SP-100/SP-103

Current Monitor Single Phase 1A/5A AC(RMS)/DC

SLIMLINE
MONITORING RELAYS

ORDERING CODE

TYPE	MODEL	VOLTAGE	POWER SUPPLY	RELAY CONTACTS
SP	100	230V	AC	SP

SEE PAGE 32 FOR ORDERING OPTIONS

Application Examples

- Overload protection on cranes and hoists.
- Underload detection on conveyors. Conveyor belt slip-tear alarm or simple load control of conveyors.
- Simple and inexpensive load control on small industrial or agricultural installations.
- Monitoring and controlling loads on generator sets.
- Detection of blocked extruders on plastic moulding machines.
- Overload detection of single phase motors.
- Lift door control. Quickly responds to lift doors closing on foreign objects.

Features

- Failsafe feature.
- Internal shunt for direct in-line current sensing (AC or DC).
- Adjustable response delay of 0,1 to 10 seconds on SP-103.
- 1A or 5A, AC or DC input range (programmable).
- Direct interface with conventional current transformers.
- Trip point adjustable on percentage scale.
- Hysteresis adjustable 5-30%.
- Programmable for overload or underload detection.
- Latching on overload or underload (programmable).
- Start-up delay.
- 10A SPDT relay output.

Description of Operation

The **SP-100** and **SP-103** are precision current monitors for both AC and DC applications. It can be programmed for either overload sensing or underload sensing. The internal shunt facilitates direct connection into a current loop up to 5A (continuous).

AC Monitoring: The units interfaces readily with conventional current transformers (1A or 5A secondary rating). For applications with current to voltage transformers refer to the SP-101.

DC Monitoring: The units are polarity sensitive and will not respond to current in the reverse direction. To monitor currents in excess of 5A DC, refer to the SP-101.

Start-up Delay: When power is applied to the module, the relay energises immediately, ignoring abnormal load conditions experienced during start-up.

Overload Sensing: When programmed for overload sensing, the relay will de-energise if the current exceeds the setpoint. The relay will switch on again if the current drops by a certain percentage below the set overload threshold. This percentage hysteresis is adjustable.

Underload Sensing: When programmed for minimum load sensing, the relay will de-energise if the current drops below the setpoint. The relay will switch on again if the current rises by a certain percentage above the set underload threshold. This percentage hysteresis is adjustable.

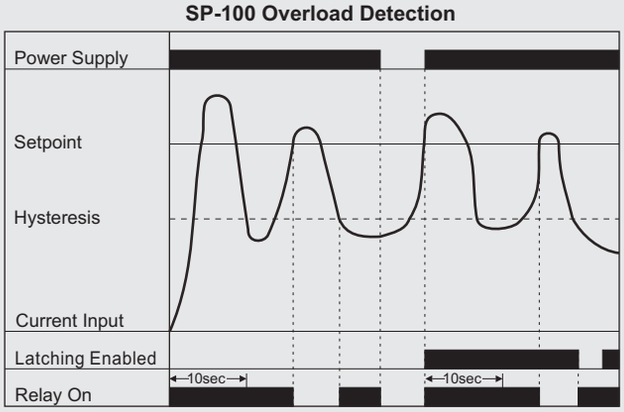
Hysteresis: Hysteresis represents the difference between the tripping point and the recovery point of the unit. The hysteresis can be adjusted as a percentage of set-point to prevent relay chatter or hunting when the load current fluctuates around the setpoint.

Latching: When latching is armed, the relay will not recover from a tripped condition, but will remain de-energised until reset. The unit can be reset by either breaking and re-applying power supply to the unit or by momentarily disabling the latching circuit (e.g. Push-to-open switch). During the start-up delay, the latching circuit is disabled automatically (see wiring and connection diagram).

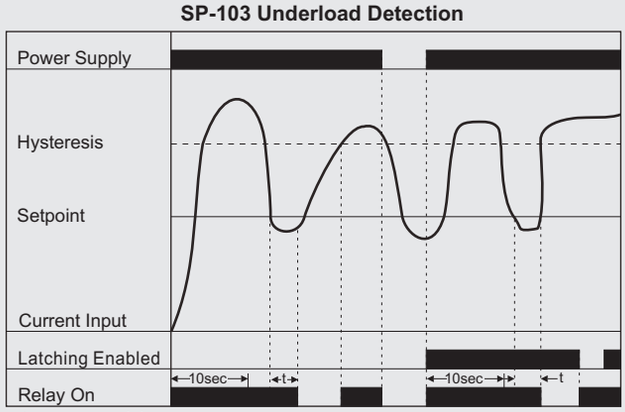
Adjustable Response (SP-103): Response delay can be adjusted from 0,1 to 10 seconds. When a trip condition is detected, the relay will only de-energise after the set response time (a delayed recovery is also available on special order).

Operational Diagrams

SP-100 Overload Detection

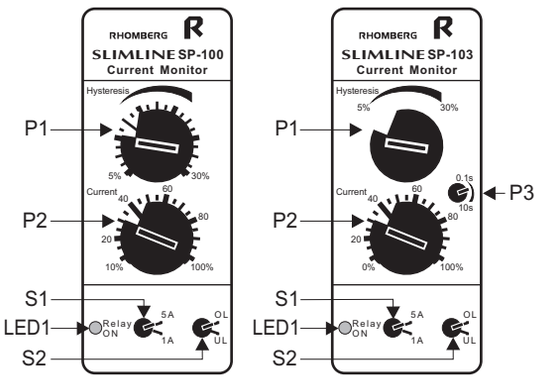


SP-103 Underload Detection



t = response delay

Description of Controls



P1: **Hysteresis** i.e. The difference between the tripping point and the recovery point is set between 5% and 30% on P1 (hysteresis relates to the setpoint of P2).

P2: The **Current Threshold** (tripping point) is adjusted on P2. Maximum setting of 100% corresponds with a current level of 1A or 5A (depending on the setting of S1).

P3: Adjustable **Response Delay** from 0.1 to 10 seconds (SP-103).

S1: The **Current Range** is set for 1A or 5A applications on S1.

S2: **Function Selection** is provided by S2. If set to "OL" the unit operates as an overload detector. If set to "UL" the unit operates as an underload (minimum load) detector.

LED 1: The red LED illuminates to indicate that the relay is energised. The LED will be off if the unit registers a fault condition (overload/underload) or the power supply to the unit is interrupted.

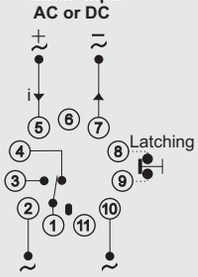
Wiring and Connection

Power Supply	
Phase/ Positive	Pin 2
Neutral/ Negative	Pin 10

Relay Contacts	
Normally Open	1 + 3
Normally Closed	1 + 4

Latching
Latching to be enabled by interconnecting pin 8 and pin 9 (e.g. Push-to-open reset switch)

Current Input AC or DC

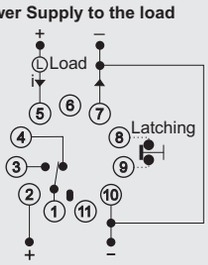


APPLICATION 1

Direct In-line Sensing: Connect the sensing input pin 5 and pin 7 in series with the current loop. For DC monitoring, the polarity must be observed (pin 5 positive, pin 7 negative).

Note: *NOT suitable for DC supply on pin 2 and pin 10.)*

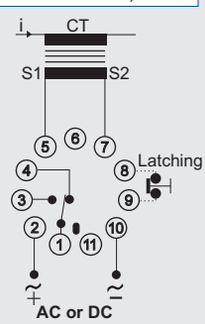
DC Power Supply to the load



APPLICATION 2

DC Current Sensing: DC power supply on pin 2 and pin 10: In this mode, the DC power supply and current sensing input share a common negative connection, since no galvanic isolation is provided.
Therefore, the current input, pin 5 and pin 7, has to be connected in series between the negative lead and the load.

Note: *Pin10 and pin7 are to be externally linked.*
DO NOT CONNECT THE LOAD BETWEEN PIN 7 AND PIN 10.



APPLICATION 3

AC Current Sensing with a Current Transformer: Connect the secondary terminals of the current transformer (S1 and S2) to the current input pin 5 and pin 7. Other devices such as ammeter, may be connected in series with the current loop, provided the VA rating of the CT is not exceeded.

Note: *Do not unplug the unit while the current loop is energised, since this will cause an open circuit of the current loop and may damage the current transformer (see "CT protection" in the general section of the catalogue on page 121).*

Technical Specifications

POWER SUPPLY

AC: Supply voltage:12, 24, 110, 230, 400, 415, 525V ±15%
Isolation (current input to power supply): 2kV
Power consumption: 3VA (approx.)
6VA for 415, 525V (approx.)

DC: Supply voltage: 10-30V, 48, 60, 110V ± 15%
Isolation: no galvanic isolation.
Power consumption: 100mA (10-30V),
30mA for 48V and higher

CURRENT INPUT

Trip point: 0.1 to 1A or 0.5 to 5A AC/DC (adjustable)
Repetitive accuracy: 1%
Hysteresis: 5% to 30% (adjustable)
Maximum input current (continuous): 6A
Peak short-term over-current (10 seconds): 20A
Current input impedance: 50 milliohms.

RESPONSE

Start-up delay: approximately 10 seconds, standard.
(0.1 to 15 seconds also possible on special order)

Response:
Start-up delay: approximately 10 seconds, standard.
(0.1 to 15 seconds also possible on special order)
Response Delay: SP-100 - 1 second
SP-103 - adjustable from 0.1 to 10 seconds
(other ranges on special order).

Additional information in Section J, page 131.