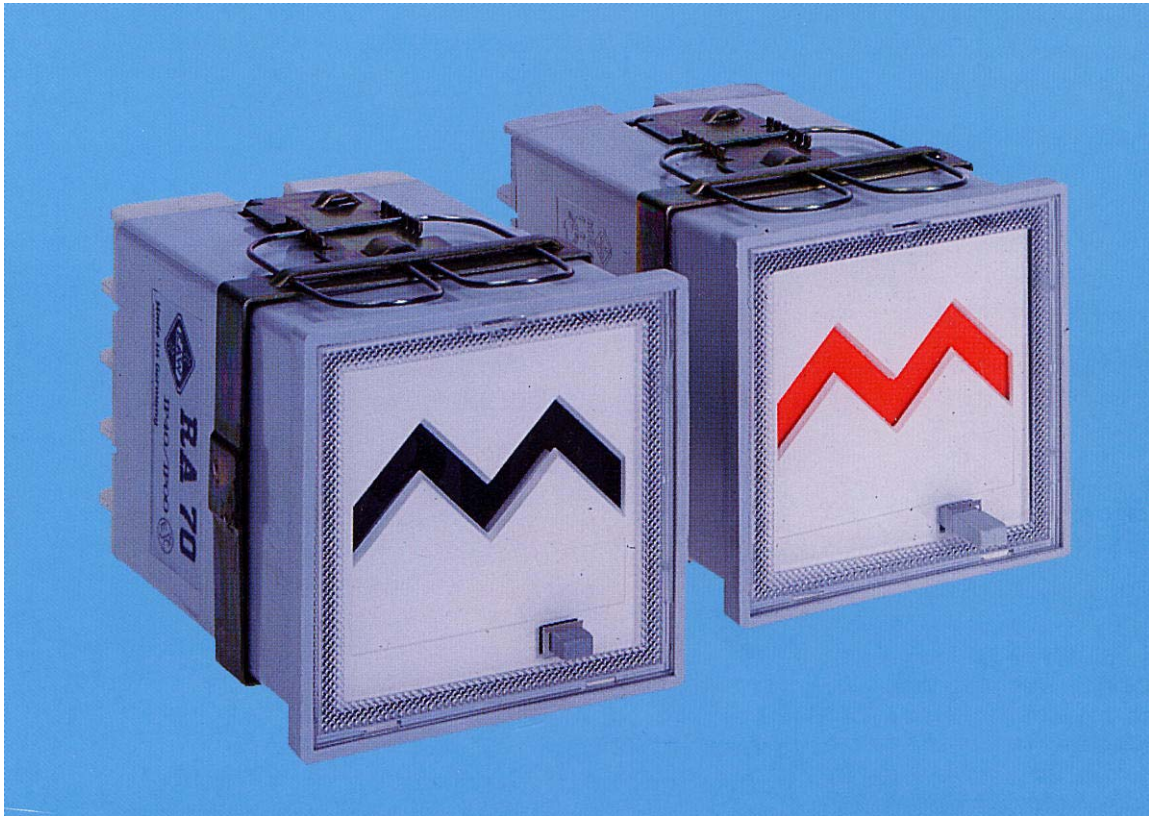


## Signalling Relay

RA 70



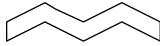


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Version 12.2003

## Equipment Programm

### Signalling Relay RA 70

Input Variables			
12 V AC ... 400 V AC ...		12 V DC ... 220 V DC	
Open-circuit arrangement	Closed-circuit arrangement	Open-circuit arrangement	Closed-circuit arrangement
Signalling Information			
Initial state: white		Signalling state: red	
		Acknowledgement state: black	
Contact Systems			
2 changeover contacts	1 changeover contact & 1 passing contact	1 changeover contact & 1 make contact in center position	1 make contact in center position & 1 passing contact
			1 changeover contact, directly operated & 1 changeover contact
			1 changeover contact, directly operated & 1 passing contact
			1 changeover contact, directly operated & 1 make contact in center position

## Description and Use of Equipment

The RA 70 signalling relays are used to signal and monitor operating states, malfunctions and faults in energy-generating plants, energy-distributing plants and in almost all industrial plants.

For example, they are used to signal:

- operating states in electrical components and plants
- limit violations of pressure, temperature, a.o.
- malfunctions due to the reaction of the protective equipment pertaining to transformers, motors and generators in energy-generating and energy-distributing plants, etc.
- voltage failures during the monitoring of control circuits

The signalling information (e.g., faults, malfunctions, voltage failure, etc.) is saved until it is acknowledged by manually operating the drop indicator and removing the signalling cause.

The contacts operated by the signalling relay in case of a signalling information can be used for visual and/or acoustic indication of for activating other relays, for example to disconnect faulted systems.

If necessary, a passing contact allows to control an acknowledged circuit to centrally signalize faults or other signalling information.

## Configuration of Equipment

It consists of a black molded enclosure, cap with inspection window detachable for customer-tailored labeling (customer labeling may be done by the manufacturer, if requested), manual operation button for the drop indicator at the front of the enclosure.

Screw terminals are arranged at the base plate.

Magnetic system (with DC) made of magnetically soft relay iron, with AC made if a FeAl11 special alloy, clapper armature with knife-edge bearing, tripping of drop indicator through mechanical jack and reset by manual operation, two directly or indirectly operated contacts in the following variants:

- 2 changeover contacts
- 1 changeover contact and 1 passing contact
- 1 changeover contact and 1 make contact in center position
- 1 make contact in center position and 1 passing contact
- 1 changeover contact, directly operated and 1 changeover contact
- 1 changeover contact, directly operated and 1 passing contact
- 1 changeover contact, directly operated and 1 make contact in center position

Depending on the information to be shown, the drop indicator has the following colors:

- Initial state: white display field
- Signalling state: red M on white field
- Acknowledgement state: black M on white field

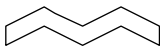


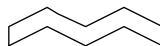
## Mode of Functioning

During the operation the drop indicator changes from normal position to signalling position. This position is maintained even if the signalling cause is not longer there.

If the signalling cause is still there, the acknowledgement state is reached by manual operation; if the signalling cause is not longer there, the normal position is reached.

If, in the acknowledgement state, the signalling cause is not longer on, it automatically switches to the normal position. These relay functions can be realized in open-circuit arrangement as well as in closed-circuit arrangement.

For functions of open-circuit and closed-circuit arrangement, see the following table:

	Initial state	Indication	Acknowledged*	
			still there	removed
operating current	magnetic system: <b>not</b> energized	magnetic system: energized	magnetic system: energized	magnetic system: <b>not</b> energized
closed-circuit current	magnetic system: energized	magnetic system: <b>not</b> energized	magnetic system: <b>not</b> energized	magnetic system: energized
vision signs	 white	 red	 black	 white
contacts	see presentation circuit diagram in initial state	see presentation circuit diagram in signalling state	see presentation circuit diagram in acknowledgement state	see presentation circuit diagram in initial state

\*For the RA 70 special arrangement **without acknowledgement position** the "Acknowledged" column is not available and for the circuit diagrams the "acknowledgement position" is omitted.

## Connection

The connection, one to two copper conductors 0.5 mm<sup>2</sup> to 2.5 mm<sup>2</sup>, is performed at the rear screw terminals of the signalling relay. With terminal cover, the terminal end is provided with an IP 20 protection degree, without cover, the protection degree is IP 00.

Supplementary elements screwed under the screw terminals can be used to realize 4.8 and/or 6.3 plug-type terminals, or respectively, solder terminals, with a protection degree of IP 00 at the terminal end.

Signalling relays may also be provided with a recovery diode arranged between the terminal connections 1 (cathode) and 2 (anode).

Depending on the specific circuit of relay contacts, the user might take appropriate measures to meet the requirements of the electromagnetic compatibility law.

## Suppressor Circuits

Suppressor circuits are used for protection from cut-off voltage peaks caused by an inductivity connection and the reduction of contact load. It prevents, among other things, the malfunction and/or destruction of electronic and insulation parts caused by overvoltage, radio disturbance as well as it reduces material migration and contact erosion. The suppressor circuit should be placed directly at the spot of fault.

Normal suppressor circuits are:

### • Diode suppressor circuits

Advantages: - no overvoltage (only approx. 0.7 V)  
- low costs  
- only for DC

Disadvantages: - causes a dropout delay at the relay  
- not protected against polarity reversal

### • Varistor suppressor circuits

Advantages: - for DC and AC  
- only low dropout times at the relay  
- low costs  
- protected against polarity reversal

Disadvantages: - relatively high remaining overvoltage

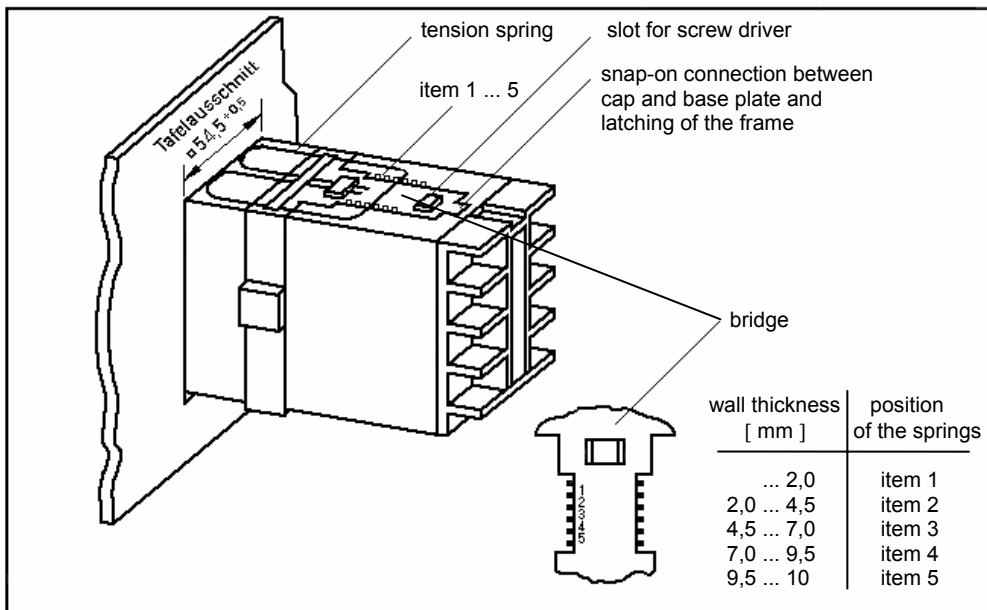
### • RC suppressor circuits

Advantages: - for DC and AC  
- low overvoltage  
- only low dropout times at the relay  
- protected against polarity reversal

Disadvantages: - relatively high switch-on peaks  
- not for small voltages  
- increased dropout times at the relay  
- R and C must be optimized for L<sub>coil</sub>

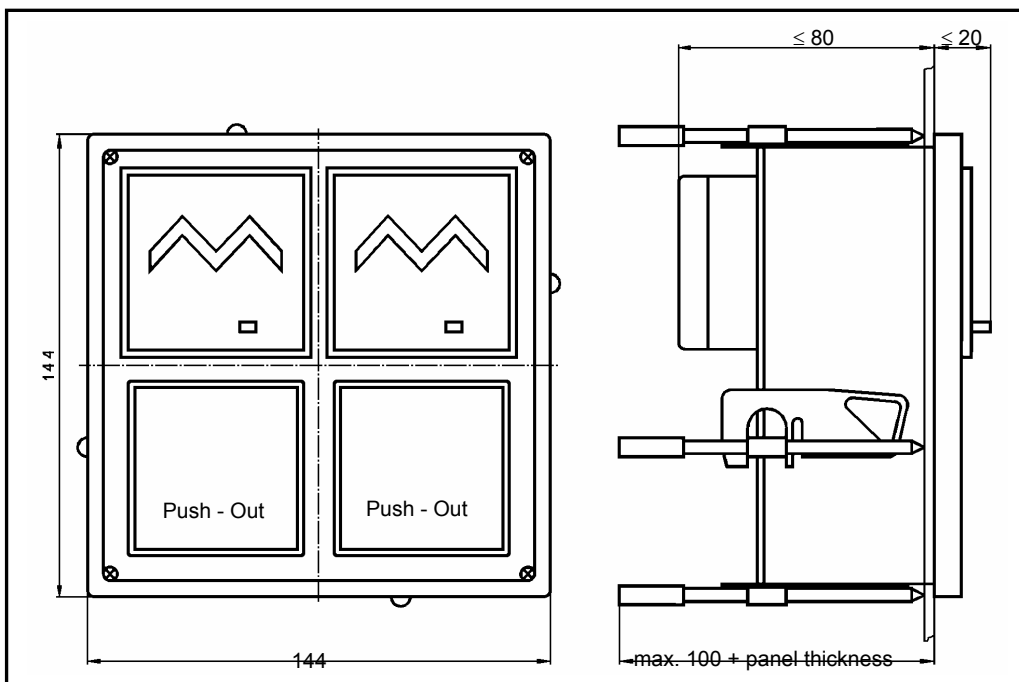
## Installation

The installation is done in panel cutouts of  $54,5^{+0,5}$  mm  $\times$   $54,5^{+0,5}$  mm. The panel thickness can be between 1 - 10 mm. The mounting position of the signalling relays (front surface) may be vertically to horizontally upwards. It is fastened by use of the supplied frame that must be slid onto the enclosure by manual power and latches tight into enclosure grooves. The fastening element has been designed in such a way to mount the signalling relays at the front side horizontally and vertically closely side by side.



Installation survey

Two, three or four signalling relays may also be installed into a quadruple panel enclosure according to DIN 43 700. Here, the front frame is sized 144 mm x 144 mm with a panel cutout of 138 mm x 138 mm.



Quadruple switchboard enclosure for 2 to 4 RA 70 signalling relays

## Technical Parameter

### Input parameter

Rated voltages:	12 V to 400 V AC, 12 V to 220 V DC (see list of order numbers)
Rated frequency:	0 Hz, 50 Hz, 60 Hz
Permitted tolerance of rated frequency:	$\pm 6 \%$
Working range of coil voltage:	Class 1 in line with EN 61810-1: 04.1999
Response voltage:	$\leq 0,8 \times U_N$
Maximum operating voltage:	$1,1 \times U_N$
Operating mode:	continuous operation
Overload capacity of operating element:	$2 U_N$ AC or DC, 1 min (pursuant to the requirement of power supply company)
Operating method:	working current or closed-circuit current
Minimum operating time:	$\geq 30$ ms at $U_N$
Dropout voltage:	$\geq 15 \%$ of $U_N$ at AC $\geq 5 \%$ of $U_N$ at DC
Rated consumption:	$\leq 7.0$ VA, $\cos \varphi = 0.32$ at AC (relay armature in initial position) $\leq 3.5$ VA, $\cos \varphi = 0.62$ at AC (relay armature tightened) $\leq 2.5$ W at DC

### Output parameter

Relay contact variants:	2 changeover contacts 1 changeover contact and 1 passing contact 1 changeover contact and 1 make contact in center position 1 make contact in center position and 1 passing contact 1 changeover contact, directly operated and 1 changeover contact 1 changeover contact, directly operated and 1 passing contact 1 changeover contact, directly operated and 1 make contact in center position
Contact application classes:	1, 2, 3 in line with DIN EN 60255-23 / 03.97
Max. switching voltage:	$\leq 250$ V AC/DC
Contact arrangement:	single contact
Contact material:	
- Type	hard silver - AgCu4
- Main fields of use:	24 V ... 250 V; 5 mA ... 10 A, $\geq 1$ W
- Contact resistance:	$\approx 40$ m $\Omega$ in new condition
- Main fields of application:	universal application at medium AC and DC loads
Maximum making capacity:	10 A
Limiting continuous current:	5 A
Maximum permitted continuous current:	6 A
Maximum breaking capacity:	10 A $\cos \varphi = 1.0$ 230 V AC 6 A $\cos \varphi = 0.4$ 230 V AC 0.6 A $\tau = 0$ ms 220 V DC 0.2 A $\tau = 40$ ms 220 V DC
Minimum switching capacity:	24 V, 50 mA
Maximum switching rate:	$\leq 600$ operating cycles per hour
Voltage endurance:	$\geq 1 \times 10^5$ operating cycles at a maximum breaking capacity
Passing time of passing contacts:	$\geq 40$ ms

### Operational parameter:

Ambient temperature:	- $10^\circ\text{C}$ to $50^\circ\text{C}$ at close-to-close arrangement - $10^\circ\text{C}$ up to $55^\circ\text{C}$ for single arrangement (distance $\geq 60$ mm)
Impulse voltage withstand level: 4.0 kV,	voltage form 1.2/50 $\mu\text{s}$ according to EN 61810-5: 04.1999
Rated insulation Alternating voltage:	2.0 kV at $U_N \leq 250$ V 2.5 kV at $U_N = 400$ V
Degree of pollution:	2 in line with EN 61810-5: 04.1999 for $U_N = 400$ V AC 3 in line with EN 61810-5: 04.1999 for $U_N \leq 250$ V AC
Clearances in air:	$\geq 3$ mm in line with EN 61810-5: 04.1999
Creepage distances:	$\geq 4$ mm in line with EN 61810-5: 04.1999
Site altitude:	$\leq 2,000$ m above sea level
HF interference immunity (1 MHz):	Class III pursuant to DIN IEC 255 Part 22-1 / 05.91 1.0 kV normal-mode voltage (transverse voltage) 2.5 kV common-mode voltage (longitudinal voltage)

**Ambient conditions, environmental test procedure:**

Low temperature:	DIN EN 60068 - 2 - 1, Issue 03.1995; Test Ab - 10°C -function - 40° C strength/transport/storage
High temperature:	DIN EN 60068 - 2 - 1, Issue 03.1995; Test Bb 50°C -; 55°C; 70°C
Continuous damp heat:	DIN EN 60068 - 2 -3, Issue 12.1986; Test Ca (40°C)
Cyclical damp heat:	DIN EN 60068 - 2 -30, Issue 09.1996; Test Db40 (25°C, 40°C)
Corrosive atmosphere:	DIN EN 60068 - 2 - 42 / 43, Issue 08.1985 08.1985; Test Ki (Kc+Kd) (SO <sub>2</sub> 10 mg/m <sup>3</sup> + H <sub>2</sub> S 0,75 mg/m <sup>3</sup> ; 40°C)
Salt fog:	DIN EN 60068 - 2 -11, Issue 08.1985; Test Ka (30 g ± 1 g NaCl / dm <sup>3</sup> H <sub>2</sub> O)
Bumping:	DIN EN 60068 - 2 -29, Issue 03.1995; Test Eb strength: 150 m / s <sup>2</sup> ; 6 ms strength: 100 m / s <sup>2</sup> ; 16 ms function: 50 m / s <sup>2</sup> ; 16 ms
Vibrations, sinusoidal:	DIN EN 60068 - 2 -6, Issue 05.1995; Test Fc strength: Frequency range 10 ... 500 Hz vibration displacement 0.15 mm, ≤ 60 Hz cut frequency 60 Hz acceleration 20 ms <sup>-2</sup> , > 60 Hz function: 10...500 Hz 0.075 mm, ≤ 60 Hz cut frequency 60 Hz acceleration 10 ms <sup>-2</sup> , > 60 Hz function, strength: Frequency range 5 ... 80 Hz 0.55 mm, ≤ 30 Hz cut frequency 30 Hz acceleration 20 ms <sup>-2</sup> , > 30 Hz

**Installation and connection conditions:**

Operating position	front surface vertically to horizontally upwards
Visibility of display:	up to approx. 5 m at a viewing angle of 90 ° ± 20° to the front surface
relay enclosure:	Enclosed panel bay, transparent display window
Type of Protection	according to DIN EN 60529-1: 2000-12
- relay enclosure:	IP 40
- terminals:	IP 00, with additional terminal cover IP 20
Connections:	screw connection 4.8 and/or 6.3 plug-type terminals (DIN 46244), or respectively, solder terminals, through supplementary elements which have to be separately ordered and supplied and then be screwed on.
Connectable supply leads:	1 or 2 × 0.5 mm <sup>2</sup> up to 2.5 mm <sup>2</sup> Cu single or multistranded 1 or 2 × 1. mm <sup>2</sup> up to 2. mm <sup>2</sup> Cu extra finely stranded
Fastening:	latching of frame
Front dimensions:	60 mm × 60 mm
Panel cutout	54.5 <sup>+0,5</sup> mm × 54.5 <sup>+0,5</sup> mm
Weight	about 0.3 kg
Dimensioned drawing	Rs 805 275
Treatment instruction:	Rs 808,278

**General data:**

Manufacturing quality:	The RA 70 signalling relays are manufactured in line with a quality
Management system	According to the requirements given in DIN ISO 9004 and documented according to DIN ISO 9001.
Useful life:	Expected value ≥ 20 years, if the electrical and/or mechanical service life has not been exceeded before.

**Shipment and storage condition:**

Temperature range	-50 °C up to 70 °C
Place of storage:	enclosed and vented rooms

## Conformity of Standards

The data given for the RA 70 signalling relays, including accessories, refer to the following national and international standards:

DIN VDE 0435-110 / VDE Part 110: 1989-04  
Electrical relays; terms

DIN EN 60810-1 / VDE 0435 Part 201: 1999-04  
Electromechanical non-specified-time relays,  
Part 1: General Requirements

DIN EN 60810-5 / VDE 0435 Part 140: 1999-04  
Electromechanical non-specified-time relays,  
Part 5: Insulation coordination

DIN EN 60255-23 / VDE 0435 Part 120: 1997-03  
Part 23: Electrical relays; contact behavior

DIN EN 60529 / VDE 0470 Part 1: 2000-12  
Degrees of protection provided by enclosure (IP code)

DIN EN 60999-1 / VDE 0609 Part 1: 2000-12  
Connection material – electrical copper conductors – safety requirements for screw terminal connections and screwless terminals

## CE Conformity

Presently, no CE labeling for "Electromechanical non-specified-time relays" is required in the guidelines. However, the signalling relays of the RA 70 type are in line with the European guidelines

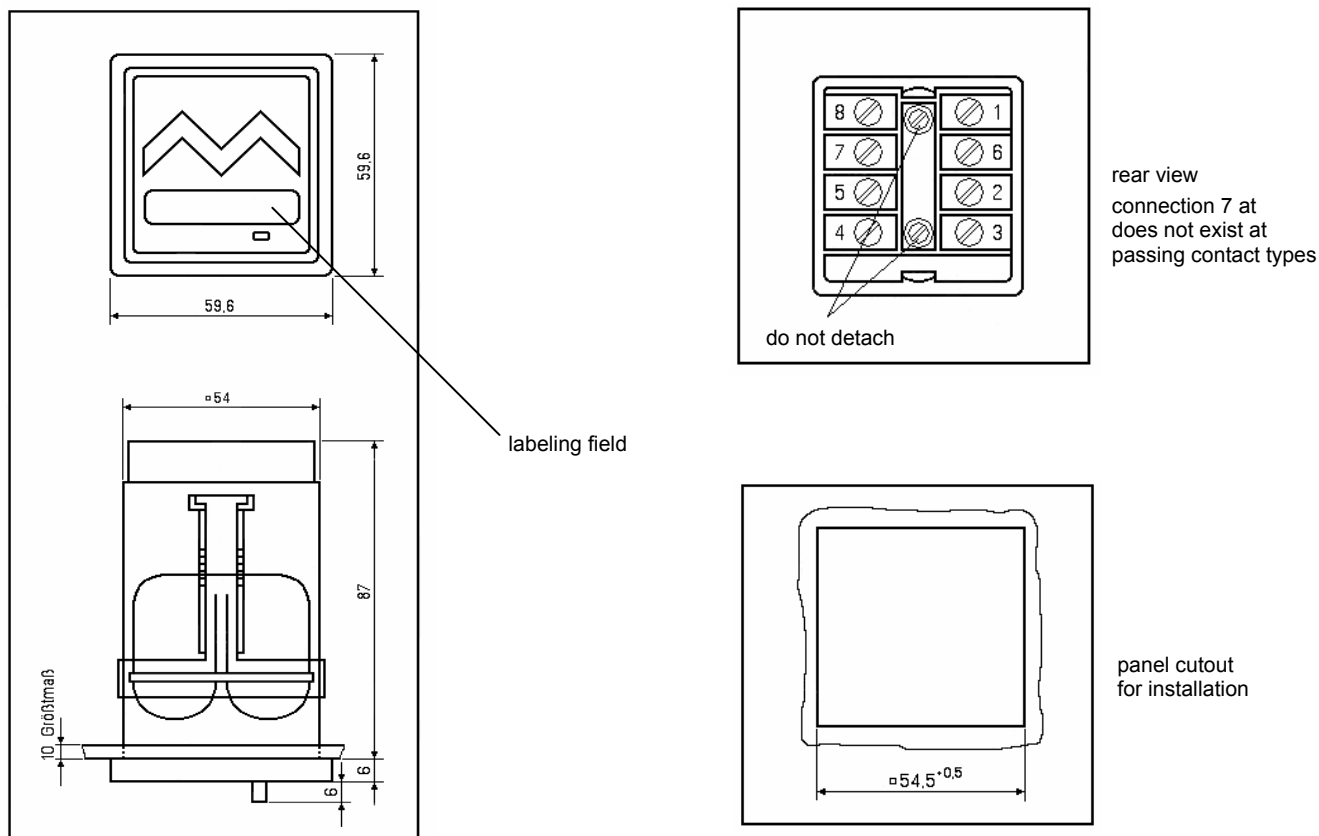
- 73/23/EEC "Low-voltage guideline" as of 19.02.1973 and
- 89/392/EEC of 03.05.89

including the revisions concerning the use in case of terminal cover (degree of protection: IP 20) except the following deviation from standard EN 61810-1: 1999.04:

In the factory-built state, company logo and type designation are not legible.

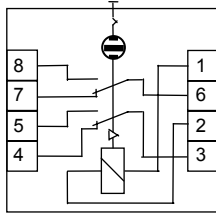
The CE marking will be attached onto the side print of the relay or on the package.

## Dimensions and Labeling

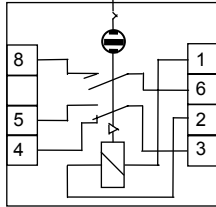
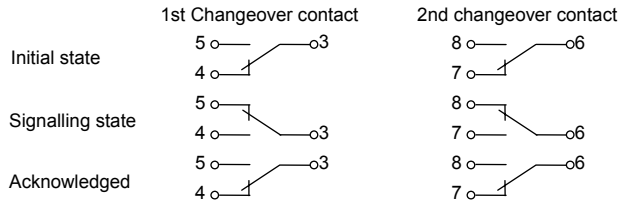


Dimensioned drawing Rs 805 275

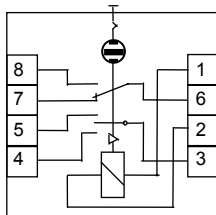
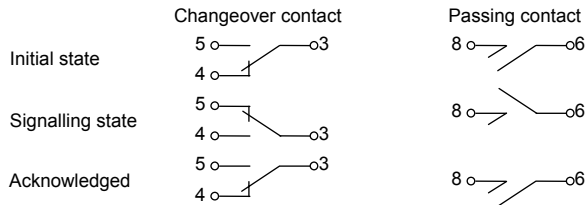
# Wiring Diagrams



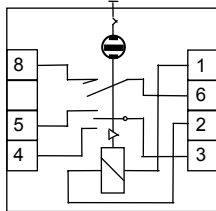
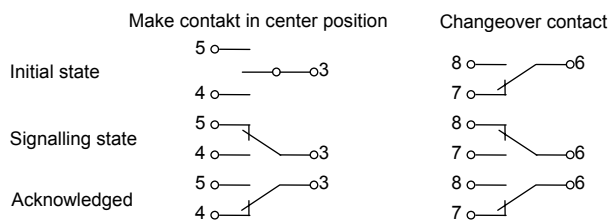
Dimensioned drawing Rs 801,837: Arrangement with 2 changeover contacts



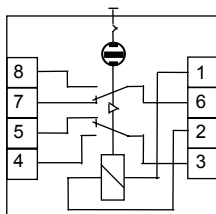
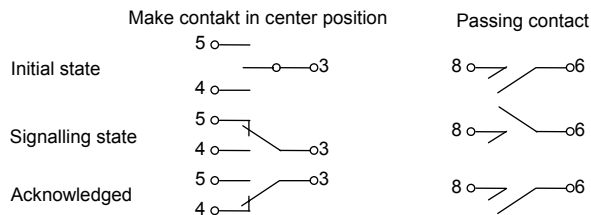
Dimensioned drawing Rs 801,838: Arrangement with 1 changeover contact and 1 passing contact



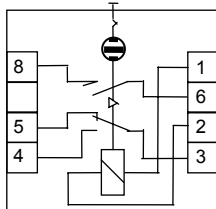
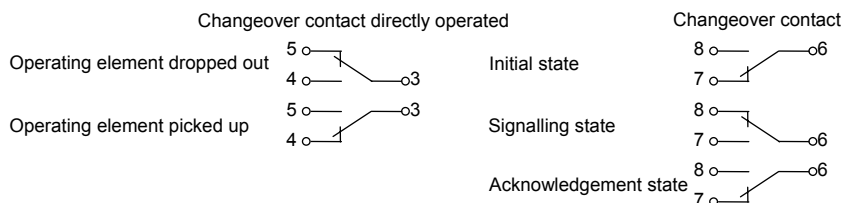
Dimensioned drawing Rs 801,839: Arrangement with 1 changeover contact and 1 make contact in center position



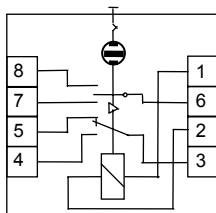
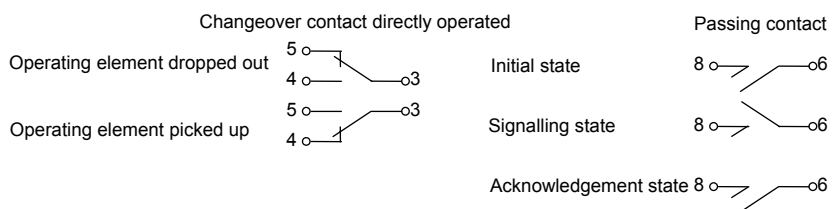
Dimensioned drawing Rs 801,840: Arrangement with 1 make contact in center position and 1 passing contact



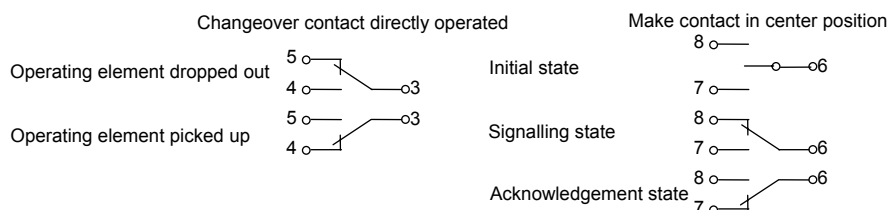
Dimensioned drawing Rs 801,722: Arrangement with 1 changeover contact, directly operated and 1 changeover contact



Dimensioned drawing Rs 801,723: Arrangement with 1 changeover contact, directly operated, and 1 passing contact



Dimensioned drawing Rs 801,724: Arrangement with 1 changeover contact, directly operated and 1 make contact in center position





## List of Order Numbers

### Direct voltage:

#### **Open-circuit working**

60 V  
110 V  
220 V  
Special voltages

#### **Closed-circuit arrangement**

60 V  
110 V  
220 V  
Special voltages

### Alternating voltage:

#### **Open-circuit working**

24 V, 50 Hz  
230 V, 50 Hz  
400 V, 50 Hz  
Special voltages

#### **Closed-circuit arrangement**

24 V, 50 Hz  
230 V, 50 Hz  
400 V, 50 Hz  
Special voltages

### Special arrangements:

Normal arrangements\*  
Arrangement with diode GP02-40 (4 kV)  
Arrangement for 60 Hz  
Arrangement without acknowledged state  
Arrangement without acknowledged state with diode GP02-40

### Contact arrangements:

2 changeover contacts  
1 changeover contact and 1 passing contact  
1 changeover contact and 1 make contact in center position  
1 make contact in center position and 1 passing contact  
1 changeover contact, directly operated and 1 changeover contact  
1 changeover contact, directly operated and 1 passing contact  
1 changeover contact, directly operated and 1 make contact in center pos.

### Special voltages:

Normal arrangements  
12-volt  
24 V (DC)  
250 V (DC)  
42-volt  
48-volt  
60 V (AC)  
100-volt  
127 V (AC); 125 V (DC)  
Other special voltages upon request

\*Relays to be operated on sea ships upon request

Pl. no.: 

1	7	3	2	8				
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84
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9

## List of Order Numbers - Accessories

Terminal cover for IP 20 degree of protection	Pl. no. 1. 732 848 000
4.8 plug-type terminals according to DIN 46244	Pl. no. 1. 732 899 000
6.3 plug-type terminals according to DIN 46244	Pl. no. 1. 732 899 001
Masking frame for panel cutout 58 mm x 58 mm**	Pl. no. 1. 732 898 000
Quadruple panel casing for 2 to 4 RA 70 signalling relays	Pl. no. 1. 732 846 000

\*\*For substitutes in case of exchange of RA 6 and RA 7 signalling relays (panel cutout 55<sup>5</sup>) by RA 70 signalling relay

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mit uns!

Make contact with us!

Die Experten der EAW Relais-technik GmbH nehmen sich gern Zeit für ein informatives Gespräch mit Ihnen. Natürlich kostenlos und unverbindlich. So haben Sie Gewissheit, dass wir die richtigen Partner sind.

The specialists of EAW Relais-technik GmbH will be glad to take time out to meet you for informative talks. Convince yourself – without charge – that you have found the right partner in us.



EAW RELAISTECHNIK GMBH  
Hauptstraße 13  
10317 Berlin, Germany  
[www.eaw-relais-technik.de](http://www.eaw-relais-technik.de)

Phone +49-30-55 76 22 00  
Fax +49-30-55 76 22 03  
e-mail [vertrieb@eaw-relais-technik.de](mailto:vertrieb@eaw-relais-technik.de)

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**RELAISTECHNIK** GMBH