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COMBIFLEX

Time relays RXKL 1 and RXKM 2H
Product guide

Hitachi Energy

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Section 1 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

Section 2 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 energization 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.

Section 3 Design and installation

3.1 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 energizing 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 x (a+b).

The setting time cannot be changed while the relay is energized.

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).

3.2 RXKM 2H

The RXKM 2H is a DC or AC voltage operated, high-precision, digital on-delay and off-delay 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 x (a+b).

The setting time can be changed while the relay is energized. 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 energizing 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 energizing 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).

3.3 Installation

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

For relays energized via contacts outside the relay cubicle, it is an 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.

Section 4 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 variant B variant C variant D	 24-250 V DC / 24-240 V 50-60 Hz 48-250 V DC / 48-240 V 50-60 Hz 110-250 V DC / 110-240 V 50-60 Hz 220-250 V DC / 220-240 V 50-60 Hz	
Setting time range continuous output function single pulse output function flashing output function	 10-99 x scale constant K 1-99 x 0.1 s 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 after operation	 < 50 ms < 20 ms	
Overshoot time	< 20 ms	
Pulse length (single pulse)	500 ±10 ms	
Start voltage variant A variant B variant C variant D	 15-19.2 V DC / 14-19 V 50-60 Hz 30-36 V DC / 28-38 V 50-60 Hz 75-83 V DC / 65-85 V 50-60 Hz 150-165 V DC / 130-170 V 50-60 Hz	
Release voltage variant A variant B variant C variant D	 > 10 V DC /AC > 20 V DC /AC > 24 V DC /AC > 24 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 24/48 V DC 110/250 V DC 100/240 V AC	before operation 0.15/0.25 W 0.6/1.5 W 1/2 VA	after operation 0.8/1.0 W 2/3 W 2/3.5 VA
Setting accuracy continuous output function single pulse output function (setting < 0.7 s) single pulse output function (setting > 0.7 s) flashing output function	 < 0.5% of set value or 10 ms (20 ms for AC supply) < 25 ms < 0.5% of set value or 10 ms (20 ms for AC supply) < 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
Table continues on next page	

Function	On-delay and off-delay with continuous and single pulse output functions
Start voltage input 111-121 input 312-121	 16-19 V DC, 18-24 V AC 55-70 % of supply voltage DC
Release voltage input 111-121 input 312-121	 15 V AC and DC 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 input 312-121, on delay input 312-121, off delay	 < 20 ms < 40 ms < 50 ms
Recovery time input 111-121 input 312-121, on and off delay	 < 30 ms < 40 ms
Overshoot time input 111-121 input 312-121, on delay input 312-121, off delay	 < 20 ms < 40 ms < 30 ms
Pulse length (single pulse)	500±10 ms
Nominal operative voltage range	80-110 % of rated voltage
Power consumption at voltage 24/48 V DC 110/250 V DC 100/240 V AC	before op. after op. 0.6/0.9 W 1.3/1.6 W 1.8/4.0 W 2.8/5.5 W 2.5/6 VA 4/8 VA
Setting accuracy at U=110 V and setting (10-99) x K	< 0.5% of set value or 10 ms (20 ms for AC supply)
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)

Table 4: Electromagnetic compatibility 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 60 255-22-2) air discharge contact discharge indirect application (IEC 6100-4-2)	 15 kV, class 4 8 kV, class 4 8 kV, level 4
Electromagnetic field test radiated (IEC 61000-4-3) radiated pulse (ENV 50204) conducted (IEC 61000-4-6)	 10 V/m, 26-1000 MHz, level 3 10 V/m, 900 MHZ 10 V, 0.15-80 MHz, level 3
Fast transient test, (IEC 60255-22-4)	4 kV, class 4
Table continues on next page	

Tests	
Emission tests, (EN 55011) conducted emission radiated emission	 0.15-30 MHz, class A 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 μs, 0.5 J
Insulation resistance (IEC 60255-27)	> 100 MΩ at 500 V

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

Tests	
Vibration test (IEC 60255-21-1) Response test Endurance test	 0.075 mm/1.0 g, 10-150 Hz, Class 2 2.0 g, 10-150 Hz, 20 sweeps, Class 2
Shock tests (IEC 60255-21-2) Response test Withstand test	 10 g, 11 ms, 3 pulses, Class 2 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 Z-axis	 11 mm/3 g, 1-50 Hz, Class 2 extended 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 continuously	 30/15 A 5 A
Making and conducting capacity L/R< 10 ms 200 ms/1 s	 30/10 A
Breaking capacity for AC, PF>0.4, max 250 V DC, L/R<40 ms U = 24 V/48 V U = 110 V/125 V U = 220 V/250 V	 8.0 A 2.0 A/1.0 A 0.4 A/0.3 A 0.2 A/0.15 A

Table 8: Additional general data

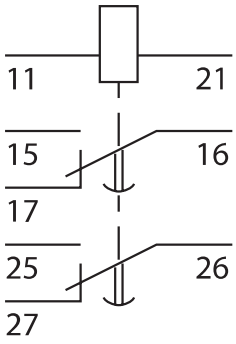
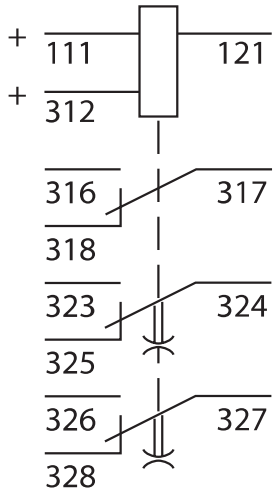
	RXKL 1	RXKM 2H
Dimensions	2U 6C	4U 6C
Weight	190 g	400 g

Section 5 Mounting, diagram and ordering

5.1 Mounting

For mounting details refer Mounting Hardware and Dimensions document 1MRK508227-BEN.

5.2 Diagrams

RXKL 1	RXKM 2H
	

5.3 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 1MRK000066-AC
  - RXKL 1, variant B, U_r =48-250 V DC/48-240 V AC 1MRK000066-BC
  - RXKL 1, variant C, U_r =110-250 V DC/110-240 V AC 1MRK000066-CC
  - RXKL 1, variant D, U_r =220-250 V DC/220-240 V AC 1MRK000066-DC
  - RXKM 2H 1MRK000142-A

Table 9: RXKLM, RXKM

Ordering code of previous version	Ordering code of the new version
1MRK000066-AB	1MRK000066-AC
1MRK000066-BB	1MRK000066-BC
1MRK000066-CB	1MRK000066-CC
1MRK000066-DB	1MRK000066-DC

Section 6 Related documents

Documents	
COMBIFLEX connection and installation components	1MRK513003-BEN
Relay mounting systems	1MRK514001-BEN
Instruction for Application	1MRK508002-WEN

Section 7 Document revision history

Table 10: Document revision history

Document revision	Date	Product revision	History
D	2026-03	-	Document enhancements and corrections. Migrated to latest template.

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