Multi-function multi-range timer relay

- Multi voltage for AC/DC 24 up to 240 V
- 16 functions
- Setting range from 0.1 s to 300 h divided into 16 selectable time ranges
- 2 change-over contacts or 1 instantaneous change-over contact and
  1 timed change-over contact (function-dependent)
- 3 LEDs for function display

### Functions

<table>
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<tr>
<th>Mode</th>
<th>Funktion</th>
</tr>
</thead>
<tbody>
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<td>11</td>
<td>ON-delay</td>
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<td>11-ON</td>
<td>ON-delay, with instantaneous contact</td>
</tr>
<tr>
<td>11C-ON</td>
<td>ON-delay, with instantaneous contact, accumulative y/n, with auxiliary supply</td>
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<tr>
<td>12</td>
<td>OFF-delay, with auxiliary supply</td>
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<td>12-ON</td>
<td>OFF-delay, with instantaneous contact, with auxiliary supply</td>
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<td>11-12</td>
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<td>12-22</td>
<td>OFF-delay and interval OFF, 0.5 s fixed interval time, with auxiliary supply</td>
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<td>21</td>
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<td>21-ON</td>
<td>interval ON, with instantaneous contact</td>
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<tr>
<td>21-22</td>
<td>interval ON, interval OFF, with auxiliary supply</td>
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<td>22-ON</td>
<td>interval OFF, with instantaneous contact, with auxiliary supply</td>
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<td>43-44</td>
<td>clock-generating, 0.5 s fixed ON and OFF time, ON/OFF start, with cycle time setting</td>
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<tr>
<td>51</td>
<td>star-delta switching, interval ON</td>
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<tr>
<td>81-1s-ON</td>
<td>ON-delay, pulse-generating, 1 s fixed ON time</td>
</tr>
<tr>
<td>82-ON</td>
<td>pulse-shaping, with instantaneous contact, with auxiliary supply</td>
</tr>
<tr>
<td>83-84-1s</td>
<td>pulse-generating, 1 s fixed ON or OFF time</td>
</tr>
</tbody>
</table>

### Time ranges

Setting range from 0.1 s to 300 h divided into:

- 0.15 ... 3 s
- 15 ... 300 s
- 1.5 ... 30 h
- 15 ... 300 h

### Function

- Setting the function
  The function is set with the MODE selector switch and displayed by the function code in the window next to it. The code designation for the function can be found in the column “Function diagrams”.

- Setting the time delay
  The time range is set with the RANGE selector switch and displayed in the window next to it. The desired delay time is set with a selecting wheel.

  LEDs show the state of the excitation input and the position of the contacts. You can monitor the countdown on a flashing LED.

### Notes

- The device is designed for multi-voltage. Connect phase L1 or L+ to terminal A1 and B1 and neutral N and/or M to terminal A2.
- You can change the function or delay time during operation. The change is effective immediately.
# Function diagrams

**Function code 11 = ON-delay**

- A1-A2: Energizing quantity
- 15-18: Delayed contact
- 15-16: LED green
- 25-26: LED green

$\tau_0 = \text{operating time}$

$\tau_1 = \text{break time, must be }> \text{ recovery time 1}$

$\tau_2 = \text{break time, must be }> \text{ recovery time 2}$

**Function code 11-ON = ON-delay**

- A1-A2: Energizing quantity
- 15-18: Delayed contact
- 15-16: LED green
- 21-24: Instantaneous contact
- 21-22: LED green

$\tau_0 = \text{operating time}$

$\tau_1 = \text{break time, must be }> \text{ recovery time 1}$

$\tau_2 = \text{break time, must be }> \text{ recovery time 2}$

**Function code 11C-ON = ON-delay, accumulative yfn, with auxiliary supply**

- A1-A2: Auxiliary supply
- 15-16: Energizing quantity
- 15-16: LED green
- 25-26: LED green

$\tau_0 = \text{operating time}$

$\tau_1 = \text{break time, must be }> \text{ recovery time 1}$

$\tau_2 = \text{break time, must be }> \text{ recovery time 1}$

**Function code 12 = OFF-delay, with auxiliary supply**

- A1-A2: Auxiliary supply
- 15-18: Energizing quantity
- 15-16: Delayed contact
- 25-26: LED green

$\tau_0 = \text{returning time}$

$\tau_1 = \text{make time, must be }> \text{ minimum ON time 1}$

$\tau_2 = \text{time between switching on auxiliary supply and energizing quantity, must be }> \text{ recovery time 1}$

$\tau_3 = \text{break time, must be }> \text{ recovery time 2}$

**Function code 12-ON = OFF-delay, with auxiliary supply**

- A1-A2: Auxiliary supply
- 15-18: Energizing quantity
- 15-16: Delayed contact
- 21-24: Instantaneous contact
- 21-22: LED green

$\tau_0 = \text{returning time}$

$\tau_1 = \text{make time, must be }> \text{ minimum ON time 1}$

$\tau_2 = \text{time between switching on auxiliary supply and energizing quantity, must be }> \text{ recovery time 1}$

$\tau_3 = \text{break time, must be }> \text{ recovery time 2}$

**Function code 21 = interval ON**

- A1-A2: Energizing quantity
- 15-18: Delayed contact
- 15-16: LED green
- 25-26: LED green

$\tau_{val} = \text{interval ON time}$

$\tau_1 = \text{break time, must be }> \text{ recovery time 1}$

$\tau_2 = \text{break time, must be }> \text{ recovery time 2}$

**Function code 21-ON = interval ON**

- A1-A2: Energizing quantity
- 15-18: Delayed contact
- 15-16: LED green
- 21-24: Instantaneous contact
- 21-22: LED green

$\tau_{val} = \text{interval ON time}$

$\tau_1 = \text{break time, must be }> \text{ recovery time 1}$

$\tau_2 = \text{break time, must be }> \text{ recovery time 2}$

**Function code 21-22 = interval ON, interval OFF, with auxiliary supply**

- A1-A2: Auxiliary supply
- 15-18: Energizing quantity
- 15-16: Delayed contact
- 25-26: LED green

$\tau_{val} = \text{interval ON time}$

$\tau_1 = \text{break time, must be }> \text{ recovery time 1}$

$\tau_2 = \text{make time, must be }> \text{ minimum ON time 1}$

$\tau_3 = \text{time between switching on auxiliary supply and energizing quantity, must be }> \text{ recovery time 1}$

$\tau_4 = \text{break time, must be }> \text{ recovery time 2}$
### Function diagrams

**Function code 22-ON** = interval OFF, with auxiliary supply

- t_{off} = interval OFF time
- t_{m} = make time, must be > minimum ON time 1
- t_{b} = break time, must be > recovery time 1

<table>
<thead>
<tr>
<th>Function code</th>
<th>Function diagram</th>
<th>Recovery time (ms)</th>
<th>Minimum ON time (ms)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
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<tr>
<td>11-ON</td>
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<tr>
<td>11C-ON</td>
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<td>12</td>
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<td>12-ON</td>
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<td>22-ON</td>
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<td>43-44</td>
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<tr>
<td>81-1s-ON</td>
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<td>82-ON</td>
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<tr>
<td>83-84-1s</td>
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</table>

**Function code 23-84-1s** = pulse-shaping, 1 s fixed OFF or ON time

- t_{off} = OFF time
- t_{on} = ON time
- t_{b} = break time, must be > recovery time 1

**Function code 43-84** = clock-generating, 0.5 s fixed OFF and ON time, OFF/ON start, with cycle time setting

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<tr>
<th>Function code</th>
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<tr>
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<td>83-84-1s</td>
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### Description of the drawing

- Control signal of the energizing quantity
- Adjustable time
- Fixed time
- Adjustable cycle time
- 5-fold function

- Time delay – energizing quantity ON
- Time delay – delayed switching element in ON position
- Time delay – delayed switching element in OFF position
- Time delay – energizing quantity OFF

**Function codes / times**

<table>
<thead>
<tr>
<th>Function code</th>
<th>Function diagram</th>
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<th>Minimum ON time (ms)</th>
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<td>21</td>
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## Technical data

### Input circuit
- **Rated voltage A1-A2**: AC/DC 24 – 240 V
- **Rated consumption AC**: 3.5 VA / 1.7 W
- **Rated consumption DC**: 1.6 W
- **Rated voltage limits**: 70 – 110 %
- **Rated frequency f_n**: 50 – 60 Hz ± 5 %
- **Release value of the input voltage (power capacity approx. 150 pF/m)**: ≥ AC/DC 10 V; permissible line capacity 0.2 µF
- **Rated current on control connection (B1-A2)**: 1 mA
- **Rated consumption on control connection (B1-A2)**: < 0.25 W
- **Parallel loads permissible**: A1-A2 yes / B1-A2 yes
- **Internal half-wave rectification**: A1-A2 no / B1-A2 yes

### Time circuit
- **Time setting / number of time ranges**: analogous / 16
- **Setting ranges for time delay**: See table "Time ranges"
- **Recovery time 1/2/3**: See table "Function codes / times"
- **Minimum ON time**: See table "Function codes / times"
- **Setting tolerance**: ≤ ± 5 %
- **Repeatability (to set value)**: ≤ ± 0.01 % + ± 10 ms
- **Influence of temperature (within range)**: ≤ ± 0.002 %
- **Influence of voltage (within range)**: ≤ ± 0.002 %

### Output circuit
- **Contact assignment**: 2 change-over contacts
- **Contact material**: AgNi 90/10
- **Rated operating voltage**: AC/DC 24 – 240 V
- **Rated value for limiting continuous current I_{th}**: 5 A
- **Minimum contact load**: ≥ AC/DC 5 V / ≥ 10 mA
- **Application category according to IEC 60947-5-1**: AC-15 Ue AC 230 V, I_{e} 3 A
  DC-13 Ue DC 24 V, I_{e} 2 A
- **Permissible switching frequency**: ≤ 3600 switching cycles/h
- **Mechanical life**: 30 x 10^6 switching cycles
- **Electrical life 20/2 A, AC 250 V, cos φ = 0.3**: 0.12 x 10^6 switching cycles AC-15
- **Response time / release time at excitation of A1-A2**: 40 ms
- **Response time / release time at excitation of B1-A2**: 20 ms

### Other data
- **Creepage distances and clearances**: according to IEC 60664-1
- **Degree of pollution**: 3 outside, 2 inside
- **Overvoltage category**: III
- **Rated voltage**: AC/DC 275 V
- **Degree of protection according to IEC 60529 housing/terminals**: IP 40 / IP 20
- **Noise immunity according to IEC 61000-4**: Test severity 3
- **Ambient temperature, operating range**: –25 to +60 °C
- **Dimension diagram (housing)**: K 3-3
- **Dimension diagram of the terminals**: KS 250-31
- **Wire ranges stranded or solid**: stranded with ferrules
  1 x 0.2 – 6 or 2 x 0.2 to 2.5 mm²
  1 x 0.4 – 4 or 2 x 0.2 to 1.5 mm²
- **Weight**: 0.13 kg
- **Accessories**: –

### Overview of devices / Part numbers

<table>
<thead>
<tr>
<th>Type</th>
<th>Rated voltage</th>
<th>ON-delay time</th>
<th>Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>NGM 1600</td>
<td>AC/DC 24-240 V</td>
<td>50-60 Hz</td>
<td>R2.065.0049.0</td>
</tr>
</tbody>
</table>