Auxiliary, signaling and tripping relays RXMA 1, RXMA 2, RXMM 1, RXMS 1, RXSF 1, RXME 1, RXME 18, RXMH 2 and RXMT 1

Contents

1. Features

- 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
- Ultra high and high speed operation, down to 1,5 ms
- Up to 15 contacts in one relay

2. Application

The relays are intended for installations where high operating requirements exist, on operating time, contact rating (heavy breaking duty) or else 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 RXMA 1, RXMA 2 and RXMM 1 are used as position repeat relays, as interposing relays in control equipment and as output relay in protection relays.

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

Type RXMS 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.

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

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

Type RXMH 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.

Plug-in units with e.g., diodes, resistors and capacitors are shown in other documents (see Section 7). Connection blocks type RTXE for attachment to the pocket of the rear side of the terminal bases can be ordered from the same catalogue.

Drop-out time-lag with a diode

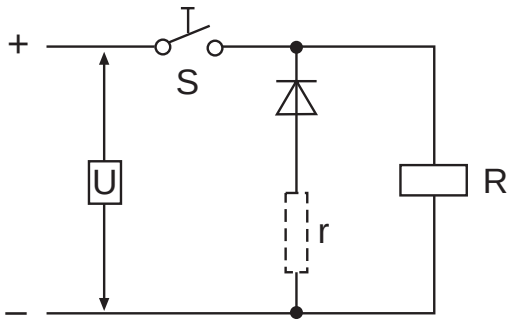
To obtain a dropout delay of a dc relay or to protect an electronic circuit against transients, a diode unit across the relay coil (R) can be used. Diode unit, type RXTDA 1, or terminal base mounted type RTXE can be selected.

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.

Type	Typical dropout time, t, with diode[1)]
RXMA 1	100-125 ms
RXMA 2	20 ms
RXMM 1	40 ms
RXMS 1[2)]	10 ms
RXME 1 RXME 18	35 ms
RXMH 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.

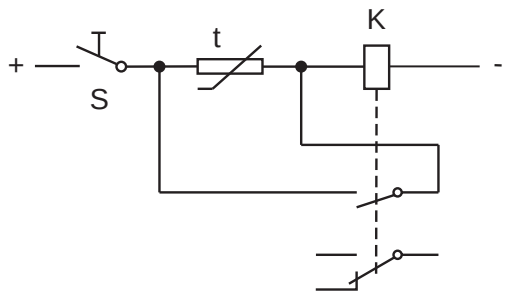
When S makes the relay picks up instantaneously. When S breaks the relay drops out with a time lag caused by the diode.

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.

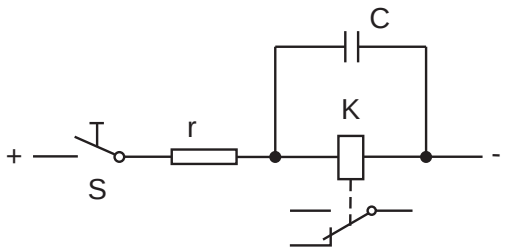
Transient protection (and shorter drop-out delays) may also be achieved by using a parallel connected resistor, thermistor or varistor across the relay instead of the diode. These components are available for mounting directly in the rear pocket of the terminal base using type RTXE component blocks.

Pick-up time-lag using a thermistor



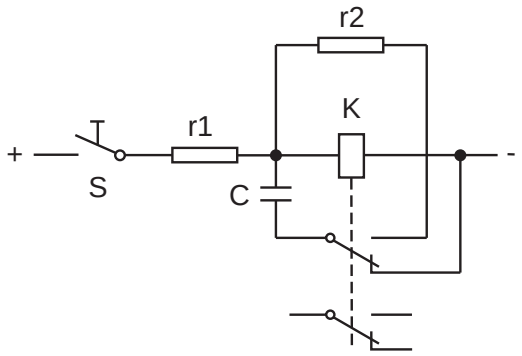
When S makes, the current heats the thermistor t and its resistance drops as its temperature increases. When the current through K reaches the pick-up value, the relay picks up and the thermistor is short-circuited by a make contact on the relay.

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



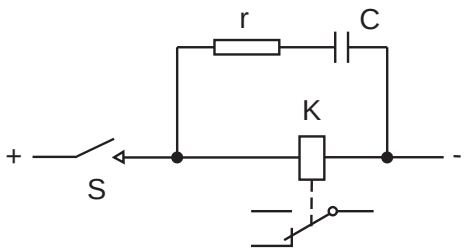
When S makes, the pick-up time is determinated by the values r, K and C. The relay picks up when C is sufficiently charged and the time lag upon drop-out is caused by C discharging through K after S breaks.

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



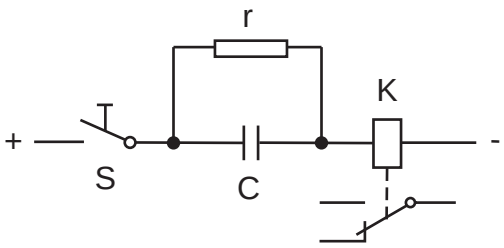
The pick-up time is determined by the values of r1, K and C. When the relay has picked up C is discharged across r2 and normal drop-out is obtained.

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.

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).

RTXV Control unit

High-speed auxiliary relays can at earth-fault in unearthed DC voltage systems give unwanted operation.

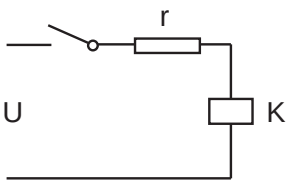
To avoid the risk that the voltage caused by the earth-fault causes unwanted operation on auxiliary relays, we have designed a control unit, type designated RTXV, to be connected in series with the terminal of the relay coil.

The control unit connects applied voltage to the relay only if the voltage is larger than 60-80% of the rated voltage of the unit. The voltage drop in the control unit is about 2 V.

The control unit is mounted in a component box, which in its turn can be mounted on the rear of the terminal base of COMBIFLEX relays.

For more information, see Section 7.

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.

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.)

Relay		Pick-up time[1)]		U = 110 V				Max. permitted connection time
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	
RXME 1		10 7	20 15	24 12	630 400	9 21	13 25	5 min. 5 min.
RXMH 2		10 6	25 15	24 12	500 160	14 48	19 60	Cont. 5 min.
RXMA 1	1-3	5	10	12	2000	5	6	Cont.
RXMA 2	6	8	13	12	330	25	30	Cont.

Relay		Pick-up time[1)]		U = 125 V				Max. permitted connection time
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	
RXME 1		10 7	20 15	24 12	750 450	11 25	15 30	5 min. 5 min.
RXMH 2		10 6	25 15	24 12	600 200	17 54	21 65	Cont. 5 min.
RXMA 1	1-3	5	10	12	2250	6	7	Cont.
RXMA 2	6	8	13	12	400	28	33	Cont.

Relay		Pick-up time[1)]		U = 220 V				Max. permitted connection time
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	
RXME 1		10 7	20 15	48-55 24	2500 1600	9 21	13 25	5 min. 5 min.
RXMH 2		10 6	25 15	48 24	2000 630	15 50	19 62	Cont. 5 min.
RXMA 1	1-3	5	10	24	8000	5	6	Cont.
RXMA 2	6	8	13	24	1600	22	26	Cont.

Relay		Pick-up time[1]		U = 250 V				Max. permitted connection time
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	
RXME 1		10 7	20 15	48-55 24	3000 1800	11 26	15 30	5 min. 5 min.
RXMH 2		10 6	25 15	48 24	2300 750	18 57	22 69	Cont. 5 min.
RXMA 1	1-3	5	10	24	9000	6	7	Cont.
RXMA 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
(The table contains information also for some non-standard voltages for relays available on request.)

Rated voltage V	Relays with twin contacts								
	RXMA 1	RXMA 2, dc	RXMM 1	RXMS 1, dc			RXMS 1, dc		
	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

Table 3. Coil resistance, relays with bridge contacts

Rated voltage	Relays with bridge contacts		
	RXME 1 RXME 18	RXMH 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

Table 4. Coil resistance, relays with single contacts

Rated voltage V	Relays with single contacts, RXMT 1					
	Symbol No.110		Symbol No. 111		Symbol No. 112	
	Terminal marks of coils					
	11-12	21-22	11-12	21-22	11-12	21-22
	Coil resistance Ω					
12-15 24 48-60 110-125	670 2600 6800 16800	670 2600 6800 16800	670 2600 6800 16800	670 2600 6800 16800	670 2600 6800 16800	670 2600 6800 16800

4. Design

The auxiliary relays in the COMBIFLEX system permit interchanging between various types of relays chiefly because the coil terminals are always connected to the same terminal on the plug-in base of the relay. Relays having the same contact symbol can be interchanged without alteration of the connection.

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 RXMS variants A and E, and is intended to be mounted on a terminal base. Terminal bases are available in four sizes. The relays are fixed to the terminal bases with two or four Phillips No. 2 cross-head screws. Each relay cover has a hole covered by a removable plastic plug with the exception of RXME 18, RXSF 1 and RXMT 1. Through the hole the armature of the relay can be activated. Relays with indicating flags have a resetting knob accessed from the outside of the cover.