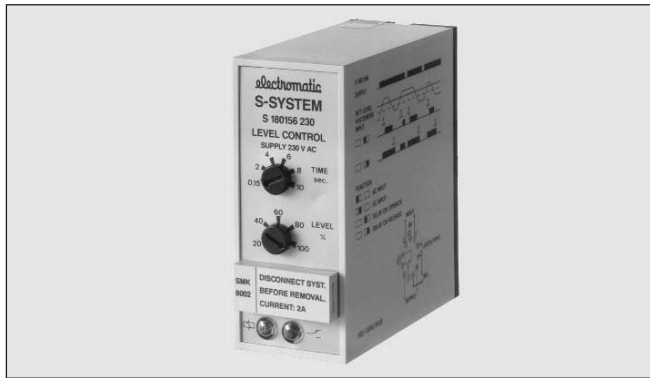


Monitoring Relays 1-Phase AC/DC Current/Voltage Type S 180



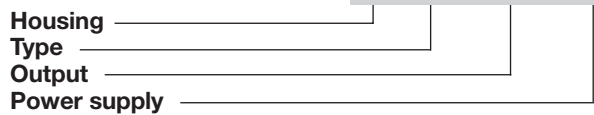
- AC/DC current/voltage control relay
- Code module for 7 current ranges (1 mA - 5A)
- Code module for 13 voltage ranges (50 mV - 500 V)
- Switch for selection of AC/DC measuring
- Built-in adjustable timer function: delay on operate and delay on release
- Maximum or minimum level detection
- Latching at set point possible
- Output: 10 A SPDT relay
- Plug-in type module
- S-housing
- LED-indication for power supply and output ON
- AC power supply

Product Description

Universal AC/DC current and plug-in voltage metering relay. Built-in time delay with both delay on operate and on release. Exchangeable module for different ranges and values. Latch function and external adjustment of hysteresis. For a wide range of applications.

Ordering Key

S 180 156 024



Type Selection

| Plug | Output | Supply: 24 VAC | Supply: 115 VAC | Supply: 230 VAC |
|----------|--------|----------------|-----------------|-----------------|
| Circular | SPDT | S 180 156 024 | S 180 156 115 | S 180 156 230 |

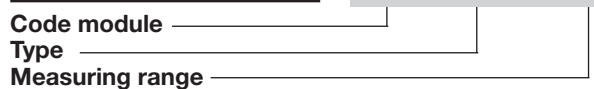
Type Selection - Volt. Code Module

| Type | Voltage range | Max. voltage | Input impedance |
|-------------------------|---------------------------------|-------------------|-----------------|
| SMK8001 50mV | 10-50 mV | 1 V | 1 kΩ |
| SMK8001 60mV | 12-60 mV | 1 V | 1 kΩ |
| SMK8001 100mV | 20-100 mV | 2 V | 4.7 kΩ |
| SMK8001 150mV | 30-150 mV | 2 V | 10 kΩ |
| SMK8001 1V | 0.2-1 V | 10 V | 70 kΩ |
| SMK8001 2.5V | 0.5-2.5 V | 30 V | 70 kΩ |
| SMK8001 4V _p | 0.8-4 V _p , MI input | 50 V _p | 70 kΩ |
| SMK8001 10V | 2-10 V | 50 V | 470 kΩ |
| SMK8001 25V | 5-25 V | 100 V | 470 kΩ |
| SMK8001 50V | 10-50 V | 150 V | 470 kΩ |
| SMK8001 150V | 30-150V | 250 V | 1 MΩ |
| SMK8001 300V | 60-300 V | 500 V | 1 MΩ |
| SMK8001 500V | 100-500 V | 600 V | 1 MΩ |

Range equal rms value of a sinusoidal voltage, except SMK8001 4V_p.

Ordering Key

SMK8001 50mV



Type Selection - Cur. Code Module

| Type | Current range | Max. current | Input impedance |
|---------------|---------------|--------------|-----------------|
| SMK8002 1mA | 0.2-1 mA | 10 mA | 102 Ω |
| SMK8002 20mA | 4-20 mA | 100 mA | 5.11 Ω |
| SMK8002 100mA | 20-100 mA | 500 mA | 1.0 Ω |
| SMK8002 500mA | 100-500 mA | 2 A | 0.1 Ω |
| SMK8002 1A | 0.2-1 A | 5 A | 0.1 Ω |
| SMK8002 2A | 0.4-2 A | 6 A | 20 mΩ |
| SMK8002 5A | 1-5 A | 10 A | 10 mΩ |



Input Specifications

| | |
|------------------|---|
| Input | |
| Pins 5 V/A | + DC/AC phase |
| Pins 6 5 A range | + DC/AC phase |
| Pins 7 V/A | - DC/AC neutral |
| Latching | Interconnection of pins 8 & 9 latching at set level |

Supply Specifications

| | |
|--------------------------------|---|
| Power supply AC types | Overvoltage cat. III (IEC 60664) (IEC 60038) |
| Rated operational voltage | 20-28 VAC, 45 to 65 Hz |
| Through pins 2 & 10 | 024 90-130 VAC, 45 to 65 Hz |
| | 115 190-270 VAC, 45 to 65 Hz |
| | 230 ≤ 40 ms |
| Voltage interruption | ≤ 40 ms |
| Dielectric voltage | None (supply/elect.) |
| Rated impulse withstand volt. | 4 kV (1.2/50 μ s) (line/neutral), no direct connection to electronics |
| Rated operational power | 2.5 VA |

General Specifications

| | |
|-----------------------|---|
| Power ON delay | ≤ 500 ms |
| Reaction time | $\tau = 0.3$ s, worst case reaction time may be up to $5 \times \tau$ |
| Indication for | |
| Power supply ON | LED, green |
| Output ON | LED, red |
| Environment | (IEC 60947-1) |
| Degree of protection | IP 20 B (IEC 60529) |
| Pollution degree | 2 (IEC 60664) |
| Operating temperature | -20° to +50°C (-4° to +122°F) |
| Storage temperature | -50° to +85°C (-58° to +185°F) |
| Weight | 200 g |
| Approvals | UL, CSA |
| CE Marking | Yes |

Output Specifications

| | | |
|--------------------------------|-------|--|
| Output | | SPDT relay |
| Rated insulation voltage | | 250 VAC (rms) (cont./elect.) |
| Contact ratings (AgCdO) | | μ (micro gap) |
| Resistive loads | AC 1 | 10 A/250 VAC (2500 VA) |
| | DC 1 | 1 A/250 VDC (250 W) |
| | or | 10 A/25 VDC (250 W) |
| Small inductive loads | AC 15 | 2.5 A/230 VAC |
| | DC 13 | 5 A/24 VDC |
| Mechanical life | | $\geq 30 \times 10^6$ operations |
| Electrical life | AC 1 | $\geq 2.5 \times 10^5$ operations (at max. load) |
| Operating frequency | | ≤ 7200 operations/h |
| Dielectric strength | | |
| Dielectric voltage | | ≥ 2 kVAC (rms) (cont./elect.) |
| Rated impulse withstand volt. | | 4 kV (1.2/50 μ s) (cont./elect.) (IEC 60664) |

Mode of Operation

S 180 is an AC/DC current/voltage metering relay. The 7 current and 13 voltage ranges are selected by means of different code modules. AC/DC metering and delay on operate/delay on release timer functions are selected by DIP-switch behind the code module. Inversion of the output is possible by interconnecting pins 9 and 11. Latching and extension of hysteresis are possible by interconnecting or adding a resistor between pins 8 and 9.

Example 1 - Delay on operate, max. level detection

The relay operates when the measured value exceeds set point for more than the set time. The relay releases when the measured value drops below set point less hysteresis. If the relay is latched it remains ON once it has been activated. Example 1 is a so-called lower min. level guard when the relay is not latched.

Example 2 - Delay on release, max. level detection

The relay operates when the measured value exceeds set point. The relay releases when the measured value drops

below set point less hysteresis for more than the set time. Example 2 is a so-called min. level guard when the relay is not latched.

Example 3 - Delay on release, min. level detection

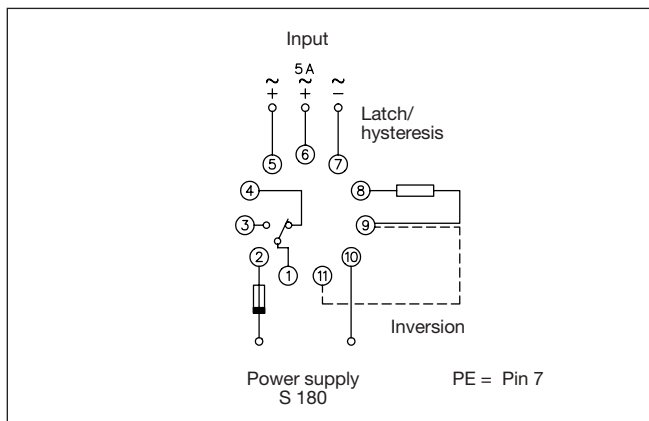
The relay releases when the measured value exceeds set point for more than the set time. The relay operates when the measured value drops below set point less hysteresis. If the relay is latched it remains ON once it has been activated. Example 3 is a so-called max. level guard when the relay is not latched.

Example 4 - Delay on release, min. level detection

The relay releases when the measured value exceeds set point. The relay operates when the measured value drops below set point less hysteresis for more than the set time. Example 4 is a so-called max. level guard when the relay is not latched.

Latching can be released by opening the contact between pins 8 and 9 or by interrupting supply voltage.

Wiring Diagram



Time/Range Setting

Time setting

By DIP-switch behind code module.

Delay on operate

Delay on release

Time range

0.15-10 s.

Min. tolerance: < 0.15 s.

Max. tolerance: -1 s, +3 s.

Time constant $\tau_{\text{amplifier}} = 0.3 \text{ s}$.

Inversion of output

Interconnect pins 9 and 11.

Latch/Hysteresis

Different hysteresis are available by inserting a resistor.

Hysteresis (% of input level)

Approx. 5%
Approx. 10%
Approx. 20%
Approx. 30%
Approx. 50%
Approx. 75%
Latch

Resistor between 8 & 9

none
750 k Ω
200 k Ω
100 k Ω
50 k Ω
20 k Ω
< 2 k Ω

AC/DC measuring

Set by switch behind code module.

AC current/
AC voltage
DC current/
DC voltage

Average value measuring principle. rms-value calibrated at sinusoidal curve (rms = 1.11 x average of sine).

Operation Diagram

t_d = Power ON delay

t = Time

