

# Time-lag relay type RXKP 2



**0.3 s to 60 h  
for a.c. or d.c. supply**

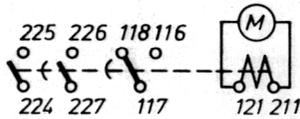


- Pick-up delayed synchronous motor-driven relay for a.c. supply or d.c. supply via a separate inverter
- Time-lag scale 0.3 s to 60 h on the same relay. The scale is divided into 6 scale ranges with progressive fine adjustment. Operating times and scales can be adjusted externally when the relay is in service.
- High degree of accuracy obtained by means of the self-starting motor – dispersion in the operating time:  $\pm 1\%$
- Short resetting time: 15 ms
- Low power consumption – approx. 4 VA before and 2.3 VA after operation
- The relay is available for d.c. supply of the pick-up magnet and a.c. supply of the motor
- Integrated time measurement by utilising the separate connections to the motor and the pick-up magnet
- Running time recorder – a scale shows time that elapses before the time-lag contacts operate
- Good resistance to vibration – the robust design is suitable for mobile equipment as well as equipment on board ships.

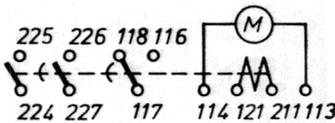
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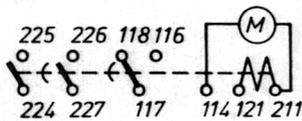
\* Reg. trade mark



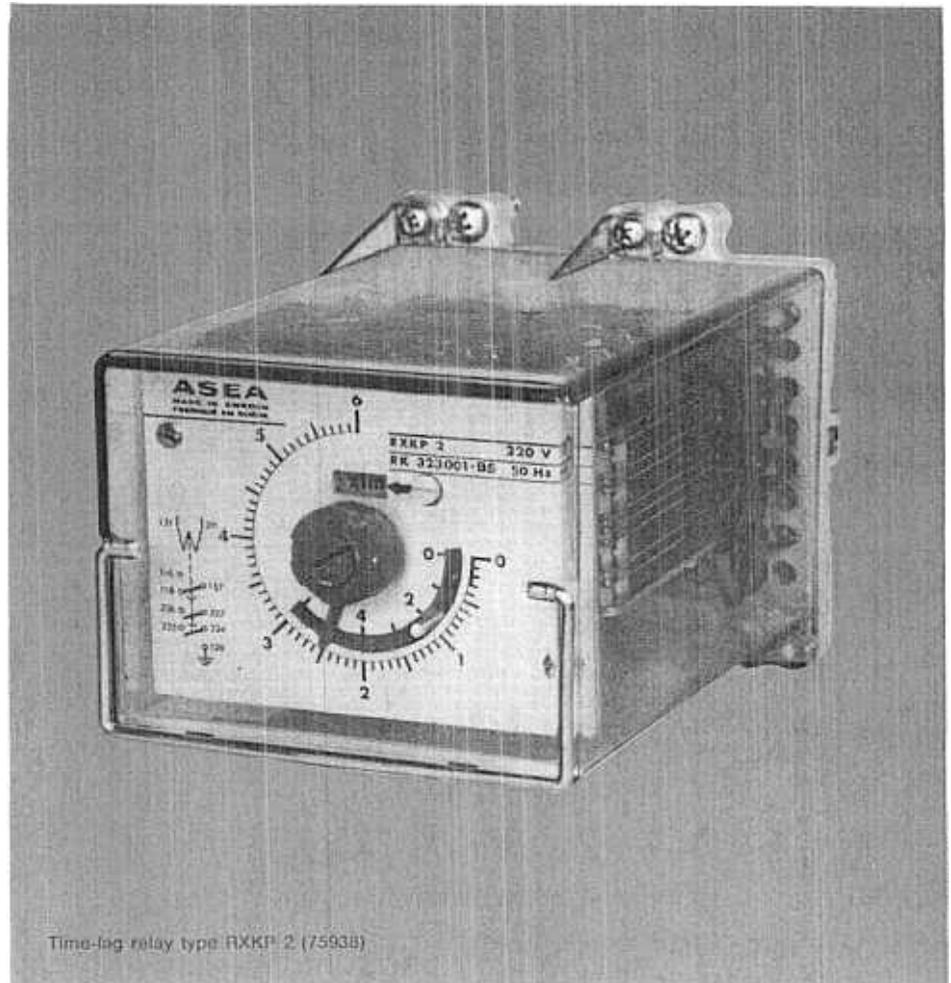
Standard



D.c. supply of pick-up magnet and a.c. supply of the motor



Integrated time measurement



Time-lag relay type RXKP 2 (75933)

## Applications

The RXKP 2 relay is intended primarily for control and automatic equipment but it is also suitable as a protective relay. This relay can be used with advantage

- in plants where the operating time is often changed, for example, in test rooms, laboratories and where conveyor belts are used
- if a wide setting range is needed in industrial processes, such as in rolling mills; for assembly belts for series production, for machine tools, or in automatic equipment in power stations
- for long operating times often required for processes in the paper and chemical industries, galvanic baths, electric furnaces and high frequency equipment, etc.

## Description

The ASEA industrial time-lag relay RXKP 2 is driven by a synchronous motor which is coupled by a pick-up magnet to a time-lag mechanism consisting of spur and planetary gearing. The time-lag mechanism actuates the time-lag contacts after the set time.

The main components in the RXKP – the synchronous motor, time-lag mechanism and pick-up mechanism – are mounted in a frame fitted to a terminal base. The relay has a dust-proof cover of transparent plastic with gaskets which seal against the terminal base and the setting knob. The cover is fitted with a hinged handle so that the relay can be easily withdrawn from its case. The RXKP 2 is provided with an external knob for setting the operating time.

Selection of scale is carried out by means of a screwdriver inserted through a hole in the plastic cover that is normally sealed by means of an easily removable plastic plug. The figures in the following section refer to the cut-away illustration shown below.

When the relay is fed, the synchronous motor (1), which is provided with a reverse stop, starts to operate simultaneously as the pick-up magnet operates. The pick-up magnet is supplied via a built-in full-wave rectifier consisting of 4 silicon diodes of the avalanche type with built-in diode protection. The synchronous motor (1) drives a gear train (15) the gears of which influence each other alternately so that the speed is gradually reduced. Using the scale range setting screw (4) the pinion (17) is moved by the worm (18) to a suitable wheel in the gear train. At the same time, the setting screw (4) actuates the range indicator (5) so that the operating range can be read off through an aperture in the front of the relay.

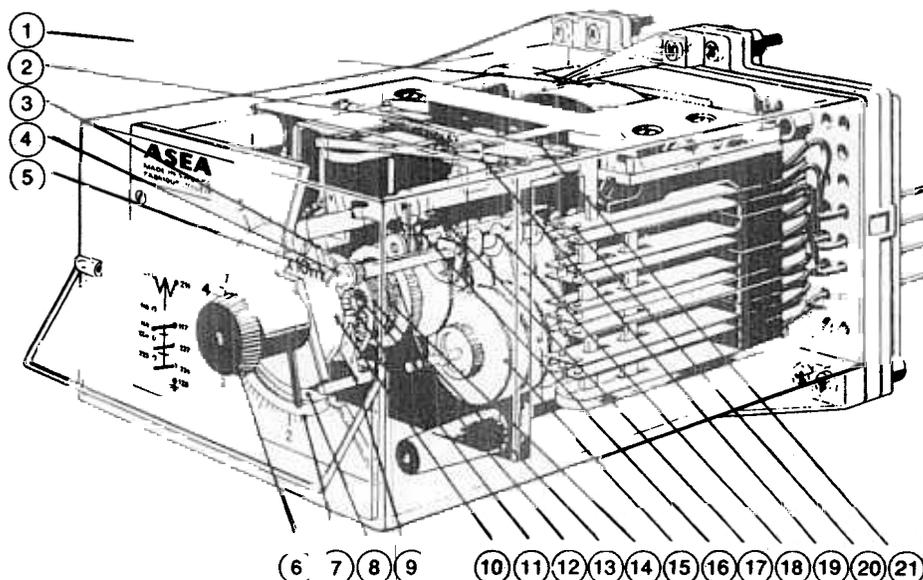
When the armature (21) of the magnet picks up, it actuates the instantaneous contact (20) and is stopped in the half-on position by the stop (19) after having combined the coupling halves in the clutch (16) causing the crown wheel (13) of the planetary gearing to rotate with the pinion (17). The second crown wheel (10) is permanently united with the time scale setting knob (6) and is thus stationary except when the operating time is being set. The planet wheel (12) is mounted on the disc (11) which has a projection (3) that shortly before the set time actuates the stop (19), thus releasing the armature which can then pick up completely, actuating the time-

lag contacts and a break contact which breaks the supply to the motor. The gear train cannot be damaged even if the supply is not broken, since the disc actuates the coupling (16) by means of the stop (19), thus disengaging the motor mechanically. That intermediate disc of the planetary gearing is also provided with a running time recorder (9) which, when the relay is energised, indicates the length of the time remaining before the time-lag contacts operate, and which, when the relay is de-energised, takes up the same position on its scale (8) as the knob (6) on the operating time scale (7). When the supply to the relay is broken, the armature is reset by means of the spring (2) disengaging the clutch (16) simultaneously. At this point, the crown wheel (13) is actuated by the return spring (14) returning the intermediate disc and its recorder (9), via the planetary gearing, back to the initial position; that is, the set time. It is possible to alter the operating time when the relay is operating, because the knob (6) actuates the intermediate disc via the crown wheel (10) and the planet wheel. After resetting, the relay operates according to the new times set on the scale. Upon alteration of the scale ranges during operation, the relay resets to the initial position and then operates according to the new time.

The setting screw (4) has a straight slot 0.8x4.5 mm. The limit in the anti-clockwise direction is X 10 h and in the clockwise direction X 1 s. The setting mechanism will be damaged if the setting knob is forced past its limits.

1. Synchronous motor
2. Spring
3. Projection on intermediate disc
4. Setting screw for scale range
5. Scale range index
6. Setting knob for operating time
7. Operating time scale
8. Running time scale
9. Running time recorder
10. Crown wheel
11. Intermediate disc
12. Planet wheel
13. Crown wheel
14. Return springs
15. Gear train
16. Clutch
17. Pinion
18. Worm
19. Stop
20. Instantaneous contact
21. Armature

Fig. 1. Time-lag relay type RXKP 2



### Latched armature

The relay is available in a version where the armature of the pick-up magnet, in the event of interrupted supply, remains in the half-on position and prevents the return of the timing mechanism and the instantaneous contact. On recovery of the supply, the relay continues and operates for a time equivalent to that which remained of the set operating time when the supply was interrupted. The relay returns to its initial position if the supply is interrupted after the operating time has expired. If the relay, after interruption of the supply, is to start from the beginning of the operating time, the knob (6) is turned to 0 thus releasing the latch which prevented the return of the armature. This should be carried out when the supply to the relay is switched off.

### Versions

RXKP 2 is available in three versions in accordance with symbol 1 to 3, and each version can be supplied with latched or unlatched armature.

Version as per symbol 1:

Motor and pick-up magnet are connected in parallel. The relay has two time-lag contacts and one instantaneous contact.

Version as per symbol 2:

For d.c. supply of the pick-up magnet and a.c. supply of the motor. Used, for example, in auto-reclosing relays. The relay has two time-lag contacts and one instantaneous contact.

Version as per symbol 3:

For integrated time measurement (summation of measurement values). One of the motor's and one of the magnet's terminals are connected together. The relay has two time-lag contacts and one instantaneous contact.

### Contacts

RXKP 2 is provided with twin contacts, each contact member being provided with two silver contact elements which can make individual contact with the elements of the other contact members. Thus, two parallel current circuits are formed which allow great contact reliability. These contacts are also available with gold contact elements, which are recommended for voltages lower than 10 V in the contact circuits. All the symbols show one instantaneous make contact and a change-over contact and a normal make contact which closes after the set time.

### Running time recorder

In addition to the operating scale, RXKP 2 is also provided with a scale for running time indication. This scale indicates the time remaining before the time-lag contacts close.

### Non-standard voltages

Normally, RXKP 2 is to be supplied with the rated voltage as shown under heading Data on page 4. However, the time-lag relay can be connected in circuits having other rated voltages up to max. 400 V a.c. by using an external series resistor. It will also be necessary to use the make contact 226-227 to enable an extra external resistor to be switched in when operating in parallel with the relay. This is to prevent the magnet being overloaded, because the motor is disconnected upon operation and therefore the voltage increases across the magnet. Suitable resistance values are shown in the table below. Resistors can be ordered from Catalogue RK 78-2 E.

### Supply via inverter

When d.c. only is available, RXKP 2 can be fed from an inverter type RXTNP 1,

see Fig. 2. This is available for rated voltages 24 V- and 110-125 V-, but 48-55 V- and 220-250 V-, can also be used if the inverter is connected in series with an external resistor. However, the resistor limits the output of the inverter, and therefore only RXKP 2, symbol 2 can be used. The motor and pick-up magnet are connected as shown in Fig. 3. Resistors can be ordered from Catalogue RK 78-2 E.

### Integrated time measurement

RXKP 2 with unlatched armature, symbol 3, is used primarily for integrated time measurement (summated time measurement). This version is suitable when a relay is required in which the time is added sequentially for each time the motor is run, until the set time has been reached and the contacts operate. The relay resets to the initial position when the supply to the magnet is broken.

RXKP 2 as per symbol 1-3 and with latched armature can also be utilised for integrated time measurement.

### Installation

RXKP 2 is screwed to a terminal base which is affixed in a case, equipment frame or on a panel. RXKP 2 is included in ASEA's COMBIFLEX system and requires space of 2 S, 12 C. S and C are modular units where the height S = 44.5 mm and width C = 7 mm.

The COMBIFLEX system is described in Catalogue RK 92-10 E. Cases and equipment frames are described in Catalogue SK 14-1 E.

### Maintenance

Under normal conditions, the RXKP 2 requires no special maintenance. However, the relay should be protected against moisture and corrosive atmospheres. The cover should be kept on. Do not lubricate.

### Recommended resistance values

Voltage V, a.c.	Rated for RXKP 2 V, a.c.	Series resistor		Parallel resistor	
		$\Omega$	type MSB	$\Omega$	type MSB
48	24	160	104	400	54
55	24	200	104	400	54
127	110	630	54	-	-
220	110	3600	104	10000	54
240	220	1250	54	-	-
250	220	2000	54	-	-
380	220	10 000	104	2x12 500	104

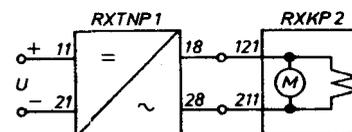


Fig. 2. Supply via inverter RXTNP  
U = 24 or 110-125 V

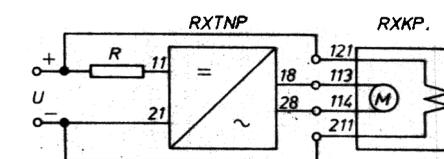


Fig. 3. Supply via inverter RXTNP 1 and series resistor  
U = 48-55 V d.c.; R = 315  $\Omega$ , 5 W  
U = 220-250 V d.c.; R = 3150  $\Omega$ , 10 W

## Data

### RXKP 2

Type of current	a.c. (also d.c. for symbol 2)
Rated voltages:	
at 50 Hz	24, 110 and 220 V
at 60 Hz	110-120 and 220 V
Max. system voltage	400 V a.c.
Operating range:	
operates reliably	
down to	80 % of the rated voltage
drops out at	10 % of the rated voltage
continuously withstands	110 % of the rated voltage
Power consumption at	
rated voltage:	
Symbol 1, before	
operation	approx. 4 VA
Symbol 1, after	
operation	approx. 2.3 VA
Symbol 2, motor	approx. 1.8 VA
Symbol 2, magnet	approx. 2.2 W
Symbol 3, motor	approx. 1.8 VA
Symbol 3, magnet	approx. 2.3 VA
Time scale	0.3 s – 60 h
Dispersion in operating	
time:	
with scale range 0.3-6 s	± 1.5 % of the highest setting
with other scale ranges	± 1 % of the highest setting
Resetting time	15 ms
	(correct time, that set on the
	scale, is thus obtained upon
	the next operation after 15 ms)
Graduation error	< ± 1 % of the highest setting
Permitted frequency	
deviation	± 10 %
Dependence of operating	
time upon frequency:	Changes in frequency cause
	inversely proportional changes in
	the operating time (higher
	frequency – shorter operating
	time). Ex.: 1.1 ± rated
	frequency gives operating time
	1/1.1 x set time
Dependence of operating	
time on temperature	
and voltage	Negligible. Lies within the
	range of dispersion.
Other times:	
instantaneous contact	
224–225	
pick-up time	approx. 13 ms
drop-out time	approx. 10 ms
impulse limit time	approx. 12 ms at rated voltage
	approx. 25 ms at 0.8 x rated
	voltage
	(When used in holding circuits,
	RXKP must be connected for more
	than 12 ms at rated voltage to enable
	it to hold in)
time-lag contacts,	
drop-out time	approx. 10 ms
Permitted ambient	
temperature	–25 to +55 °C
Test voltage	2 500 V, 50 Hz
Mechanical life,	
millions of operations	approx. 10
Net weight	approx. 0.5 kg

<sup>1)</sup> For a small number of breaks per hour. For heavy duty the contacts should be provided with arc suppression means. The breaking capacity is then reduced to half.

### Contact data

Highest system voltage	450 V d.c., 400 V a.c.
Continuous current	
carrying capacity	5 A
Making capacity	10 A
Breaking capacity:	
a.c., P.F. ≥ 0.1, max	220 V 10 A
d.c. <sup>1)</sup> , L/R ≤ 40 ms	48 V 1.5 A
	55 V 1 A
	110 V 0.4 A
	125 V 0.3 A
	220 V 0.2 A
	250 V 0.15 A

### RXTNP 1

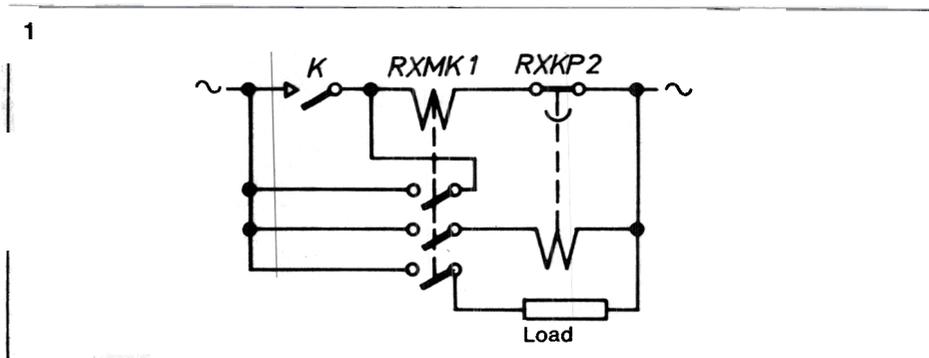
Type of current	d.c.
Rated voltage	24 V, 110-125 V
Frequency at rated	
voltage	50 Hz
Dependence of frequency	
on temperature	< 0.03 %/C
Dependence of the	
frequency on voltage	
within the permitted	
voltage interval	< ± 0.1 %
Permitted voltage	
variation	+10 to –20 % of rated voltage
Power consumption	approx. 2 W at 110 V
	(except RXPK 2)
Permitted ambient	
temperature	– 5 to +55 °C
Test voltage	2 000 V, 50 Hz
Surge voltage	5 kV, 1.2/50 μs, 0.5 joule



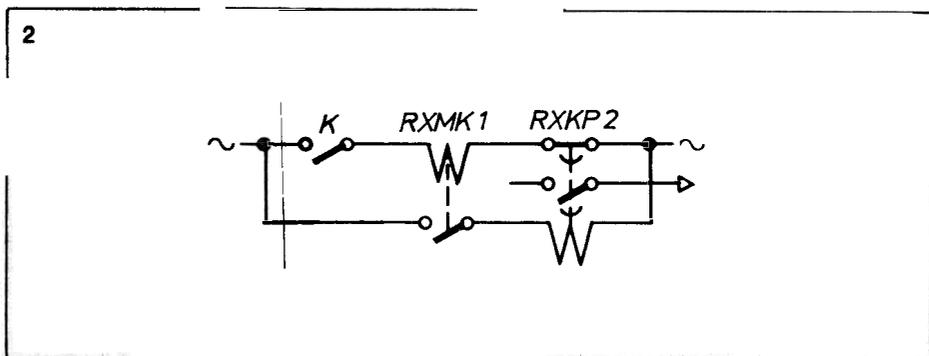
## Principle connections

The diagrams show the relays in de-energised state. When the coils are energised the contacts move upwards. The semi-circles under the timing contacts (with the open side upward) indicate time-lag on pick-up of make and break contacts.

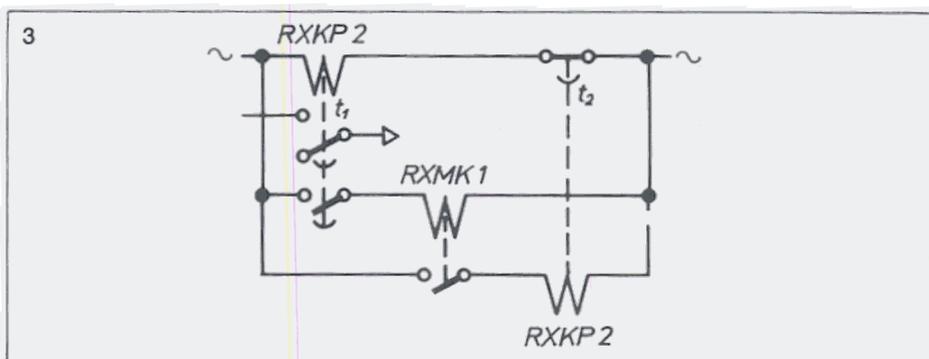
An impulse  $\geq 12$  ms at  $U_n$ , connects the load for a pre-determined time.



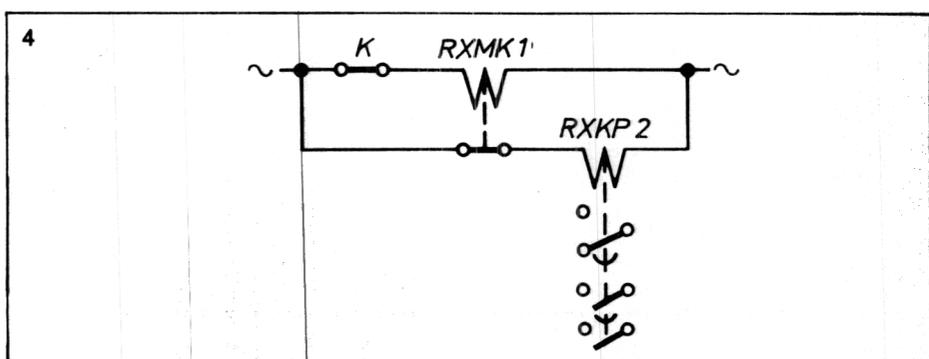
After pre-set time an impulse with 15-20 ms duration is obtained.



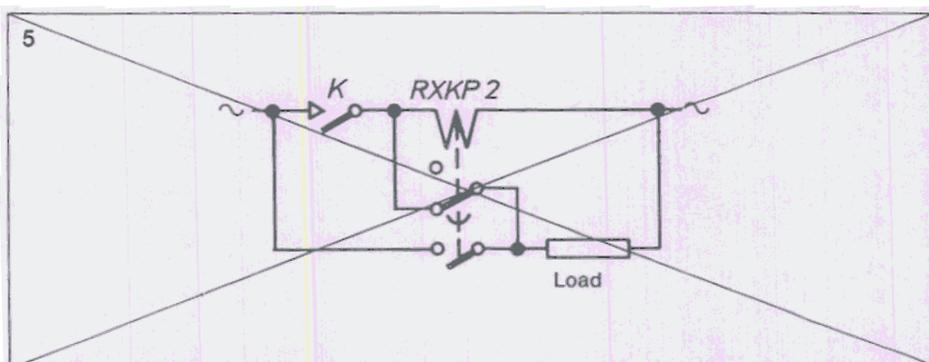
Impulse transmitter with adjustable pulse duration,  $t_1$ , and interval length  $t_2$ .



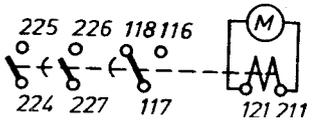
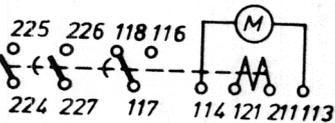
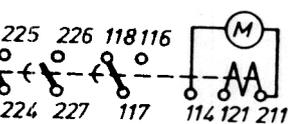
The delay is obtained when the break contact K opens.



The adjacent circuit cannot be utilised as the instantaneous contact is influenced too late on the return movement of the armature so that the timing contact will make before the instantaneous contact breaks and the relay will again pick up. Use the circuit shown in Example 1 instead.



**Ordering table, RXKP 2**

Symbol	Rated frequency Hz	Rated voltage V, a.c.	Rated voltage for pick-up magnet V, d.c.	Cat. No.	
				Unlatched armature	Latched armature
	50	24 110 220	—	RK 323 001-BD -BN -BS	RK 323 006-BD -BN -BS
	60	110-120 <sup>1)</sup> 220 240	—	RK 323 001-CN -CS -CT	RK 323 006-CN -CS -CT
	50	24 24 110 110 110 110 220 220 220	24 48 24 48 110 220 220 110 24		RK 323 002-BA -BK -BB -BC -BD -BE -BF -BG -BH
	60	110-120 <sup>1)</sup> 220	110-120 <sup>1)</sup> 220	RK 323 002-CC -CD	RK 323 007-CC -CD
	50	24 110 220	— — —	RK 323 003-BD -BN -BS	RK 323 008-BD -BN -BS
	60	110-120 <sup>1)</sup> 220	— —	RK 323 003-CN -CS	RK 323 008-CN -CS

**Ordering table, RXTNP 1**

Supply voltage V, d.c.	Suitable for RXKP 2 with rated voltage	Cat. No.
24	24 V a.c., 50 Hz	RK 732 103-AA
110-125	119 V a.c., 50 Hz	RK 732 103-CA
48-55	motor: 24 V a.c., 50 Hz magnet: 48-55 V d.c.	RK 732 103-AA + Cat. No. for resistor <sup>2)</sup>
220-250	motor: 110 V a.c., 50 Hz magnet: 220-250 V d.c.	RK 732 103-CA + Cat. No. for resistor <sup>2)</sup>

**Ordering table, accessories**

**Position plate**

The position plate is an aluminised, self-adhesive label, which is affixed to the plate of the relay. It can be stamped for types, with a maximum of characters with a height of 2 or 2.6 mm per row

Unstamped plate  
packed with the relay

Cat. No.

Stamped plate  
fitted to the relay

**RK 324 0010**

**Special  
setting knob**

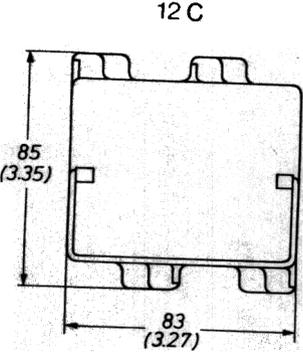
This special setting knob is designed to replace the normal knob when a larger setting knob is required. The knob has a diameter of 16 mm and a height of 20 mm

**RK 324 0012**

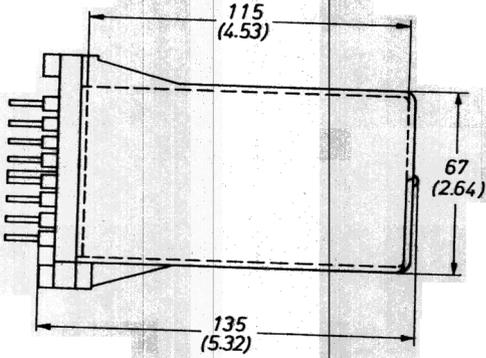
<sup>1)</sup> Note that the operating range is 85-110 % of the rated voltage at 110-120 V, 60 Hz, signifying 93-132 V.  
<sup>2)</sup> As per Catalogue RK 78-2 E.

# Dimension drawings

Dimensions in mm(in.). The design, data and dimensions are subject to modification without notice.



2 S





**ASEA**  
Relay Division  
721 83 VÄSTERÅS SWEDEN  
Tel. +46 21 100000

# ASEA

## Supplement

till Katalog RK 33-10  
to Catalogue RK 33-10 E

FRT 1981-04-28 (int)

Insätts i pärm R, del 1  
To be inserted in file R, Part 1

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Frånslagsfördröjt tidrelä  
typ RXKC-2H

Drop-out delayed time-lag relay  
type RXKC 2H

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RXKC skall alltid matas över reläkontakt  
som sluter och bryter momentant och ej  
över någon form av diodkoppling.

The supply to RXKC must always be via  
an instantaneous make-break contact and  
not via any type of diode connection.

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