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### 1. INTRODUCTION

The time circuits ECO 31/AC230V, ECO 31/AC115V and ECO 31/DC24V in the ECO series with 22.5 mm DIN construction, can be snapped onto DIN rail TS35 and are cost-optimised units with emphasis on high tolerance to environmental conditions. With such a design it is possible to achieve low acquisition, commissioning and maintenance costs. The units are distinguished by their high tolerance to residual current.

There are four time ranges available from 0.5 s to 20 min as well as the four timing functions On-delay time (E), Shot-timing mode (W) and Blinking (B, B2).

The output changeover contact is designed for 6A 250V~. The switch mode is indicated by a LED. The units satisfy the relevant standards and are labelled CE.

Fo-61.01-D-401

Datei: ECO31\_DB\_E.DOC

| Gez.   | Entw. | Gepr. | Reg. | Datum    | Ae M | Ausg. | Blatt: 1   |
|--|-------|-------|------|----------|------|-------|--|
| An   |       |       |      | 10.5.99  |      | A     | von: 7   |
|  | Mo    | Pd    | wie  | 08.09.99 |      | 1     | M:   |
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| ComatReleco  |       |       |      |          |      |       | <p><b>Data sheet</b><br/> <b>COMATRELECO Timer</b><br/> <b>ECO31</b></p> <p><b>25035 - 49 - 57 - 401</b></p> |

-----  
 Technical specifications subject to change without notice  
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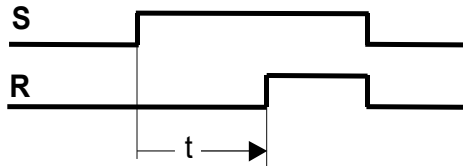
**2. ORDER DESIGNATION**

|                   |               |
|-------------------|---------------|
| ComatReleco Timer | ECO 31/AC230V |
|                   | ECO 31/AC115V |
|                   | ECO 31/DC24V  |

**3. FUNCTIONS**

**3.1. On-Delay E**

Time diagram

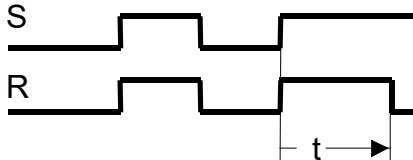


Description

With S↑ switching R↑ is activated after a delay t.

**3.2. One-Shot Leading Edge with delimitation W**

Time diagram

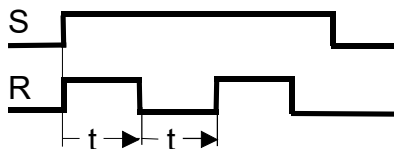


Description

With S↑ switching R↑ is activated for period t.

**3.3. Blinking pulse beginning B**

Time diagram

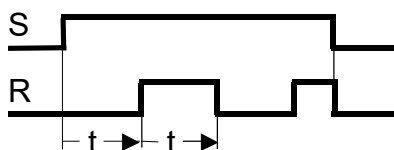


Description

With S↑ switching the time-symmetrical blinking function starts with R↑ active.

**3.4. Blinking pulse beginning B2**

Time diagram



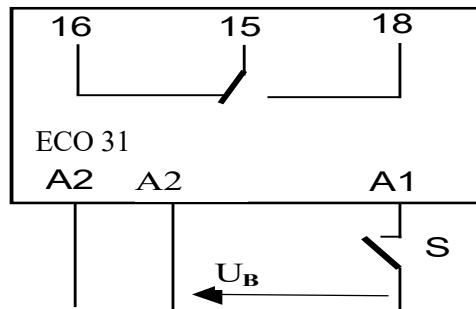
Description

With S↑ switching the time-symmetrical blinking function starts with R↓ inactive.

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|   |       |       |      |          |      |       |          |   |
|---|-------|-------|------|----------|------|-------|----------|---|
| Gez.  | Entw. | Gepr. | Reg. | Datum    | Ae M | Ausg. | Blatt: 2 | <b>Data sheet</b><br><b>COMATRELECO Timer</b><br><b>ECO31</b><br><br><b>25035 - 49 - 57 - 401</b> |
| An  |       |       |      | 10.5.99  |      | A     | von: 7   |   |
|   | Mo    | Pd    | wie  | 08.09.99 |      | 1     | M:       |   |
|   |       |       |      |          |      |       |          |   |
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| ComatReleco   |       |       |      |          |      |       |          |   |

#### 4. CONNECTION DIAGRAM



#### 5. TECHNICAL DATA

##### 5.1. General data

###### 5.1.1. Mechanical data

|                   |  |
|-------------------|--|
| Case              | DIN case (DIN 43 880) WHD = 22.5 x 90 x 70 mm                          |
| Protection        | IP 40, terminals IP 20   |
| Case material     | NORYL SE1 ( UL 94V-1 )   |
| Weight            | approx. 80 g   |
| Mounting          | TS 35 DIN / EN 50022   |
| Shock resistance  | IEC 68-2-6/FC, IEC 571   |
| Connections       | Terminals with guard 2 x 1.5 mm <sup>2</sup> , 1 x 2.5 mm <sup>2</sup> |
| Tightening torque | ≤ 0.8 Nm   |

###### 5.1.2. Ambient conditions

|                       |                         |
|-----------------------|-------------------------|
| Storage temperature   | -40°C ÷ +85°C           |
| Operating temperature | -25°C ÷ +60°C           |
| Relative humidity     | 10 ÷ 95% non-condensing |

##### 5.2. Electrical data

###### 5.2.1. Supply

| Operating voltage nominal / type                   | <b>230V AC</b>   | <b>115V AC</b>                       | <b>24V DC</b>       |
|--|--|--------------------------------------|---------------------|
| Operating voltage range                            | 184V ÷ 265V 50 Hz<br>180V ÷ 255V 60 Hz                 | 95V ÷ 138V 50 Hz<br>90V ÷ 132V 60 Hz | 18V = ÷ 30V =       |
| Frequency range                                    | 48 Hz ÷ 62 Hz  | 48 Hz ÷ 62 Hz                        |                     |
| Current consumption I <sub>B</sub>                 | ≤ 30 mA 50 Hz<br>≤ 35 mA 60 Hz                         | ≤ 35 mA 50 Hz<br>≤ 40 mA 60 Hz       | ≤ 25 mA             |
| Power consumption                                  | ≤ 1.2 W, 7 VA  | ≤ 1 W, 5 VA                          | ≤ 0.85 W            |
| Inrush current                                     | ≤ 1.8 A, τ = 100 μs                                    | ≤ 1A, τ = 150 μs                     | ≤ 1.5 A, τ = 250 μs |
| Switch-off energy, inductive parallel load         | 5 kV // 50 mWs / 1 Hz, or single pulse 2.5 kV / 0.5 Ws |                                      |                     |
| Transient voltage protection (EN 61000-4-5, surge) | 2 kV   | 2 kV                                 | 1 kV                |

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| Gez.  | Entw. | Gepr. | Reg. | Datum    | Ae M | Ausg. | Blatt: 3 | Data sheet<br><b>COMATRELECO Timer<br/>ECO31</b> |
|---|-------|-------|------|----------|------|-------|----------|--|
| An  |       |       |      | 10.5.99  |      | A     | von: 7   |  |
|   | Mo    | Pd    | wie  | 08.09.99 |      | 1     | M:       |  |
|   |       |       |      |          |      |       |          |  |
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| ComatReleco   |       |       |      |          |      |       |          | <b>25035 - 49 - 57 - 401</b>                     |

### 5.3. Time response

#### 5.3.1. Time ranges

|                              |  |
|------------------------------|--|
| Time ranges                  | 0.5 s ÷ 5 s / 2 s ÷ 20 s / 16 s ÷ 160 s / 2 min ÷ 20 min |
| Range tolerance $t_{min}$    | - 30% ÷ 0%   |
| Range tolerance $t_{max}$    | 0 ÷ +20%   |
| Fine setting (potentiometer) | 1 : 10   |

#### 5.3.2. Dependency on ambient conditions

| <u>Operating voltage / Type</u>                           | <u>230V AC</u>      | <u>115V AC</u>    | <u>24V DC</u>     |
|---|---------------------|-------------------|-------------------|
| Voltage stability   | ± 0.1% / K (≤ 0.5%) | 0.1% / K (≤ 0.5%) | 0.1% / K (≤ 0.5%) |
| Temperature dependency                                    | -0.2% / K (≤ 2%)    | -0.2% / K (≤ 2%)  | -0.2% / K (≤ 2%)  |
| Max. deviation for parasitic induction defined under 7.2. | ≤ 2%                | ≤ 2%              | ≤ 2%              |

#### 5.3.3. Other time data

|                           |                  |                  |                  |
|---------------------------|------------------|------------------|------------------|
| Supply failure protection | ≥ 30 ms          | ≥ 30 ms          | ≥ 30 ms          |
| Reset time                | ≤ 100 ms         | ≤ 100 ms         | ≤ 100 ms         |
| Repeat accuracy           | ± 0.2% (± 20 ms) | ± 0.2% (± 20 ms) | ± 0.2% (± 10 ms) |

### 5.4. Output circuit

|                         |  |
|-------------------------|--|
| Output                  | 1 x U, contact AgNi  |
| Switching voltage       | 5 ÷ 250V~ / 5 ÷ 60V =  |
| Switching current       | 6A // 20A / 20 ms      3A, AC15  |
| Breaking capacity       | 1500VA AC1 // ... 170W   |
| Recomm. minimum load    | 10mA 12V   |
| Service life mechanical | > 2 x 10 <sup>7</sup>  |
| Service life electrical | ≥ 1 x 10 <sup>5</sup> / 6A, 230V AC1<br>≥ 3.5 x 10 <sup>5</sup> / 3A, 230V AC1<br>≥ 1 x 10 <sup>5</sup> / 5.5A 30V DC1<br>≥ 2.5 x 10 <sup>5</sup> / 3A 30V DC1 |
| Insulation              | ≥ 2kV / 1 min  |

## 6. OPERATION

### 6.1. Function setting

Function DIP switch



Timing functions

**E**

**W**

**B**

**B2**

On-Delay

Shot-Timing

Blinking, pulse beg.

Blinking, pause beg.

### 6.2. Time range setting

Time range setting



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|      |       |       |      |          |      |       |          |
|------|-------|-------|------|----------|------|-------|----------|
| Gez. | Entw. | Gepr. | Reg. | Datum    | Ae M | Ausg. | Blatt: 4 |
| An   |       |       |      | 10.5.99  |      | A     | von: 7   |
|      | Mo    | Pd    | wie  | 08.09.99 |      | 1     | M:       |
|      |       |       |      |          |      |       |          |

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ComatReleco

Data sheet

**COMATRELECO Timer  
ECO31**

**25035 - 49 - 57 - 401**

DIP switch □

Time range                      **0.5 ÷ 5 s**                      **2 ÷ 20 s**                      **16 ÷ 160 s**                      **2 ÷ 20 min**

**6.3. Fine setting of time**

Linear potentiometer                      1 : 10

**6.4. Display**

LED red for R1 active

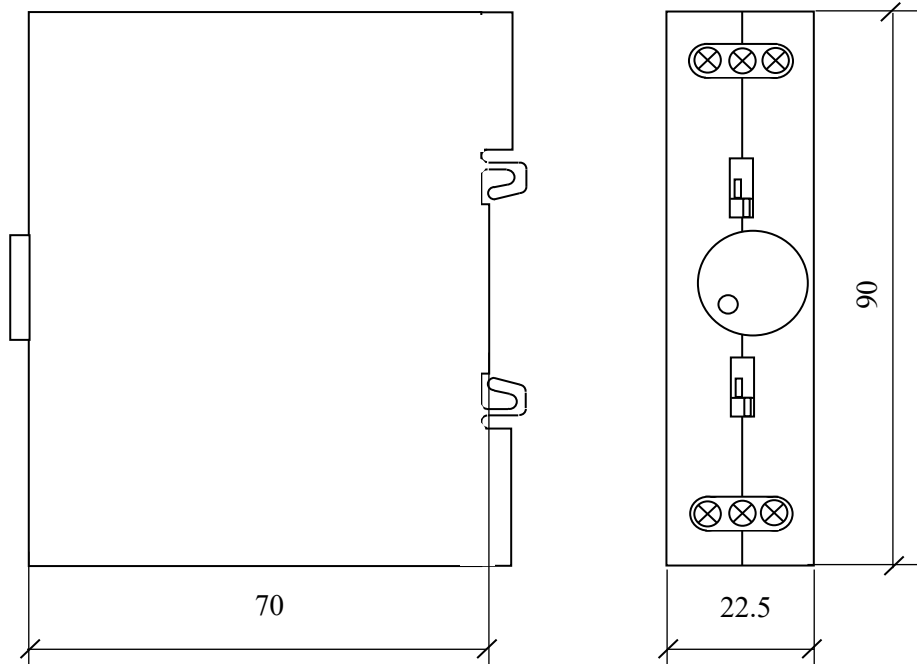
**7. STANDARDS, DIRECTIVES, LABELLING**

|      |  |  |   |
|------|--|--|---|
| 7.1. | <b>Vibration safety</b>                              | IEC 571  | Item 6.3  |
| 7.2. | <b>Immunity to interference</b><br>as per EN 50082-2 | IEC 255-4<br>EN 61000-4-2<br>EN 61000-4-4<br>ENV 50140<br>ENV 50204<br>ENV 50141 | Appendix E, Class III<br>Air: 8kV<br>≤ Level 3<br>10V/m<br>10V/m<br>10V |
|      | <b>Interference emission</b>                         | as per EN 50081-1  | EN 55022                      Class B                                   |
|      | <b>Low voltage</b>                                   | EN 60065   |   |
| 7.3. | <b>Approvals</b>                                     | cUR  |   |
| 7.4. | <b>Conformity, labelling</b>                         | CE, cUR  |   |

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|  |       |       |      |          |      |       |          |   |
|--|-------|-------|------|----------|------|-------|----------|---|
| Gez.   | Entw. | Gepr. | Reg. | Datum    | Ae M | Ausg. | Blatt: 5 | <b>Data sheet</b><br><b>COMATRELECO Timer</b><br><b>ECO31</b> |
| An   |       |       |      | 10.5.99  |      | A     | von: 7   |   |
|  | Mo    | Pd    | wie  | 08.09.99 |      | 1     | M:       |   |
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## 8. CASE



## 9. BRIEF DESCRIPTION

### 9.1. Power supply

#### 9.1.1. ECO 31 / AC230 / 115V

The internal power supply for the relay and the electronics is gained from the operating voltage  $U_B$  at  $A_1$ - $A_2$  via a series capacitor and the bridge rectifier.

There is a high-impedance discharge resistor parallel to the series capacitor.

Pulse-resistant resistors limit the current during transient overvoltage peaks.

The voltage regulator for the timing circuit comprises a Z-diode and a longitudinal transistor.

#### 9.1.2. ECO 31 / DC 24V

The internal power supply for the relay and the electronics is gained from the operating voltage  $U_B$  at  $A_1$ - $A_2$  via a reverse polarity protection diode.

Protection against transients is executed in two stages: a VDR with series resistor forms the principal protection, a further series resistor and a Z-diode protect the electronics from overvoltage.

### 9.2. Time circuit

A tuneable RC oscillator serves as the timing basis and together with a divider, adjustable by DIP switch, is integrated into the timer IC type 4541. The time basis oscillator can be balanced by fixed resistors.

### 9.3. Output circuit

The output relay is activated from the timer IC via a switching transistor. A balanced load (with output relay switched off) is effected by means of a complementary switching transistor, so the power

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| Gez.   | Entw. | Gepr. | Reg. | Datum    | Ae M | Ausg. | Blatt: 6   |
|--|-------|-------|------|----------|------|-------|--|
| An   |       |       |      | 10.5.99  |      | A     | von: 7   |
|  | Mo    | Pd    | wie  | 08.09.99 |      | 1     | M:   |
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| ComatReleco  |       |       |      |          |      |       | <p><b>Data sheet</b><br/> <b>COMATRELECO Timer</b><br/> <b>ECO31</b></p> <p><b>25035 - 49 - 57 - 401</b></p> |

consumption of the power supply always remains constant, thus guaranteeing good residual current behaviour and a constantly low reset time.

## 10. BLOCK DIAGRAM

Transientenschutz = Transient protection

U-Regler = Overcurrent regulator

Lastausgleich = Load balance

Oszillator = Oscillator

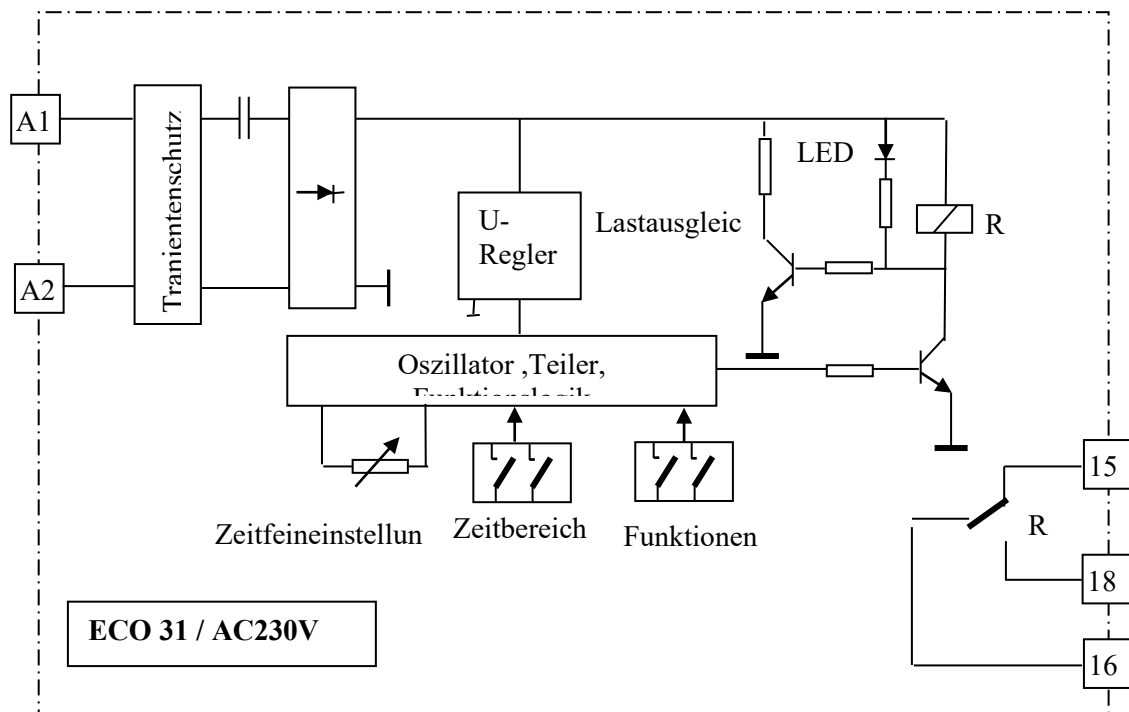
Teiler = divider

Funktionslogik = function logic

Zeitfeineinstellung = Fine time setting

Zeitbereich = time range

Funktionen = Functions



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| Gez. | Entw. | Gepr. | Reg. | Datum    | Ae M | Ausg. | Blatt: 7 |
|------|-------|-------|------|----------|------|-------|----------|
| An   |       |       |      | 10.5.99  |      | A     | von: 7   |
|      | Mo    | Pd    | wie  | 08.09.99 |      | 1     | M:       |
|      |       |       |      |          |      |       |          |

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