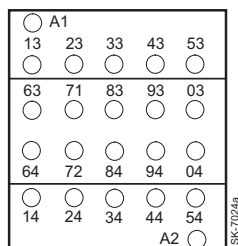
10 NO

Ident. No.: 100E



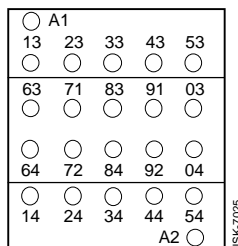
9 NO + 1 NC

91E



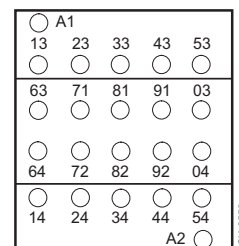
8 NO + 2 NC

82E



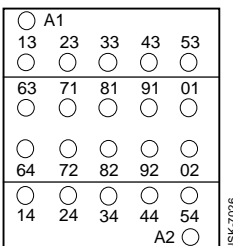
7 NO + 3 NC

73E



6 NO + 4 NC

Ident. No.: 64E



5 NO + 5 NC

55E

