E-T-A Solid State Remote Power Controllers (SSRPCs)

E-T-A solid state remote power controllers combine solid state switching with electronic overload protection and current limiting characteristics. Selected models also include electro-mechanical switching for applications which demand physical contact separation.

These products have been designed for the protection of programmable controller outputs, instrumentation, and process control switching circuits. Their performance characteristics are especially suitable for limiting the high in-rush currents associated with solenoids and other high resistance or inductive loads. Versions are also available for power management control in vehicles and marine craft.

Physical isolation between control and load circuits is assured through inclusion of an opto-coupler in most models, and all types provide fault status and wire break indication. Advanced thickfilm and hybrid circuitry specially developed and manufactured for E-T-A make a significant contribution to the reliability of these products while ease of installation is achieved through convenient industry standard rail or socket mounting.

There is a suitable E-T-A solid state remote power controller for most process control and DC power distribution requirements and characteristics may also be tailored to special circumstances as necessary.

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved. Product markings may not be exactly as the ordering codes. Errors and omissions excepted.
<table>
<thead>
<tr>
<th>Type No.</th>
<th>E-1048-60.</th>
<th>E-1071-073-...</th>
<th>E-1071-128-...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage rating of load</td>
<td>DC 24 V</td>
<td>DC 24 V</td>
<td>DC 24 V</td>
</tr>
</tbody>
</table>
| Current rating of load | 0.5 A  
1 A  
2 A  
4 A | 0.2 - 3.0 A | 0.2 - 3.0 A |
| Short-circuit limitation | 25 A (0.5A/1A rating)  
75 A (2 A/4 A rating) | approx. 2.5 x \(i_n\) | approx. 2.5 x \(i_n\) |
| Hold current of magnetic coil | N/A | N/A | N/A |
| Operating voltage of SSRPC | DC 18 ... 36 V | DC 20 ... 48 V | DC 20 ... 48 V |
| Display | ON indication  
fault indication | control current  
load current | control current  
minimum current  
ON indication  
fault indication |
| Status outputs | fault indication via opto coupler (N/O contact) | fault indication via auxiliary contact (N/O contact) | ON and fault indication via opto coupler |
| Physical isolation of load circuit (after electronic overload disconnection) | after approx. 5 s | after approx. 5 s | |
| Temperature range | 0 °C ... +60 °C | 0 °C ... +60 °C | 0 °C ... +60 °C |
| Housing - mounting dimensions (W/H/D) | 12/50/65 mm (without socket)  
12/80/89 mm (with socket type 17) | 45 / 74 / 128 mm | 45 / 74 / 128 mm |
<p>| - mounting | rail to EN 50022-35x7.5 when used with socket 17-P-Si (accessory) | rail to EN 50022-35x7.5 | rail to EN 50022-35x7.5 |
| Other data | suitable for lamp load | monitoring of minimum current, adjustable between 0.1 and 2.1 A | |
| Technical data | see CPI cat. pages 227 - 229 | see CPI cat. pages 231 - 233 | see CPI cat. pages 235 - 237 |</p>
<table>
<thead>
<tr>
<th>Model</th>
<th>DC Voltage Range</th>
<th>Current Ranges</th>
<th>Dimensions</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-1071-343/353-...</td>
<td>DC 48 V (E-1071-343-...), DC 24 V (E-1071-353-...)</td>
<td>0.2 - 3.0 A (parallel operation: max. 4 A), adjustable between 0.1 and 3.1 A</td>
<td>approx. 3.5 x IN</td>
<td>see CPI cat. pages 241 - 243 (E-1071-343)</td>
</tr>
<tr>
<td>E-1071-603/607-...</td>
<td>DC 24 V</td>
<td>0.25 A (3... 6 W), 0.40 A (6... 10 W), 1 A (15... 30 W), 2 A (30... 50 W), adjustable between 0.06 A and 0.18 A, 0.1 A and 0.3 A, 0.25 A and 0.75 A, 0.5 A and 1.5 A</td>
<td>approx. 3.5 x IN</td>
<td>approx. 12 A</td>
</tr>
<tr>
<td>E-1071-803-...</td>
<td>DC 24 V</td>
<td>50 mA ... 3.0 A, adjustable between 0.06 A and 1.85 A, max. DC 60 V</td>
<td>approx. 3.5 x IN</td>
<td>N/A</td>
</tr>
<tr>
<td>E-1072-CF2-...</td>
<td>DC 24 V</td>
<td>approx. 2.5 x IN</td>
<td>approx. 3.5 x IN</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**Load Current Control**
- Control current: N/A
- Load current: 0.2 - 3.0 A

**Fault Indication**
- ON and fault indication via opto coupler after approx. 5 s
- Fault indication via auxiliary contact (N/O) after approx. 5 s

**Environment**
- Operating temperature: 0 °C ... +60 °C
- Storage temperature: 0 °C ... +50 °C

**Dimensions**
- 45 / 74 / 122 mm
- Rail to EN 50022-35x7.5

**Additional Features**
- Double unit
- 2 pole switching amplifier elimination of inadvertent start-up upon system ground fault

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**Model:** E-1071-343/353-...
**DC Voltage Range:** DC 48 V (E-1071-343-...), DC 24 V (E-1071-353-...)
**Current Ranges:** 0.2 - 3.0 A (parallel operation: max. 4 A), adjustable between 0.1 and 3.1 A
**Dimensions:** approx. 3.5 x IN
**Notes:** see CPI cat. pages 241 - 243 (E-1071-343)

**Model:** E-1071-603/607-...
**DC Voltage Range:** DC 24 V
**Current Ranges:** 0.25 A (3... 6 W), 0.40 A (6... 10 W), 1 A (15... 30 W), 2 A (30... 50 W), adjustable between 0.06 A and 0.18 A, 0.1 A and 0.3 A, 0.25 A and 0.75 A, 0.5 A and 1.5 A
**Dimensions:** approx. 3.5 x IN
**Notes:** approx. 12 A

**Model:** E-1071-803-...
**DC Voltage Range:** DC 24 V
**Current Ranges:** 50 mA ... 3.0 A, adjustable between 0.06 A and 1.85 A
**Dimensions:** approx. 3.5 x IN
**Notes:** N/A

**Model:** E-1072-CF2-...
**DC Voltage Range:** DC 24 V
**Current Ranges:** approx. 2.5 x IN
**Dimensions:** approx. 3.5 x IN
**Notes:** N/A

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**Issue C**
USA (847) 827-7600 - CANADA (905) 764-9510
## Solid State Remote Power Controllers (SSRPCs)

### Control circuit
- Control voltage DC 24 V
- Max. switching frequency $f_{\text{max}}$
  - 1 Hz
  - 10 Hz
  - 100 Hz
  - 500 Hz

### Load circuit
- PNP transistor output, plus switching
  -
- NPN transistor output, minus switching
  -
- Transistor output, plus and minus switching
  -

### Current rating $I_n$
- 0.5 A
- 1 A
- 2 A
- 3 A
- 4 A

### Load current $I_i$
- max. 0.25 A
- max. 0.4 A
- max. 1 A
- max. 2 A
- max. 3.1 A

### Short-circuit current, self-limiting

### Physical isolation under fault conditions (short-circuit, overload)

### Reverse polarity protection $U_R$

### Fault signal output
- Opto coupler
- Auxiliary contact (N/O)
- LED

### Constructional features
- Double unit
- Current measuring terminals

### Connection
- Blade terminals
- Screw terminals
- Screw-less connectors
- Plug-in block with screw terminals

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1) plus wire break, reverse polarity, internal fault

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**Selector chart**

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Control circuit</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
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<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Current rating $I_n$</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<td>●</td>
</tr>
<tr>
<td>Load current $I_i$</td>
<td>max. 0.25 A</td>
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<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>Physical isolation by hand release</td>
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<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<td>●</td>
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<tr>
<td>Auxiliary contact (N/O)</td>
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<td>●</td>
<td>●</td>
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<tr>
<td>LED</td>
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<td>●</td>
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<td>●</td>
</tr>
<tr>
<td>Constructional features</td>
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<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>Connection</td>
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<td>●</td>
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<tr>
<td>Blade terminals</td>
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<td>●</td>
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</tr>
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<td>Screw terminals</td>
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<td>Screw-less connectors</td>
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<tr>
<td>Plug-in block with screw terminals</td>
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<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
</tbody>
</table>

---

1) plus wire break, reverse polarity, internal fault

Description

The E-T-A Solid State Remote Power Controller (SSRPC) E-1048-60 is an opto decoupled transistorised switching device providing both protection and signalisation. It may be used wherever safe switching and protection of resistive, inductive or lamp loads in DC voltage systems is required.

Typical applications

- Automation
  - Interface module providing inexpensive power amplification at PLC outputs
  - Optimum protection of individual loads by monitoring the load circuit
- Protection and control of
  - Motors
  - Solenoids
  - Lamps

Features

- Optimum load protection. Available in current ratings of 0.5 A; 1 A; 2 A; 4 A. No derating required over entire temperature range!
- Fast short-circuit limitation and disconnection
- Time/current dependent overload disconnection (simulating thermal-magnetic CBE trip curve)
- Remote control
- Fault indication: LED and signal output for overload/short-circuit signalisation, and wire break indication in the OFF condition (version -600) and in the OFF and ON condition (version -602)
- Physically isolated fault indication.
- Compact plug-in type

Technical data ($T_{ambient} = 25^\circ C; at \ U_{N}$)

Load circuit

<table>
<thead>
<tr>
<th>Voltage rating $U_{N}$</th>
<th>DC 24 V (18...36 V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current rating $I_{N}$</td>
<td>0.5 A; 1 A; 2 A; 4 A (other ratings to special order)</td>
</tr>
<tr>
<td>Min. load current $I_{load}$</td>
<td>Typically 0.3 mA</td>
</tr>
</tbody>
</table>

Closed-circuit current $I_{S}$ typically 0.3 mA

<table>
<thead>
<tr>
<th>Wire break indication in OFF condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard version: $I_{load} &gt; 1$ mA</td>
</tr>
<tr>
<td>Option: wire break indication in OFF and ON condition</td>
</tr>
<tr>
<td>$R_{load} &gt;$ typ. 500 kΩ</td>
</tr>
<tr>
<td>$I_{load} &lt;$ typ. 130 mA (0.5/1 A unit)</td>
</tr>
<tr>
<td>$I_{load} &lt;$ typ. 500 mA (2/4 A unit)</td>
</tr>
</tbody>
</table>

Voltage drop $U_{DS_{max}}$ 0.15 V; 0.3 V; 0.1 V; 0.2 V

Switch-on/switch-off time $t_{on}/t_{off}$ typ. 300 μs/700 μs with resistive load

Overload disconnection approx. 1.5 $\times I_{N}$ after approx. max. 25 A (with 0.5 A and 1 A current ratings) max. 75 A (with 2 A and 4 A current ratings)

Short-circuit disconnection < 250 μs

Control circuit

<table>
<thead>
<tr>
<th>Voltage rating $U_{E}$</th>
<th>DC 24 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage controlled input $U_{E}$</td>
<td>DC 0 V low level &lt; 5 V</td>
</tr>
<tr>
<td>DC 8.5 V high level &lt; 36 V</td>
<td></td>
</tr>
<tr>
<td>Input current $I_{E}$</td>
<td>1...10 mA (8.5...36 V)</td>
</tr>
<tr>
<td>Max. switching frequency $f_{max}$</td>
<td>500 Hz</td>
</tr>
<tr>
<td>Reset time after short-circuit/overload disconnection</td>
<td>1 ms</td>
</tr>
</tbody>
</table>

Fault indication output F (Relaiskontakt)

<table>
<thead>
<tr>
<th>Voltage rating range</th>
<th>DC 5...36 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage rating range</td>
<td>DC 5...36 V</td>
</tr>
<tr>
<td>Max. load current</td>
<td>100 mA (AU &lt; 2 V), with reverse polarity protection</td>
</tr>
<tr>
<td>Error indication</td>
<td>Output F+ / F- conductive</td>
</tr>
<tr>
<td>- Wire break in load circuit</td>
<td></td>
</tr>
<tr>
<td>- After short-circuit/overload disconnection</td>
<td></td>
</tr>
</tbody>
</table>

General data

| Temperature range | 0 °C...+60 °C |
| Insulation voltage | 2.5 kV$_{rms}$ (IEC 664/VDE 0110) |
| Mass | 28 g |

Where remote control, wire break and LED indication is not required, please contact us for a thermal-magnetic circuit breaker (e.g. types 2210, 3600, 3900).
Technical description

At the appropriate input level (>8.5 V), the opto decoupled input in the SSRPC will switch on a power transistor to connect the load to the plus pole of the load circuit supply (Ub).

The transistor will switch off when
- the control voltage (Ub) is removed
- there is a short-circuit/overload in the load circuit.

Status indication is provided by two LEDs (red and green).

Thermal-magnetic style overload protection occurs at approx. 1.5 times rated current. See time/current characteristic curves.

The SSRPC is fitted with blade terminals DIN 46244-A6.3-0.8 and is suitable for plug-in mounting with various E-T-A sockets (see Accessories).

Control circuit

ON condition:
If a voltage higher than 8.5 V is applied to the input terminals (-IN, +IN), the control current (from the PLC) will flow through the opto coupler. The output transistor will be conductive, the green LED will be lighted.

OFF condition:
A control voltage lower than 5 V will switch the output transistor off.

Load circuit

The load circuit switches depending on the control signal (“0” or “1”). It is electronically monitored for faults. In the event of a short-circuit the circuit is disconnected after max. 250 µs whilst upon inadmissible overload it is disconnected according to the time/current curves shown.

Fault indication output

The fault indication circuit (F+, F-) is opto decoupled from the load and control circuit.

In the OFF condition, this circuit will provide wire break indication, with the transistor output being open.

In the ON condition, the circuit will provide short-circuit and overload monitoring and indication.

Visual fault indication by red LED.

Status indication

<table>
<thead>
<tr>
<th>Status indication</th>
<th>Fault indication output (opto coupler)</th>
<th>LED green</th>
<th>LED red</th>
</tr>
</thead>
<tbody>
<tr>
<td>non-conductive, no duty</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>conductive, normal duty</td>
<td></td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>overload or short circuit at the output (and with option wire break indication in ON condition)</td>
<td></td>
<td>×</td>
<td>×</td>
</tr>
<tr>
<td>wire break, in the OFF position</td>
<td></td>
<td></td>
<td>×</td>
</tr>
</tbody>
</table>

Dimensions

This is a metric design and millimeter dimensions take precedence (mm).
Functional diagrams E-1048-60.

**Functional diagram E-1048-60.**

**Wire break indication**

<table>
<thead>
<tr>
<th>Version</th>
<th>$U_a$</th>
<th>IN</th>
<th>LED yellow</th>
<th>output</th>
<th>LED red</th>
<th>relay</th>
<th>Error indication</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>0</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>Error</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Operating voltage is applied

**Functional diagram E-1048-60.**

**Wire break indication**

<table>
<thead>
<tr>
<th>Version</th>
<th>$U_a$</th>
<th>IN</th>
<th>LED yellow</th>
<th>output</th>
<th>LED red</th>
<th>relay</th>
<th>Error indication</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>0</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>Error</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Operating voltage is applied

**Error indication**

- Wire break

**Functional diagram E-1048-60.**

**Overload/short-circuit indication**

<table>
<thead>
<tr>
<th>Version</th>
<th>$U_a$</th>
<th>IN</th>
<th>LED yellow</th>
<th>output</th>
<th>LED red</th>
<th>relay</th>
<th>Error indication</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>0</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td>Error</td>
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<td></td>
<td>0</td>
<td></td>
<td></td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Operating voltage is applied

**Error indication**

- Overload/short-circuit

- Fault indication is reset when control voltage is switched off, whether the failure is still active or not.

**E-1048-60.**

- Without fault storage
**Accessories for E 1048-60.**

### Single mounting sockets (with adapter)

- **17-P10-Si**
- **17-P70-Si**
  - (retaining clip Y 300 581 11 available on request)
- **17-P10-Si-20025**
- **17-P70-Si-20025**

### Bus bar (10-way) (supplied as a complete package)
- for type 17 socket
- (up to 100 A continuous load)
- 100 quick-connect tabs 6.3 (.250) DIN 46247 tinned brass, insulated

### Insulating sleeving for bus bar (10-way)

- **Y 303 824 01**

### Pin selection 17-P10-Si fitted with E-1048-60.

**E-1048-60. 17-P10-Si**

<table>
<thead>
<tr>
<th>IN +</th>
<th>IN -</th>
<th>F +</th>
<th>F -</th>
<th>-UB</th>
<th>Q</th>
<th>+UB</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2)</td>
<td>(5)</td>
<td>(7)</td>
<td>(3)</td>
<td>(6)</td>
<td>(4)</td>
<td>(1)</td>
</tr>
</tbody>
</table>

### 2-way mounting socket 23-P10-Si

- **23-P10-Si**
- (retaining clip Y 300 581 03 available on request)

### 6-way mounting socket 63-P10-Si

- **63-P10-Si**

### Connector bus links -P10

- **X 210 588 01**
  - 1.5 mm² (AWG 16), brown (up to 13 A max. load)
- **X 210 588 02**
  - 2.5 mm² (AWG 14), black (up to 20 A max. load)
- **X 210 588 03**
  - 2.5 mm² (AWG 14), red (up to 20 A max. load)
- **X 210 588 04**
  - 2.5 mm² (AWG 14), blue (up to 20 A max. load)

**This is a metric design and millimeter dimensions take precedence (mm).**

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All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved. Product markings may not be exactly as the ordering codes. Errors and omissions excepted.
The E-T-A Solid State Remote Power Controller E-1048-7.. is a transistorised switching device providing both protection and signalisation. It is suitable for all applications where the capabilities of the existing PLC outputs are not sufficient or where no protection against overload and short circuit or wire breakage monitoring of connected loads is provided. The use of a costly, high-capacity output card becomes superfluous when only one or two powerful outputs are necessary.

Using the SSRPC E-1048-7.. in combination with the module 17plus creates a new, very flexible system capable of being subsequently changed or extended. Busbars, pre-wired signal contacts and spring-loaded terminals reduce installation times considerably (see accessories).

### Typical applications

- Automation
  - Interface module providing inexpensive power amplification at PLC outputs
  - Optimum protection of individual loads by monitoring the load circuit

- Protection and control of
  - Motors
  - Solenoids
  - Lamps

### Features

- Optimum load protection. Available in current ratings of 0.5 A; 1 A; 2 A; 4 A. No derating required over entire temperature range!
- Fast short-circuit limitation and disconnection
- Time/current dependent overload disconnection (simulating thermal-magnetic CBE trip curve)
- Remote control
- Fault indication: LED and signal output for overload/short-circuit signalisation, and wire break indication in the OFF condition (version -700 and -710) and in the OFF and ON condition (version -702 and -712)
- Fault storage: version -710 and -712
- Physically isolated fault indication.
- Compact plug-in type
- Plug-in design for use with power distribution system module 17plus
- Integral pre-wiring of common supply and signal contacts

### Ordering information

<table>
<thead>
<tr>
<th>Type No.</th>
<th>SSRPC for PLC outputs</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-1048</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>700</td>
<td>wire break indication in OFF condition (standard)</td>
</tr>
<tr>
<td>710</td>
<td>wire break indication in OFF condition and fault storage</td>
</tr>
<tr>
<td>702</td>
<td>permanent wire break indication</td>
</tr>
<tr>
<td>712</td>
<td>permanent wire break indication and fault storage</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voltage rating</th>
<th>DC24 V (standard)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current ratings</td>
<td></td>
</tr>
<tr>
<td>0.5 A</td>
<td></td>
</tr>
<tr>
<td>1.0 A</td>
<td></td>
</tr>
<tr>
<td>2.0 A</td>
<td></td>
</tr>
<tr>
<td>4.0 A</td>
<td></td>
</tr>
</tbody>
</table>

| E-1048 - 700 DC24 V 1.0 A ordering example |

### Technical data (Tambient = 25 °C; at UN)

<table>
<thead>
<tr>
<th>Load circuit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage rating U_B</td>
</tr>
<tr>
<td>Current rating I_N</td>
</tr>
<tr>
<td>Closed-circuit current I_S</td>
</tr>
<tr>
<td>Min. load current</td>
</tr>
<tr>
<td>Standard version:</td>
</tr>
<tr>
<td>Optional: wire break indication in OFF condition</td>
</tr>
</tbody>
</table>

### Overload disconnection

- approx. 1.5 (±0.3) x I_N after approx. 100 ms
- max. 25 A (with 0.5 A and 1 A current ratings)
- max. 75 A (with 2 A and 4 A current ratings)
- approx. 10 ms
- <250 μs

### Short-circuit current

- (self-limiting)
- DC 24 V
- max. 25 A (with 0.5 A and 1 A current ratings)
- max. 75 A (with 2 A and 4 A current ratings)
- typ. 300 μs/700 μs with resistive load

### Control input

- Control level between IN+ and GND
- Voltage rating DC 24 V
- Voltage controlled input U_E DC 0 V < low level < 5 V
- DC 8.5 V < high level < 36 V
- Input current I_G
- Max. switching frequency f_max 1 kHz
- Reset time after short-circuit/overload disconnection 1 ms

### Fault indication output F

- Relay contact
- max. switching voltage DC 150 V
- AC 125 V
- max. interrupting capacity DC 30 W
- AC 60 W
- limiting continuous current 1 A

### General data

- Temperature range 0 °C ... +60 °C
- Insulation voltage DC 500 V>10 MΩ
- Mass 28 g
Technical description

At the correct input voltage (>8.5 V), the SSRPC will switch on a power transistor to connect the load to the plus pole of the load circuit supply (Ug).

The transistor will switch off when
- the control voltage (Ue) is removed
- there is a short-circuit/overload in the load circuit.

Status indication is provided by two LEDs (red and yellow).

Simulated thermal-magnetic overload protection occurs at approx. 1.5 times rated current. See time/current characteristic curves.

The SSRPC is fitted with blade terminals DIN 46244-A6.3-0.8 and is suitable for plug-in mounting with various E-T-A sockets or module 17plus (see Accessories).

Control circuit

ON condition:
If a voltage higher than 8.5 V is applied to the input terminals (+IN against GND), the control current (from the PLC) will flow through the opto coupler. The output transistor will be conductive, status indication by yellow LED.

OFF condition:
A control voltage lower than 5 V will switch the output transistor off.

Load circuit

The load circuit switches depending on the control signal ("0" or "1"). It is electronically monitored for faults. In the event of a short-circuit the circuit is disconnected after max. 250 µs whilst upon inadmissible overload it is disconnected according to the time/current curves shown.

Fault indication output F

The fault indication circuit is physically isolated from the load and control circuits via a relay.

In the OFF condition, this circuit (with closed contact) will provide wire break indication, with the transistor output being open.

The versions with fault storage (-702 and -712) store the fault signal until the control voltage is re-applied.

Visual fault indication by red LED.

Dimensions

Connection diagram

Typical time/current characteristics
### Functional diagrams E-1048-7..

#### Functional diagram E-1048-7..
**wire break indication**

**Version**

<table>
<thead>
<tr>
<th>Version</th>
<th>E-1048-7x0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>wire breakage monitoring only in OFF condition</td>
</tr>
</tbody>
</table>

**Operating voltage is applied**

<table>
<thead>
<tr>
<th>U_a</th>
<th>1</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>IN</th>
<th>1</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>LED yellow</th>
<th>1</th>
</tr>
</thead>
</table>

| output | 0 |

| relay |  |

<table>
<thead>
<tr>
<th>Error indication</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>wire break</td>
<td>Error</td>
</tr>
</tbody>
</table>

**LED lights**

#### Functional diagram E-1048-7..
**overload / short-circuit indication**

**Version**

<table>
<thead>
<tr>
<th>Version</th>
<th>E-1048-7x0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>without fault storage</td>
</tr>
</tbody>
</table>

**Operating voltage is applied**

<table>
<thead>
<tr>
<th>U_a</th>
<th>1</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>IN</th>
<th>1</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>LED yellow</th>
<th>1</th>
</tr>
</thead>
</table>

| output | 0 |

| relay |  |

<table>
<thead>
<tr>
<th>Error indication</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>overload / short-circuit</td>
<td>Error</td>
</tr>
</tbody>
</table>

**IN = input set / output = switched through**
Solid State Remote Power Controller E-1048-700 with Module 17plus

- Power supply for PLC
- Signalisation circuit
- Control circuit
- Busbar fitted
- Jumper
- Main circuit minus U_a

Connection diagram

Common power supply for load, PLC I/O and signal loop

- Power supply DC 24 V
- Chassis earth connection directly between the two power supplies!

Wiring diagram

Caution: If there is no firm chassis earth connection when using several separate power supplies, the connected fault indication loop may lead to intermittent operation of the SSRPC and resultant operational hazards.
Description

Module 17plus is a power distribution system for use with SSRPC E-1048-7.. for PLC outputs. Each module accommodates two SSRPCs with an individual housing width of only 12.5 mm and fits onto all industry standard mounting rails. The two-way modules can be interconnected to provide as many ways as required with a terminal block fitted at each end for connection of signalling circuits. A distribution busbar can be fitted on the supply side of the modules (positive pole) though each pole of multipole circuit breakers must be individually connected. Electrical connections are by means of spring-loaded terminals. The reference potential for the electronic amplifiers (GND pin 11) is also looped through and to the terminals connected at the sides. Control of the amplifiers (IN+), referenced to GND, is per channel via the separate terminal 12 beside the LOAD terminal. The SSRPC has an integral signal contact (break contact) used for group signalisation. Therefore the terminals of all break contacts are connected in series in the module 17plus and are connected to the terminal blocks via two terminals (13, 14). The module is designed to accommodate a probe for series connection continuity tests. When multipole circuit breakers are fitted auxiliary contacts are required for each pole. Individual circuit breaker signalisation is achieved through use of the break contacts (which close in the event of failure) connected in parallel by means of terminals on each module. The signalling circuitry between modules and the internal prewiring for the potential is automatically connected when the modules are linked together.

Ordering information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>17PLUS-Q02-00</td>
<td>Module 17plus, centre piece, two-way</td>
</tr>
<tr>
<td>17PLUS-QA0-LR</td>
<td>one each left- and right-side terminal block for supply feed from the side by means of screw terminal</td>
</tr>
</tbody>
</table>

Technical data

Connection

Spring-loaded terminals for solid conductors and stranded cables with and without wire end ferrules. Please use appropriate screw driver size (SD) for removing the spring loaded terminals.

LINE feed (1):
- Spring-loaded terminals for 0.5-6 mm², (AWG 20 - AWG 10)
- SD 2 (0.8x4.0)

LOAD output (2):
- Spring-loaded terminals for 0.25-4 mm², (AWG 24 - AWG 12)
- SD 1 (0.6x3.5)

Reference potential GND and signalisation terminals (11, 13, 14):
- Spring-loaded terminals for 0.25-2.5 mm², (AWG 24 - AWG 14)
- SD 1 (0.6x3.5)

Control IN+ terminal (12):
- Spring-loaded terminal for 0.25-1.5 mm², (AWG 24 - AWG 16)
- SD 0 (0.4x2.5)

Test probe for testing the group signal for line interruption: ≤ 2 mm ø

Voltage rating

(Without SSRPC): AC 433 V; DC 65 V

Current rating

(Without SSRPC)
- LINE feed (1): 50 A
- LOAD output (2): 25 A
- Reference potential GND (11): 10 A
- Control IN+ (12): 1 A
- Group signal (/13-14): 1 A

Internal resistance values

(Without SSRPC)
- LINE-LOAD (1-2): ≤ 5 mΩ
- Group signal (13-14): ≤ 8 mΩ /je Pol
  +5 mΩ for each additional module

Busbar for power distribution

Insulated busbar
- (blue or red): I_{max} = 32 A
- non-insulated busbar: I_{max} = 50 A
  (The non-insulated busbar, too, meets brush contact safety standards when fitted.)

Dielectric strength

- between main circuits (without busbar): 1,500 V
- main circuit to auxiliary circuit: 1,500 V
- between auxiliary circuits: 1,500 V

Mass: Module 17plus (centre piece)
- terminal blocks (pair): approx. 85 g
- approx. 30 g

---

Modul 17plus

---
**Dimensions**

This is a metric design and millimeter dimensions take precedence (mm). Inch

**Connection diagram**

**Pin selection, fitted with E-1048-7..**

<table>
<thead>
<tr>
<th>E-1048-7..</th>
<th>Module 17plus</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINE + (2)</td>
<td>(1)</td>
</tr>
<tr>
<td>GND (5)</td>
<td>(11)</td>
</tr>
<tr>
<td>F 7 (7)</td>
<td>(13)</td>
</tr>
<tr>
<td>F 6 (6)</td>
<td>(14)</td>
</tr>
<tr>
<td>IN+ (4)</td>
<td>(12)</td>
</tr>
<tr>
<td>LOAD (1)</td>
<td>(2)</td>
</tr>
</tbody>
</table>

13, 14 terminals for group signalisation
11 reference potential GND
12 control IN+
## Accessories

### Busbar 32 A
- **X 222 005 01** blue insulation, 500 mm/19.68 in.
- **X 222 005 02** red insulation, 500 mm/19.68 in.
- **X 222 005 03** grey insulation, 500 mm/19.68 in.

### Busbar 50 A
- **Y 307 016 01** non-insulated, 500 mm/19.68 in.

### Busbar 50 A
- for busbar connection by means of terminal 17plus-QA0-LR
- **Y 307 016 11** non-insulated, 500 mm/19.68 in.

### End bracket
- **X 222 004 01**

### Screw terminal for busbar
- **X 211 156 01** non insulated

### Jumper
- **X 222 066 01**

### End bracket
- **X 222 004 01**

### Screw terminal for busbar
- **X 211 156 01** non insulated

### Busbar 50 A
- **Y 307 016 01** non-insulated, 500 mm/19.68 in.

### Busbar 50 A
- for busbar connection by means of terminal 17plus-QA0-LR
- **Y 307 016 11** non-insulated, 500 mm/19.68 in.

### Jumper
- **X 222 066 01**

### Retaining clip for SSRPC E-1048-7..
- recommended for fitting the devices
- **Y 300 581 11**

---

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved. Product markings may not be exactly as the ordering codes. Errors and omissions excepted.
**Accessories for E-1048-7..**

**Single mounting sockets**
- (with adapter)
- 17-P10-Si
- 17-P70-Si
  - 17-P10-Si-20025
  - 17-P70-Si-20025
  - (retaining clip Y 300 581 11 available on request)

**Bus bar (10-way)**
- (supplied as a complete package)
- for type 17 socket
- (for max. 100 A continuous load, more positions available on request)
- X 211 157 01 with terminal
- X 211 157 02 without terminal

**Insulating sleeving for bus bar (10-way)**
- Y 303 824 01

**Pin selection 17-P10-Si, fitted with E-1048-7..**

<table>
<thead>
<tr>
<th>E-1048-7..</th>
<th>17-P10-Si</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINE + (2)</td>
<td>(2) [2(k)]</td>
</tr>
<tr>
<td>GND (5)</td>
<td>(5) [12]</td>
</tr>
<tr>
<td>F 7 (7)</td>
<td>(7) [24]</td>
</tr>
<tr>
<td>F 6 (6)</td>
<td>(6) [23]</td>
</tr>
<tr>
<td>IN+ (4)</td>
<td>(4) [11]</td>
</tr>
<tr>
<td>LOAD (1)</td>
<td>(1) [1]</td>
</tr>
</tbody>
</table>
Smart Power Relay E-1048-8C. (CUBIC)

**Description**

The Smart Power Relay E-1048-8C. is a remotely controllable electronic load disconnecting relay with three functions in a single unit:

- Electronic relay
- Electronic overcurrent protection
- Status indication

The 7 pin CUBIC version is designed for use with standard automotive relay sockets. A choice of current ratings is available from 1 A through 25 A. An operating voltage range of DC 9...32 V allows the connection of DC 12 V and DC 24 V loads.

In order to switch and protect loads remotely, it has until now been necessary to connect several discreet components together
- an electro-mechanic relay, control cable and integral contact to close the load circuit
- an additional protective element (circuit breaker or fuse) for cable or equipment protection
- a device for current measurement (shunt)

Now type E-1048-8C combines all these functions in a single unit, thus minimising the number of connections in the circuit and thereby reducing the risk of failures.

**Features**

- Integral power electronics provide a wear-resistant switching function, insensitive to shock and vibration.
- Only a fraction of the control power needed by electro-mechanical relays is required for switching loads. This is important for battery buffered load circuits which have to remain controlled even with the generator offline.
- The extremely low induced current consumption of less than 1 mA is absolutely necessary for battery buffered applications.
- The load circuit is disconnected in the event of an overload or short circuit, the trip curve is also suitable for smaller motor loads.
- The load circuit is permanently monitored for wire breakage.
- Two status outputs for control signal AS and group signal SF provide status indication. For processing the actual value of the current flow in a power management system an analogue output from 0 to 5 V is provided. This voltage signal may also be used as an input to a control circuit or to switch off the unit by means of external control in the event of low load current value.
- For switching and monitoring loads of 25 A plus it is possible to connect several units in parallel. Uniform power distribution between units must be ensured by symmetrical design of the supply cables (length and cross section).
- Coloured label, e.g. red = 10 A, see ordering information.

**Applications**

Type E-1048-8C. is suited to all applications with DC 12 V or DC 24 V circuits, where magnetic valves, motors or lamp loads have to be switched, protected or monitored:
- road vehicles (utility vehicles, buses, special vehicles)
- rail vehicles
- marine industry (ships, boats, yachts etc.)

The Power Relay is also suitable for industrial use (process control, machine-building, engineering) as an electronic coupling relay between PLC and DC 12 V or DC 24 V load.

**Technical Data**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply LINE +</td>
<td></td>
</tr>
<tr>
<td>Type</td>
<td>DC power supply with small $R_i$ battery and generator etc.</td>
</tr>
<tr>
<td>Voltage ratings $U_N$</td>
<td>DC 12 V / DC 24 V</td>
</tr>
<tr>
<td>Operating voltage $U_{B2}$</td>
<td>DC 9...32 V</td>
</tr>
<tr>
<td>Load circuit LOAD</td>
<td></td>
</tr>
<tr>
<td>Load output</td>
<td>Power MOSFET, high side switching</td>
</tr>
<tr>
<td>Max. current rating $I_N$</td>
<td>25 A</td>
</tr>
<tr>
<td>Types of loads</td>
<td>resistive, inductive, capacitive, lamp loads, motors (depending on duration of inrush current)</td>
</tr>
<tr>
<td>Current rating range $I_N$</td>
<td>1 A ... 20 A (fixed ratings) up to 85 °C ambient without load reduction, 25 A up to 60°C.</td>
</tr>
<tr>
<td>Induced current consumption</td>
<td>$I_0$ (OFF condition) &lt; 1 mA</td>
</tr>
<tr>
<td>Typical voltage drop $U_{ON}$ at rated current $I_N$ (at 25 °C)</td>
<td>$I_N$ $U_{ON}$</td>
</tr>
<tr>
<td>1 A</td>
<td>50 mV</td>
</tr>
<tr>
<td>2 A</td>
<td>55 mV</td>
</tr>
<tr>
<td>3 A</td>
<td>60 mV</td>
</tr>
<tr>
<td>5 A</td>
<td>80 mV</td>
</tr>
<tr>
<td>7.5 A</td>
<td>90 mV</td>
</tr>
<tr>
<td>Switching point</td>
<td>typically 1.3 $I_N$ ($-40 {^\circ}C...+85 {^\circ}C$: 1.1...1.5 $I_N$)</td>
</tr>
<tr>
<td>Trip time (standard curve)</td>
<td>typically 200 ms with switch-on onto overload and/or load increase on duty</td>
</tr>
<tr>
<td>Current limitation</td>
<td>version 1: typically 75 A</td>
</tr>
<tr>
<td>Temperature disconnection</td>
<td>version 2: typically 350 A</td>
</tr>
<tr>
<td>After trip</td>
<td>power transistor &gt;150 °C</td>
</tr>
<tr>
<td></td>
<td>- resettable via external control signal (low-high) at control input $I_N+$</td>
</tr>
<tr>
<td></td>
<td>- reset of supply voltage</td>
</tr>
<tr>
<td>Parallel connection of channels</td>
<td>for loads of 25 A plus, several units of identical current ratings may be connected in parallel. To ensure equal distribution of current between units, symmetrical design of the supply feed is necessary (length and cross section).</td>
</tr>
<tr>
<td>Leakage current in OFF condition</td>
<td>version 1: max. 100 µA</td>
</tr>
<tr>
<td></td>
<td>version 2: max. 500 µA</td>
</tr>
<tr>
<td>Free-wheeling diode</td>
<td>integral</td>
</tr>
<tr>
<td>for connected load</td>
<td>version 1: max. 40 A</td>
</tr>
<tr>
<td></td>
<td>version 2: max. 100 A</td>
</tr>
</tbody>
</table>

**E-1048-8C. CUBIC**

Now type E-1048-8C combines all these functions in a single unit, thus minimising the number of connections in the circuit and thereby reducing the risk of failures.
<table>
<thead>
<tr>
<th>Technical Data (TU = 25°C, UB = DC 24 V) (TU = ambient temperature at U_B)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Delay time</strong> t_on / t_off (resistive load) typ. 5 ms / typ. 1.5 ms (EMC filter in control input)</td>
</tr>
<tr>
<td><strong>Wire breakage monitoring in ON and OFF condition of load</strong> wire breakage thresholds: in OFF-condition (version 1): R_{load} &gt; typically 100 kΩ in OFF-condition (version 2): R_{load} &gt; typically 10 kΩ in ON-condition: I_{load} &lt; typically 0.2 x I_N indication via group fault signalisation FM (switching output) Fault indication will not be stored, i.e. after remedy of wire breakage fault indication will disappear (possible options: - wire breakage indication only in ON condition - wire breakage indication only in OFF condition - no wire breakage indication) - disconnection of load, indication via group signal SF - no automatic re-start - after remedy of the fault unit has to be reset via control input IN+</td>
</tr>
<tr>
<td><strong>Short circuit, overload in load circuit</strong></td>
</tr>
<tr>
<td><strong>Control input IN+</strong></td>
</tr>
<tr>
<td>Control voltage IN+ 0...5 V = &quot;OFF&quot;, 8.5...32 V = &quot;ON&quot;</td>
</tr>
<tr>
<td>Control current I_E 1...10 mA (8.5...DC32V)</td>
</tr>
<tr>
<td>Reset in the event of a failure: - reset via external control signal (low - high) at control input IN+ - via reset of supply voltage</td>
</tr>
<tr>
<td><strong>Dimmer operation (e.g. PWM signal)</strong> possible, see max. switching frequency</td>
</tr>
<tr>
<td><strong>Switching frequency</strong> at resistive or inductive load max. 100 Hz</td>
</tr>
<tr>
<td><strong>Status and diagnostic functions</strong></td>
</tr>
<tr>
<td><strong>Control signal AS</strong> transistor output minus switching (LSS), open collector, short circuit and overload proof, max. load: DC 32 V/2 A 0 V-level: when unit is set (at IN+ = 8.4...32 V)</td>
</tr>
<tr>
<td><strong>Group signal SF</strong> transistor output minus switching (LSS), open collector, short circuit and overload proof, load max. DC 32 V/2 A 0 V-level with overload and short circuit disconnection, wire breakage indication</td>
</tr>
<tr>
<td><strong>Analogue output U(I)</strong> voltage output 0-5 V proportional to load current: 1 V = 0.2 x I_N 5 V = 1.0 x I_N 5 V... typically 6.5 V = overload range tolerance: ± 5 % of I_N (for I_{load} &gt; 0.2 x I_N) max. output current 5 mA load resistance &gt;1 kΩ against GND</td>
</tr>
<tr>
<td><strong>Trip times</strong> definition of t_{90} reached 90% of final value response time when switching on a load: t_{90} = typically 20 ms response time of load change on duty: t_{90} = typically 1 ms</td>
</tr>
<tr>
<td><strong>Visual status indication</strong> control signal AS LED yellow group fault signal SF LED red</td>
</tr>
<tr>
<td><strong>General data</strong></td>
</tr>
<tr>
<td><strong>Reverse polarity protection</strong> yes</td>
</tr>
<tr>
<td><strong>Control circuit</strong> no (due to integral free-wheeling diode)</td>
</tr>
<tr>
<td><strong>Load circuit</strong> interference voltage resistance max. DC 32 V</td>
</tr>
</tbody>
</table>

**Technical Data (TU = 25°C, UB = DC 24 V) (TU = ambient temperature at U_B)**

| **Temperature range** ambient temperature - Standard: -40...+85 °C without load reduction (60 °C at 25 A) - for other temperature ranges please see ordering key |
| **Tests** |
| Humid heat combined test, 9 cycles with functional test test to DIN EN 60682-2-30, Z/AD |
| Temperature change min. temperature -40 °C, max. temperature +90 °C test to DIN IEC 60682-2-14, Nb |
| Vibration (random) in operation, with temperature change 6 g eff. (10 Hz...2000 Hz) test to DIN EN 60682-2-64 |
| Shock 25 g/11 ms, 10 shocks test to DIN EN 60682-2-27 |
| Corrosion test to DIN EN 60682-2-S2, severity 3 housing -8C4 IP30 to DIN 40050 housing -8CS IP54 to DIN 40050, higher protection class upon request |
| EMC requirements EMC directive: emitted interference EN 50081-1 noise immunity EN 61000-6-2 Automotive directive: emitted interference, noise immunity: 72/245/EW6 und 95 / 54 / E6 |

**Terminals of CUBIC version (7 pin, standard)** 5 blade terminals 6.3 mm x 0.8 mm and 2 blade terminals 2.8 mm x 0.6 mm to DIN 46244 Contact material CuZn37F44 |

**Mounting:** on automotive relay socket 7 pole or 9 pole |

**Housing CUBIC** max. dimensions 30 x 30 x 40 mm when plugged in 30 x 30 x 51.6 mm including terminals |

**Materials** CUBIC: housing PA66-GF30 base plate PA6-GF30 |

**Mass** approx. 23 g... 43 g, depending on version |

**Approvals** CE, e1 logo according to EU, EMC and automotive directives, approvals no. e1 023880
### Smart Power Relay E-1048-8C. (CUBIC)

#### Ordering Information

<table>
<thead>
<tr>
<th>Type</th>
<th>E-1048-8C</th>
<th>Smart Power Relay DC 12 V/24 V - 1 A...20 A (25 A) in CUBIC housing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Housing / temperature range</strong></td>
<td>4 with housing -40 °C...85 °C (60 °C at ( I_N = 25 ) A)</td>
<td>5 with housing -40 °C...85 °C (60 °C at ( I_N = 25 ) A)</td>
</tr>
</tbody>
</table>

**Control input**

| C | with control input (+ control 8.5...32 V) |

**LEDs**

| 0 | without |
| 2 | 2 LEDs: AS yellow, SF red |

**Status output minus-switching**

| A | without |
| B | with control signal AS |
| C | with group fault signal SF |
| D | with AS and SF |

**Contents of group fault signal SF / LED indication SF**

| 0 | without |
| 1 | short circuit / overload |
| 2 | short circuit / overload + wire breakage off |
| 3 | short circuit / overload + wire breakage on |
| 4 | short circuit / overload + wire breakage off + wire breakage on |

**Analog output**

| V0 | without |
| V1 | 0...5V |

**Characteristic curve**

| 1 | 50 ms (switch-off delay with overload) |
| 2 | 100 ms (switch-off delay with overload) |
| 4 | 200 ms standard (switch-off delay with overload) |

**Voltage rating**

| U3 | DC 12/24 V |

**Current ratings / colour of label**

| 1 A | black |
| 2 A | grey |
| 3 A | purple |
| 5 A | light-brown |
| 7.5 A | brown |
| 10 A | red |
| 15 A | blue |
| 20 A | yellows |
| 25 A | white |
| 50 A | |

**Ordering example 1:** “DELUXE”-version 7 pin

| E-1048-8C | 6 - C 3 D 4 V1 - 4 U3 - 20 A |

**Ordering example 2:** “BASIC”-version 4 pin

| E-1048-8C | 4 - C 0 A 0 V0 - 4 U3 - 5 A |

---

**Dimensions CUBIC /7 pin version**

- LED indications AS/SF
- Signal outputs AS/SF
- Analogue output U (I)

 Dimensions to ISO 7588

- Blade terminals 1.18 x 0.8

**Dimensions BASIC /4 pin version**

- LED indication AS/SF
- Signal outputs AS/SF
- Analogue output U (I)

Dimensions to ISO 7588

- Blade terminals 1.18 x 0.8

---

This is a metric design and millimeter dimensions take precedence (mm).
Typical time/current characteristics (standard 200 ms)

**Version 1:** 1 A, 2 A, 3 A, 5 A, 7.5 A and 10 A

**Version 2:** 15 A, 20 A and 25 A

Connection diagram

Pin selection CUBIC (7 pin)

E-1048-8C. Cubic

<table>
<thead>
<tr>
<th>PIN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS</td>
<td>control signal (LED yellow)</td>
</tr>
<tr>
<td>LINE</td>
<td>plus U_B (DC 12 V/24 V)</td>
</tr>
<tr>
<td>SF</td>
<td>group fault signal (LED red)</td>
</tr>
<tr>
<td>IN+</td>
<td>control input</td>
</tr>
<tr>
<td>U()</td>
<td>0 ... 5 V analogue output</td>
</tr>
<tr>
<td>GND</td>
<td>minus U_B</td>
</tr>
<tr>
<td>LOAD</td>
<td>load output</td>
</tr>
</tbody>
</table>

Pin selection CUBIC (4 pin = “BASIC”)

E-1048-8C. Cubic

<table>
<thead>
<tr>
<th>PIN</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINE</td>
<td>plus U_B (DC 12 V/24 V)</td>
</tr>
<tr>
<td>IN+</td>
<td>control input</td>
</tr>
<tr>
<td>GND</td>
<td>minus U_B</td>
</tr>
<tr>
<td>LOAD</td>
<td>load output</td>
</tr>
</tbody>
</table>

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved. Product markings may not be exactly as the ordering codes. Errors and omissions excepted.
Description

The Smart Power Relay E-1048-8I. is a remotely controllable electronic load disconnecting relay with three functions in a single unit:
- electronic relay
- electronic overcurrent protection
- status indication

The 7 pin INLINE version is designed for use with various E–T–A terminal blocks, e.g. 17-P10-Si. A choice of current ratings is available from 1 A through 20 A. An operating voltage range of DC 9...32 V allows the connection of DC 12 V and DC 24 V loads.

In order to switch and protect loads remotely, it has until now been necessary to connect several discreet components together:
- an electro-mechanic relay, control cable and integral contact to close the load circuit
- an additional protective element (circuit breaker or fuse) for cable or equipment protection
- a device for current measurement (shunt)

Now type E-1048-8I. combines all these functions in a single unit, thus minimising the number of connections in the circuit and thereby reducing the risk of failures.

Applications

Type E-1048-8I. is suited to all applications with DC 12 V or DC 24 V circuits, where magnetic valves, motors or lamp loads have to be switched, protected or monitored:
- road vehicles (utility vehicles, buses, special vehicles)
- rail vehicles
- marine industry (ships, boats, yachts etc.)

The Power Relay is also suitable for industrial use (process control, machine-building, engineering) as an electronic coupling relay between PLC and DC 12 V or DC 24 V load

Features

- Integral power electronics provide a wear-resistant switching function, insensitive to shock and vibration.
- Only a fraction of the control power needed by electro-mechanical relays is required for switching loads. This is important for battery buffered load circuits which have to remain controlled even with the generator off line.
- The extremely low induced current consumption of less than 1 mA is absolutely necessary for battery buffered applications.
- The load circuit is disconnected in the event of an overload or short circuit, the trip curve is also suitable for smaller motor loads.
- The load circuit is permanently monitored for wire breakage.
- Two status outputs for control signal AS and group signal SF provide status indication. For processing the actual value of the current flow in a power management system an analogue output from 0 to 5 V is provided. This voltage signal may also be used as an input to a control circuit or to switch off the unit by means of external control in the event of low load current value.
- For switching and monitoring loads of 20 A plus it is possible to connect several units in parallel. Uniform power distribution between units must be ensured by symmetrical design of the supply cables (length and cross section).
- Coloured label, e.g. red = 10 A, see ordering information.

Technical Data

<table>
<thead>
<tr>
<th>Power supply LINE +</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>DC power supply with small $R_i$ battery and generator etc.</td>
</tr>
<tr>
<td>Voltage ratings $U_N$</td>
<td>DC 12 V / DC 24 V</td>
</tr>
<tr>
<td>Operating voltage $U_B$:</td>
<td>DC 9...32 V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Load circuit LOAD</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Load output</td>
<td>Power MOSFET, high side switching</td>
</tr>
<tr>
<td>Max. current rating $I_N$</td>
<td>20 A</td>
</tr>
<tr>
<td>Types of loads</td>
<td>resistive, inductive, capacitive, lamp loads, motors (depending on duration of inrush current)</td>
</tr>
<tr>
<td>Current rating range $I_N$</td>
<td>1 A ... 15 A (fixed ratings)                                                                    up to 85 °C ambient without load reduction, 20 A up to 70 °C.</td>
</tr>
<tr>
<td></td>
<td>Two basic versions with factory preset ratings:</td>
</tr>
<tr>
<td></td>
<td>version 1: 1 A/2 A/3 A/5 A/7.5 A/10 A</td>
</tr>
<tr>
<td></td>
<td>version 2: 15 A / 20 A</td>
</tr>
</tbody>
</table>

| Induced current consumption $I_0$ of the unit (OFF condition) | < 1 mA                                                                                           |
| Typical voltage drop $U_{ON}$ at rated current $I_N$ (at 25 °C) |                                                                                                   |
| $I_N$ | $U_{ON}$ | $U_N$ | $I_N$ | $U_{ON}$ |
| 1 A     | 50 mV    | 7.5 A   | 90 mV   |
| 2 A     | 55 mV    | 10 A    | 110 mV   |
| 3 A     | 60 mV    | 15 A    | 60 mV    |
| 5 A     | 80 mV    | 20 A    | 60 mV    |

| Switching point |
| typical 1.3 x $I_N$ (-40 °C...+85 °C: 1.1...1.5 x $I_N$) |

| Trip time (standard curve) | typically 200 ms with switch-on onto overload and/or load increase on duty |

| Current limitation | power transistor >150 °C - resettable via external control signal (low-high) at control input IN| |
|version 1: | typically 75 A |
|version 2: | typically 350 A |

| Temperature disconnection | power transistor >150 °C - resettable via external control signal (low-high) at control input IN+ |
|version 1: | |
|version 2: | |

| Parallel connection of channels | for loads of 20 A plus, several units of identical current ratings may be connected in parallel. To ensure equal distribution of current between units, symmetrical design of the supply feed is necessary (length and cross section). |

| Leakage current in OFF condition | version 1: max. 100 µA |
| version 2: | max. 500 µA |

| Free-wheeling diode for connected load | integral |
|version 1: | max. 40 A |
|version 2: | max. 100 A |
**Technical Data** (TU = 25°C, UB = DC 24 V) (TU = ambient temperature at UB)

### Delay time  
**t_{on} / t_{off}** (resistive load)
- Typically 5 ms / typically 1.5 ms
- (EMC filter in control input)

### Wire breakage monitoring
**in ON and OFF condition of load**
- Wire breakage thresholds:
  - In OFF-condition (version1): $R_{load} >$ typically 100 kΩ
  - In OFF-condition (version2): $R_{load} >$ typically 10 kΩ
- In ON-condition: $I_{load} <$ typically 0.2 x $I_N$
- Indication via group fault signalisation
- FM (switching output)
- Fault indication will not be stored, i.e. after remedy of wire breakage fault
- Indication will disappear
- (possible options: - wire breakage indication only in ON condition
  - wire breakage indication only in OFF condition
  - no wire breakage indication
  - disconnection of load, indication via group signal SF
  - no automatic re-start
  - after remedy of the fault unit has to be reset via control input IN+)

### Short circuit, overload in load circuit
- Control input IN+
  - Control voltage IN+ 0...5 V = "OFF", 8.5...32 V = "ON"
  - Control current $I_E$ 1...10 mA (8.5...DC 32 V)
  - Reset in the event of a failure
    - Reset via external control signal (low - high) at control input IN+
    - Via reset of supply voltage
  - Dimmer operation (e.g. PWM signal)
  - Possible, see max. switching frequency

### Switching frequency
- At resistive or inductive load: max. 100 Hz

### Status and diagnostic function
#### Control signal AS
- Transistor output minus switching (LSS), open collector, short circuit and overload proof, max. load: DC 32 V/2 A
- 0 V-level: when unit is set (at IN+ = 8.4...32 V)
- Load max. DC 32 V/2 A
- 0 V-level with overload and short circuit disconnection, wire breakage indication
- Voltage output 0-5 V proportional to load current:
  - 1 V = 0.2 x $I_N$
  - 5 V = 1.0 x $I_N$
- 5 V... typically 6.5 V = overload range
- Tolerance: ± 5 % of $I_N$ (for $I_{load} > 0.2 x I_N$)
- Max. output current 5 mA
- Load resistance >1 kΩ against GND
- Response time when switching on a load: $t_{90} =$ typically 20 ms
- Response time of load change on duty: $t_{90} =$ typically 1 ms

#### Group signal SF
- Transistor output minus switching (LSS), open collector, short circuit and overload proof, max. DC 32 V/2 A
- 0 V-level with overload and short circuit disconnection, wire breakage indication

### Analogue output $U(I)$
- 0-5 V proportional to load current:
  - 1 V = 0.2 x $I_N$
  - 5 V = 1.0 x $I_N$
  - 5 V... typically 6.5 V = overload range
- Tolerance: ± 5 % of $I_N$ (for $I_{load} > 0.2 x I_N$)
- Max. output current 5 mA
- Load resistance >1 kΩ against GND
- Response time when switching on a load: $t_{90} =$ typically 20 ms
- Response time of load change on duty: $t_{90} =$ typically 1 ms

### Visual status indication
#### Control signal AS
- LED yellow

#### Group fault signal SF
- LED red

### General data
#### Reverse polarity protection
- Control circuit
- Yes
- Load circuit
- No (due to integral free-wheeling diode)
- Status outputs
  - Interference voltage resistance
  - Max. DC 32 V

### Tests
- Humid heat: combined test, 9 cycles with functional test
- Temperature change: min. temperature -40 °C, max. temperature +90 °C
- Vibration (random): test to DIN EN 60068-2-30, Z/AD
- Shock: test DIN EN 60068-2-64
- Corrosion: test to DIN EN 60068-2-52, severity 3
- Protection class: housing -8C4 IP30 to DIN 40050
- Housing -8C5 IP54 to DIN 40050, higher protection class upon request
- EMC requirements: emitted interference EN 50081-1 noise immunity EN 61000-6-2
- Automotive directive: emitted interference, noise immunity: 72/245/EW6 und 95 / 54 / E6

### Terminals of INLINE version
(7 pin, standard)
- 7 blade terminals 6.3 mm x 0.8 to DIN 46244-A6.3-0.8
- Copper-plated and tin-plated
- - E-T-A socket type 17-P10-Si (max. load 16 A)
- - On a pc board with 6.3 mm receptacles

### Housing
- Max. dimensions
  - Inline: 11.5 x 50 x 56 mm when plugged in
  - 11.5 x 50 x 66 mm including terminals
- Materials
  - Inline: Ultradur
- Mass
  - Approx. 23 g ... 33 g, depending on version

### Approvals
- CE, e1 logo according to EU, EMC and automotive directives

---

**Technical Data** (TU = 25°C, UB = DC 24 V) (TU = ambient temperature at UB)

### Temperature range
- Ambient temperature
  - Standard: -40...+85 °C
  - Without load reduction
  - For other temperature ranges please see ordering key

### Tests
- Humid heat
  - Combined test, 9 cycles with functional test
- Temperature change
  - Min. temperature -40 °C
  - Max. temperature +90 °C
- Vibration (random)
  - In operation, with temperature change 6 g eff. (10 Hz...2000 Hz)
- Shock
  - Test to DIN EN 60068-2-64
- Corrosion
  - Test to DIN EN 60068-2-52, severity 3
- Protection class
  - Housing -8C4 IP30 to DIN 40050
  - Housing -8C5 IP54 to DIN 40050,
  - Higher protection class upon request
- EMC requirements
  - Emitted interference EN 50081-1
  - Noise immunity EN 61000-6-2
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- Max. dimensions
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- Materials
  - Inline: Ultradur
- Mass
  - Approx. 23 g ... 33 g, depending on version

### Approvals
- CE, e1 logo according to EU, EMC and automotive directives
**Ordering Information**

**Type**

E-1048-8I  
Smart Power Relay DC 12 V/24 V - 1 A...20 A  
in INLINE housing

**Housing / temperature range**

3  with housing 70 °C (without moisture condensation)
4  with housing -40 °C...85 °C (70 °C at I_N = 20 A)

**LEDs**

0  without LEDs
3  2 LEDs: AS yellow, SF red

**Status output minus-switching**

A  without
B  with control signal AS
C  with group fault signal SF
D  with AS and SF

**Contents of group fault signal SF/LED indication SF**

0  without
1  short circuit / overload
2  short circuit / overload + wire breakage off
3  short circuit / overload + wire breakage on
4  short circuit / overload + wire breakage off + wire breakage on

**Analogue output**

V0  without
V1  0...5V

**Characteristic curve**

1  50 ms (switch-off delay with overload)
2  100 ms (switch-off delay with overload)
4  200 ms (switch-off delay with overload)

**Voltage rating**

U_J  DC 12/24 V

**Current ratings / colour of label**

1 A / black
2 A / grey
3 A / purple
5 A / light-brown
7.5 A / brown
10 A / red
15 A / blue
20 A / yellow

**Ordering example 1:** (all options = "DELUXE"

E-1048-8I  4  - C 3 D 4 V1 - 4 U3  - 20 A

**Ordering example 2:** (without options = "BASIC"

E-1048-8I  3  - C 0 A 0 V0 - 4 U3  - 5 A

**Dimensions**

This is a metric design and millimeter dimensions take precedence.

**Connection diagram**

* Optionally available:
  - signal outputs AS / SF
  - analogue output U(I)

**Pin selection INLINE**

<table>
<thead>
<tr>
<th>E-1048-8I</th>
<th>17-P10-Si</th>
</tr>
</thead>
<tbody>
<tr>
<td>LINE (1)</td>
<td>(2)</td>
</tr>
<tr>
<td>GND (5)</td>
<td>(5)</td>
</tr>
<tr>
<td>SF (7)</td>
<td>(7)</td>
</tr>
<tr>
<td>U(I) (3)</td>
<td>(3)</td>
</tr>
<tr>
<td>AS (6)</td>
<td>(6)</td>
</tr>
<tr>
<td>IN+ (4)</td>
<td>(4)</td>
</tr>
<tr>
<td>LOAD (1)</td>
<td>(1)</td>
</tr>
</tbody>
</table>
Typical time/current characteristics (standard 200 ms)

Version 1: 1 A, 2 A, 3 A, 5 A, 7.5 A and 10 A

- Current limitation (typ. 75 A)
- ... times rated current $I_n$

Version 2: 15 A and 20 A

- Current limitation (typ. 350 A)
- ... times rated current $I_n$
E-1048-8I - Accessories for E-1048-8I

**Single mounting sockets** (up to 16 A max. load)
- 17-P10-Si
- 17-P70-Si
(retaining clip Y 300 581 11 available on request)

2-way mounting socket
23-P10-Si
6-way mounting socket
63-P10-Si
(retaining clip Y 300 581 03 available on request)

Bus bar (10-way) (supplied as a complete package)
for type 17 socket
(for max. 100 A continuous load),
more positions available on request
X 211 157 01 with terminal
X 211 157 02 without terminal

Insulating sleeving for bus bar (10-way)
Y 303 824 01

---

This is a metric design and millimeter dimensions take precedence (mm) inch.

---

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Description

The E-T-A Remote Power Controller E-1071-073 is an electronic ON/OFF control module with protective functions and is suitable for resistive and inductive loads such as solenoids in rolling mills and other large plant applications. It is specifically used in plant modernization where the load circuit supply should be maintained at DC 24 V.

Typical applications

Control of hydraulic and pneumatic systems in production lines and chemical plants.

Features

- Solid-state relay with protective functions
- Solid-state switching avoids contact arcing and welding
- Inrush current limitation
- Overload and short-circuit proof output
- Low control power
- Control current indication by LED
- Auxiliary contact

Ordering information

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-1071</td>
<td>with signal output</td>
</tr>
<tr>
<td>073</td>
<td>Voltage rating of load DC 24 V</td>
</tr>
<tr>
<td>Current rating 3.0 A</td>
<td></td>
</tr>
</tbody>
</table>

Technical data (Tambient = 25 °C, UB = DC 24 V)

- Voltage rating UN DC 24 V
- Operating voltage UB DC 20...48 V
- Current rating IN 3 A
- Current consumption typically 17 mA
- Residual ripple for all voltages max. 5 % (3 phase bridge)
- Reverse polarity protection UB (terminals 1 and 2)
- Physical isolation 2-pole
  - by circuit breaker hand release
  - approx. 5 s after overload disconnection

Load circuit

- Load output NPN transistor, minus switching
- Load rating DC 24 V/0.2...3 A
- Voltage drop at IN max. 1.75 V
- Overload disconnection approx. 1.1 x IN
- Storage time tS (at 2xIN) typically 20 ms (see storage time curve)
- Short-circuit limitation approx. 2.5 x IN
- Short-circuit response delay approx. 4 µs
- Load current monitoring GREEN LED (lights at Iload > 0.2 A)
- Free-wheeling diode integral

Control circuit

- Control opto coupler in control input
- Control voltage US "0" = 0 ... 5 V
- Control current IS typically 5 mA
- Switching frequency fmax 100 Hz
- Control signal (US = "1") YELLOW LED lights (IS flowing)
- Protection reverse polarity protection (diode)

Signal output

- Fault indication auxiliary contact (N/O)
  - max. DC 30 V/3 A
  - physically isolated
  - closed with the circuit breaker tripped

General data

- Ambient temperature 0...+60 °C (without condensation)
- Terminals screw terminals 2x2.5 mm² to DIN 46288
- Housing clamping plate; polycarbonate GV, blue cover; polycarbonate, black
- Mounting symmetric rail to EN 50022-35
- Self-extinguishing properties to UL 94: V = 0; VDE 0304: grade 1
- Degree of protection (IEC 529/DIN 40050) IP20 housing, terminals
- Mounting dimensions approx. 240 g
- Mass 45 x 74 x 128 mm
In principle, the E-T-A SSRPC E-1071-073 operates like conventional electro-mechanical relays, with additional protective and signal functions. The control input replaces the magnetic coil and the power transistor replaces the main contact.

**Control circuit**
The control current flows through the LED and the opto coupler immediately a voltage higher than 8.5 V (control signal “1”) is applied at the input terminals (6 and 7). The opto coupler transmits the signal to the load circuit, at the same time switching the load transistor on. This signal is transmitted as a status signal to all monitoring circuits. The input protection diode protects the control voltage from incorrect polarization. Control current limitation is provided by a constant current diode.

**Load circuit**
The load circuit is switched ON or OFF according to the control signal ("0" or "1"), with electronic circuits monitoring the load circuit for faults such as overload or short-circuit. Should one of these faults occur, the monitoring circuitry will immediately react, causing the load transistor to disconnect and the circuit breaker to trip. Transistor disconnection occurs according to the storage time characteristics. The storage time increases noise immunity avoiding disconnection of non-harmful peaks such as those caused by inrush currents from lamp load connection. Storage time is not a constant quantity but is inversely proportional to the overcurrent factor.

**Status indication**
Status indication is provided by 2 LEDs (yellow and green) on the front of the housing.

- **YELLOW LED** = correct control voltage
  - The LED indicates when the control voltage is higher than 8.5 V, with control current flowing.
- **GREEN LED** = correct load current
  - The green LED indicates when the load current is higher than 0.2 A.

Faults such as too high a load resistance, wire break, poor contact, or overload/short-circuit, are available when only the yellow LED indicates. SSRPC E-1071-073 includes two current measuring terminals (2 mm dia.) on the front. These terminals provide for load current measurement in terms of voltage drop at the 0.1 Ω shunt in the load circuit.

### Storage time characteristic curve \( t_s \)

![Storage time characteristic curve](image)

### Operating modes

<table>
<thead>
<tr>
<th>Operating status</th>
<th>Fault-free operation</th>
<th>Short-circuit on the load</th>
<th>Wire break</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control input ( U_B )</td>
<td>&quot;0&quot;</td>
<td>&quot;1&quot;</td>
<td>&quot;1&quot;</td>
</tr>
<tr>
<td>YELLOW LED - control current</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>GREEN LED - load current monitoring</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Auxiliary contact</td>
<td>open</td>
<td>open</td>
<td>closed</td>
</tr>
<tr>
<td>Remarks</td>
<td>load OFF</td>
<td>load ON</td>
<td>circuit breaker tripped</td>
</tr>
</tbody>
</table>

1 - LED indicates
0 - LED does not indicate
Dimensions

1 2 3 4 5

Terminal selection

1 operating voltage +U_B: DC 20...48 V
2 operating voltage -U_B
3 load (+)
4 load (-)
5 not used
6 control voltage +U_S: max. DC 35 V
7 control voltage -U_S
8 auxiliary contact
9 auxiliary contact
10 not used

Basic circuit diagram

This is a metric design and millimeter dimensions take precedence. All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved. Product markings may not be exactly as the ordering codes. Errors and omissions excepted.
**Description**

The E-T-A Solid State Remote Power Controller E-1071-128 is an electronic ON/OFF control module with protective and signalling functions. It is suitable for inductive loads (solenoids, magnetic brakes) when the load circuit supply cannot be increased to the voltage level required (e.g. DC 36 V). The operating status of the controller/load connected is continuously indicated and signalled via opto coupler.

**Typical applications**

Control of hydraulic and pneumatic systems in production lines and chemical plants where check-back signals for process control systems are needed.

**Features**

- Overcurrent and short-circuit proof switching output with electronic current limitation
- Switch-off current largely independent of operating voltage
- Inrush current limitation
- Physical isolation between control and load circuit via opto coupler
- Low control power; control current indication by LED
- Solid state switching avoids contact arcing and welding
- 2 pole physical isolation upon overload or when tripped manually
- Opto decoupled ON and fault indication by LED
- Setting of minimum current on front of housing, with minimum current indication (set at approx. 50 % of the load current rating)
- Current measuring terminals on front of housing
- Reverse polarity protection in control and load circuit

**Technical data (Tambient = 25 °C, UB = DC 24 V)**

- **Voltage rating UN** DC 24 V
- **Operating voltage UB** DC 20...48 V
- **Current rating IN** 3 A
- **Current consumption** typically 15 mA
- **Residual ripple for all voltages** max. 5 % (3 phase bridge)
- **Reverse polarity protection** UB (terminals 1 and 2)
- **Physical isolation** 2 pole
  - by manual release (circuit breaker)
  - approx. 5 s after overload disconnection

**Load circuit**

- **Load output** NPN transistor, minus switching
- **Load rating** DC 24 V/0.2...3 A
- **Voltage drop at IN** max. 2 V
- **Overload disconnection** approx. 1.1 x IN
- **Storage time ts** (at 2xIN) typically 20 ms (see storage time curve)
- **Short-circuit limitation** approx. 2.5 x IN
- **Short-circuit response delay** approx. 4 µs
- **Load current monitoring Imin** GREEN LED lights at Iload> 0.2 Imin
- **Load current monitoring (MIN monitoring, to be set by potentiometer) at 50 % of the load current rating)**
- **Current measuring terminals** 2 x 2 mm dia. (shunt 0.1 Ω ±1 %)
- **Leakage current (US = “0”)** max. 3 mA
- **Free-wheeling diode** integral

**Control circuit**

- **Control** opto coupler in control input
- **Control voltage US “0”** = 0 ... 5 V
- **“1” = 8.5...35 V**
- **Control current** typically 5 mA
- **Switching frequency fmax** 10 Hz
- **Control signal (US = “1”)** YELLOW LED lights (IL flowing)
- **Protection** reverse polarity protection (diode)

**Status outputs**

- **2 signal outputs**
  - ON indication/fault indication
  - physically isolated by opto coupler
  - transistor outputs plus switching
  - max. DC 33 V/100 mA per output
  - integral free-wheeling diode
  - 20 ms time delay (eliminating false signals before the minimum current is reached)
  - ON indication (terminal 8) US = “0”: output non-conductive
  - US = “1”: output connecting plus potential (terminal 10) to terminal 8
  - Fault indication (terminal 9) no fault: output connecting plus potential (terminal 10) to terminal 9

**Ordering information**

<table>
<thead>
<tr>
<th>Type No.</th>
<th>E-1071-128</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage rating of load</td>
<td>DC 24 V</td>
</tr>
<tr>
<td>Current rating</td>
<td>3.0 A</td>
</tr>
</tbody>
</table>

The above information is valid for the storange temperature range of 0°C to 55°C. For more information, please visit www.e-t-a.com.
In principle, the E-T-A SSRPC E-1071-128 operates like conventional electro-mechanical relays, with additional protective and signalling functions. The control input replaces the magnetic coil and the power transistor replaces the main contact. ON and fault indication outputs have more complex functions and may not be compared with auxiliary contacts.

Control circuit
The control current flows through the LED and the opto coupler immediately a voltage higher than 8.5 V (= control signal “1”) is applied at the input terminals (6 and 7). The opto coupler transmits the signal to the load circuit, at the same time switching the load transistor on. This signal is transmitted as a status signal to all monitoring circuits. The input protection diode protects the control voltage from incorrect polarization. Control current limitation is provided by a constant current diode.

Load circuit
The load circuit is switched ON or OFF according to the control signal (“0” or “1”), with electronic circuits monitoring the load circuit for faults such as overload or short-circuit. Should one of these faults occur, the monitoring circuitry will immediately react, causing the load transistor to disconnect and the circuit breaker to trip. Transistor disconnection occurs according to the storage time characteristics. The storage time increases noise immunity avoiding disconnection of non-harmful peaks such as those caused by inrush currents from lamp load connection. Storage time is not a constant quantity but is inversely proportional to the overcurrent factor.

Signal circuit
The signal circuit includes two opto couplers signaling either correct ON duty or a fault. These signals may be computer processed:
- The ON signal output indicates correct operating in the ON condition.
  - The LED is on when control voltage is available
  - The LED is not on when the load current is lower than the set minimum current
  - The circuit breaker has not tripped
  - There is no wire break.
- The fault signal output signals the fault source which must be eliminated. This output is non-conductive when
  - The LED is on when the circuit breaker has tripped on overload or short-circuit
  - The LED is not on when there is a wire break
  - Control voltage is available AND the minimum current has not been reached
  - No control voltage is applied although the load current is available.

The fault signal output operates on the closed-circuit principle, i.e. it carries plus potential during fault-free operation.
This is a metric design and millimeter dimensions take precedence.

Dimensions

Terminal selection

Basic circuit diagram

Terminal
1 operating voltage +U_B: DC 20...48 V
2 operating voltage -U_B
3 load (+)
4 load (-)
5 auxiliary voltage -U_A for status outputs
6 control voltage +U_C: max. DC 35 V
7 control voltage -U_S
8 ON status output (max. 100 mA)
9 fault status output (max. 100 mA)
10 auxiliary voltage +U_A for status outputs: max. DC 33 V

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved. Product markings may not be exactly as the ordering codes. Errors and omissions excepted.
The E-T-A Solid State Remote Power Controller E-1071-343 is a double relay with protective function both for resistive and inductive DC 48 V loads. It is particularly suitable to control upward/downward and forward/backward movements. Failure of one channel will also cause the other channel to disconnect.

### Description

- Valve timing gears for forward/backward or upward/downward movements (overlapping operation is possible)
- Parallel circuits which must be completely disconnected after failure of one of the circuits.

### Features

- Small double relay with protective function
- Overcurrent and short-circuit proof outputs
- Two pole physical isolation of both channels
  - approx. 5 s after electronic fault disconnection
  - by manual release
- Both part units are disconnected upon isolator tripping
- Current load of each unit: max. 3 A; total current max. 4 A
- Electrical isolation between control and load circuit by means of opto coupler
- Control current indication by RED LED
- Load current indication by GREEN LED
- With auxiliary contact (fault indication)
- Temperature disconnection

### Technical data (Tambient = 25 °C, UB = DC 48 V)

<table>
<thead>
<tr>
<th>Voltage rating UN</th>
<th>DC 48 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage UB</td>
<td>DC 36...60 V</td>
</tr>
<tr>
<td>Current rating IN</td>
<td>3 A / 3 A, (2 A + 2 A)</td>
</tr>
<tr>
<td>Current consumption (UB = DC 48 V, US = &quot;0&quot;)</td>
<td>max. 21 mA</td>
</tr>
<tr>
<td>Residual ripple for all voltages</td>
<td>max. 5 % (3 phase bridge)</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>UB (terminals 1 and 2)</td>
</tr>
<tr>
<td>Physical isolation</td>
<td>2 pole</td>
</tr>
<tr>
<td>- by manual circuit breaker release</td>
<td></td>
</tr>
<tr>
<td>- approx. 5 s after overload disconnection</td>
<td></td>
</tr>
<tr>
<td>- upon thermal response (approx. +130 °C)</td>
<td></td>
</tr>
</tbody>
</table>

### Load circuits (I/II)

- NPN transistor, minus switching
- Voltage drop at IN: approx. 1.1 x IN
- Load output: approx. 4 µs
- NPN transistor, minus switching
  - approx. 11 x IN
  - Typically 20 ms (see storage time curve)
  - approx. 2.5 x IN
- Short-circuit limitation: approx. 4 µs
- Short-circuit response delay: approx. +130 °C
- Load current monitoring: GREEN LED lights at Iload > 0.1 A
- Free-wheeling diode: integral

### Control circuits (I/II)

- Control current: typically 5 mA
- Control voltage US: 8.5...35 V
- Switching frequency fmax: 100 Hz
- Control signal (UB = "1"): RED LED lights (Is flowing)
- Protection: reverse polarity protection (diode)

### Signal output

- Fault indication: auxiliary contact (N/O)
- - max. DC 30 V/3 A
- - physically isolated
- - closed when the circuit breaker has tripped

### General data

- Ambient temperature: 0...+60 °C (without condensation)
- Terminals: screw terminals 2x2.5 mm² to DIN 46286
- Housing: clamping plate: polycarbonate GV, blue cover: polycarbonate, black
- Mounting: symmetric rail to EN 50022-35
- Self-extinguishing properties: to UL 94: V = 0; VDE 0304: grade 1
- Degree of protection: IP20 housing, terminals
- Mounting dimensions: 45 x 74 x 128 mm
- Mass: approx. 320 g
Technical description

Under normal operating conditions, the E-T-A SSRPC E-1071-343 allows the connection and disconnection of the load outputs of two channels independent of each other.

Control circuits (I/II)
The control current flows through the LED and the opto coupler immediately a voltage higher than 8.5 V (= control signal “1”) is applied at the input terminals (6 and 7, or 10 and 7). The opto coupler transmits the signal to the load circuit, at the same time switching the load transistor on. This signal is transmitted as a status signal to all monitoring circuits. The input protection diode protects the control voltage from incorrect polarization. Control current limitation is provided by a constant current diode.

Load circuits (I/II)
The load circuit is switched ON or OFF according to the control signal (“0” or “1”), with electronic circuits monitoring the load circuit for faults such as overload or short-circuit. Should one of these faults occur, the monitoring circuitry will immediately react, causing the load transistor to disconnect and the circuit breaker to trip. Transistor disconnection occurs according to the storage time characteristics. The storage time increases noise immunity avoiding disconnection of non-harmful peaks such as those caused by inrush currents from lamp load connection. Storage time is not a constant quantity but is inversely proportional to the overcurrent factor.

After expiration of the storage time (see diagram) the load circuit transistor will become non-conductive. After approx. 5 s the isolator will switch off so as to disconnect the two load circuits. The common auxiliary contact closes signalling the fault. After removal of the fault, the SSRPC can be reactivated by pushing the isolator button.

Status outputs
Status indication is provided by 4 LEDs (2 x RED, 2 x GREEN).

RED LED
ON indication (I/II)
The red LED indicates when the control voltage is higher than 8.5 V, with control current flowing.

GREEN LED
Current flow indication (I/II)
The green LED indicates when the load current is above 0.1 A.

Faults such as too high a resistance, wire break, poor contact, or overload/short-circuit, are available when only the red LED indicates.

The SSRPC E-1071-343 includes three current measuring terminals (4 mm dia.) on the front. These terminals provide for load current measurement in terms of voltage drop at the 0.1 Ω shunt in the load circuit (I/II).

Storage time characteristic curve $t_s$

Operating modes

<table>
<thead>
<tr>
<th>Operating status</th>
<th>Fault-free operation</th>
<th>Short-circuit on the load</th>
<th>Wire break</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control input</td>
<td>“0”</td>
<td>“1”</td>
<td>“1”</td>
</tr>
<tr>
<td>RED LED - Control current</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>GREEN LED - Load current monitoring</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Auxiliary contact</td>
<td>open</td>
<td>open</td>
<td>closed</td>
</tr>
<tr>
<td>Remarks</td>
<td>load</td>
<td>load</td>
<td>both load circuits</td>
</tr>
</tbody>
</table>

1 - LED indicates
0 - LED does not indicate
### Terminal selection

1. operating voltage +U_B: DC 36...60 V
2. operating voltage -U_B
3. load (+) (carrying plus potential)
   - **CAUTION:** Do not connect to GND/-U_B
4. load I (-)
5. load II (-)
6. control voltage I +U_S: max. DC 35 V
7. control voltage I, II -U_B
8. auxiliary contact
9. auxiliary contact
10. auxiliary voltage II +U_B: max. DC 35 V

---

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The E-T-A Solid State Remote Power Controller E-1071-353 is a double relay with protective function both for resistive and inductive DC 24 V loads. It is particularly suitable to control upward/downward and forward/backward movements. Failure of one channel will also cause the other channel to disconnect.

**Description**

- Valve timing gears for forward/backward or upward/downward movements (overlapping operation is possible)
- Parallel circuits which must be completely disconnected upon failure of one of the circuits.

**Typical applications**

- Valve timing gears for forward/backward or upward/downward movements (overlapping operation is possible)
- Parallel circuits which must be completely disconnected upon failure of one of the circuits.

**Features**

- Small double relay with protective function
- Overcurrent and short-circuit proof outputs
- Two pole physical isolation of both channels
- Current load of each unit: max. 3 A; total current max. 4 A
- Electrical isolation between control and load circuit by means of opto coupler
- Control current indication by RED LED
- Load current indication by GREEN LED
- With auxiliary contact (fault indication)
- Temperature disconnection

**Technical data (Tambient = 25 °C, UB = DC 24 V)**

<table>
<thead>
<tr>
<th>Voltage rating UN</th>
<th>DC 24 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage UB</td>
<td>DC 20...48 V</td>
</tr>
<tr>
<td>Current rating Iᵣ</td>
<td>3 A / 3 A (2 A + 2 A)</td>
</tr>
<tr>
<td>Current consumption (U₀ = DC 24 V, Uᵣ = &quot;0&quot;)</td>
<td>typically 30 mA</td>
</tr>
<tr>
<td>Residual ripple for all voltages</td>
<td>max. 5 % (3 phase bridge)</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>Uᵣ (terminals 1 and 2)</td>
</tr>
<tr>
<td>Physical isolation</td>
<td>2 pole</td>
</tr>
<tr>
<td>- by manual circuit breaker release</td>
<td></td>
</tr>
<tr>
<td>- approx. 5 s after overload disconnection</td>
<td></td>
</tr>
<tr>
<td>- upon thermal response (approx. +130 °C)</td>
<td></td>
</tr>
<tr>
<td>Load output</td>
<td>NPN transistor, minus switching</td>
</tr>
<tr>
<td>Load rating</td>
<td>DC 24 V/0.2...3 A per channel</td>
</tr>
<tr>
<td>with parallel duty of both channels: max. 4 A (e.g. 2 A + 2 A)</td>
<td></td>
</tr>
<tr>
<td>Voltage drop at IN</td>
<td>max. 1.8 V</td>
</tr>
<tr>
<td>Overload disconnection</td>
<td>approx. 1.1 x Iᵣ</td>
</tr>
<tr>
<td>Storage time tₛ (at 2xIᵣ)</td>
<td>typically 20 ms (see storage time curve)</td>
</tr>
<tr>
<td>Short-circuit limitation</td>
<td>approx. 2.5 x Iᵣ</td>
</tr>
<tr>
<td>Short-circuit response delay</td>
<td>approx. 4 µs</td>
</tr>
<tr>
<td>Load current monitoring</td>
<td>GREEN LED lights at Iᵣ &gt; 0.1 A</td>
</tr>
<tr>
<td>Current measuring terminals</td>
<td>3 x 4 mm dia. (shunt 0.1 Ω ± 1 %)</td>
</tr>
<tr>
<td>Leakage current (Uᵣ = &quot;0&quot;)</td>
<td>max. 3 mA</td>
</tr>
<tr>
<td>Free-wheeling diode</td>
<td>integral</td>
</tr>
<tr>
<td>Control circuits (I/II)</td>
<td>opto coupler in control input</td>
</tr>
<tr>
<td>Control voltage Uᵣ</td>
<td>&quot;0&quot; = 0 ... 5 V</td>
</tr>
<tr>
<td>&quot;1&quot; = 8.5...35 V</td>
<td></td>
</tr>
<tr>
<td>Control current Iₛ</td>
<td>typically 5 mA</td>
</tr>
<tr>
<td>Switching frequency f_max</td>
<td>100 Hz</td>
</tr>
<tr>
<td>Control signal (Uᵣ = &quot;1&quot;)</td>
<td>RED LED lights (Iₛ flowing)</td>
</tr>
<tr>
<td>Protection</td>
<td>reverse polarity protection (diode)</td>
</tr>
</tbody>
</table>

**Ordering information**

<table>
<thead>
<tr>
<th>Type No.</th>
<th>SSRPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-1071 - 353</td>
<td>double unit</td>
</tr>
<tr>
<td>Voltage rating of load</td>
<td>DC 24 V</td>
</tr>
<tr>
<td>Current rating</td>
<td>3A / 3A</td>
</tr>
</tbody>
</table>

| E-1071 - 353 | DC 24 V - 3A / 3A ordering example |

**General data**

- Ambient temperature 0...+60 °C (without condensation)
- Terminals screw terminals 2x2.5 mm² to DIN 46288
- Housing clamping plate: polycarbonate GV, blue cover: polycarbonate, black
- Mounting symmetric rail to EN 50022-35
- Self-extinguishing properties to UL 94: V = 0; VDE 0304: grade 1
- Degree of protection IP20 housing, terminals
- Mounting dimensions 45 x 74 x 128 mm
- Mass approx. 320 g
Technical description

Under normal operating conditions, the E-T-A SSRPC E-1071-353 allows the connection or disconnection of the load outputs of two channels independent of each other.

Control circuits (I/II)
The control current flows through the LED and the opto coupler immediately a voltage higher than 8.5 V (LED control signal “1”) is applied at the input terminals (6 and 7, or 10 and 7). The opto coupler transmits the signal to the load circuit, at the same time switching the load transistor on. This signal is transmitted as a status signal to all monitoring circuits. The input protection diode protects the control voltage from incorrect polarization. Control current limitation is provided by a constant current diode.

Load circuits (I/II)
The load circuit is switched ON or OFF according to the control signal (“0” or “1”), with electronic circuits monitoring the load circuit for faults such as overload or short-circuit. Should one of these faults occur, the monitoring circuitry will immediately react, causing the load transistor to disconnect and the circuit breaker to trip. Transistor disconnection occurs according to the storage time characteristics. The storage time increases noise immunity avoiding disconnection of non-harmful peaks such as those caused by inrush currents from lamp load connection. Storage time is not a constant quantity but is inversely proportional to the overcurrent factor.

After expiration of the storage time (see diagram) the load circuit transistor will become non-conductive. After approx. 5 s the isolator will switch off so as to disconnect the two load circuits. The common auxiliary contact closes signalling the fault. After removal of the fault, the SSRPC can be reactivated by pushing the isolator button.

Status outputs
Status indication is provided by 4 LEDs (2 x RED, 2 x GREEN).

RED LED
ON indication (I/II)
The red LED indicates when the control voltage is higher than 8.5 V, with control current flowing.

GREEN LED
Current flow indication (I/II)
The green LED indicates when the load current is above 0.1 A.

Faults such as too high a resistance, wire break, poor contact, or overload/short-circuit, are available when only the red LED indicates.

The SSRPC E-1071-353 includes three current measuring terminals (4 mm dia.) on the front. These terminals provide for load current measurement in terms of voltage drop at the 0.1 Ω shunt in the load circuit (I/II).

Storage time characteristic curve \( t_s \)

---

Operating modes

<table>
<thead>
<tr>
<th>Operating status</th>
<th>Fault-free operation</th>
<th>Short-circuit on the load</th>
<th>Wire break</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control input</td>
<td>“0”</td>
<td>“1”</td>
<td>“1”</td>
</tr>
<tr>
<td>RED LED -</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>control current</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GREEN LED -</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Load current monitoring</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Auxiliary contact</td>
<td>open</td>
<td>open</td>
<td>closed</td>
</tr>
<tr>
<td>Remarks</td>
<td>load</td>
<td>load</td>
<td>both load circuits</td>
</tr>
</tbody>
</table>

1 - LED indicates
0 - LED does not indicate
Solid State Remote Power Controller E-1071-353

**Dimensions**

This is a metric design and millimeter dimensions take precedence (mm)inch.

**Basic circuit diagram**

**Terminal selection**

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>operating voltage + $U_B$: DC 20...48 V</td>
</tr>
<tr>
<td>2</td>
<td>operating voltage -$U_B$</td>
</tr>
<tr>
<td>3</td>
<td>load (+) (carrying plus potential) <strong>CAUTION:</strong> Do not connect to GND/-$U_B$</td>
</tr>
<tr>
<td>4</td>
<td>load I (-)</td>
</tr>
<tr>
<td>5</td>
<td>load II (-)</td>
</tr>
<tr>
<td>6</td>
<td>control voltage I +$U_S$: max. DC 35 V</td>
</tr>
<tr>
<td>7</td>
<td>control voltage II -$U_S$</td>
</tr>
<tr>
<td>8</td>
<td>auxiliary contact</td>
</tr>
<tr>
<td>9</td>
<td>auxiliary contact</td>
</tr>
<tr>
<td>10</td>
<td>auxiliary voltage II +$U_S$: max. DC 35 V</td>
</tr>
</tbody>
</table>

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The E-T-A Solid State Remote Power Controllers E-1071-603/607 are electronic control modules suitable for inductive loads such as solenoids, magnetic brakes etc.

They are used
- for safe and quick switching of loads
- for monitoring the electrical condition of the loads
- for compensating different cable lengths

The load connected to the relay should be operated with a voltage higher than its rated voltage (DC 24 V) because the load current is controlled electronically (pulse-controlled characteristics). This is to ensure that in industrial plants with different cable lengths (supply cables, load cables) an increased inrush current can be applied to each load. During hold duty the load current is reduced to a smaller value (approx. 60 % of the current rating), thus reducing the operating temperature and extending the life of the loads.

### Typical applications

Circuits with inductive load such as
- solenoids
- magnetic brakes etc.
in large plants, e.g. rolling mills where a very high availability is required.

### Features

- **Designed for inductive loads (DC 24 V)**
- **Individual adjustment to various load currents (IN = 0.1...3.1 A)**
- **Significant reduction of power loss in the load by pulse-controlled characteristics**
- **Short-circuit proof (short-circuit limitation): physical disconnection from supply after approx. 5 s**
- **Inrush current monitoring**
- **Physical isolation:**
  - opto coupler in the control circuit
  - physical disconnection from supply
  - opto coupler for status outputs
- **Reverse polarity and overvoltage protection in the control, load and status circuits**
- **Control current indication by YELLOW LED**
- **O.K. indication by GREEN LED**
- **Wire break indication by RED LED (load circuit)**
- **Two status outputs for PLCs for function indication (function signal, ON signal)**
- **Temperature disconnection**
- **Quick disconnection (do not connect a free-wheeling diode to the load as the free-wheeling current is controlled electronically!)**
  Break time < make time!

### Technical data (Tambient = 25 °C, UB = DC 36 V)

- **Operating voltage UB**: DC 60 V (UB min see Technical description)
- **Current rating IN**: adjustable between 0.1 and 3.1 A (switch and potentiometer) typically 35 mA
- **Current consumption**: typically 35 mA
- **Residual ripple for all voltages**: Uf (terminals 1 and 2) 2 pole
- **Short-circuit limitation**: approx. 3.5 x IN
- **Short-circuit current IK (rms)** typically 10...400 mA
- **Wire break monitoring**: in the ON and OFF condition (RED LED)
- **Load circuit**
  - **Load output**: NPN transistor, minus switching, pulse-controlled (approx. 180 Hz)
  - **Load rating**: DC 24 V adjustable between 0.1 and 3.1 A
- **Switch-on current IE**: approx. 400 ms
- **Hold current IH**: typically 60 % of the set current rating
- **Short-circuit limitation**: approx. 3.5 x IH
- **Current measuring terminals**: 2 x 2 mm dia. (0.1 Ω shunt ± 1 %)
- **Leakage current**: typically 1 mA
- **Free-wheeling circuitry**: integral electronic control with quick release
- **Control circuit**
  - **Control**: opto coupler in control input
  - **Control voltage UB**: typically 5 mA
  - **Control current IS**: typically 8.5...35 V
- **Switching frequency fmax**: 1 Hz
- **Control signal (US = "1")**: YELLOW LED lights (Icontrol flowing)
- **Protection**: reverse polarity protection (diode) overdvoltage protection (varistor)
- **Status outputs**
  - **ON indication (terminal 8)**: U0 = "0": output non-conductive
  - **Function indication (terminal 9)**: fault: output non-conductive

### Ordering information

<table>
<thead>
<tr>
<th>Type No.</th>
<th>SSRPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-1071</td>
<td>603</td>
</tr>
<tr>
<td></td>
<td>607</td>
</tr>
<tr>
<td>Terminals</td>
<td></td>
</tr>
<tr>
<td>DC 24 V</td>
<td></td>
</tr>
<tr>
<td>Current rating</td>
<td>0.1 ... 3.1 A</td>
</tr>
</tbody>
</table>

E-1071 - 603 - DC 24 V - 0.1 ... 3.1 A ordering example
### Technical data

#### General data
- **Ambient temperature**: 0...+60 °C (without condensation)
- **Terminals**: E-1071-603: screw terminals 2x2.5 mm² to DIN 46288
  - E-1071-607: screw-less connectors
- **Connection**: max. 2 x 2.5 mm² to DIN 46288
- **Housing**: clamping plate: polycarbonate GV, blue cover: polycarbonate, black
- **Mounting**: symmetric rail to EN 50022-35
- **Self-extinguishing properties (IEC 529/DIN 40050)**: IP20 housing, terminals
- **Degree of protection**: to UL 94: V = 0; VDE 0304: grade 1
- **Mounting dimensions**: 45 x 74 x 128 mm
- **Mass**: approx. 320 g

#### Technical description

The max. admissible operating voltage of the SSRPC is approx. DC 60 V. The min. operating voltage is a function of the overall ohmic resistance in the load circuit. The switch-on current is reduced by:
- the voltage drop on the load cable
- the load resistance increasing with the operating temperature of the load.

#### Minimum operating voltage $U_B_{\min}$

<table>
<thead>
<tr>
<th>$I_H$ (A)</th>
<th>Cable length (m)</th>
<th>Cable size (AWG)</th>
<th>$U_B_{\min}$ (V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2x50/100/200/300</td>
<td>1.5/2.5 mm²</td>
<td>33/32/35/40</td>
</tr>
<tr>
<td>2</td>
<td>2x50/100/200/300</td>
<td>1.5/2.5 mm²</td>
<td>35/34/39/42</td>
</tr>
<tr>
<td>3</td>
<td>2x50/100/200/300</td>
<td>1.5/2.5 mm²</td>
<td>37/35/42/48</td>
</tr>
</tbody>
</table>

The load capacity is no longer ensured when the minimum operating voltage is under limits. The RED LED (fault) will indicate and the circuit breaker will trip after approx. 15 s.

#### Resistance increase in the load circuit:
- 1.5 mm² cable: approx. 2.8 Ω/100 m distance
- 2.5 mm² cable: approx. 1.6 Ω/100 m distance

#### Switch-on current

To reach the max. inrush current the output transistor connects the operating voltage to the inductive load for approx. 400 ms. After this period the load current is set back to hold current.

#### Rated current $I_{NH}$, hold current $I_H$

The current rating of the applicable load at its rated voltage should be set between 0.1 and 3.1 A.

The hold current of the load is internally adjusted to 60 % of the set current rating. This hold current should be measured by means of a voltmeter connected to the 2 mm current measuring terminals (0.1 Ω shunt ±1 %).

### Technical description (cont’d)

#### Setting the current rating

The current rating is set by means of a rotary switch (switch setting 0 A - 1 A - 2 A) and a 270° potentiometer (setting range between 0.1 and 1.1 A).

The sum of the two settings should equal the current rating of the load.

**Example:**
- 24 V load with $I_H = 1.1$ A

**Setting:**
- switch 0 A + potentiometer 1.1 A, or
- switch 1 A + potentiometer 0.1 A

- Operating voltage (terminals 1 and 2): reverse polarity protected by means of a relay.
  - The relay will only pick up and apply voltage to the device if the operating voltage is correctly polarised. This relay will then remain permanently energized, without being influenced by the control input.
- Control circuit (terminals 6 and 7): reverse polarity protected by means of a diode.
- Auxiliary voltage status outputs (terminals 10 and 5): reverse polarity protected by means of a diode.
- The load output (terminals 3-4) or the inductive load must not be fitted with a free-wheeling diode as the free-wheeling current is controlled electronically. This control also causes a very short fall time of the inductive load.

The solenoid connector may be provided with means of visual indication (LED).
Operating modes

<table>
<thead>
<tr>
<th>Operating status</th>
<th>Fault-free operation</th>
<th>Short-circuit on the load</th>
<th>Wire break</th>
<th>U_{B} too low/transistor short-circuit/incorrect setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>control input</td>
<td>“0”</td>
<td>“1”</td>
<td>“0”</td>
<td>“1”</td>
</tr>
<tr>
<td>YELLOW LED - control current</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>GREEN LED - O.K.</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>RED LED - wire break</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>RED LED - fault</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Functional status (terminal 9)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Operating status (terminal 8)</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Remarks

1 - LED lights; status output carries plus potential
0 - LED does not light; status output is non-conductive

Status outputs

<table>
<thead>
<tr>
<th>Operating status (terminal 8)</th>
<th>Functional status (terminal 9)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>not operable no operation - CAUTION: FAULT</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>operable not switched on - O.K. - GREEN LED indicates</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>- CAUTION: FAULT</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>operable switched on - O.K. - GREEN LED lights</td>
</tr>
</tbody>
</table>

Dimensions

This is a metric design and millimeter dimensions take precedence (mm) inch

Terminal selection

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>operating voltage +U_{B}; max. DC 60 V</td>
</tr>
<tr>
<td>2</td>
<td>operating voltage (-)</td>
</tr>
<tr>
<td>3</td>
<td>load (+)</td>
</tr>
<tr>
<td>4</td>
<td>load (-)</td>
</tr>
<tr>
<td>5</td>
<td>auxiliary voltage -U_{A} for status outputs</td>
</tr>
<tr>
<td>6</td>
<td>control voltage +U_{A}; max. 35 V</td>
</tr>
<tr>
<td>7</td>
<td>control voltage -U_{A}</td>
</tr>
<tr>
<td>8</td>
<td>status output “operation” (max. 50 mA)</td>
</tr>
<tr>
<td>9</td>
<td>status output “function” (max. 50 mA)</td>
</tr>
<tr>
<td>10</td>
<td>auxiliary voltage +U_{A} for status outputs: max. DC 60 V/100 mA</td>
</tr>
</tbody>
</table>

Basic circuit diagram

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved. Product markings may not be exactly as the ordering codes. Errors and omissions excepted.
Solid State Remote Power Controller E-1071-803

Description

The E-T-A Solid State Remote Power Controllers E-1071-803 are electronic control modules suitable for inductive loads (DC 24 V) such as solenoids, magnetic brakes etc.

- for safe and quick switching of loads
- for monitoring the electrical condition of the loads
- for compensating for different cable lengths

The load connected to the relay should be operated with a voltage higher than its rated voltage (DC 24 V) because the load current is controlled electronically (pulse-controlled characteristics). This is to ensure that in industrial plants with different cable lengths (supply cables, load cables) an increased inrush current can be applied to each load. During hold duty the load current is reduced to a smaller value (between 25 % and 75 % of the current rating), thus reducing the operating temperature and extending the life of the loads.

Typical applications

Circuits with inductive load such as

- solenoids
- magnetic brakes etc.

where fast switching of inductive loads is required.

Features

- Designed for inductive loads (DC 24 V)
- Individual adjustment to various load currents ($I_N = 0.25 A; 0.4 A; 1 A; 2 A$)
- Significant reduction of power loss in the load by pulse-controlled characteristics
- Short-circuit proof; short-circuit limitation and physical disconnection from supply after approx. 5 s
- Inrush current monitoring
- Overload protection (current control)
- Fast disconnection (do not connect a free wheeling diode to the load as the the free wheeling current is controlled electronically!)
- Physical isolation:
  - opto coupler in the control circuit
  - relay contacts in the load circuit
  - fault indication by means of auxiliary contact (N/O)
- Reverse polarity protection in the control and load circuits
- Control current indication by YELLOW LED
- Wire break indication by RED LED (load circuit)
- Minimum current indication by GREEN LED

Ordering information

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-1071</td>
<td>SSRPC</td>
</tr>
</tbody>
</table>

Operating mode

- pulse controlled

Voltage rating of load

<table>
<thead>
<tr>
<th>DC 24 V</th>
<th>Voltage rating of load</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.25 A</td>
<td></td>
</tr>
<tr>
<td>0.4 A</td>
<td></td>
</tr>
<tr>
<td>1 A</td>
<td></td>
</tr>
<tr>
<td>2 A</td>
<td></td>
</tr>
</tbody>
</table>

Ordering example

E-1071 - 803 - DC 24 V - 1 A

Technical data ($T_{ambient} = 25 ^\circ C, U_B = DC 36 V$)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage $U_B$</td>
<td>DC 36 V (28...60 V) (function maintained up to DC 18 V)</td>
</tr>
<tr>
<td>Current rating $I_N$</td>
<td>0.25 A/0.4 A/1 A/2 A typically 30 mA</td>
</tr>
<tr>
<td>Current consumption</td>
<td>typically 30 mA</td>
</tr>
<tr>
<td>Residual ripple for all voltages</td>
<td>max. 5 % (3 phase bridge)</td>
</tr>
<tr>
<td>Reverse polarity protection</td>
<td>UB (terminals 1 and 2)</td>
</tr>
<tr>
<td>Physical isolation</td>
<td>2 pole</td>
</tr>
<tr>
<td>- by manual circuit breaker release</td>
<td></td>
</tr>
<tr>
<td>- approx. 5 s after short-circuit disconnection</td>
<td></td>
</tr>
</tbody>
</table>

Circuit with inductive load such as

- solenoids
- magnetic brakes etc.

where fast switching of inductive loads is required.

Load circuit

- Load output: NPN transistor, minus switching, pulse-controlled (approx. 180 Hz)
- Load rating: DC 24 V/0.25 A (3...6 W)
- DC 24 V/0.4 A (6...10 W)
- DC 24 V/1 A (15...30 W)
- DC 24 V/2 A (30...50 W)
- Switch-on current $I_E$ (with short-circuit limitation) adjustable between 25 and 75 % $I_N$
- (e.g. 0.5...1.5 A with the 2 A version)
- Short-circuit limitation approximately 10 mA
- Short-circuit current $I_K$ (rms) typically 10 mA

Free-wheeling circuitry

- 2 x 2 mm dia. (0.1 Ω shunt ± 1 %)
- integral electronic control with quick release

Control circuit

- Control
- Control voltage $U_S$ “0” = 0 ... 5 V
- “1” = 8.5...35 V
- Control current $I_S$ typically 5 mA
- Switching frequency $f_{max}$ 1 Hz
- Control signal ($U_S = “1”) $Y$ELOW LED lights (IS flowing)

Status outputs

- Fault indication
- max. DC 30 V/3 A
- physically isolated
- closed when the circuit breaker has tripped

Protection

- reverse polarity protection (diode)
Solid State Remote Power Controller E-1071-803

Technical data

General data
Ambient temperature: 0...+60 °C (without condensation)
Terminals: screw terminals 2x2.5 mm² to DIN 46288
Housing: clamping plate: polycarbonate GV, blue
Self-extinguishing properties: to UL 94; V = 0; VDE 0304: grade 1
Degree of protection: IP20 housing, terminals
Mounting dimensions: 45 x 74 x 128 mm
Mass: approx. 240 g

Operating voltage U_B
The max. admissible operating voltage of the SSRPC is approx. DC 60 V. The min. operating voltage is a function of the overall ohmic resistance in the load circuit. The switch-on current is reduced by:
- the voltage drop on the load cable
- the load resistance increasing with the operating temperature of the load.

The function as shown below is no longer ensured when the minimum operating voltage (DC 28 V) is under limits. The output will then be continuously conductive, and the set minimum current may no longer be reached.

Switch-on current I_E
To reach the max. inrush current the output transistor connects the operating voltage to the inductive load for approx. 400 ms. After this period the load current is set back to hold current (= minimum current).

Technical description

Setting of hold current I_H (= minimum current)
The hold current of the load is set between 25 % and 75 % IN by the 270 ° potentiometer on the front. This hold current should be measured by means of a voltmeter connected to the 2 mm current measuring terminals (shunt 0.1 Ω ± 1 %).

Operating modes

<table>
<thead>
<tr>
<th>Operating status</th>
<th>Fault-free operation</th>
<th>Short-circuit on the load</th>
<th>Wire break</th>
<th>U_B too low/incorrect setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>control input</td>
<td>“0”</td>
<td>“1”</td>
<td>“1”</td>
<td>“0”</td>
</tr>
<tr>
<td>YELLOW LED - control current</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>GREEN LED - minimum current indication</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>RED LED - wire break</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Auxiliary contact</td>
<td>open</td>
<td>open</td>
<td>closed</td>
<td>open</td>
</tr>
</tbody>
</table>

Remark:
- load OFF
- load ON
- physical isolation after approx. 5 s
- no load connected, wire break
- current cannot be adjusted

1 = LED lights
0 = LED does not light
### Dimensions

This is a metric design and millimeter dimensions take precedence (mm).

### Terminal selection

#### Basic circuit diagram

Terminal:
1. operating voltage +U_B: max. DC 60 V
2. operating voltage -U_B
3. load (+)
4. load (-)
5. not used
6. control voltage +U_S: max. 35 V
7. control voltage -U_S
8. auxiliary contact
9. auxiliary contact
10. not used

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved. Product markings may not be exactly as the ordering codes. Errors and omissions excepted.
Solid State Remote Power Controller E-1072-100

Description
The E-T-A Solid State Remote Power Controller E-1072-100 is a double pole electronic switching amplifier suitable for resistive and inductive loads (solenoids, magnetic brakes etc.) as well as for lamp loads and capacitive loads.

The double pole electronic switching output eliminates inadvertent start-up or dangerous machine movements as may arise upon a ground fault in systems with ungrounded power supply (IT systems) (see Machinery Directive 89/392/EEC and 93/44/EEC or EN 60204 part 1, para. 9.4.3.1).

Typical applications
- Two pole actuator switching for machinery and plants.
- Monitoring of the electrical functionality of these loads.
- In-rush current limitation of lamp and capacitive loads.
- Protection of load circuit cables.
- ON and fault indication (by LEDs or RED trip button) and signalling (via potential-free auxiliary contacts).
- Two pole physical isolation upon overload or when tripped manually.

Features
- PLC controllable electronic switching amplifier (max. 3 A) with additional protective and control functions for DC 24 V loads (e.g. solenoids, magnetic brakes, electromagnetic clutches, monitoring and indicator lamps).
- Overload and short-circuit proof double pole switching output with in-rush current and short-circuit limitation.
- Electronic disconnection upon - an overload in the load circuit, - short-circuit in the load (load+/load-, load+/load-UB, and load-/+UB), followed by 2 pole isolation of the load circuit (via relay contacts).
- Control input "In/Ctrl" with control current indication (YELLOW LED).
- "O.K." and availability indication (GREEN LED).
- Short-circuit and overload indication (fault indication F and RED LED).
- "Err1" group fault signalisation – all faults will be signalled:
  - wire breakage in the load circuit
  - earth fault at switching output
  - internal faults
  - overload or short circuit in the load circuit
- "Err2" fault signalisation:
  - only overload or short circuit in the load circuit
  - reset required
- Integral protection against reverse polarity and overvoltage for the control and load circuit

Ordering information

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-1072</td>
<td>Solid State Remote Power Controller SIRPC</td>
</tr>
<tr>
<td>100</td>
<td>(trips only with overload or short circuit)</td>
</tr>
<tr>
<td></td>
<td>Voltage rating of load DC 24 V</td>
</tr>
<tr>
<td></td>
<td>Current rating 3 A</td>
</tr>
</tbody>
</table>

Technical data (Tambient = 25 °C, UB = DC 24 V)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage rating UN</td>
<td>DC24 V</td>
</tr>
<tr>
<td>Operating voltage UB</td>
<td>DC 18...36V</td>
</tr>
<tr>
<td>Current rating IN</td>
<td>max. 3 A</td>
</tr>
<tr>
<td>Current consumption I0</td>
<td>typically 24 mA</td>
</tr>
<tr>
<td>(UB = &quot;0&quot;)</td>
<td></td>
</tr>
<tr>
<td>Power loss Pmax</td>
<td>typically 3.5 W</td>
</tr>
<tr>
<td>Residual ripple for all voltages</td>
<td>max. 5 % (3 phase bridge)</td>
</tr>
<tr>
<td>Reverse polarity protection UB integral</td>
<td>- fault release, LEDs not lighting</td>
</tr>
<tr>
<td>Insulation voltage</td>
<td>AC 500 V (control circuit, load circuit, fault indication &quot;Err1&quot; and &quot;Err2&quot;)</td>
</tr>
</tbody>
</table>

Load Circuit
- Load output two pole switching output (minus and plus switching), MOS transistors
  - Max. load data DC 24 V/3 A (no derating over the entire temperature range!)
- Min. load data DC 24 V / 50 mA (wire break threshold 30 mA)
- Voltage trop at IN typically 0.9 V (Ri typically 300 mΩ)
- Switch times (ton / toff) typically 2 ms (resistive load)
- Overload disconnection approx 1.15 x IN (typically 3.45 A)
- Trip time (Iload= 2 x IN) typically 400 ms
- Short-circuit current ISC typically 12 A current limitation
- Trip time (upon I0) typically 50 ms, 2 pole isolation of load circuit after approx. 200 ms
- Leakage current (US = "0") typically 1 mA
- Free-wheeling circuitry integral
- Load current measurement no isolation of load circuit required as a (term. 33: +shunt/term. 34: -shunt) the device.
- Measurement by voltmeter terminal 33 - terminal 34 (100 mV =1 A)
- Isolation of load circuit 2 pole by relay contacts - by manual release of RED button - approx. 200 ms after electronic tripping due to overload or short circuit ("OFF")
### Technical data (cont’d)

#### Control circuit
- Control "In/ Ctrl": internal low-level signal relay in control input (with integral free-wheeling diode)
- Control voltage $U_S$:
  - "0": 0 ... 2.4 V
  - "1": 18 ... 32 V
- Control voltage $I_S$: typically 5 ... 10 mA
- Switching frequency $f_{\text{max}}$: 10 Hz
- Control signal ($U_S$:"1") "In/ Ctrl" YELLOW LED lights with $I_S$
- Protection: reverse polarity protection (diode), overvoltage protection (varistor)

#### Fault indication "Err1"
- Group fault signalisation
- Potential-free relay contact N/O, DC 30 V/0.5 mA ... 1 A
- Wire breakage in the load circuit
- Other faults (ground fault in load circuit or internal fault)
- Overload/short circuit (= "Err2")
- LED RED "Error" lighted
- LED GREEN "O.K." not lighted
- Relay contact "Err1" closed

#### Signal delay
- Typically 600 ms

#### Fault indication "Err2"
- Fault indication
- Potential-free auxiliary contact, make contact N/O, DC 30 V/0.5 mA ... 1 A
- Overload or short circuit in the load circuit
- LED RED "Error" lighted
- LED GREEN "O.K." not lighted
- Relay contact "Err1" closed
- Auxiliary contact "Err2" closed
- RED button "OFF"
- Reset required
- Load circuit isolated 2 pole
- Manual release "OFF"
- Reverse polarity of UB (LEDs not indicating)

#### Signal delay
- Typically 200 ms

#### General data
- Ambient temperature: 0 ... +50 °C (without condensation)
- Storage temperature: -20 ... +70 °C

#### Terminals
- COMBICON MSTBO 2.5/4 1x2.5 mm² max. 16 pole
- Some are double terminals -> loop-through possibility (continuous load max. 12 A)

#### Back-up protection
- For SSRPC: circuit breaker for plus line (term. 41/42)
- Depending on power supply capacity and number of loop-through arrangements, max. 12 A (= max. continuous load of the COMBICON terminals)

#### Housing material
- PA 66- FR

#### Mounting
- Symmetric rail to EN 50022-35

#### Vibration
- 3 g, to IEC 68-2-6 test Fc

#### Degree of protection
- (IEC 529/DIN 40050):
  - IP20 housing
  - IP20 terminals
- Emitted interference EN 50081-1: interference suppression EN 61000-6-2

#### Mounting dimensions
- 22.5 x 99 x 122 mm (w x h x d)
- Approx. 130 g

### Status matrix

<table>
<thead>
<tr>
<th>Operating status</th>
<th>Fault-free operation</th>
<th>Short circuit/overload in load circuit</th>
<th>Wire break in load circuit</th>
<th>Other faults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control input</td>
<td>&quot;0&quot;</td>
<td>&quot;1&quot;</td>
<td>&quot;0&quot;</td>
<td>&quot;0&quot;</td>
</tr>
<tr>
<td>Load output</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>Load circuit</td>
<td>isolated 2 pole (via relay contacts)</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
</tbody>
</table>

### Typical time/current characteristics

**Current limitation**
- Current limitation: typical trip point: $1.15 \times I_L$
- Short-circuit disconnection in typically 50 ms

**Graph**
- Trip time in ms vs load current in A
- Typical trip point: 1.15 x $I_L$
- Short-circuit disconnection in typically 50 ms
Solid State Remote Power Controller E-1072-100

Dimensions

Connection diagram

Basic circuit diagram

Terminal selection

Level | Terminal | Remark
--- | --- | ---
1 | 11 | +U_B (control voltage plus) DC 18...32 V
1 | 13 / 14 | -U_B (control voltage minus)
1 | 12 | not use
2 | 21 | “Err2” fault indication OL/SC (signal contact NO)
2 | 22 / 23 | joint terminal “Err1”, “Err2” C
2 | 24 | “Err1” group fault indication (relay contact NO)
3 | 31 | load (+) DC 24 V / max. 3 A
3 | 32 | load (-)
3 | 33 / 34 | load current measurement by voltmeter (shunt 0.1 Ω/±1 % integral with device, 100 mV = 1 A) term. 33: shunt+ / term. 34: shunt-
4 | 41 / 42 | +U_B (operating voltage plus) DC 18...36 V
4 | 43 / 44 | -U_B (operating voltage minus)

Top side

LEVEL 2 (fault indication)
LEVEL 1 (control input)

Cable side (bottom)

LEVEL 3 (load circuit)
LEVEL 4 (voltage supply)

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved. Product markings may not be exactly as the ordering codes. Errors and omissions excepted.
**Description**

The E-T-A Solid State Remote Power Controller E-1072-2.. complies with the EC Machinery Directive and meets the requirements of EN60204 part 1 “Electrical equipment of machinery, safety of machinery” in ungrounded DC 24 V supply systems (“IT systems”).

The E-1072-2.. is a double pole electronic switching amplifier for magnetic valves (hydraulic and pneumatic mechanisms), magnetic brakes and magnetic couplings with rated voltage DC 24 V and a max. current rating of 1 A or 2 A. It combines true circuit breaker characteristics with additional diagnostic functions.

**Why use the E-1072-2..**

- for double pole switching of actuators (magnetic valves, magnetic brakes) in machinery and equipment
- for monitoring the electronic function of the loads and signal to the PLC
- for preventing a voltage dip of the DC 24 V output voltage in a switch-mode power supply, in the event of a short circuit, as a true 2 pole, remotely controllable electronic circuit breaker
- for protecting the cables of the load circuit
- for status signalling and for visually indicating load circuit faults (LEDs or RED trip button) via potential-free signal contacts
- for double-pole physical isolation of the load circuit - manually or electrically in the event of a failure (short circuit/overload)

**Features**

- Voltage rating DC 24 V (18...36 V)
- Current rating IN max. 1 A or 2 A (min. load current 30 mA)
- Activates and monitors DC 24 V magnetic valves
- PLC controllable 2 pole remote power controller with physical isolation of control input
  - Switching output with integral current limitation to 2 x IN
  - Disconnection of load in the event of short circuit or overload, followed by double pole physical isolation of load
  - Permanent wire break monitoring of load circuit
  - Group fault signalisation by relay contact “Err1”
  - Additional signal contact “Err2” when integral circuit breaker has tripped due to short circuit or overload in the load circuit
  - LED displays: LED green: OK
  - LED red: Error
  - LED yellow In/Ctrl (control current indication)
  - Integral reverse polarity protection and overload protection for control and load circuit
  - No back-up fuse required due to integral fail-safe element
  - Track-mountable, width 22.5 mm

**Additional feature E-1072-210**

- additional “status indication” relay output to facilitate confirmation to a PLC; for example, of activation and a load current >30 mA

**Additional feature E-1072-220** (see fig. “inrush current curve magnetic valves”)

- Analogue output 4-20 mA proportional to load current enables permanent monitoring of magnetic valve circuits as well as recording of the load current via ET200 sub-assemblies or field bus modules (with analogue input). In addition it is possible to check the inrush current characteristic curve of a magnetic valve to determine whether the armature of the valve has moved or is stuck.

**Technical Data**

<table>
<thead>
<tr>
<th>Voltage rating U_N</th>
<th>Operating voltage U_I</th>
<th>Current rating I_N</th>
<th>Current consumption I_0</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC24 V</td>
<td>DC 18...36 V</td>
<td>max. 1 A or 2 A</td>
<td>typically 22 mA</td>
</tr>
<tr>
<td>(U_B = “0”)</td>
<td></td>
<td>(I_N = 30 mA)</td>
<td></td>
</tr>
<tr>
<td>Power loss P_max</td>
<td>Residual ripple for all voltages</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(I_N=1 A)</td>
<td>typically 1.6 W</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>max. 5 % (3 phase bridge)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Caution: Ensure free travel of actuator button!!</td>
<td></td>
</tr>
</tbody>
</table>

- Voltage drop at I_N (with k=1 A) typically 0.8 V
- Switching times (t_ST / t_OF) typically 1 ms (resistive load)
- Overload disconnection approx 1.15 x I_N
- trip time (t_trip= 1.5 x I_N) typically 1 s
- Short-circuit current I_K typically 2 x I_N current limitation
- Trip time (upon I_K) typically 300 ms, 2 pole isolation of load circuit after approx. 200 ms
  - => RED LED indicates, fault indication F “Err1” and “Err2”
- Leakage current (U_B = “0”) typically 1 mA
- Free-wheeling circuitry integral
- Load current measurement (term. 33: +shunt/ term. 34: -shunt)
  - no isolation of load circuit required as a load current measurement (term. 33: +shunt/ term. 34: -shunt)
  - measuring shunt is integral with the device. Measurement by voltmeter terminal 33 - terminal 34 (200 mV = I_Q)
- Isolation of load circuit 2 pole by relay contacts
  - - by manual release of RED button
  - approx. 20 ms after electronic tripping due to overload or short circuit (“OFF”)
## Technical Data (TU = 25°C, U_B = DC 24 V (TU = ambient temperature at U_B))

### Control circuit
- Control "In/Ctrl" internal low-level signal relay in control input (with integral free-wheeling diode)
- Control voltage U_B in "0": 0 ... 2.4 V
- "1": 18 ... 32 V
- Control voltage I_S typically 5 ... 10 mA
- Switching frequency f_max 10 Hz
- Control signal (U_S = "1") "In/Ctrl:" YELLOW LED lights with I_S flowing
- Protection reverse polarity protection (diode), overvoltage protection (varistor)

### Fault indication
- **"Err1"** group fault signalisation potential-free relay contact N/O, (closed circuit principle) DC 30 V/5 mA...1 A
- relay contact "Err1" open
- wire breakage in the load circuit
- load current < 30 mA
- other faults (ground fault in load circuit or internal fault)
- overload/short circuit (= "Err2")
- LED RED "Error" lighted
- LED GREEN "O.K." not lighted
- relay contact "Err1" closed

### Signal delay
- **"Err2"** typically 600 ms fault indication potential-free auxiliary contact, make contact N/O, DC 30 V/5 mA...1 A

### Fault indication
- **"Err2"** signal contact "Err2" closed
- overload or short circuit in the load circuit
- LED RED "Error" lighted
- LED GREEN "O.K." not lighted
- relay contact "Err2" open
- auxiliary contact "Err2" closed
- RED button "OFF" reset required
- load circuit isolated 2 pole
- manual release "OFF"
- reverse polarity of U_B (LEDs not indicating)

### Option –210
- with status indication "BM" potential-free relay contact DC 30 V / 5 mA...1 A
- relay contact closed, if I_load >30mA
- relay contact open, with wire breakage and after tripping of circuit breaker
- analogue output proportional to load current "ANA" 4-20 mA, max. load 500 Ω on –U_B (term. 44)
- U_B = "0" -> 4 mA
- U_B = "0" -> 4 mA with 0 A (load current)
- 20 mA with I_S
- Accuracy: ± 5 % of measured value

### Option –220
- analogue output option-220
- 4 mA load: 20 mA max. load
- 4 mA load: 4 mA max. load
- RED button to be reset
- load: 0 mA
- ground fault in load circuit or internal fault

### General data
- Ambient Temperature 0...+50 °C (without condensation)
- Storage temperature -20 ...+70 °C
- Terminals COMBICON MSTBO 2.5/4 1x2.5 mm² max. 16 pole
- Some are double terminals -> loop-through possibility (continuous load max. 12 A)
- Back-up protection for SSRPC not required because of integral fail-safe element with VDE approval
- Housing material PA 66-FR
- Mounting Vibration IP20 housing
- Degree of protection (IEC 529/DIN 40050) IP20 terminals
- EMC emitted interference EN 50081-1 interference suppression EN 61000-6-2
- Mounting dimensions Mass

### Operating information

#### Type
- **E-1072** Solid State Remote Power Controller
- **Version**
  - 210 with additional option: status indication
  - 220 with additional option: analogue output 4-20 mA
- **Voltage rating of load**
  - DC 24 V
- **Current rating**
  - 1 A or 2 A

#### Status matrix

<table>
<thead>
<tr>
<th>Operating status</th>
<th>Fault-free operation</th>
<th>Short circuit/overload in load circuit</th>
<th>Wire break in load circuit</th>
<th>Other faults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load output</td>
<td>&quot;0&quot;</td>
<td>&quot;1&quot;</td>
<td>&quot;1&quot;</td>
<td>&quot;0&quot;</td>
</tr>
<tr>
<td></td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td>2 pole non-conductive</td>
<td>2 pole non-conductive</td>
<td>2 pole non-conductive</td>
<td></td>
</tr>
</tbody>
</table>

#### Indicator

<table>
<thead>
<tr>
<th>Indicator</th>
<th>YELLOW LED &quot;In/Ctrl&quot;</th>
<th>GREEN LED &quot;O.K.&quot;</th>
<th>RED LED &quot;Error&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Option –210
- with status indication "BM" potential-free relay contact DC 30 V / 5 mA...1 A
- relay contact closed, if I_load >30mA
- relay contact open, with wire breakage and after tripping of circuit breaker
- with U_B = 0 V: group fault signalisation »Err1« (closed circuit principle)

### Option –220
- analogue output proportional to load current "ANA" 4-20 mA, max. load 500 Ω on –U_B (term. 44)
- US = "0" –> 4 mA
- US = "0" –> 4 mA with 0 A (load current)
- 20 mA with IN
- Accuracy: ± 5 % of measured value

### Remark
- Available load" >30 mA or <1 A or 2 A N
- RED button to be reset
- load" <30 mA
- ground fault in load circuit or internal fault

### Operating modes at:
- reverse polarity: indication of fault "Err2"; LEDs not illuminated!
- manual release "OFF" (RED button out): indication of fault "Err1" and "Err2", additionally lighted LED RED "Error".
- with U_B = 0 V: group fault signalisation »Err1« (closed circuit principle)
### Dimensions

- Width: 8.315 mm
- Height: 3.90 mm
- Depth: 3.115 mm

Symmetrical rail to DIN 50022-35

This is a metric design and millimeter dimensions take precedence (mm) inch.

### Connection diagram

#### Basic circuit diagram -210

- Circuit diagram with basic components and labels:
  - Power mosfet yellow
  - Electronic control unit
  - Shunt load red green
  - Status in/off
  - LED colors: yellow (OK), green (O.K.), red (Error)
  - Button colors: red (OFF), yellow
  - Contact labels: Err1, Err2, BM, ANA

- Shown in “OFF” condition with no load (UB= 0 V) and red button tripped.

#### Basic circuit diagram -220

- Circuit diagram with basic components and labels:
  - Power mosfet yellow
  - Electronic control unit
  - Shunt load red green
  - Status in/off
  - LED colors: yellow (OK), green (O.K.), red (Error)
  - Button colors: red (OFF), yellow
  - Contact labels: Err1, Err2, BM, ANA

- Shown in “OFF” condition with no load (UB= 0 V) and red button tripped.

### Inrush current curve magnetic valve

- Graph showing inrush current curve:
  - Curve 1: Armature of valve has moved and reached its final position.
  - Curve 2: Armature of valve has not moved.

- Approx. 40 ms

1. Inrush current curve if armature of valve has moved and reached its final position.
2. Inrush current curve if armature of valve has not moved.
## Terminal selection

<table>
<thead>
<tr>
<th>Level</th>
<th>Terminal</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11</td>
<td>+U_S (Control voltage plus)</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>not used</td>
</tr>
<tr>
<td></td>
<td>13 / 14</td>
<td>-U_S (Control voltage minus)</td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td>option-210: Kl. 21 (+)</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td>option-220: Kl. 22 (-)</td>
</tr>
<tr>
<td></td>
<td>23 / 24</td>
<td>“Err1” group fault signalisation (relay contact)</td>
</tr>
<tr>
<td>3</td>
<td>31</td>
<td>load (+)</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>load (-)</td>
</tr>
<tr>
<td></td>
<td>33 / 34</td>
<td>load current measurement by voltmeter</td>
</tr>
<tr>
<td></td>
<td>41 / 42</td>
<td>“Err2” indication of fault circuit breaker (auxiliary contact)</td>
</tr>
<tr>
<td>4</td>
<td>43</td>
<td>+U_B (operating voltage plus)</td>
</tr>
<tr>
<td></td>
<td>44</td>
<td>-U_B (operating voltage minus)</td>
</tr>
</tbody>
</table>

### DC 18...32 V

<table>
<thead>
<tr>
<th>Top side</th>
<th>Level 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>11</td>
<td>12</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cable side (bottom)</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>32</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>41</td>
</tr>
</tbody>
</table>

### Typical time/current characteristics

- **Disconnection**
  - typ. 1.15 x I_n

- **Current limitation**
  - typ. 2 x I_n

- **Short circuit disconnection**
  - typ. 360 ms

- **Trip time in seconds**
  - min. 1.05 x I_n
  - max. 1.25 x I_n

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Description

The E-T-A Solid State Remote Power Controller E-1072 is a double pole electronic switching amplifier suitable for resistive and inductive loads (solenoids, magnetic brakes etc.) as well as for lamp loads and capacitive loads.

The double pole electronic switching output eliminates inadvertent start-up or dangerous machine movements as may arise upon a ground fault in systems with ungrounded power supply ("IT systems") (see Machinery Directive 89/392/EEC and 93/44/EEC or EN 60204 part 1).

Typical applications

- Two pole actuator switching for machinery and plants.
- Monitoring of the electrical functionality of these loads.
- In-rush current limitation of lamp and capacitive loads.
- Protection of load circuit cables.
- ON and fault indication (by LEDs or RED trip button) and signalling (via potential-free auxiliary contact).
- Two pole physical isolation upon overload or when tripped manually.

Features

- PLC controllable electronic switching amplifier (max. 3 A) with additional protective and control functions for DC 24 V loads (e.g. solenoids, magnetic brakes, electromagnetic clutches, monitoring and indicator lamps).
- Overload and short-circuit proof double pole switching output with in-rush current and short-circuit limitation.
- Electronic disconnection upon
  - an overload in the load circuit,
  - short-circuit in the load (load+/load-, load+/-UB, and load-/+UB),
  - followed by 2 pole isolation of the load circuit (via relay contacts).
- Control input with control current indication (YELLOW LED).
- OK and availability indication (GREEN LED).
- Short-circuit and overload indication (fault indication F and RED LED).
- Continuous wire break monitoring of the load circuit (fault indication F and ORANGE LED).
- Additional supervision of the power transistors and load output potential (e.g. ground fault) when not energized. Deviation from required state is indicated as an internal fault (fault indication F, RED + ORANGE LEDs).
- Integral reverse polarity and overvoltage protection of control and load circuits.
- Integral fault indication F (wire break, short-circuit, overload, ground fault, internal fault)
  - switch contact (N/O) with external status indication (RED actuator button tripped).
  - internal fault storage (push RED button to reset).
- Electronic disconnection upon
  - an overload in the load circuit,
  - short-circuit in the load (load+/load-, load+/-UB, and load-/+UB),
  - followed by 2 pole isolation of the load circuit (via relay contacts).
- Control input with control current indication (YELLOW LED).
- OK and availability indication (GREEN LED).
- Short-circuit and overload indication (fault indication F and RED LED).
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- Integral reverse polarity and overvoltage protection of control and load circuits.
- Integral fault indication F (wire break, short-circuit, overload, ground fault, internal fault)
  - switch contact (N/O) with external status indication (RED actuator button tripped).
  - internal fault storage (push RED button to reset).

Ordering information

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Solid State Remote Power Controller SSRPC CF2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage rating of load DC24 V</td>
<td></td>
</tr>
<tr>
<td>Current rating 3 A</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type No.</th>
<th>E-1072 - CF2   - DC24 V = 3 A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage rating of load DC24 V</td>
<td></td>
</tr>
<tr>
<td>Current rating 3 A</td>
<td></td>
</tr>
</tbody>
</table>

Technical data (Tambient = 25 °C, U_B = DC 24 V)

<table>
<thead>
<tr>
<th>Voltage rating U_N</th>
<th>DC24 V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage U_B</td>
<td>DC 18...36 V</td>
</tr>
<tr>
<td>Current rating I_N</td>
<td>max. 3 A</td>
</tr>
<tr>
<td>Current consumption I_0 (U_B = &quot;0&quot;)</td>
<td>typically 24 mA</td>
</tr>
<tr>
<td>Power loss P_max (I_N=3 A)</td>
<td>typically 3.5 W</td>
</tr>
<tr>
<td>Residual ripple for all voltages</td>
<td>max. 5 % (3 phase bridge)</td>
</tr>
<tr>
<td>Reverse polarity protection U_B</td>
<td>integral -&gt; fault release, LEDs not lighting</td>
</tr>
</tbody>
</table>

Caution: Ensure free travel of actuator button!!

- Load circuit

  - two pole switching output (minus and plus switching), MOS transistors
  - Load output (term. 31-term. 32)
  - Max. load data DC 24 V/3 A (no derating over the entire temperature range!)
  - Min. load data DC 24 V / 50 mA (wire break threshold 30 mA)
  - Voltage trip at I_N typically 0.9 V (R_I typically 300 mΩ)
  - Switch times (t_on / t_off) typically 2 ms (resistive load)
  - Overload disconnection approx. 1.15 x I_N (typically 3.45 A)
  - Trip time (I_load= 2 x I_N) typically 400 ms
  - Short-circuit current I_C typically 12 A current limitation
  - Trip time (upon I_C) typically 50 ms, 2 pole isolation of load circuit after approx. 1 s
- Wire break monitoring

  - -> RED LED indicates, fault indication F with the load switched on or off; RED button trips after approx. 1 s
  - -> ORANGE LED indicates, fault indication F (U_B="0") wire break threshold R_load>100 kΩ (U_B="1") minimum current I_load<30 mA

- Supervision of load circuit

  - with the load switched on, the load current is monitored via the two switching outputs
  - GREEN LED indicates (OK signal), I_load>30 mA
  - wire break monitoring (term. 33: +shunt)/
  - Load current measurement (term. 34: -shunt)

- Leakage current (U_B = "0") typically 1 mA

- Free-wheeling circuitry integral

  - Option (on request): additional quick release (max. 30 W load)

- Load current measurement no isolation of load circuit required as a

- Isolation of load circuit 2 pole by relay contacts

  - by manual release of RED button
  - approx. 1 s after electronic fault sensing (wire break, overload, short-circuit, internal fault)
Solid State Remote Power Controller E-1072-CF2

Technical data (cont’d)

Control circuit
Control via low-level signal relay in control input
(with integral free-wheeling diode)
Control voltage $U_{i0}$ “0”: 0 ... 2.4 V
“+”: 18 ... 32 V
Control voltage $I_{i0}$ typically 5 ... 10 mA
Switching frequency $f_{\text{max}}$ 10 Hz
Control signal ($U_i=+1$) YELLOW LED lights with IS flowing
Protection reverse polarity protection (diode),
overvoltage protection (varistor)

Fault indication
Fault indication F Potential-free auxiliary contact (hard gold
plated N/O contact), DC 30 V/0.5 mA ... 1 A
Faults Contact F1-F2 closed after RED button has tripped upon
- wire break in load circuit (ORANGE LED indicates)
- overload/short-circuit in load circuit (RED LED indicates)
- internal fault (RED + ORANGE LEDs indicate)
  (e.g. ground fault in load circuit, power
  transistor failure)
Faults indicated by the LEDs remain stored
  until the RED button is reset!
- manual release (GREEN LED indicates)
- reverse polarity of UB (LEDs not indicating)

Signal delay typically 1 s

General data
Ambient Temperature 0...+50 °C (without condensation)
Storage temperature -20 ...+70 °C
Terminals COMBICON MSTBO 2.5/4 1x2.5 mm²
  max. 16 pole
  Some are double terminals -> loop-through
  possibility (continuous load max. 6 A)
Back-up protection for SSRPC circuit breaker for plus line
  (term. 41/42):
  depending on power supply capacity and
  number of loop-through arrangements,
  max. 12 A (= max. continuous load of the
  COMBICON terminals)
Housing material PA 66-FR
Mounting symmetric rail to EN 50022-35
Vibration 3 g, to IEC 68-2-6 test Fc
Degree of protection (IEC 529/DIN 40050) IP20 housing
  IP20 terminals
EMC to EN 61326-1 (01-1998)
Mounting dimensions 22.5 x 99 x 122 mm (w x h x d)
Mass approx. 135 g

Operating modes

Operating status Fault-free operation Load short
circuited in load circuit Wire break
Internal fault

Control input “0” “+1” “0” “+1” “0” “+1”

Load output OFF 2 pole non-
  conductive ON 2 pole conductive
OFF 2 pole non-
  conductive OFF 2 pole non-
  conductive OFF 2 pole non-
  conductive

Load circuit isolated 2 pole
  (via relay contacts) no no yes yes yes yes

Indication

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>G</th>
<th>O</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>“0”</td>
<td>“+1”</td>
<td>“0”</td>
<td>“+1”</td>
</tr>
<tr>
<td>OK signal</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
</tr>
</tbody>
</table>

Faults indicated by the LEDs remain stored
  until the RED button is reset!

Remark availability load: RED RED RED RED
  button to button to button to button
  <30 mA button to button to button to button
  be reset be reset be reset be reset

Faults indicated by the LEDs remain stored
  until the RED button is reset!

Operating modes at:
- reverse polarity: indication of fault F; LEDs not illuminated!
- manual release (RED button out): indication of fault F,
  GREEN LED lights!

Typical time/current characteristics

![Typical time/current characteristics graph]

Current limitation: $1.15 \times I_{\text{IN}}$

Typical trip point: 1.15 \times I_{\text{IN}}

short-circuit disconnection in typically 50 ms
### Dimensions

![Diagram showing dimensions](image)

*This is a metric design and millimeter dimensions take precedence.*

### Basic circuit diagram

![Circuit diagram](image)

#### Terminal selection

<table>
<thead>
<tr>
<th>Level</th>
<th>Terminal</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC 18...32 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>11</td>
<td>+U_S (control voltage plus)</td>
</tr>
<tr>
<td>1</td>
<td>13 / 14</td>
<td>-U_S (control voltage minus)</td>
</tr>
<tr>
<td>1</td>
<td>12</td>
<td>not use</td>
</tr>
<tr>
<td>DC 24 V / max. 3 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>21 / 22</td>
<td>F1 fault indication (circuit breaker contact)</td>
</tr>
<tr>
<td></td>
<td>23 / 24</td>
<td>F2 fault indication (circuit breaker contact)</td>
</tr>
<tr>
<td>3</td>
<td>31</td>
<td>load (+)</td>
</tr>
<tr>
<td>3</td>
<td>32</td>
<td>load (-)</td>
</tr>
<tr>
<td>3</td>
<td>33 / 34</td>
<td>load current measurement by voltmeter (shunt 0.1 Ω/1 % integral with device, 100 mV = 1 A) Kl. 33: shunt+ / Kl. 34: shunt-</td>
</tr>
<tr>
<td>DC 18...36 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>41 / 42</td>
<td>+U_B (operating voltage plus)</td>
</tr>
<tr>
<td>4</td>
<td>43 / 44</td>
<td>-U_B (operating voltage minus)</td>
</tr>
</tbody>
</table>

All dimensions without tolerances are for reference only. In the interest of improved design, performance and cost effectiveness the right to make changes in these specifications without notice is reserved. Product markings may not be exactly as the ordering codes. Errors and omissions excepted.