

SP-200/SP-201

Voltage Monitor
Single Phase AC(RMS)/DC

SLIMLINE
MONITORING RELAYS



ORDERING CODE

TYPE	MODEL	VOLTAGE	POWER SUPPLY	RELAY CONTACTS
SP	200	230V	AC	SP

SEE PAGE 32 FOR ORDERING OPTIONS

Application Examples

- Providing automatic control for the charging cycle of battery chargers.
- Monitoring voltage on Tacho-generators for over-speed conditions.
- Monitoring the discrimination voltage between neutral and earth to ensure that the neutral does not 'float'.
- Monitoring voltage supplies from voltage transformers in control panels.
- Monitoring the battery voltage on underground locomotives for recharging purposes.
- Monitoring the system trip circuits on high voltage switchgear.
- Monitoring the conditions of fuses which are not accessible or easy to inspect.

Features

- Failsafe feature.
- Programmable input voltage range 0V to 600V AC(RMS) or DC.
- Adjustable response delay from 0,1 to 10 seconds on SP-101.
- Voltage threshold adjustable on calibrated scale, 0-100%.
- Trip point adjustable on calibrated scale 0-100%.
- Adjustable hysteresis 5-30%.
- Programmable for over-voltage or under-voltage detection.
- Latching on over-voltage or under-voltage.
- 10A SPDT relay output.

Description of Operation

The **SP-200** and **SP-201** are precision voltage comparators for both AC and DC applications. They can be programmed for either over-voltage detection or under-voltage detection. The input voltage range is selectable from 0V to 600V in six overlapping ranges. The unit is calibrated for both AC(RMS) and DC.

AC Monitoring: The voltage monitor is connected directly across the voltage to be monitored and trips on the RMS value (assuming no AC waveform distortion).

DC Monitoring: The voltage monitor is polarity sensitive and will not respond to a voltage input with reversed polarity.

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

Under-voltage Sensing: When programmed for under-voltage sensing, the relay will de-energise if the voltage drops below the setpoint. The relay will switch on again if the voltage rises by a

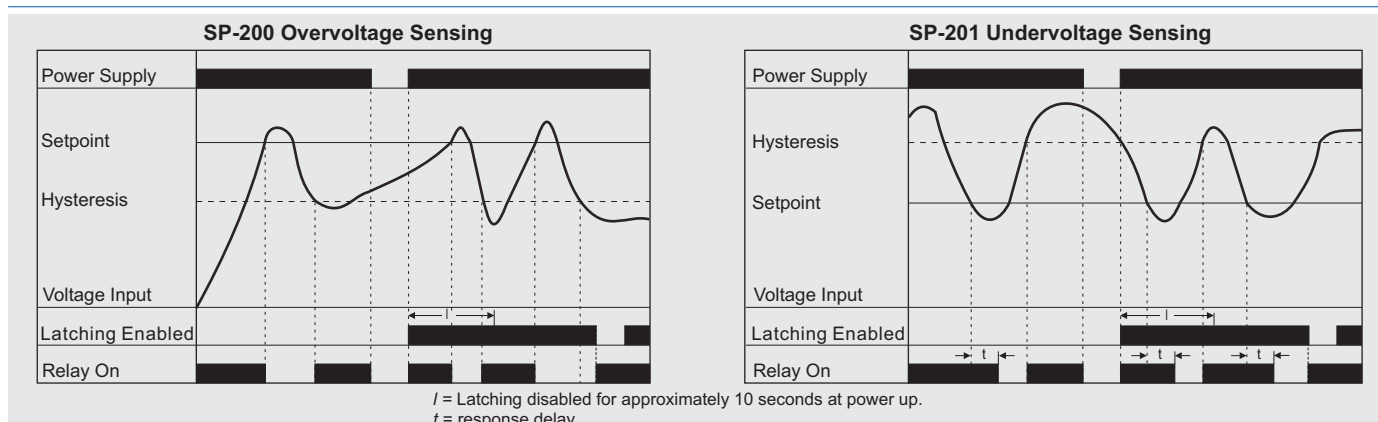
certain percentage above the set under-voltage threshold. This percentage hysteresis is adjustable.

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 setpoint to prevent relay chatter or hunting when the monitored voltage fluctuates around the setpoint.

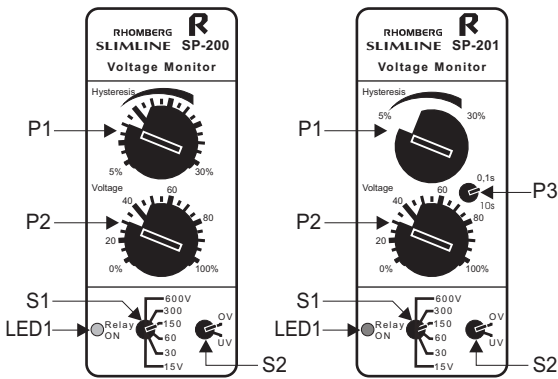
Latching: When latching is armed, the relay will not recover from a tripped condition, but will remain de-energised until reset. The unit can be reset by either breaking and re-applying power supply to the unit or by momentarily disabling the latching circuit (e.g. push-to-open switch). On power-up of the module, the latching is inactive for approximately 10 seconds.

Adjustable Response (SP-201): 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 on recovery is also available on special order).

Operational Diagrams



Description of Controls



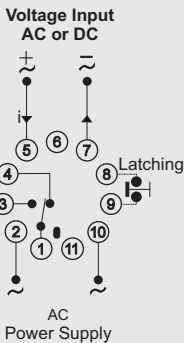
- P1: **Hysteresis** i.e. The difference between the tripping point and the recovery point is set between 5% and 30% on P1. (Hysteresis relates to setpoint P2)
- P2: The **Voltage Threshold** (tripping point) is adjusted on P2.
- P3: **Adjustable response delay** from 0.1 to 10 seconds (SP-201).
- S1: The **Voltage Range** is set on S1.
- S2: **Function Selection** is provided by S2. If set to "OV" the unit operates as an over-voltage detector. If set to "UV" the unit operates as an under-voltage detector.
- LED 1: The LED illuminates to indicate that the relay is energised. The LED will be off if the unit registers a fault condition (over-voltage/under-voltage) or the power supply to the unit is interrupted.

Wiring and Connection

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

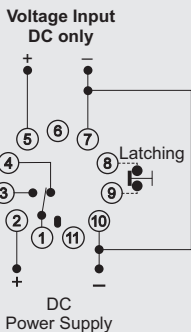
Relay Contacts	
Normally Open	1 + 3
Normally Closed	1 + 4

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



APPLICATION 1

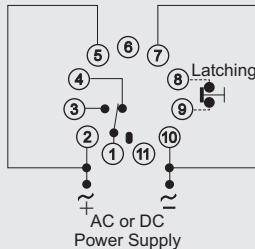
AC/DC voltage sensing, AC supply: Connect the voltage to be monitored to pin 5 and pin 7. For DC monitoring, the polarity must be observed (pin 5 positive, pin 7 negative).



APPLICATION 2

DC voltage sensing, DC supply: Connect the voltage to be monitored to pin 5 (positive) and pin 7 (negative). Link pin 7 and pin 10.

Note: For DC supply, the voltage input and power supply share a common negative (pin 7 and pin 10). There is, therefore, no galvanic isolation.



APPLICATION 3

AC/DC voltage, monitoring own supply voltage. Connect the power supply to pin 2 and pin 10. On DC supply observe polarity. Interconnect pin 5 and pin 2. Interconnect pin 7 and pin 10.

Technical Specifications

POWER SUPPLY

- AC:** Supply voltage: 12, 24, 110, 230, 400, 415, 525V $\pm 15\%$
Isolation (current input to power supply): 2kV
Power consumption: 3VA (approx.)
6VA for 415, 525V (approx.)
- DC:** Supply voltage: 10-30V, 48, 60, 110V $\pm 15\%$
Isolation: no galvanic isolation.
Power consumption: 100mA (10-30V),
30mA for 48V and higher

VOLTAGE INPUT

Repetitive accuracy: 1%
Hysteresis: 5% to 30% (adjustable)

Range	Input Impedance	Maximum Input Voltage
0-15V	500k Ohm	700V
0-30V	500k Ohm	700V
0-60V	500k Ohm	700V
0-150V	500k Ohm	700V
0-300V	500k Ohm	700V
0-600V	500k Ohm	700V

Response delay: SP-200 - 1 second.
SP-201 - adjustable from 0.1 to 10 seconds (other ranges on special order).
Latching disabled during power-up: approx. 10 seconds