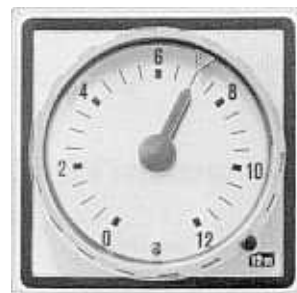


# Electromechanical precision timers



## Characteristic features

- 6 time ranges can be set from the front on each KOF
- Supplied as standard for both 50 Hz and 60 Hz with changeover facility
- Various wiring combinations by means of 2 potential-free changeover contacts
- Large setting knob, easy to read setting scale and timing run indication by rotating pointer
- High repetition accuracy,  $\pm 0.5\%$  of the full time range value
- Standardised terminal positioning and marking
- International approvals

## Technical data

### Timing characteristics

Time ranges	6 (details see summary list, page 6)
Min. setting time	2% of the full time range value
Setting accuracy	$\pm 1.5\%$ of the full time range value
Repetition accuracy	$\pm 0.5\%$ of the full time range value <sup>1)</sup>
Reset time	$\leq 200$ ms (KOF 511/KOF 211)
Running off indication	by rotating time pointer

<sup>1)</sup> The motor start delay of  $\pm 0.1$  s should be taken into account for the KOF 511/KOF 211 and delay times  $< 60$  s.

### Control circuit

Supply voltage $U_n$	Versions for alternating current (details see summary list, page 6), direct current on request (only for the control circuit)
Voltage tolerance	$-15\%/+10\%$
Power consumption	1.3 W motor 1.9 W electromagnet
Duration of control pulse	min. 200 ms for KOF 512/KOF 212, min. 30 ms for KOF 511/KOF 211
Duty cycle	100%

### Output

Contacts	KOF 511/KOF 512: 1 timed contact and 1 instantaneous contact as changeover KOF 211/KOF 212: 2 timed contacts as changeover
Type of contacts	Pure silver
Delayed time	approx. 20 ms to operating or rest position

Breaking capacity	
Alternating current	6(2)A/250 VAC according to SEV, DEMKO, NEMKO, SEMKO 6 A/250 VAC according to VDE 0435/201, IEC 255-1-00 6 A/250 VAC AC1, ohmic load } according to 1 A/250 VAC AC11, inductive load } VDE 0660/IEC 337-1 6 A/300 VAC SD according to CSA

Direct current	see adjacent graph
Switching frequency	max. 3600 operations/h at 0.6 A/220 VAC AC1, ohmic load max. 300 operations/h at 6 A/220 VAC AC1

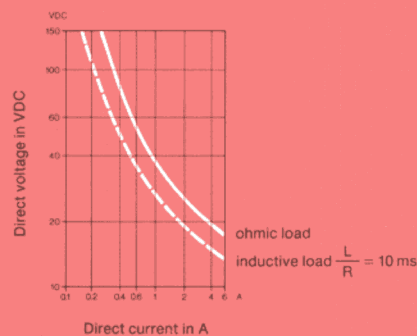
Life expectancy	
electrical	see adjacent graph
mechanical	10 million cycles or 30 000 motor running hours

Short-circuit protection	Fuse 10 A quick blow or 6 A slow, in conformity with VDE 0660
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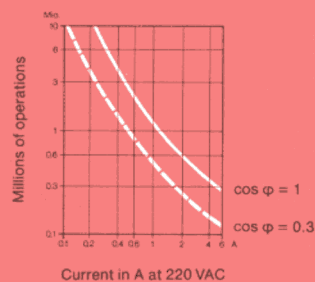
### General data

Insulation voltage	2 kV/50 Hz
Creepage- and clearance distances	Type C, 250 VAC, in conformity with VDE 0110
Degree of protection in conformity with DIN 40050	Type of case A: Case IP 50, rear IP 30, terminals safeguarded against finger contact in conformity with VDE 0106, part 100 Type of case E: Case IP 50, terminals IP 10 Type of case F: Case IP 50, pins IP 10 (plugged-in) Multiplug housing for F (accessories): Terminal IP 10
Ambient temperature	operation: $-20^\circ\text{C}$ to $+60^\circ\text{C}$ storage: $-30^\circ\text{C}$ to $+70^\circ\text{C}$

## Breaking capacity direct current



## Electrical life

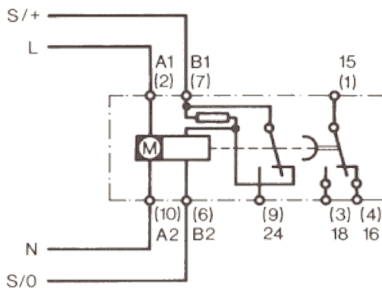


## Function

The mains frequency serves as a time base which is converted to a rotary movement via a synchronous motor and gear train. The electromagnet (control circuit) actuates both the instantaneous contact and the clutch of the timing element (motor). After the running of the set time, the motor operates the time delayed contact(s) and is brought to a standstill via a separate motor contact.

## Version with direct current control circuit (available on enquiry)

Direct current for the electromagnet (control circuit), alternating current 50/60 Hz for the motor (timing element).



- instantaneous contact not electrically separated
- series resistor to limit the consumption of the electromagnet

## Climatic conditions

Class E in conformity with DIN 40040  
Humid warmth in conformity with IEC 68C4 (40°C, 95% relative humidity, 56 days)  
FW 24 in conformity with DIN 50016 (23°C, 83% relative humidity or 40°C, 92% relative humidity, 10 cycles)

## Resistance to vibration

Reliability of performance 2g; mechanical resistance 2g for type of case A; 5g for type of case E and F (plugged-in); according to IEC 68-2-6, test FC in 3 planes at 10...150 Hz during 6 hours

## Resistance to shock

50 g; according to IEC 68-2-27, 3 shocks in each plane

## Connections

Type of case A and E: Screw terminals for 2 × 1.5 mm<sup>2</sup> multistrand with end sleeve  
Type of case F: via 11-pole plug-in socket in conformity with IEC 67-1-18a  
Plug-in socket (accessories): Screw terminals for 2 × 2.5 mm<sup>2</sup> single wire or 2 × 1.5 mm<sup>2</sup> multistrand with end sleeve.

## Mounting

Type of case A: Surface mounting, snapable on rail 35 mm (EN 50 022) or screw fixing  
Type of case E: Flush mounting, fixing with sleeve  
Type of case F: Flush or surface mounting, plug-in socket  
Plug-in socket: Screw fixing or snapable on rail 35 mm (EN 50 022)  
Any mounting position

## Insulating material

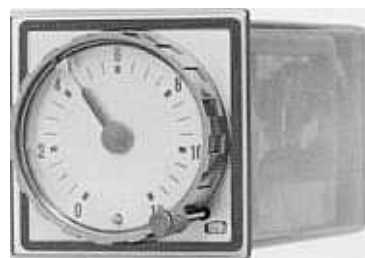
Case: polycarbonat, self extinguishing in conformity with UL 94, class V-1 or CEE 24 by 500°C  
Terminal block: Polyphenylenoxyd, self extinguishing in conformity with UL 94, class V-1

## Weight

approx. 250 g

## Approvals

SEV, VDE, CSA, DEMKO



Setting the time range

Selection of the time range (also possible during a run) is from the front using the 1.5 mm Allen key supplied. The full time range value is displayed in the window below the dial.



Setting the frequency

The timers are factory set to 50 Hz. To change to 60 Hz, turn spindle by a half-turn using a screwdriver.

# Summary list

Delayed operation timer <sup>1)</sup> <i>1 timed and 1 instantaneous contact resetting on supply failure</i>	Delayed release timer <sup>2)</sup> <i>1 timed and 1 instantaneous contact standstill at zero voltage</i>	Delayed operation timer <i>2 timed contacts resetting on supply failure</i>	Delayed release timer <i>2 timed contacts standstill at zero voltage</i>
<b>KOF 511</b>	<b>KOF 512</b>	<b>KOF 211</b>	<b>KOF 212</b>
<b>Function diagram</b> 			
<b>Connection diagram<sup>3)</sup></b> 			
<b>Function description</b> On application of the supply voltage the time delayed contact operates with t. The instantaneous contact 21 is operated all the while the supply voltage is applied. On interruption of the supply the time delayed and instantaneous contacts are released and the timer is reset to the set time t.  <b>Note:</b> Reset time < 200 ms (= min. voltage-interruption for a reset).	The time delayed contact 15 operates after control circuit B1/B2 closes. When the control circuit is opened time delayed contact is released with delay t. The instantaneous contact 21 is operated for the period of the control pulse. On interruption of the supply standstill occurs without reset, i.e. the timing run continues when the supply is restored (permits time addition).  <b>Note:</b> Duration of the control pulse min. 200 ms (reset to set time t).	After application of the supply voltage, time delayed contacts 15 and 25 operate with delay t. On interruption of the supply the time delayed contacts are released and reset takes place to the set time t.  <b>Note:</b> Reset time < 200 ms (= min. voltage-interruption for a reset).	Time delayed contacts 15 and 25 operate after the closing of control circuit B1/B2. When the control circuit is opened the time delayed contacts are released with delay t. On interruption of the supply standstill occurs without reset, i.e. the timing run continues when the supply is restored (permits time addition).  <b>Note:</b> Duration of control pulse min. 200 ms (reset to set time t).

**Time ranges (changeable)**

Type Q	Type R	Type S
0.1 ... 3 s	0.1 ... 3 s	0.1 ... 3 s
0.2 ... 6 s	0.5 ... 12 s	1 ... 30 s
2 ... 60 s	5 ... 120 s	0.1 ... 3 h
0.2 ... 6 min	0.5 ... 12 min	1 ... 30 min
2 ... 60 min	5 ... 120 min	0.1 ... 3 h
0.2 ... 6 h	5 ... 120 h	1 ... 30 h

**Supply voltages**

**U<sub>n</sub>** 24 VAC, 36 VAC, 42 VAC, 48 VAC, 110 VAC, **220 VAC**, 240 VAC, **50/60 Hz** (user selectable)  
 On request, only for the control circuit B1/B2 (7/6): 24 VDC, 48 VDC, 110 VDC

<sup>1)</sup> Additional functions such as fleeting ON-delay (pulse shortening) or as clock generator (with two KOF 511) are possible with external wiring. See page 9.

<sup>2)</sup> Fleeting OFF-delay possible with external wiring. See page 9.

<sup>3)</sup> Numbers in parenthesis: For the plug-in version (type of case F).



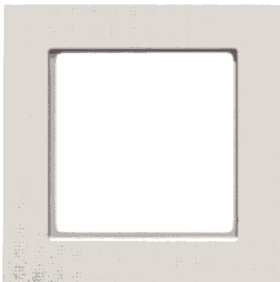
## Ordering details

# KOF

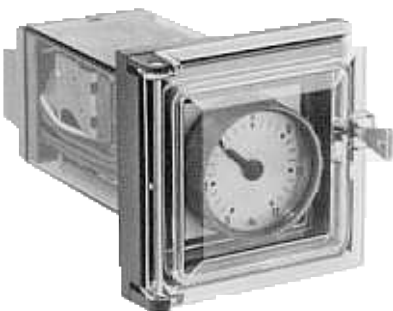
### Accessories



Plug-in socket for type of case F



Additional front frame (72 x 72 mm) for type of case E, order number: CJ 480



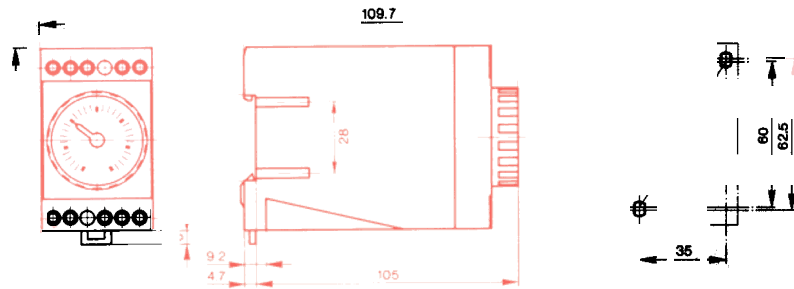
Transparent, rigid cover with hinge, which can be opened optionally by pushbutton or key. Degree of protection IP 65. Timer is fixed by means of sleeve (type of case E). Order number: CJ 380

	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII
<b>Output</b>	<b>K</b>	<b>O</b>	<b>F</b>		<b>1</b>				<b>O</b>	<b>M</b>			<b>N</b>
<b>5</b>	<b>1 timed and 1 instantaneous contact</b>												
<b>2</b>	2 timed contacts												
<b>Function</b>													
<b>1</b>	<b>Delayed operation timer</b> resetting on supply failure												
<b>2</b>	<b>Delayed release timer</b> standstill at zero voltage												
<b>Type of case</b>													
<b>A</b>	<b>Surface mounting</b>												
<b>E</b>	<b>Flush mounting</b>												
<b>F</b>	Plug-in flush or surface mounting, incl. plug-in socket												
<b>6 time ranges</b> (full time range values)													
<b>Q</b>	<b>3 s, 6 s, 60 s, 6 min, 60 min, 6 h</b>												
<b>R</b>	3 s, 12 s, 120 s, 12 min, 120 min, 12 h												
<b>S</b>	<b>3 s, 30 s, 3 min, 30 min, 3 h, 30 h</b>												
<b>Supply voltage</b>													
<b>B4</b>	24 V, 50/60 Hz			<b>C1</b> 48 V, 50/60 Hz			<b>D4</b> 220 V, 50/60 Hz			D6 240 V, 50/60 Hz			
<b>B6</b>	36 V, 50/60 Hz			<b>C8</b> 110 V, 50/60 Hz									
<b>B8</b>	42 V, 50/60 Hz												
<b>Accessories</b> (to order separately)													
<b>CJ250</b>	Plug-in socket for type of case F (replace)						<b>CJ380</b> Protection cover						
<b>CJ480</b>	Additional front frame												
<b>Note:</b>	The bold typeface denotes the standard versions. Ordering can be by means of the above ASN-code or in plain language.												
<b>Example:</b>	Electromechanical precision timer KOF, 220 VAC/50 Hz, 3 s to 6 h, surface mounting, delayed operation, 2 timed contacts or KOF 211A0MQD4N												

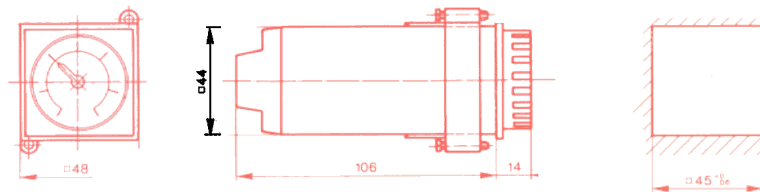
## Dimensional drawings



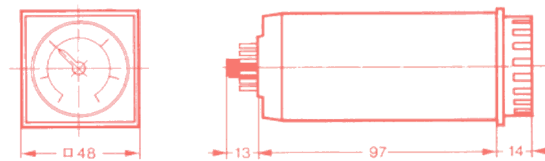
### Type of case A, surface mounting



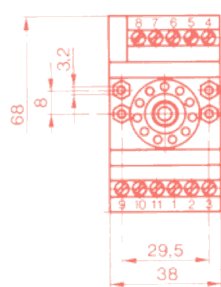
### Type of case E, flush mounting



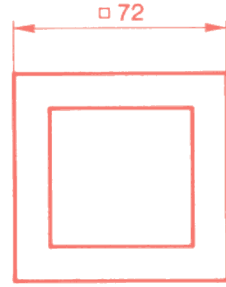
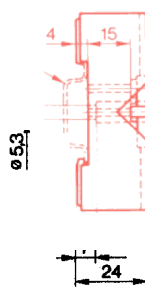
### Type of case F, Flush or surface mounting, plug-in



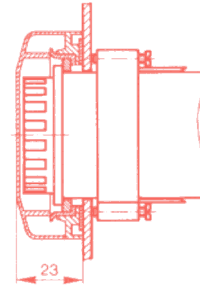
### Accessories



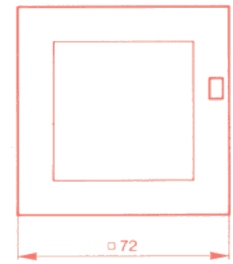
Plug-in socket CJ 250



Front frame CJ 480



Protection cover CJ 380



## Additional functions by external wiring

# KOF

Timer fleeting ON-delay (with KOF 511)	Timer pulse lengthening (with KOF 511)	Programmer or asymmetric impulser (with 2 KOF 511)	Timer fleeting OFF-delay (with KOF 512)
<p><b>Function diagram</b></p>	<p><b>Function diagram</b></p>	<p><b>Function diagram</b></p>	<p><b>Function diagram</b></p>
<p><b>Connection diagram</b></p>	<p><b>Connection diagram</b></p>	<p><b>Connection diagram</b></p>	<p><b>Connection diagram</b></p>
<p><b>Function description</b> After application of the supply voltage, output 1 (terminal 21/16) is closed for the time t. After time t the output 2 (terminal 21/18) is closed as long as the supply voltage is applied.</p> <p><b>Note:</b> A voltage interruption &gt; 20 ms initiates a reset and a new cycle is started.</p>	<p>After control pulse S, voltage is applied to output 16 during the adjustable time t. If control pulse S is longer than t, voltage continues to be applied to the load at the output (16+24) until the control pulse is removed.</p> <p><b>Note:</b> - Duration of control pulse &gt; 30 ms - A voltage interruption &gt; 20 ms initiates a reset and a new cycle is started.</p>	<p>After the closing of control contact S, voltage is applied to load circuit 1 during t1, and then to load circuit 2 during t2. Further cycles continue until the control contact opens.</p> <p><b>Note:</b> Control pulse &gt; 20 ms</p>	<p>The load circuit is closed during t after the opening of control contact S. Time addition is possible, i.e. the timing continues when supply is restored after a voltage interruption.</p> <p><b>Note:</b> Control pulse duration &gt; 20 ms</p>