

# 3RT, 3RH Contactors for Special Applications

## 3RH21 contactor relays

### Overview

#### DC operation

IEC 60947-4-1, EN 60947-4-1, for requirements according to IEC 60077-1 and IEC 60077-2.

The contactor relays are finger-safe according to EN 50274. The size S00 contactor relays have spring-type connections for all terminals.

#### Ambient temperature

The permissible ambient temperature for operation of the contactor relays (across the full coil operating range) is -40 to +70 °C.

Uninterrupted duty at temperatures > +60 °C reduces the mechanical endurance, the current carrying capacity of the conducting paths and the switching frequency.

#### Control and auxiliary circuits

The solenoid coils of the contactor relays have an extended coil operating range from  $0.7$  to  $1.25 \times U_s$  and are fitted as standard with suppressor diodes to provide protection against overvoltage. The opening delay is consequently 2 to 5 ms longer than for standard contactors.

### Application

For operation in installations which are subject both to considerable variations in the control voltage and to high ambient temperatures, e. g. railway applications under extreme climatic conditions, rolling mills, etc.

Also for control supply voltages with battery buffer for longer operating times should the battery charging fail.

#### Contactor relays without series resistor

##### Control and auxiliary circuits

These contactor relays have an extended operating range from  $0.7$  to  $1.25 \times U_s$ ; the solenoid coils are fitted with a suppressor diode. An additional series resistor is not required.

##### Note:

*An additional auxiliary switch block cannot be mounted.*

##### Side-by-side mounting

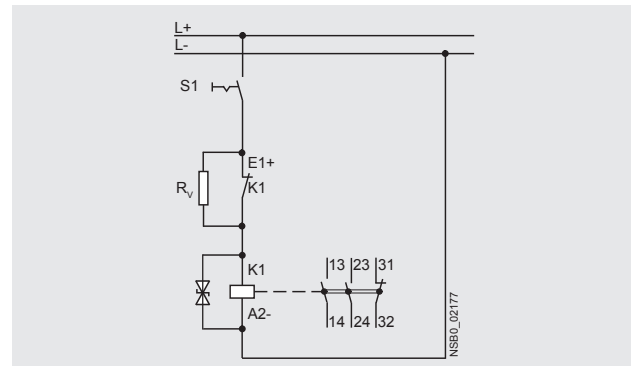
A clearance of 10 mm is required for side-by-side mounting at ambient temperatures > 60 °C ≤ 70 °C.

#### Contactor relays with series resistor

##### Control and auxiliary circuits

The DC solenoid systems of the contactor relays are modified (to hold-in coil) by means of a series resistor.

The size S00 contactor relays are supplied prewired with a plug-on module containing the series resistor. The suppressor diode is integrated.



A 4-pole auxiliary switch block (according to EN 50005) can be fitted additionally.

##### Side-by-side mounting

Side-by-side mounting is permitted at ambient temperatures up to 70 °C.

# 3RT, 3RH Contactors for Special Applications

## 3RH21 contactor relays

2

CONTACTORS AND  
ASSEMBLIES

### Selection and ordering data

**DC operation · DC solenoid system**

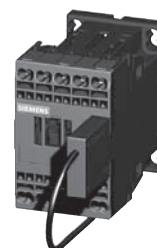
**Spring-type terminals**

**For screw and snap-on mounting onto standard mounting rail**

**Solenoid coil fitted with suppressor diode**



3RH21 22-2K.40



3RH21 22-2K.40-0LA0

|                                                                        |       |       |       |                                                                                   |                                                                                   |                                       |                                                                                                              |                   |
|------------------------------------------------------------------------|-------|-------|-------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------|-------------------|
| Rated operational current<br>$I_B$ /AC-15/AC-14<br>$I_{th}$ : 70 °C at |       |       |       | Contacts                                                                          |                                                                                   | Rated control supply<br>voltage $U_s$ | Spring-type terminals<br> | Weight<br>approx. |
| 230 V                                                                  | 400 V | 500 V | 690 V | Version                                                                           |                                                                                   |                                       |                                                                                                              |                   |
| A                                                                      | A     | A     | A     |  |  | V DC                                  | Order No.                                                                                                    | kg                |

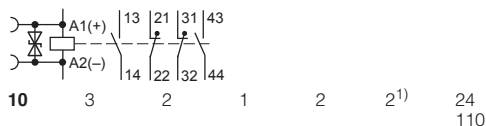
### 3RH21 contactor relays

**Size S00**

#### Without series resistor

Terminal designations according to EN 50011

2 NO + 2 NC, identification number **22E**



**3RH21 22-2KB40**  
**3RH21 22-2KF40**

0.300  
0.300

#### With series resistor

Terminal designations according to EN 50005

2 NO + 1 NC, identification number **21E**



**3RH21 22-2KB40-0LA0**  
**3RH21 22-2KF40-0LA0**

0.300  
0.300

<sup>1)</sup> It is not possible to mount an auxiliary switch block.

<sup>2)</sup> 4-pole auxiliary switch block according to EN 50005 can be mounted.

### More information

| Contactors                                     | Type      | 3RH21 ..                      |
|------------------------------------------------|-----------|-------------------------------|
| <b>Upright mounting position</b>               |           |                               |
| • Contactors with series resistor              |           | Special version (on request)  |
| • Contactors without series resistor           |           | Special version (on request)  |
| <b>Ambient temperature</b>                     |           |                               |
| • During operation                             | °C        | -40 ... +70                   |
| • During storage                               | °C        | -55 ... +80                   |
| <b>Solenoid coil operating range</b>           |           | DC                            |
|                                                |           | 0.7 ... 1.25 x $U_s$          |
| <b>Power consumption of the solenoid coils</b> |           | For cold coil and 1.0 x $U_s$ |
| • Contactors with series resistor              | - Closing | W 13                          |
|                                                | - Closed  | W 4                           |
| • Contactors without series resistor           | - Closing | W 2.8                         |
|                                                | - Closed  | W 2.8                         |

All specifications and technical specifications not mentioned here are identical to those of the standard contactor relays.

# 3RT, 3RH Contactors for Special Applications

## 3RT20 motor contactors, 7.5 ... 25 HP

### Overview

#### DC operation

IEC 60947-4-1, EN 60947-4-1, for requirements according to IEC 60077-1 and IEC 60077-2.

The contactors are finger-safe according to EN 50274. The contactors have spring-type connections as well as screw connections. The size S00 and S0 contactors have spring-type connections for all terminals.

#### Ambient temperature

The permissible ambient temperature for operation of the contactors (across the full coil operating range) is -40 to +70 °C.

Uninterrupted duty at temperatures > +60 °C reduces the mechanical endurance, the current carrying capacity of the conducting paths and the switching frequency.

#### Control and auxiliary circuits

The solenoid coils of the contactor relays have an extended coil operating range from 0.7 to 1.25 or 1.3 x  $U_s$  and are fitted as standard with suppressor diodes. The opening delay is consequently 2 to 5 ms longer than for standard contactors.

### Application

For operation in installations which are subject both to considerable variations in the control voltage and to high ambient temperatures, e. g. railway applications under extreme climatic conditions, rolling mills, etc.

Also for control supply voltages with battery buffer for longer operating times should the battery charging fail.

#### Contactors without series resistor

##### Control and auxiliary circuits

These contactors have an extended operating range from 0.7 to 1.25 x  $U_s$ ; on size S00 the coils are fitted with suppressor diodes, on size S0 with varistors. An additional series resistor is not required.

##### Note:

*An additional auxiliary switch block cannot be mounted.*

##### Side-by-side mounting

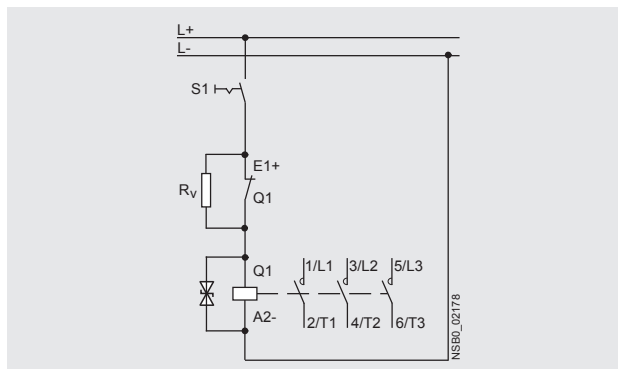
A clearance of 10 mm is required for side-by-side mounting at ambient temperatures > 60 °C ≤ 70 °C.

### 3RT20 1. contactors with series resistor

#### Control and auxiliary circuits

The solenoid coils of the contactors have an extended coil operating range from 0.7 to 1.25 x  $U_s$  and are fitted as standard with suppressor diodes to provide protection against overvoltage.

The DC solenoid systems of the contactors are modified (to holding excitation) by means of a series resistor.



The size S00 contactors are supplied prewired with a plug-on module containing the series resistor. The suppressor diode is integrated. A 4-pole auxiliary switch block (according to EN 50005) can be fitted additionally.

A circuit diagram showing the terminals is labeled on each contactor. One NC of the auxiliary contacts is required for the series resistor function. The selection and ordering data shows the number of additional, unassigned auxiliary contacts. With size S00 it is possible to extend the number of auxiliary contacts.

#### Side-by-side mounting

At ambient temperatures up to 70 °C, the size S00 contactors and contactor relays are allowed to be mounted side by side.

### 3RT20 2. contactors with solid-state operating mechanism, extended operating range

#### Control and auxiliary circuits

The solenoid coils of the contactors have an extended coil operating range from 0.7 to 1.3 x  $U_s$  and are fitted as standard with varistors to provide protection against overvoltage.

The contactors are energized via upstream control electronics which ensure the coil operating range of 0.7 to 1.3 x  $U_s$  at an ambient temperature of 70 °C. They are supplied as complete units with integrated coil electronics. A varistor is integrated for damping opening surges in the coil.

The mounting possibilities for auxiliary switches correspond to those of the standard contactors for switching motors in the matching size (see page 2/58).

#### Side-by-side mounting

Side-by-side mounting is permitted at ambient temperatures up to 70 °C for these contactor versions in size S0.

## Rated control supply voltages

## Selection and ordering data

| Contactor type                     | 3RT201<br>3RA211 | 3RT231<br>3RT251 | 3RT202<br>3RA212 | 3RT232<br>3RT252 | 3RT2617<br>3RT2627<br>3RT2637 | 3RT203<br>3RA213 | 3RT233<br>3RT253 | 3RT104<br>3RT134<br>3RT144<br>3RA114 |
|------------------------------------|------------------|------------------|------------------|------------------|-------------------------------|------------------|------------------|--------------------------------------|
| Rated control supply voltage $U_s$ | S00              | S00              | S0               | S0               | S00-S2                        | S2               | S2               | S3                                   |

## Rated control supply voltages (changes to 10th and 11th positions of the Order No.)

AC Operation<sup>1)</sup>

|                                                                                    |                          |                       |    |    |    |    |    |    |
|------------------------------------------------------------------------------------|--------------------------|-----------------------|----|----|----|----|----|----|
| <b>Coils for 50 Hz</b><br>(exception:<br>size S00: 50<br>and 60 Hz <sup>2)</sup> ) | <b>24 V AC</b>           | B0                    | B0 | B0 | B0 | B0 | B0 | B0 |
|                                                                                    | <b>42 V AC</b>           | D0                    | D0 | D0 | -- | -- | D0 | D0 |
|                                                                                    | <b>48 V AC</b>           | H0                    | H0 | H0 | -- | -- | H0 | H0 |
|                                                                                    | <b>110 V AC</b>          | F0                    | F0 | F0 | F0 | F0 | F0 | F0 |
|                                                                                    | <b>230 V AC</b>          | P0                    | P0 | P0 | P0 | P0 | P0 | P0 |
|                                                                                    | <b>400 V AC</b>          | V0                    | V0 | V0 | V0 | V0 | V0 | V0 |
| <b>Coils for<br/>50 and 60 Hz <sup>2)</sup></b>                                    | <b>24 V AC</b>           | B0                    | B0 | C2 | C2 | C2 | C2 | C2 |
|                                                                                    | <b>42 V AC</b>           | D0                    | D0 | D2 | D2 | -- | D2 | D2 |
|                                                                                    | <b>48 V AC</b>           | H0                    | H0 | H2 | H2 | -- | H2 | H2 |
|                                                                                    | <b>110 V AC</b>          | F0                    | F0 | G2 | G2 | G2 | G2 | G2 |
|                                                                                    | <b>208 V AC</b>          | M2                    | M2 | M2 | M2 | M2 | M2 | M2 |
|                                                                                    | <b>220 V AC</b>          | N2                    | N2 | N2 | N2 | N2 | N2 | N2 |
|                                                                                    | <b>230 V AC</b>          | P0                    | P0 | L2 | L2 | L2 | L2 | L2 |
|                                                                                    | <b>240 V AC</b>          | P2                    | P2 | P2 | P2 | P2 | P2 | P2 |
| <b>For USA<br/>and Canada <sup>3)</sup></b>                                        | 50 Hz:                   | 60 Hz:                |    |    |    |    |    |    |
|                                                                                    | <b>110 V AC</b>          | <b>120 V AC</b>       | K6 | K6 | K6 | K6 | K6 | K6 |
|                                                                                    | <b>220 V AC</b>          | <b>240 V AC</b>       | P6 | P6 | P6 | P6 | P6 | P6 |
|                                                                                    |                          | <b>277 V AC</b>       | —  | —  | U6 | —  | U6 | U6 |
|                                                                                    |                          | <b>480 V AC</b>       | V6 | —  | —  | V6 | V6 | V6 |
|                                                                                    |                          | <b>600 V AC</b>       | —  | —  | T6 | —  | T6 | T6 |
| <b>For Japan</b>                                                                   | 50/60 Hz <sup>4)</sup> : | 60 Hz <sup>5)</sup> : |    |    |    |    |    |    |
|                                                                                    | <b>100 V AC</b>          | <b>110 V AC</b>       | G6 | G6 | G6 | G6 | G6 | G6 |
|                                                                                    | <b>200 V AC</b>          | <b>220 V AC</b>       | N6 | N6 | N6 | N6 | N6 | N6 |
|                                                                                    | <b>400 V AC</b>          | <b>440 V AC</b>       | R6 | R6 | R6 | R6 | R6 | R6 |

DC Operation<sup>1)</sup>

|                 |    |    |    |    |   |   |   |   |
|-----------------|----|----|----|----|---|---|---|---|
| <b>12 V DC</b>  | A4 | A4 | —  | —  | — | — | — | — |
| <b>24 V DC</b>  | B4 | B4 | B4 | B4 | — | — | — | — |
| <b>42 V DC</b>  | D4 | D4 | D4 | D4 | — | — | — | — |
| <b>48 V DC</b>  | W4 | W4 | W4 | W4 | — | — | — | — |
| <b>60 V DC</b>  | E4 | E4 | E4 | E4 | — | — | — | — |
| <b>72 V DC</b>  | J8 | J8 | J8 | J8 | — | — | — | — |
| <b>80 V DC</b>  | —  | —  | —  | —  | — | — | — | — |
| <b>110 V DC</b> | F4 | F4 | F4 | F4 | — | — | — | — |
| <b>125 V DC</b> | G4 | G4 | G4 | G4 | — | — | — | — |
| <b>220 V DC</b> | M4 | M4 | M4 | M4 | — | — | — | — |
| <b>230 V DC</b> | P4 | P4 | P4 | —  | — | — | — | — |

Coil codes for frame sizes S6-S12 can be found on page 2/9. Further voltages on request

| Rated control supply voltage       | Contactor type | 3RT2. 2.-N | Rated control supply voltage       | Contactor type | 3RT2. 3.-N | 3RT2. 2.-N |
|------------------------------------|----------------|------------|------------------------------------|----------------|------------|------------|
| $U_{s \min} \dots U_{s \max}^{6)}$ | Size           | S00        | $U_{s \min} \dots U_{s \max}^{6)}$ | Size           | S2         | S3         |

## Sizes S00 to S3

## AC/DC operation (50/60 Hz AC, DC)

|                                   |    |    |                     |    |    |
|-----------------------------------|----|----|---------------------|----|----|
| 21 ... 28 V AC/DC                 | -- | B3 | 20 ... 33 V AC/DC   | B3 | B3 |
| 95 ... 130 V AC/DC                | -- | F3 | 83 ... 155 V AC/DC  | F3 | F3 |
| 200 ... 280 V AC/DC <sup>7)</sup> | -- | P3 | 175 ... 280 V AC/DC | P3 | P3 |

<sup>1)</sup> For deviating coil voltages and coil operating ranges of sizes S00 and S0, the SITOP power 24 V DC power supply unit with wide range input (93 to 264 V AC; 30 to 264 V DC) can be used for coil excitation (For more SITOP information see section 15).

<sup>2)</sup> Coil operating range  
at 50 Hz: 0.8 ... 1.1 x  $U_s$   
at 60 Hz: 0.85 ... 1.1 x  $U_s$

<sup>3)</sup> Coil operating range  
Size S00: at 50 Hz: 0.85 ... 1.1 x  $U_s$   
at 60 Hz: 0.8 ... 1.1 x  $U_s$   
Size S0 to S3: at 50 Hz and 60 Hz: 0.8 ... 1.1 x  $U_s$

<sup>4)</sup> Coil operating range  
Size S00: at 50/60 Hz: 0.85 ... 1.1 x  $U_s$   
Size S0: at 50 Hz: 0.8 ... 1.1 x  $U_s$   
at 60 Hz: 0.85 ... 1.1 x  $U_s$

<sup>5)</sup> Coil operating range  
at 60 Hz: 0.8 ... 1.1 x  $U_s$

<sup>6)</sup> Coil operating range for S0: 0.7 x  $U_{s \min}$  ... 1.3 x  $U_{s \max}$   
Coil operating range for S2: 0.8 x  $U_{s \min}$  ... 1.1 x  $U_{s \max}$

<sup>7)</sup> The following applies to S0 and  $U_{s \max} = 280$  V: Upper limit = 1.1 x  $U_{s \max}$

### Selection and ordering data AC and DC operation



3RH11...-1...



3RH11...-2...

**Size S00** – Terminal designations according to EN 50011

| Rated current<br>at 240 V<br>NEMA<br>A600/Q600<br>Amps | Auxiliary contacts         |                   | Rated control<br>supply<br>voltage $U_s$<br>V AC 50/60 Hz <sup>3)</sup> | AC Operation<br>Screw<br>Terminals <sup>1) 2)</sup> | Rated control<br>supply<br>voltage $U_s$<br>V DC | DC Operation<br>Screw<br>Terminals <sup>1) 2)</sup> |
|--------------------------------------------------------|----------------------------|-------------------|-------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------------------------|-----------------------------------------------------|
|                                                        | Ident-<br>ification<br>No. | Version<br>I<br>L |                                                                         | Order No.                                           |                                                  | Order No.                                           |

#### For screw and snap-on mounting onto TH 35 standard mounting rail

|  |    |     |   |   |                          |                                                                      |                  |                                                                      |
|--|----|-----|---|---|--------------------------|----------------------------------------------------------------------|------------------|----------------------------------------------------------------------|
|  | 10 | 40E | 4 | — | 24<br>110/120<br>220/240 | <b>3RH2140-1AB00</b><br><b>3RH2140-1AK60</b><br><b>3RH2140-1AP60</b> | 24<br>110<br>220 | <b>3RH2140-1BB40</b><br><b>3RH2140-1BF40</b><br><b>3RH2140-1BM40</b> |
|  | 10 | 31E | 3 | 1 | 24<br>110/120<br>220/240 | <b>3RH2131-1AB00</b><br><b>3RH2131-1AK60</b><br><b>3RH2131-1AP60</b> | 24<br>110<br>220 | <b>3RH2131-1BB40</b><br><b>3RH2131-1BF40</b><br><b>3RH2131-1BM40</b> |
|  | 10 | 22E | 2 | 2 | 24<br>110/120<br>220/240 | <b>3RH2122-1AB00</b><br><b>3RH2122-1AK60</b><br><b>3RH2122-1AP60</b> | 24<br>110<br>220 | <b>3RH2122-1BB40</b><br><b>3RH2122-1BF40</b><br><b>3RH2122-1BM40</b> |

#### Notes:

For further voltages, see page 2/49.  
For accessories, see pages 2/66-2/77.  
For technical data, see pages 2/185-2/188.  
For overview, see page 2/116.  
For position terminals, see page 2/202-2/203.  
For dimension drawings, see page 2/124.

- 1) The 3RH21 contactor relays are also available with spring-type terminals. Replace the 8th digit of the order number with a "2" e.g. "3RH2140-2AB00"
- 2) The 3RH21 contactor relays are also available with ring lug terminals. Replace the 8th digit of the order number with a "4" e.g. "3RH2140-4AB00"
- 3) AC coil operating range at 50 Hz: 0.8 to 1.1 x  $U_s$  at 60 Hz: 0.85 to 1.1 x  $U_s$
- 4) For AC-15/AC-14 the following applies:  $I_e = 6A$  for mounted auxiliary contacts.