

AP-224

Combined Over-voltage and Under-voltage Monitor with 2 Independent Relays

A-LINE
MONITORING RELAYS



ORDERING CODE

TYPE	MODEL	VOLTAGE	POWER SUPPLY	RELAY CONTACTS
AP	224	230V	A	S

SEE PAGE 32 FOR ORDERING OPTIONS

Application Examples

- 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 overvoltage and undervoltage protection.
- Monitoring of supply voltage from standby generator sets to ensure a constant supply.

Features

- Fail-to-safe design.
- DIN rail format.
- Combined over-voltage and under-voltage monitoring.
- Monitoring of own supply voltage.
- Selectable power supply voltages.
- High precision and repetitive accuracy.
- Independent adjustment of over-voltage and under-voltage setpoints.
- Adjustable response times - available on trip and / or recovery (0.1 to 10 seconds).
- LED indication of Over-voltage Relay ON, and Under-voltage Relay ON (Power LED flashes when timing).
- 8A SPDT Over-voltage Relay output.

Description of Operation

The **AP-224** is a combined over-voltage and under-voltage monitor for single phase AC and DC applications. It has separate relay outputs for indicating over-voltage and under-voltage tripping. The voltage to be monitored is tapped off internally from the supply to the unit.

Voltage Sensing: The relays are energised when the voltage is maintained between the over-voltage and under-voltage setpoints. If the voltage rises above the over-voltage setpoint, the over-voltage relay de-energises. If the voltage drops below the under-voltage setpoint, the under-voltage relay de-energises.

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

Latching: When latching is enabled, the relay will not recover from a tripped condition, but will remain de-

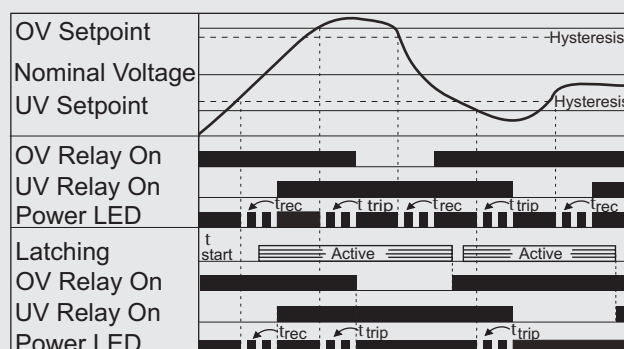
energised until reset. The unit can be reset by either interrupting its power supply to the unit or by momentarily disabling the latching circuit (e.g. push to open switch).

Start-up delay: The latching circuit is inhibited at start-up for a period of time which is adjustable from 0 to 10 seconds.

Delay on Trip: Response time on trip for over-voltage and under-voltage is adjustable from 0.1 to 10 seconds. When a trip condition is detected the relevant relay will de-energise after the set response time.

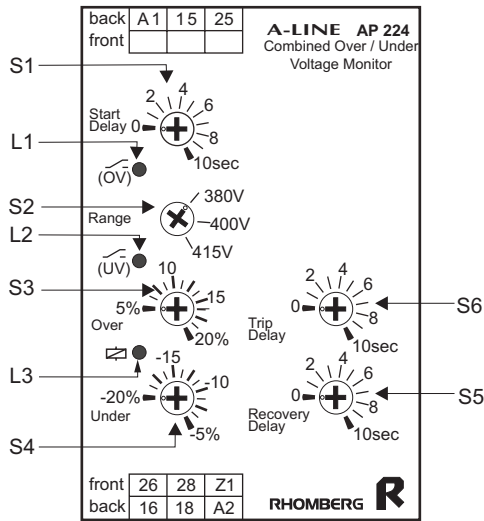
Delay on Recovery: Response time on recovery for over-voltage and under-voltage is adjustable from 0.1 to 10 seconds. When a recovery condition is detected the relevant relay will energise after the set recovery time.

Operational Diagram





Description of Controls



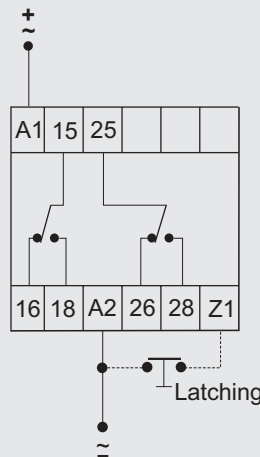
- L1: The yellow “Over-voltage” LED marked (OV) illuminates when the over-voltage relay is energised.
- L2: The yellow “Under-voltage” LED marked (UV) illuminates when the under-voltage relay is energised.
- L3: The red “Power On” LED marked ⏻ illuminates when power is supplied to the unit. It also flashes during the response time for trip and recovery.
- S1: **Start-up delay** (for disabling latching) is set on S1. This time is adjustable from 0 to 10 seconds.
- S2: **Supply voltage** is set on S2 (e.g. 380, 400 or 415V).
- S3: **Over-voltage** setpoint is adjusted on S3 (5 - 25%).
- S4: **Under-voltage** setpoint is adjusted on S4 (-20 to -5%).
- S5: **Recovery Delay** response time for the over-voltage and under-voltage is set on S5.
- S6: **Trip Delay** response time for over-voltage and under-voltage is set on S6.

Wiring and Connection

Power Supply	
Phase/Positive	A1
Neutral/Negative	A2

Undervoltage Relay Contacts	
Normally Open	15 + 18
Normally Closed	15 + 16

Overvoltage Relay Contacts	
Normally Open	25 + 28
Normally Closed	25 + 26



NOTE: Position of relay contacts are shown in the de-energised state.

Technical Specifications

POWER SUPPLY		
Supply type	AC Transformer Supply	DC Supply
Supply voltage	12, 24, 115(110, 115 or 120), 230 (220, 230 or 240), 400(380, 400 or 415), 525VAC	12, 24, 48, 60, 110VDC
Housing width	45mm	45mm
Power consumption	2VA (approx.)	30mA (approx.)
Isolation	Galvanic (without latching)	No galvanic isolation
Voltage tolerance	±20%	±20%

START-UP DELAY	
Start-up delay	0 - 10 seconds (Adjustable)

RESPONSE TIMES	
Response time on trip	0,1 - 10 seconds (Adjustable)
Response time on recovery	0,1 - 10 seconds (Adjustable)

VOLTAGE SENSING	
Setpoints	The unit is calibrated to trip on the RMS value of the supply voltage (assuming no AC waveform distortion).
Repetitive accuracy	1%
Hysteresis	2% (fixed). Hysteresis relates to the supply voltage.

Additional information in Section J, page 131.