

Time relays

RXKL 1 and RXKM 2H



RXKL 1

(xx05000257.tif)



RXKM 2H

(SE940715.eps)

Features

- For protection, control, signal and industrial applications
- Time setting 30 ms to 99 h
- Suitable for AC and DC operation
- Microprocessor design with digital settings
- High accuracy and performance

RXKL 1

- On-delay relay with continuous, single pulsed and flashing output functions

RXKM 2H

- On-delay and off-delay relay with continuous or single pulse output
- Operating mode for integrating time.
- Contact for start indication or supervision of supply voltage
- LED indication of start, elapsed time and operation

Application

These high performance time relays are intended for use in protection systems, automation control equipment, industrial processes, and control and signal systems.

RXKL 1 and RXKM 2H can replace most other types of time relays due to their wide setting ranges and large operative ranges for both DC and AC voltages.

RXKL 1 is available in four variants adopted to different rated voltage ranges. Variant A covers the largest voltage range and can be used for all rated voltages.

If the energisation of the time relay is controlled by a contact outside the relay cubicle there is a potential risk that the wiring between the contact and the relay can be subjected to an earth-fault. If this occurs in a DC battery system, the relay will be energized with a voltage pulse with a maximum value of about 50 % of actual voltage and decreasing over time to a steady-state value. To avoid an unwanted operation, in such applications, we recommend use of a variant that will only operate when the applied voltage is larger than 55 % of the system rated voltage. See "Start voltage" in table 1, defining these variants.

When RXKL 1 is to be used as a flasher relay and also for replacement of older flashing relays e.g. type RXSU 2 and 4 our recommendations are found in Application Instructions 1MRK 508 002-WEN, available on request.

Design and installation

RXKL 1

The RXKL 1 is a DC or AC voltage operated, high-precision, digital on-delay relay utilizing a microprocessor for the time functions. The relay has two electromechanical output relays providing two medium-duty changeover contacts.

The timing starts when the energising voltage is applied to terminals 11 and 21 and after the setting time has elapsed, the output switches to the operate condition. Each time the voltage supply is interrupted for a period exceeding the relay recovery time, the relay releases and the timing restarts from the beginning.

The time setting is done by three rotary switches marked K, a and b. The product of the scale factor K and the sum of a and b gives the set operate time (t) for the relay, i.e. $t = K \times (a+b)$.

The setting time can not be changed while the relay is energised.

For the continuous function the scale factor K can be set to 1 ms, 10 ms, 0,1 s, 1 s, 10 s, 1 min, 10 min or 1 h. The switch a can be set between 0 and 90 in steps of 10, and the switch b can be set between 0 and 9 in steps of 1. The recommended setting range for a + b is 10 to 99. The nominal setting time range is 30 ms to 99 h.

The switch K can also be set for two different pulse functions. One giving a single 500 ms output pulse and the other for flashing output with a pulse frequency of 30 to 600 pulses per minute.

In the position for a single pulse, the scale factor is 0,1 s. The sum of the switches a and b can in this case be set between 1 and 99, giving an on-delay setting time range 0,1 to 9,9 s. When the setting time has elapsed, the output relays operate but release after 500 ms.

In the position for flashing function, the scale factor is 10 ms. The switches a and b should be set in the range 5 and 99, giving the setting time range 50 to 990 ms. When the relay is energized the output periodically switches on and off with identical pulse on time and pulse off time. The setting time range corresponds to 30 and 600 flashes per minute. The number of flashes per minute is equal to 30000 divided by set time in milliseconds.

The relay occupies one seat (2U 6C).

RXKM 2H

The RXKM 2H is a DC or AC voltage operated, high-precision, digital on-delay and offdelay relay utilizing a microprocessor for the time functions. The relay has three electromechanical output relays providing one instantaneous and two delayed medium-duty changeover contacts.

The instantaneous output switches to the operate condition / release condition, immediately upon applying / removing voltage to terminals 111 and 121.

The time setting is done by three rotary switches marked K, a and b. The product of the scale factor K and the sum of a and b gives the set operate time (t) for the relay, i.e. $t = K \times (a+b)$.

The setting time can be changed while the relay is energised. If it is done, the relay will restart and operate when the new setting time has elapsed.

The scale factor K can be set to 1 ms, 10 ms, 0,1 s, 1 s, 10 s, 1 min, 10 min or 1 h. The switch a can be set between 0 and 90 in steps of 10, and the switch b can be set between 0 and 9 in steps of 1. The recommended setting range for a + b is 10 to 99. The nominal setting time range is 30 ms to 99 h.

On the front, the relay has four yellow LEDs for start and elapsed time indications and one red LED for indication of operation. When the timing starts, a yellow LED begins to flash. After one fourth of the setting time the LED gets a steady light and the next LED starts to flash. In this way the elapsed time is indicated in quarters of the setting time. At operation the yellow LEDs are turned off and the red LED turns on. This LED can be set for either latching or automatically reset when the energising voltage is disconnected. At latching the LED is reset with a push button on the front of the relay or when the supply voltage to terminals 111 and 121 is interrupted.

The relay has an 8-pole programming switch on the front for making the following selections:

- on-delay or off-delay time function
- latching or automatic reset indication
- continuous or summation time measuring
- pulse function 100, 250, 500 or 1000 ms

For on-delay time function with continuous time measuring and automatic reset of indication, the timing starts and the instantaneous output relay operates, when the energising voltage is connected to terminals 111 and 121. After the setting time has elapsed, the delayed output relays switch to the operate condition.

For summation time measuring, latching indication and off-delay time function, the supply voltage shall continuously be connected to terminals 111 and 121. Then the instantaneous output relay is in operate condition. The on-delay timing starts when terminal 312 is connected to terminal 111.

For off-delay time function, the delayed output relays immediately switches to the operate condition when terminal 312 is connected to terminal 111. The timing starts when this connection is disconnected. For continuous time measuring the delayed output relays switch to the release condition when the setting time has elapsed.

For summation time measuring, the delayed output relays switch when the setting time has elapsed by summing up the time intervals during which voltage has been applied to (on-delay) or removed from (off-delay) terminal 312.

The output relays release and the timing and the LEDs reset, if the supply voltage to terminals 111 and 121 is interrupted. Reset of elapsed time and the LEDs can also be done with the reset push button on the front.

The relay occupies two seats (4U 6C).

Installation

The time relays RXKL 1 and RXKM 2H can normally be installed without any special precautions.

For relays energised via contacts outside the relay cubicle, it is recommended to use an RXKL variant having a start voltage larger than 55 % of rated voltage. This is to avoid influence on the time function of induced AC voltages or DC earth faults.

RXKM in such applications, it is recommended to use terminal 312 to control the function, as the start value of that input is larger than 55 % of the voltage applied to terminals 111 and 121. For on-delay function the relay shall then be set for latching indication.

Technical data

Table 1: Energizing quantities, rated values and limits for RXKL 1

| Function | On-delay with continuous, single pulse and flashing output functions |
|---|--|
| Measurement | Continuous |
| Rated voltage U_r | |
| variant A | 24-250 V DC / 24-240 V 50-60 Hz |
| variant B | 48-250 V DC / 48-240 V 50-60 Hz |
| variant C | 110-250 V DC / 110-240 V 50-60 Hz |
| variant D | 220-250 V DC / 220-240 V 50-60 Hz |
| Setting time range | |
| continuous output function | 10-99 x scale constant K |
| single pulse output function | 1-99 x 0,1 s |
| flashing output function | 5-99 x 10 ms |
| Scale constant K | 1 ms, 10 ms, 0,1 s, 1 s, 10 s, 1 min, 10 min and 1 h |
| Release time | < 20 ms |
| Recovery time | |
| before operation | < 50 ms |
| after operation | < 20 ms |
| Overshoot time | < 20 ms |
| Pulse length (single pulse) | 500 ±10 ms |
| Start voltage | |
| variant A | 15-18 V DC / 14-19 V 50-60 Hz |
| variant B | 30-36 V DC / 28-38 V 50-60 Hz |
| variant C | 75-82 V DC / 65-85 V 50-60 Hz |
| variant D | 150-165 V DC / 130-170 V 50-60 Hz |
| Release voltage | |
| variant A | >10 V DC / AC |
| variant B | >20 V DC / AC |
| variant C | >25 V DC / AC |
| variant D | >25 V DC / AC |
| Nominal operative voltage range | 80-110 % of rated voltage DC 85-110 % of rated voltage 50-60 Hz |
| Power consumption at voltage | before operation after operation |
| 24/48 V DC | 0,15/0,25 W 0,8/1,0 W |
| 110/250 V DC | 0,6/1,5 W 2/3 W |
| 100/240 V AC | 1/2 VA 2/3,5 VA |
| Setting accuracy | |
| continuous output function | < 0,5% of set value or 10 ms (20 ms for AC supply) |
| single pulse output function (setting < 0,7 s) | < 25 ms |
| single pulse output function (setting > 0,7 s) | < 0,5% of set value or 10 ms (20 ms for AC supply) |
| flashing output function | < 10 ms |
| Repeatability in operate time | < 0,05% of set value or 5 ms (15 ms for AC supply) |
| Change in operate time at voltage change within the nominal operative range | < 0,1% of set value or 10 ms |
| Change in operate time at temperature change within the nominal operative range | < 0,1% of set value or 5 ms |

Table 2: Energizing quantities, rated values and limits for RXKM 2H

| Function | On-delay and off-delay with continuous and single pulse output functions |
|---|--|
| Measurement | Continuous and summation |
| Rated voltage U_r | 24-250 V DC and 48-240 V 50-60 Hz |
| Start voltage | |
| input 111-121 | 16-19 V DC, 18-24 V AC |
| input 312-121 | 55-70 % of supply voltage DC |
| Release voltage | |
| input 111-121 | > 15 V AC and DC |
| input 312-121 | > 40 % of supply voltage DC |
| Setting time range | 10-99 x scale constant K |
| Scale constant K | 1 ms, 10 ms, 0,1 s, 1 s, 10 s, 1 min, 10 min and 1 h |
| Release time | |
| input 111-121 | < 20 ms |
| input 312-121, on delay | < 40 ms |
| input 312-121, off delay | < 50 ms |
| Recovery time | |
| input 111-121 | < 30 ms |
| input 312-121, on- and off delay | < 40 ms |
| Overshoot time | |
| input 111-121 | < 20 ms |
| input 312-121, on delay | < 40 ms |
| input 312-121, off delay | < 30 ms |
| Pulse length (single pulse) | 500±10 ms |
| Nominal operative voltage range | 80-110 % of rated voltage |
| Power consumption at voltage | before op. after op. |
| 24/48 V DC | 0,6/0,9 W 1,3/1,6 W |
| 110/250 V DC | 1,8/4,0 W 2,8/5,5 W |
| 100/240 V AC | 2,5/6 VA 4/8VA |
| Setting accuracy at $U=110$ V and setting (10-99) x K | < 0,5% of set value or 10 ms (20 ms for ACsupply) |
| Repeatability in operate time | < 0,05% of set value or 5 ms (15 ms for AC supply) |
| Change in operate time at voltage change within the nominal operative range | < 0,1% of set value or 10 ms |
| Change in operate time at temperature change within the nominal range | < 0,1% of set value or 5 ms |

Table 3: Environmental conditions for RXKL 1 and RXKM 2H

| Environmental conditions | |
|---|---|
| Nominal operative temperature range | -20 °C to +55 °C |
| Transport and storage temperature range (IEC 60068-2-1 and 2) | -40 °C to +70 °C |
| Humidity test (IEC 60068-2-30) | Damp heat 93-95 %, 25-55 °C, 6 cycles 12+12 h |
| Degree of protection | IP 42 (RXKL) and IP44 (RXKM) |

Technical data

Table 4: Electromagnetic compability test for RXKL 1 and RXKM 2H

| Tests | |
|---------------------------------------|------------------------------|
| Fast transient test (SS 436 15 03) | 4-8 kV, class PL 4 |
| 1 MHz burst test (IEC 60255-22-1) | 2,5 kV, class 3 |
| Electrostatic test (IEC 60255-22-2) | |
| air discharge | 15 kV, class 4 |
| contact discharge | 8 kV, class 4 |
| indirect application (IEC 6100-4-2) | 8 kV, level 4 |
| Electromagnetic field test | |
| radiated (IEC 61000-4-3) | 10 V/m, 26-1000 MHz, level 3 |
| radiated pulse (ENV 50204) | 10 V/m, 900 MHz |
| conducted (IEC 61000-4-6) | 10 V, 0,15-80 MHz, level 3 |
| Fast transient test, (IEC 60255-22-4) | 4 kV, class 4 |
| Emission tests, (EN 55011) | |
| conducted emission | 0,15-30 MHz, class A |
| radiated emission | 30-1000 MHz, class A |

Table 5: Insulation tests for RXKL 1 and RXKM 2H

| Tests | |
|--------------------------------------|-------------------------------|
| Dielectric test (IEC 60255-27) | 2,0 kV 50 Hz, 1 min |
| Impulse voltage test (IEC 60255-27) | 5,0 kV, 1,2/50 μ s, 0,5 J |
| Insulation resistance (IEC 60255-27) | > 100 M Ω at 500V |

Table 6: Mechanical tests for RXKL 1 and RXKM 2H

| Tests | |
|---------------------------------|---------------------------------------|
| Vibration test (IEC 60255-21-1) | |
| Response test | 0,075 mm/1,0 g, 10-150 Hz, Class 2 |
| Endurance test | 2,0 g, 10-150 Hz, 20 sweeps, Class 2 |
| Shock tests (IEC 60255-21-2) | |
| Response test | 10 g, 11 ms, 3 pulses, Class 2 |
| Withstand test | 30 g, 11 ms, 3 pulses, Class 2 |
| Bump test (IEC 60255-21-2) | 10 g, 16 ms, 1000 pulses, Class 1 |
| Seismic test (IEC 60255-21-3) | |
| X- and Y-axes | 11 mm/3 g, 1-50 Hz, Class 2 extended |
| Z-axis | 7,5 mm/2 g, 1-50 Hz, Class 2 extended |

Table 7: Contact data for RXKL 1 and RXKM 2H

| Data | |
|--|--------------|
| Max. system voltage within a contact set DC/AC | 250 V/250 V |
| Current carrying capacity (for already closed contact) | |
| 200 ms/1 s | 30/15 A |
| continuously | 5 A |
| Making and conducting capacity L/R < 10 ms | |
| 200 ms/1s | 30/10 A |
| Breaking capacity for AC, PF > 0,4, max 250V | 8,0 A |
| DC, L/R < 40 ms | |
| U = 24 V/48 V | 2,0 A/1,0 A |
| U = 110 V/125 V | 0,4 A/0,3 A |
| U = 220 V/250 V | 0,2 A/0,15 A |

Table 8: Additional general data

| | RXKL 1 | RXKM 2H |
|------------|--------|---------|
| Dimensions | 2U 6C | 4U 6C |
| Weight | 190 g | 400 g |

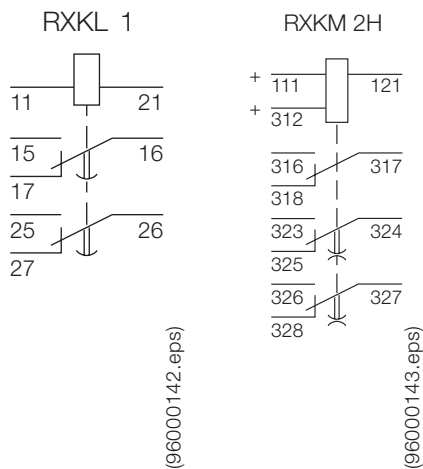
Mounting, diagram and ordering

Mounting

The relay shall be mounted on separately ordered COMBIFLEX bases.

For mounting details refer to the catalogue for COMBIFLEX connection and installation components.

Diagrams



Ordering

Specify:

- Time relay RXKL 1 or RXKM 2H
- Quantity
- Ordering No.
 - RXKL 1, variant A, $U_r=24-250$ V DC/ $24-240$ V AC 1MRK 000 066-AB
 - RXKL 1, variant B, $U_r=48-250$ V DC/ $48-240$ V AC 1MRK 000 066-BB
 - RXKL 1, variant C, $U_r=110-250$ V DC/ $110-240$ V AC 1MRK 000 066-CB
 - RXKL 1, variant D, $U_r=220-250$ V DC/ $220-240$ V AC 1MRK 000 066-DB
 - RXKM 2H 1MRK 000 142-A

Related documents

| Documents | |
|--|------------------|
| COMBIFLEX connection and installation components | 1MRK 513 003-BEN |
| Relay mounting systems | 1MRK 514 001-BEN |
| Instruction for Application | 1MRK 508 002-WEN |

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