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Auxiliary, signaling and tripping relays RSMA 1, RSMA 2, RSMM 1, RSMS 1, RSSF 1, RSME 1, RSME 18 and RSMH 2

RSMA 1

RSMA 2

RSME 1

RSME 18

RSMH 2

RSMM 1

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Contents

1. Features

- Direct flush mounting, relays do not require additional mounting accessories
- Suitable for tripping, blocking, interlocking, signaling etc. in protection, control and industrial systems
- Various ratings and contact configurations
- High voltage insulation
- Screen protected and dust-proof with a transparent plastic cover
- Low power consumption
- Heavy, medium or light duty operation and long mechanical life
- Indication flags
- High resistance to shock and vibration
- Up to 15 contacts in one relay
- Standard ring or fork type lugs can be used for termination of wires

2. Application

The relays are intended for installations where high operating requirements exist, on operating time, contact rating (heavy breaking duty) or where normal relays of industrial type are not suitable.

The relays are especially suitable in protection and control circuits. Models exist that are very suitable for high corrosive atmosphere or seismic areas. Tripping, interblocking and multiplying functions are easily achieved with single relays or combinations of relays.

Special requirements can be met by using different contact types, twin contacts, bridge contacts or dry-reed contacts.

Types RSMA 1, RSMA 2 and RSMM 1 are used as position repeat relays, as interposing relays in control equipment and as output relay in protection relays.

Type RSMM 1 is a space saving relay with two coils, each with 3 contacts for applications where few contacts are needed.

Type RSMS 1 is particularly suitable as tripping relay due to its extremely short operate time. A special variant, which is not influenced by capacitive discharges at earth fault and which also has improved insulation across open contact, is available for heavy applications where high disturbance immunity is required.

RSMS 1, in combination with heavy-duty relays, is used in high speed tripping assemblies as accessories to protection relays.

Type RSSF 1 is a signal flag relay intended for use as operation indicator. A zero voltage type is available and can be used to supervise dc supply voltages.

Types RSME 1 and RSME 18 are used where a low number of heavy duty contacts are required e.g. as trip relay. RSME 18 is a RSME 1 with an operating flag indicator.

Type RSMH 2 is used when many heavy duty contacts are required. It can be provided with an operating flag indicator, as an option.

3. Functions which can be obtained with additional components

Auxiliary relays can be used in a number of ways with different accessories to obtain a variety of types of operation. A few typical circuits are shown below.

Drop-out time-lag with a diode

To obtain a dropout delay of a dc relay or to protect an electronic circuit against transients, a diode unit across the relay coil (R) can be used.

If the dropout time (t) in the table is too long it can be reduced with a resistor (r) connected in series with the diode.

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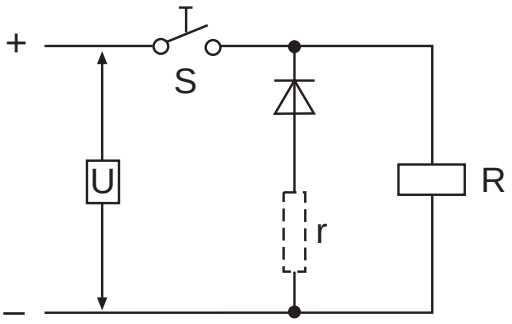
Type	Typical dropout time, t, with diode[1)]
RSMA 1	100-125 ms
RSMA 2	20 ms
RSMM 1	40 ms
RSMS 1[2)]	10 ms
RSME 1 RSME 18	35 ms
RSMH 2	60 ms

1) The deviation in dropout time from the values in the table can be considerable, due to numbers of contacts, inductance in the coil, depending on operating voltage etc.

2) The diode is to be connected to terminals 21-28.



Drop-out delay can be achieved by connecting a parallel diode across the relay coil as shown. Please observe the polarities of the dc voltage and the diode.

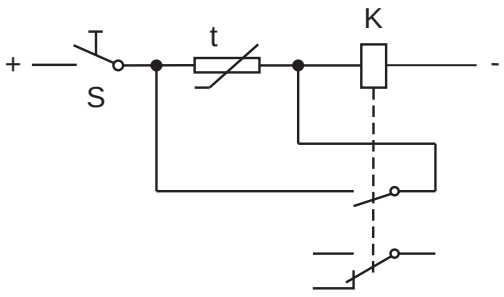
When S makes the relay picks up instantaneously. When S breaks the relay drops out with a time lag caused by the diode.

Inductive transient protection

The diode also provides transient protection of the relay and also for the parallel connected devices by reducing the induced overvoltages (many kV's) caused by the inductance of the auxiliary relay upon disconnection from the dc supply when the energizing contact opens.

Transient protection (and shorter drop-out delays) may also be achieved by using a parallel connected resistor, thermistor or varistor across the relay instead of the diode.

Pick-up time-lag using a thermistor



When S makes, the current heats the thermistor t and its resistance drops as its temperature increases. When the current through K reaches the pick-up value, the relay picks up and the thermistor is short-circuited by a make contact on the relay.

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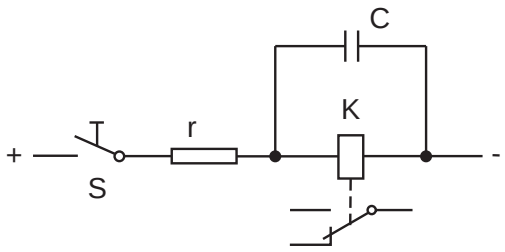
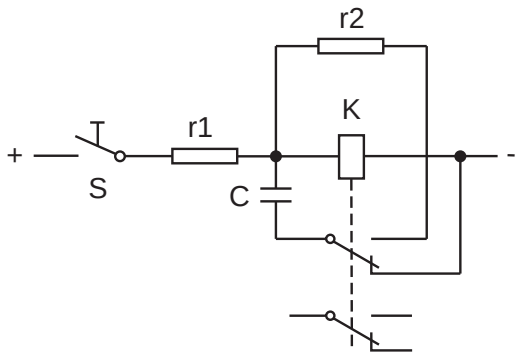
Pick-up and drop-out time-lag using a capacitor



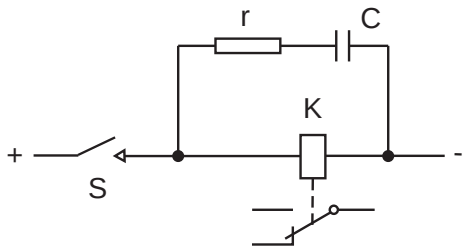
When S makes, the pick-up time is determinated by the values r, K and C. The relay picks up when C is sufficiently charged and the time lag upon drop-out is caused by C discharging through K after S breaks.

Pick-up time-lag using a capacitor (normal drop-out)



The pick-up time is determined by the values of r1, K and C. When the relay has picked up C is discharged across r2 and normal drop-out is obtained.

Impulse storing circuit (impulse lengthening)



When the impulse contact S momentarily makes, the relay picks up and remains picked up for a period the length of which is determined by r, K and C.

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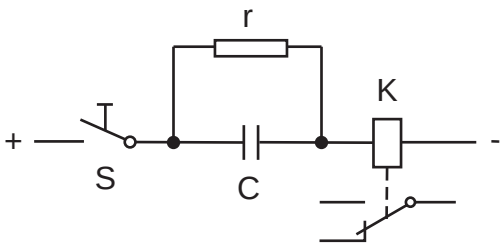
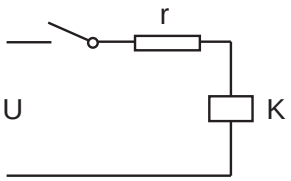
Impulse shortening circuit



When S makes, the relay K picks up instantaneously and remain a picked up until C is sufficiently charged. The relay then drops out, since the current through r and K falls below the relay drop-out value. (S remains closed all the time).

Shorter pick-up times with separate series connected resistor



The operating time can be reduced for auxiliary relays by connecting a separate resistor – r in the diagram – in series with the relay coil K.

The connection reduces the L/R ratio, i.e. the time constant for the drawn relay coil operating current.

The pick-up time and characteristics of the series resistor for a number of types of relays are listed in the table 1. The dispersion of the pick-up time is about ±20% at rated voltages and up to ±50% if considering voltage range variations.

The drop-out time of the relay will be approximately the same as for a relay without the series resistor.

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Table 1. Dimensioning the series resistor for obtaining shorter pick-up times
D.c. supplied auxiliary relays with supply voltage U = 110, 125. 220 and 250 V.

(The table contains information also for some non-standard voltages for relays available on request.)

		Pick-up time[1)]		U = 110 V				Max. permitted connection time
Relay type	**operating value group**	**Break contact ms**	**Make contact ms**	**Relay with rated voltage V**	**Series resistance, r Ω**	**Wattage of r W**	**Wattage of r + R W**	
RSME 1		10 7	20 15	24 12	630 400	9 21	13 25	5 min. 5 min.
RSMH 2		10 6	25 15	24 12	500 160	14 48	19 60	Cont. 5 min.
RSMA 1	1-3	5	10	12	2000	5	6	Cont.
RSMA 2	6	8	13	12	330	25	30	Cont.

		Pick-up time[1)]		U = 125 V				Max. permitted connection time
Relay type	**operating value group**	**Break contact ms**	**Make contact ms**	**Relay with rated voltage V**	**Series resistance, r Ω**	**Wattage of r W**	**Wattage of r + R W**	
RSME 1		10 7	20 15	24 12	750 450	11 25	15 30	5 min. 5 min.
RSMH 2		10 6	25 15	24 12	600 200	17 54	21 65	Cont. 5 min.
RSMA 1	1-3	5	10	12	2250	6	7	Cont.
RSMA 2	6	8	13	12	400	28	33	Cont.

		Pick-up time[1)]		U = 220 V				Max. permitted connection time
Relay type	**operating value group**	**Break contact ms**	**Make contact ms**	**Relay with rated voltage V**	**Series resistance, r Ω**	**Wattage of r W**	**Wattage of r + R W**	
RSME 1		10 7	20 15	48-55 24	2500 1600	9 21	13 25	5 min. 5 min.
RSMH 2		10 6	25 15	48 24	2000 630	15 50	19 62	Cont. 5 min.
RSMA 1	1-3	5	10	24	8000	5	6	Cont.
RSMA 2	6	8	13	24	1600	22	26	Cont.

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		Pick-up time[1]		U = 250 V				Max. permitted connection time
Relay type	**operating value group**	**Break contact ms**	**Make contact ms**	**Relay with rated voltage V**	**Series resistance, r Ω**	**Wattage of r W**	**Wattage of r + R W**	
RSME 1		10 7	20 15	48-55 24	3000 1800	11 26	15 30	5 min. 5 min.
RSMH 2		10 6	25 15	48 24	2300 750	18 57	22 69	Cont. 5 min.
RSMA 1	1-3	5	10	24	9000	6	7	Cont.
RSMA 2	6	8	13	24	1800	26	30	Cont.

1) The dispersion of the pick-up time is about ±20%, ±50% if considering voltage range variations

Table 2. Coil resistance, relays with twin contacts

Rated voltage V	Relays with twin contacts								
	RSMA 1	RSMA 2, dc	RSMM1	RSMS 1					
	dc op. v. gr.[1] 1–3	op. v. gr. [1] 6	dc	Variant A, E			Variant B		
	Coil resistance Ω			Coil resistance Ω	Series resistance Ω	Total resistance Ω	Coil resistance Ω	Series resistance Ω	Total resistance Ω
12 24 30-36 36	110 460 625 -	70 270 375 -	140 460 735 -	6.3 21 - 40	18 72 - 156	23.3 93 - 196	21 82 - 210	27 110 - 240	48 192 - 450
48 48-55 55 110	- 2020 - -	- 1070 - -	- 2050 - -	108 - 108 380	320 - 360 1430	428 - 468 1810	360 - 465 1920	410 - 570 2070	770 - 1035 3990
110-125 125	9680 -	6120 -	10800 -	- 610	- 2000	- 2610	- 2450	- 2900	- 5370
220 220-250 250	- 39200 -	- 19300 -	- 40000 -	1520 - 1920	5700 - 8000	7220 - 9920	6090 - 8670	8420 - 10700	14510 - 19370

1) op. v. gr. = Operating value group

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Table 3. Coil resistance, relays with bridge contacts

Rated voltage	Relays with bridge contacts		
	RSME 1 RSME 18	RSMH 2	
	dc	dc	ac 50 and 60 Hz
	Coil resistance Ω		
12 24 48 48-55	78 301 - 1130	39 155 564 -	- 39 - -
55 110 110-125	- - 5780	700 2930 -	194 700 -
125 127 220	- - -	3610 - 10600	- 890 2930
220-250 250 380	23300 - -	- 13500 -	- - 8520

4. Design

The COMBIFLEX-S family of relays have a simplified design in terms of mounting and connection. The relays can be directly flush mounted without the need for additional relay cases or equipment frames. Standard ring or fork type lugs can be used to terminate the wiring. Up to two wires of 2.5 sq. mm each can be connected per terminal. This is often a requirement by some users. The COMBIFLEX-S family of relays still retain the functional and technical data of the proven COMBIFLEX family.

The contact elements are made of silver, however, gold elements on the contacts can sometimes be necessary, for example in sulfuric atmospheres or when the voltage in the contact circuit is lower than 10 V and the current lower than 10 mA.

Each relay has a dust-tight cover, except the RSMS variants A and E which have additional holes in the cover for heat dissipation. Each relay cover has a hole covered by a removable plastic plug with the exception of RSME 18 and RSSF 1. Through the hole the relay armature can be activated. Relays with indicating flags have a resetting knob accessed from the outside of the cover.

The relays are marked with the type designation, Ordering No., rated voltage, and where applicable, the symbol of the relay is also shown.

All dc supplied relays, with the exception of RSMS 1, can be supplied with full-wave or half-wave rectified ac.

For supply with full-wave rectified ac, select relays with a rated voltage equivalent to the supply voltage.

For supply with half-wave rectified ac, a diode in addition to the series diode is to be connected in parallel across the coil and the rated voltage of the relay is to be equivalent to half the supply voltage. If transients are expected in the supply voltage, these determine the choice of matching diodes.

Smoothing capacitors are unnecessary in both cases.

The auxiliary relays will operate within a range of 80-110% of the rated voltage. If the rated voltage is given as a voltage range, e.g. 110-125 V, the relays will operate within a range of 80-110 % of each rated voltage between 110 and 125 V. Permissible temperature range is given in the data table.

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Relays with twin contacts

Auxiliary relays used in automatic equipment for control and regulation must have a very high degree of contact reliability even at lower voltages. Auxiliary relays with twin contacts fulfil this requirement. A twin contact has two contact elements on each contact member and each of these makes independent and simultaneous contact with the corresponding element on the other contact member. This gives two parallel current paths and greatly reduces the risk of contact failures. The contact sets have contact levellers of wear-resistant material with a low coefficient of expansion. This means that the correct contact force is always obtained even in contact units containing numerous contact springs. RSMA 1, RSMA 2, RSMM 1, RSMS 1, and RSSF 1 contain twin contacts.

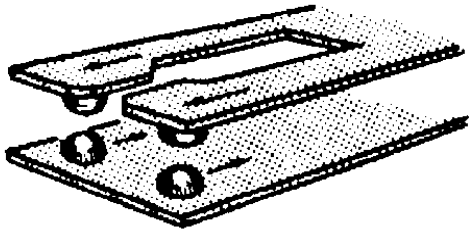

Figure 1. Twin contact

RSMA 1

This relay is designed for dc supply. The outstanding features of this relay are its low power consumption and long mechanical life.

A few variants of RSMA 1 is ac operated with a valid frequency between 50-60 Hz and rated voltage of 115 or 230 V. A half-wave rectifier is built in, connected in parallel across the coil.

RSMA 2

This relay is a variant of RSMA 1, with a larger terminal plug-in plate, and a greater number of contacts.

The relay occupies two seats.

RSMA 1 and RSMA 2 have one, two or three sets of contact stacks. The system voltage across one stack of contacts must not exceed 300 V dc or 250 V ac. The corresponding voltage between contact stacks must not exceed 600 V dc or 500 V ac.

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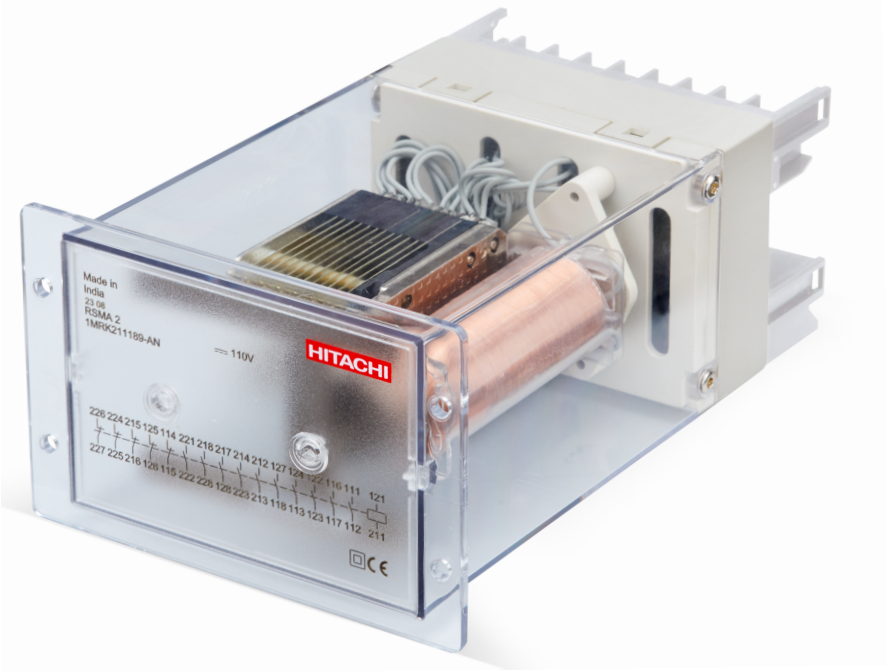

RSMM 1
The relay is designed for dc supply. Two smaller type relays are included in RSMM 1. These relays can each have up to 3 contacts (6 contact springs). Relay RSMM 1 with different rated voltages for the two relays is also available as an option.

RSSF 1
The unit contains one or two smaller relays with three contacts and red indicating flags. The flags are reset manually with an external knob or automatically when the dc is switched off.

The RSSF 1 is also available as loss-of-voltage relay. The indicating flag is always automatically reset in this variant.

There are DC voltage and DC current operated versions of the RSSF 1 relay. See Section 6. The current operated relay may e.g. be used to indicate that breaker trip coil current has flown, i.e. as a series trip current flag (target).

RSMS 1
This relay is designed for dc supply. It has a very short pick-up time, down to 4 ms for a make contact (variant A, 7 W). Variant B is a low power variant (3 W) with 1,5 ms longer pick-up time.

Variant E (7 W) is safe for capacitive discharge through the coil at dc earth faults. It has also a larger contact gap, which can withstand 2 kV test voltage.

Because of the high power consumption in variants A and E these variants should not be continuously energized.

The relay has an additional terminal (28) brought out between the coil and the series resistor. This terminal is intended for dropout delay by connecting a diode across the coil.

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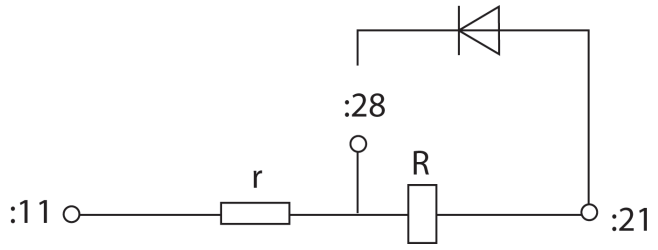

Figure 2. RSMS 1

Relays with bridge contacts

Auxiliary relays which are to be used as tripping relays or as operating relays should have a high breaking capacity, good contact reliability and be free from risk of contact welding. These qualities are possessed by relays with bridge contacts.

The contacts have two fixed contact members and a moving bridge-shaped member. This design with two breaking points in series gives high breaking capacity.

The moving contact member is designed so that a considerable sliding motion is obtained between the contact elements during closing; this increases contact reliability and reduces the risk of welding.

Types RSME 1, RSME 18, and RSMH 2 contain bridge contacts.

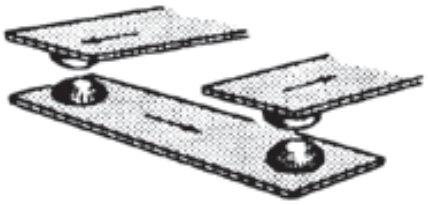

Figure 3. Bridge contact

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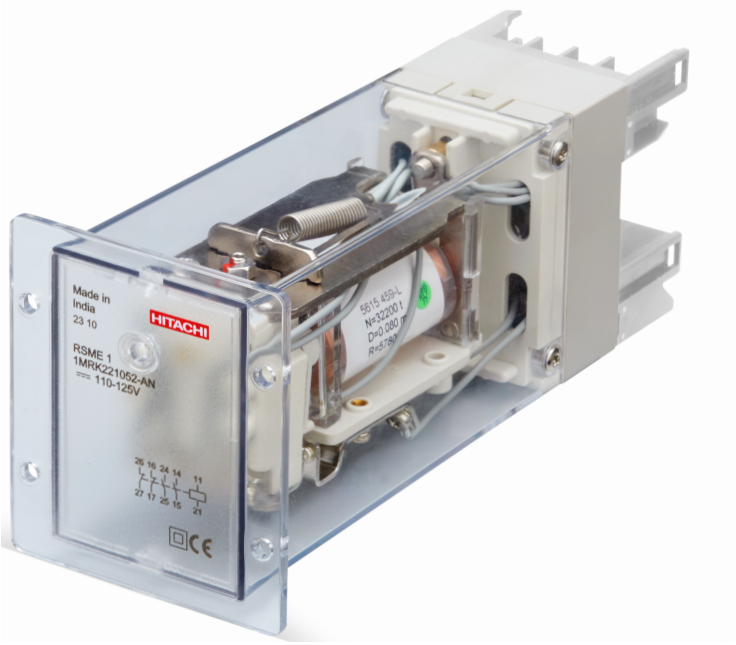
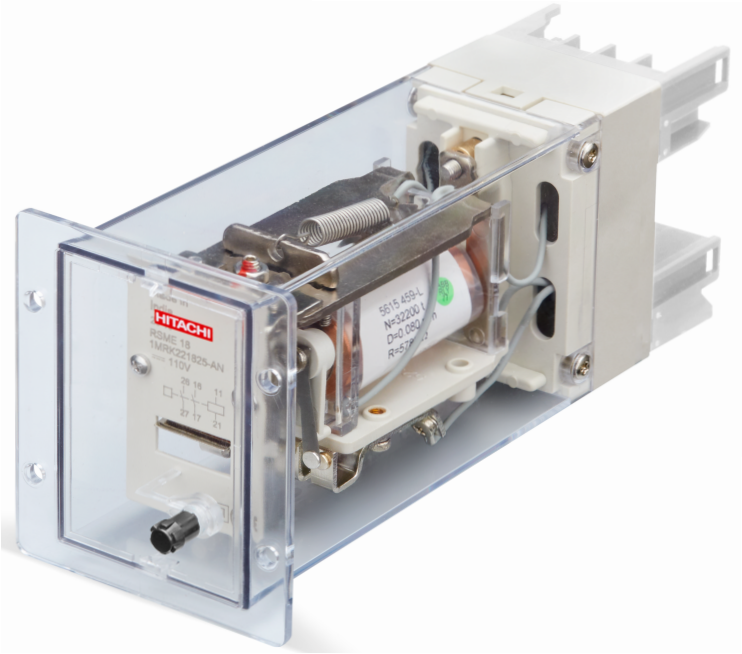
RSME 1

This relay is designed for dc supply. It has two or four contacts.



RSME 18

The relay consists of an RSME 1 relay fitted with a red indicating flag. The flag becomes visible when the armature picks-up and remains visible after drop-out. The flag is manually reset by means of a resetting knob in the cover. The relay has two contacts.



RSMH 2

This relay has eight heavy duty contacts and can be fitted with an indicating flag which becomes visible when the armature picks-up and remains visible after drop-out. The flag is manually reset by means of a resetting knob in the cover. For

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checking the operation the relay has a push-button which is accessible through a hole in the cover. The relay occupies two seats.

5. Technical data

Rated voltage U_r	**see ordering table**
Duty range in % of U_r RSMA 1 RSMA 2, RSMM 1, RSMS 1, RSSF 1, RSME 1, RSME 18, and RSMH 2	 80-125% 80-110%

Operate values and times

Relay type	**Pick-up value**	**Drop-out value**	**Pick-up time, typical values, make/break contact**	**Drop-out time, typical values, make/break contact**
	% of U_r	**% of U_r**	**ms**	**ms**
RSMA 1, variant 025 dc	<23	>5	25/-	15/-
RSMA 1, variant 063, 064, 066, 072, 073, 074 dc	< 50	> 12	40/30	15/20
RSMA 1, variant 37 and 52 dc	< 40	> 10	25/15	15/20
RSMA 1, variant 37 and 52 ac	< 70	> 30	50/35	80/80
RSMA 2	< 80	> 15	30/20	5/10
RSME 1	< 80	> 10	35/25	5/15
RSMH 2 dc	< 80	> 20	60/35	25/35
RSMH 2 ac	< 80	> 20	60/35	60/60
RSMM 1	< 80	> 5	30/20	5/10
RSMS 1 var. A	< 80	> 5	4/3.5	2.5/5
RSMS 1 var. B	< 80	> 5	5.5/5	2.5/5
RSMS 1 var. E	55-80	> 10	8/6	3/5
RSSF 1	< 80	> 5	30/20	5/10

Technical data for current relay RSSF 1 is identical as for voltage relay except for following:	
Operating time (closing contact) 2 x I_r 4 x I_r	 < 14 ms < 10 ms
Minimum pulse time for the flag	50 ms
Operate value, % of I_r Thermal capacity, % of I_r Continuous with both relays energized	80-100 250 250%
Power consumption at I = I_r	0.1 W

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Power consumption at U = U_r	
RSMA 1 dc	1.1-1.3 W
RSMA 1 ac	appr 2 VA
RSMA 2	2.0-2.5 W
RSMM	1,1-1,3 W
RSSF	1.1-1.3 W
RSMS var. A[1)]	6-7 W
RSMS var. B	2.9-3.3 W
RSMS var. E[1)]	6-7 W
RSME	1.9-2.1 W
RSMH dc	3.7-4.6 W
RSMH ac	appr. 8 VA

1) The RSMS variants A and E can be energized for max five minutes per interval of ten minutes

Contact data

Relay type	**Max. system voltage dc/ac within a contact set**	**Current-carrying capacity (for already closed contact) 200 ms/1 s/cont.**	**Making and conducting capacity L/R > 10 ms 200 ms/1 s/ two contacts in parallell1 s**	**Breaking capacity ac Cos φ > 0.1 max. 250 V**	**Breaking capacity dc L/R < 40 ms 24/48/110/220 V**
	V	**A**	**A**	**A**	**A**
RSMA 1	300/250 (600/500[1)])	90/50/5	30/10/15	10	4/1.5/0.4/0.2
RSMA 2	300/250 (600/500[1)])	90/50/5	30/10/15	10	4/1.5/0.4/0.2
RSME 1	450/400	55/30/6	30/20/30	20[2)]	20/18/3/1[3)]
RSMH 2	600/500	135/75/10	30/20/30	20	20/20/6/1.2
RSMM 1	300/250	90/50/5	30/10/15	10	4/1.5/0.4/0.2
RSMS 1 var. A, B var. E	 300/250 300/250	 35/20/4 35/20/4	 30/10/15 30/10/15	 10 10	 2.3/1.2/0.3/0.15 2.7/1.4/0.35/0.17
RSSF 1	300/250	90/50/5	30/10/15	10	4/1.5/0.4/0.2

1) between sets of contacts

2) 10 A for RSME 1 with four contacts

3) 15/6/0,9/0,3 A for RSME 1 with four contacts

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Permitted ambient temperature		**-25°C – +55°C**
Dimensions[1)]	RSMA 1, RSME 1, RSMM 1, RSMS 1, RSMT 1 and RSSF 1	2U 6C
	RSMA 2, RSMH 2	2U 12C
Weight	RSMA 1, RSME 1, RSME 18	0.5 kg
	RSMS 1	0.4 kg
	RSSF 1, RSMM 1	0.3 kg
	RSMA 2	0.7 kg
	RSMH 2	1 kg
Insulation tests:	Dielectric test, 50 Hz, 1 min	
	RSME, RSMH	2.5 kV
	RSMA 1, RSMA 2, RSMM 1, RSMS 1, RSSF 1, RSME 1,RSME 18, and RSMH 2	2.0 kV
	Impulse voltage test	
	1.2/50 µs, 0.5 J	5.0 kV

1) See 1MRK508227-BEN, Mounting Hardware and Dimensions Section 7
.

6. Diagrams and ordering

Specify:

- Type
- Quantity
- Ordering No.
  – consists of a number and letters for the rated voltage, example 1MRK211052-AN, see tables below.
- Ordering No. for flag and reset knob when applicable

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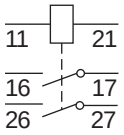
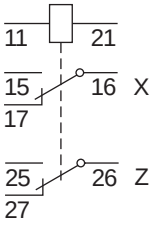
Ordering number selection table RSMA 1

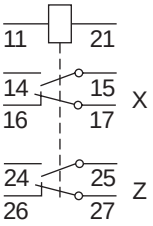
1MRK211025-..



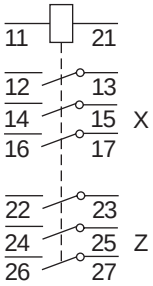
1MRK211037-..



1MRK211052-..



1MRK211063-..



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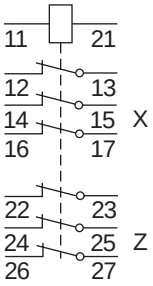

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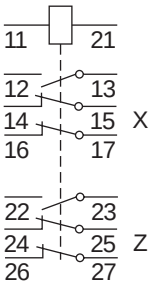

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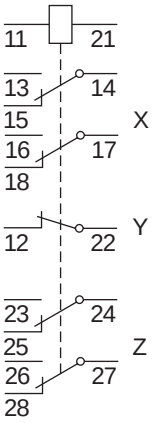

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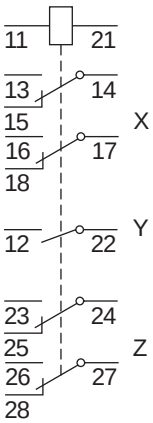
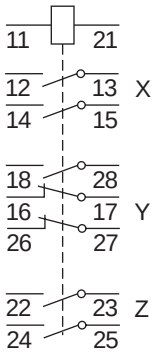
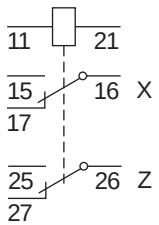


1MRK211074-..

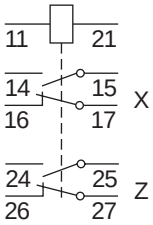


Letter selection table, DC rated voltage V			
24	48-55	110-125	220-250
AD	AH	AN	AS

1MRK211037-..



1MRK211052-..



Letter selection table, AC rated voltage V, 50-60 Hz	
115	230
BN	BS

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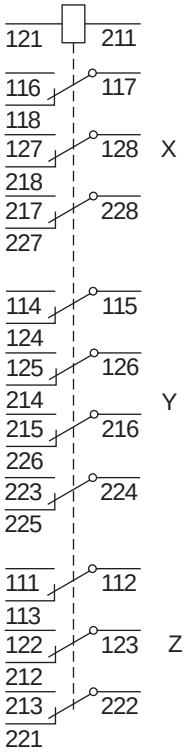
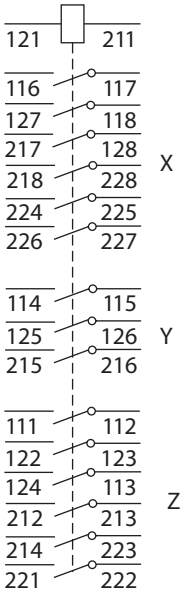
Ordering number selection table RSMA 2

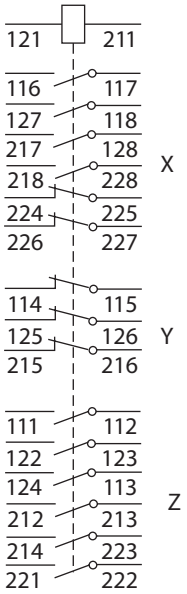
1MRK211185-..



1MRK211188-..



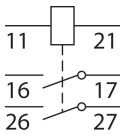
1MRK211189-..



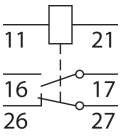
Letter selection table, DC rated voltage V			
24	48-55	110-125	220-250
AD	AH	AN	AS

Ordering number selection table RSME 1

1MRK221025-..



1MRK221027-..



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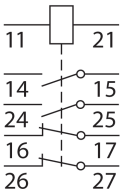

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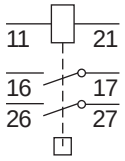
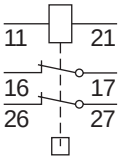
Ordering number selection table RSME 18

1MRK221825-..



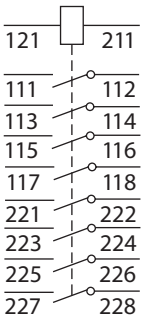
1MRK221826-..



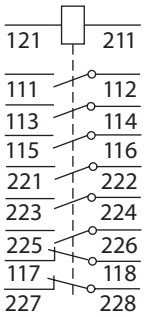
Letter selection table, DC rated voltage V			
24	48-55	110	220-250
AD	AH	AN	AS

Ordering number selection table RSMH 2

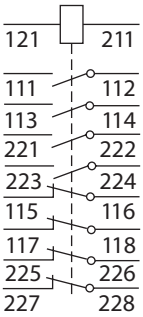
1MRK223067-..



1MRK223068-..



1MRK223069-..



Letter selection table, rated voltage V							
	48	110	120	125	127	220	250
DC	AH	AN	-	AP	-	AS	AT
AC	-	EN	EC	-	EP	ES	-
15-60 Hz							

RSMH 2 with red flag and resetting knob
Ordering No. for desired relay according to above table.
+ 1MRK223900-XA

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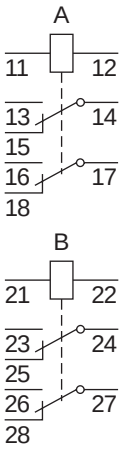
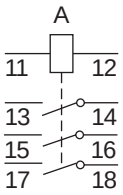
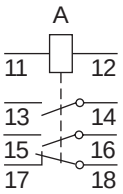
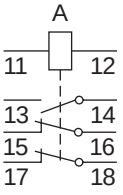
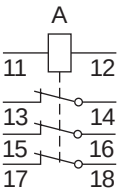
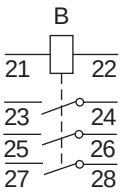
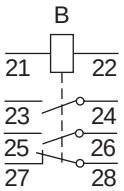
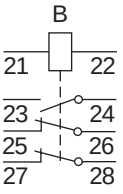
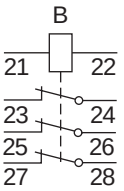
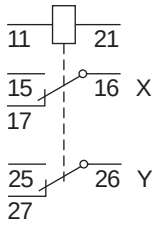
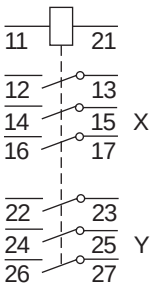
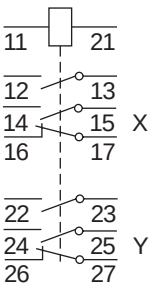
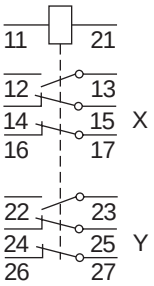
No. selection table RSMM 1

1MRK214002-..	1MRK214003-..	1MRK214004-..	1MRK214005-..	1MRK214006-..
				
				

Letter selection table, DC rated voltage V

24	48-55	110-125	220-250
AD	AH	AN	AS

Ordering number selection table RSMS 1

Variant A:	1MRK216237-..	1MRK216263-..	1MRK216265-..	1MRK216266-..
Variant B:	1MRK216037-..	1MRK216063-..	1MRK216065-..	1MRK216066-..
Variant E:		1MRK216463-..	1MRK216465-..	
				

Letter selection table, DC rated voltage V

24	48	110	125	220	250
AD	AH	AN	AP	AS	AT

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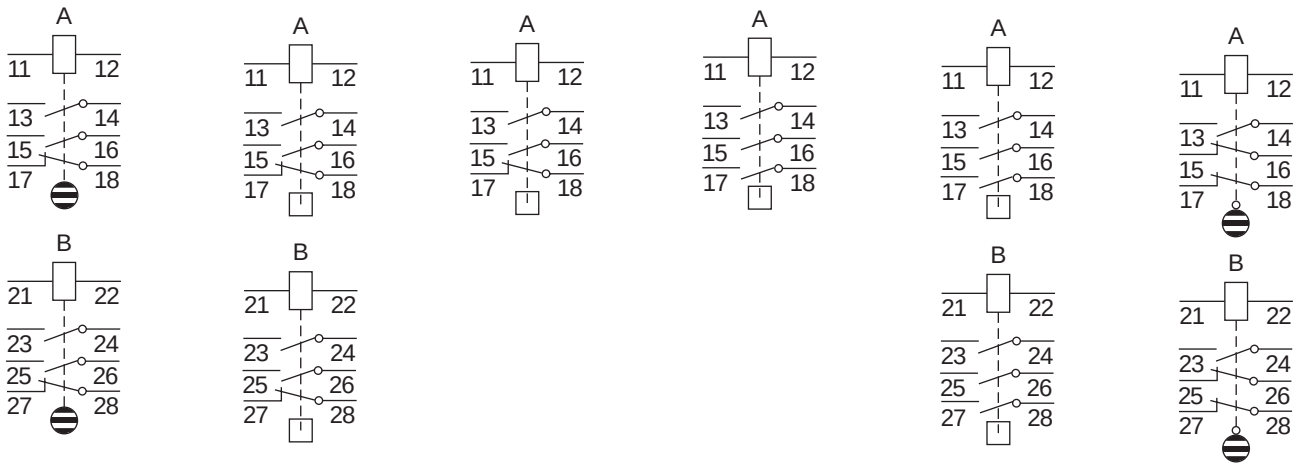
Ordering number selection table RSSF 1					
1MRK271006-..	1MRK271007-..	1MRK271016-..	1MRK271017-..	1MRK271018-..	1MRK271019-..



Flag is automatically reset when deenergizing the coil

Flag is to be reset

Loss of voltage relay

Voltage operated relay Letter selection table, DC rated voltage V			
24	48-55	110-125	220-250
AD	AH	AN	AS

Current operated relay Letter selection table, DC rated Current A		
0.2	1.0	2.0
HB	HF	HG
Other current operated variants on request		

7. References

Documents	
Mounting Hardware and Dimensions	1MRK508227-BEN

8. Document revision history

Table 4. Document revision history

Document revision	Date	Product revision	History
A	2023-04	-	New document
B	2023-08	-	Document Updated

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