SP-230/SP-231 /SP-232

Voltage Window Comparator Three Phase

SLIMLINE
MONITORING RELAYS

ORDERING CODE

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

SEE PAGE 32 FOR ORDERING OPTIONS

Application Examples

- Detection of Phase Failure.
- Phase monitoring of voltage transformers to ensure the voltage integrity of control circuits in high voltage panels.
- Monitoring of the line supply in rural areas for over- and under-voltage protection.
- Monitoring of supply voltage from standby generator sets to ensure a constant voltage supply.
- Monitoring the voltage output of UPS systems.

Features

- Failsafe feature.
- Combined over-voltage and under-voltage detection.
- Monitoring of own supply voltage.
- Adjustable response delay on SP-231
- SP-232 available with neutral.
- High precision and repetitive accuracy.
- Independent setting of over- and under-voltage tripping points.
- LED indication for type of fault and status of the relay.
- Latching facility.
- 10A SPDT relay output.

Description of Operation

The **SP-230**, **SP-231** and **SP-232** are precision voltage window comparators for three phase AC applications, monitoring phase-to-phase voltage. They respond to both over-voltage as well as under-voltage conditions. Power supply to the unit is tapped off the voltage sensing inputs.

Voltage Sensing: The relay is energised when the voltage is maintained between the set over-voltage and under-voltage thresholds. If the voltage between any two phases rises above the over-voltage setpoint or drops below the under-voltage setpoint, the relay de-energises and the appropriate LED indicates “over-voltage” or under-voltage” respectively. The relay energises again if the voltage recovers to within the set voltage window bandwidth.

Note: *The SP-230 is calibrated to respond to the RMS of sinusoidal waveform. In exceptional circumstances where voltages are not sinusoidal in nature, scale inaccuracies may be experienced.*

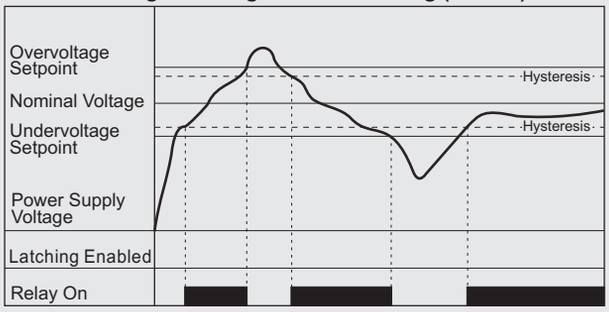
Hysteresis: Hysteresis represents the difference between the tripping point and the recovery point of the unit. The hysteresis is fixed to 2% to prevent relay chatter when the voltage fluctuates around the setpoint.

Latching: When latching is armed, the relay will not recover from a tripped condition, but will remain de-energised until reset. The appropriate LED will indicate the type of fault responsible for the tripped condition. 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.

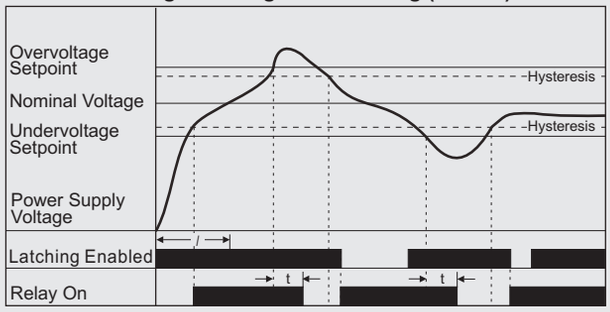
Adjustable Response (SP-231): Response delay can be adjusted from 1 to 10 seconds. When a trip condition is detected, the relay will only de-energise after the set response time (a delayed on recovery is also available on special order).

Operational Diagram

Voltage Sensing Without Latching (SP-230)

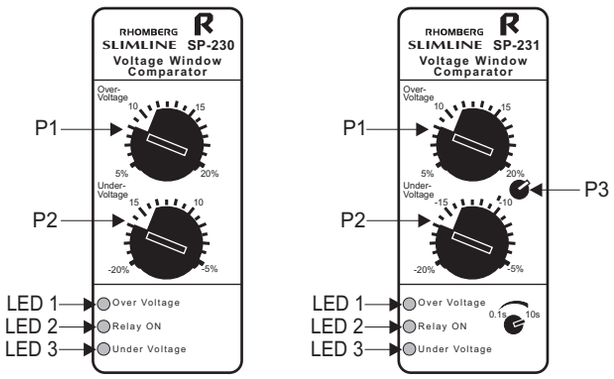


Voltage Sensing With Latching (SP-231)



I = Latching disabled for approximately 10 seconds at power up.
t = response delay

Description of Controls



P1: The **Over-voltage Threshold** is adjusted on P1.

P2: The **Under-voltage Threshold** is adjusted P2.

Note: *The scales for over-voltage and under-voltage threshold settings are calibrate in percentage deviation from nominal supply voltage.*

P3: **Adjustable Response Delay** from 0.1 to 10 seconds.

LED 1: The red LED marked "**Over-voltage**" will illuminate whenever the current exceeds the set over-voltage threshold.

LED 2: The green LED marked "**Relay ON**" will illuminate when the relay is energised, i.e. under normal supply conditions.

LED 3: The red LED marked '**Under-voltage**" will illuminate whenever the current drops below the set under-voltage threshold.

Wiring and Connection

Power Supply

The three phase R, S and T are to be connected to pins 5,6 and 7 respectively.

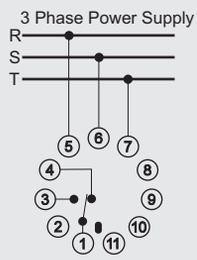
Relay Contacts

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)

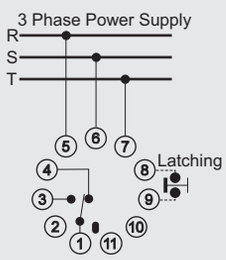
SP-230/SP-231



APPLICATION 1

Without latching

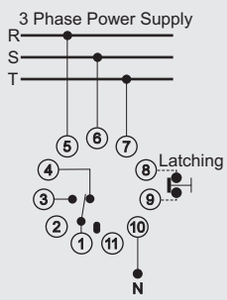
SP-230/SP-231



APPLICATION 2

With latching

SP-232



APPLICATION 3

Technical Specifications

POWER SUPPLY

Supply voltage (phase-to-phase): 12, 24, 110, 230, 400, 415, 525V AC ±15%
Power consumption: 3VA (approx.)
6VA for 415, 525V AC (approx.)

VOLTAGE SENSING

Calibrated to respond to the RMS of a sinusoidal waveform.
Repetitive accuracy: 1%
Hysteresis: 2% fixed (relative to its supply voltage).
Response delay: 1 second.
Latching disabled during power-up: approx. 10 seconds.

Additional information in Section J, page 131.