PRODUCT SUMMARY

Three-Phase Monitor Relays provide protection against premature equipment failure caused by voltage faults on three-phase systems. They are compatible with most Wye or Delta systems with no connection to Neutral required. These relays protect against single phasing regardless of any regenerative voltages, except the PCP Series, which offers Phase Reversal protection only.

The Reference Guide below provides general information on the different versions of Three-Phase Monitor Relays offered by Macromatic.

Series	Mounting Style	Phase Loss	Phase Reversal	Phase Unbalance	Under Voltage	Over Voltage	Time Delay on Undervoltage	Approvals ●
PCP	Plug-in ●		✓					
PLP	Plug-in ●	✓	✓					
PAP	Plug-in ●	✓	✓		✓ (adj.)		4 seconds fixed	
PJP	Plug-in ●	✓	✓	Indication only	✓ (fixed)		4 seconds fixed	
PMP	Plug-in ●	✓	✓	✓ (adj.)	✓ (adj.)	✓ (fixed)	0.1 - 30 sec.	
PMP-FA	Plug-in ●	✓	✓	✓ (fixed)	✓ (fixed)	✓ (fixed)	4 seconds fixed	
PMD	DIN-Rail	✓	✓	✓ (adj.)	✓ (adj.)	✓ (fixed)	0.1 - 30 seconds	
PBDU	DIN-Rail	✓	✓	✓ (adj.)				
PC ●●	DIN-Rail	✓	✓	✓ (adj.)	✓ (adj.)	✓ (adj.)	0.3 - 30 seconds	

● All Plug-in Products are cULus Listed when used with the appropriate Macromatic socket.

●● PC Series have embedded communication via Modbus TCP, which makes data available within smart connected control systems.

PROTECTION

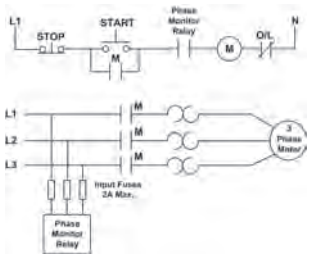
Depending on the unit selected, it will protect three-phase equipment against:

- **Phase loss** - total loss of one or more of the three phases. Also known as "single phasing." Typically caused by a blown fuse, broken wire, or worn contact. This condition would result in a motor drawing locked rotor current during start-up. In addition, a three-phase motor will continue to run after losing a phase, resulting in possible motor burn-out.
- **Phase reversal -** reversing any two of the three phases will cause a three-phase motor to run in the opposite direction. This may cause damage to driven machinery or injury to personnel. The condition usually occurs as a result of mistakes made during routine maintenance or when modifications are made to the circuit.
- **Phase unbalance -** unbalance of a three-phase system occurs when single phase loads are connected such that one or two of the lines (phases) carry more or less of the load. This could cause motors to run at temperatures above published ratings.
- **Undervoltage -** when voltage in all three lines of a three-phase system drop simultaneously. This could result in an increase in current and motor heating and a reduction in motor performance.
- **Overvoltage -** when voltage in all three lines of a three-phase system increase simultaneously. Could cause a decrease in load current and poor power factor.

TYPICAL CONNECTIONS

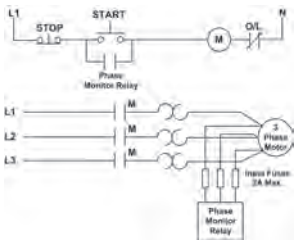
Line Side Monitoring

With the relay connected before the motor starter, the motor can be started in the reverse direction. However, the motor is unprotected against phase failures between the relay and the motor.



Load Side Monitoring

With the relay connected directly to the motor, the total feed lines are monitored. However, this connection should not be used with reversing motors.



PHASE LOSS, PHASE REVERSAL & PHASE UNBALANCE

PBDU Series

- Protects against phase loss, phase reversal and phase unbalance
- Compact 17.5 mm wide enclosure for DIN-rail mounting
- Universal voltage range: 208 - 480V AC
- LED status indication on front face for easy troubleshooting
- 5A SPDT output contact

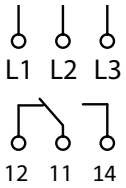
File # E236146

The PBDU Series Phase Monitor Relays protect motors and equipment from damage due to voltage faults on three-phase systems. PBDU relays monitor phase loss, phase reversal, and unbalance. Phase unbalance is adjustable from 5% to 25%, and can be disabled altogether if desired.

The compact 17.5 mm enclosure for DIN-rail mounting conserves space and reduces installation time.

LED status indication is located on the front face. Green indicates Power ON. Yellow indicates relay status. Any of the three fault conditions will de-energize the relay after a fixed trip delay of 100 ms. Re-energization is automatic upon correction of the fault condition.

Monitored voltage is universal: 208V - 480V AC.

PROTECTS AGAINST	MONITORED VOLTAGE 50/60 HZ	CATALOG NUMBER	WIRING
Phase Loss, Phase Reversal, Phase Unbalance	208 – 480V AC ■	PBDU	 **DIAGRAM 823**

■ Phase-to-Phase (Line-to-Line)

MACROMATIC

Better. By Design.

800.238.7474

WWW.MACROMATIC.COM

SALES@MACROMATIC.COM

PHASE LOSS, PHASE REVERSAL & PHASE UNBALANCE

PBDU Series

Application Data

Voltage Requirements:

RANGE (50/60Hz ±5%)	MIN VOLTAGE	MAX VOLTAGE	CATALOG NUMBER
208 – 480V AC	187V AC	528V AC	PBDU

Power Consumption:
10VA (1W) @ 400V / 50Hz
16VA (1,5W) @ 480V / 60Hz

IP Rating: IP 20

Phase Loss:
Unit trips on loss of any Phase L1, L2 or L3, regardless of any regenerative voltages.

Phase Reversal (Out-of-Sequence):
Unit trips if sequence (rotation) of the three phases is anything other than L1-L2-L3.
It will not work on L3-L2-L1.

Phase Unbalance: Adjustable from 5 - 25% unbalance or can be disabled. Unit trips when any one of the three lines deviates from the average of all three lines by more than the adjusted set point for a period longer than the adjustable trip delay.

Time Range: Trip delay, fixed 100 ms

Accuracy: ≤5%
Repeat accuracy, ±2%
Temperature influence, ≤0.05% / °C

Output Contacts: SPDT 5A @250V AC

Life:
Mechanical - 20,000,000 operations;
Electrical - 200,000 operations at 1000 VA resistive load

Temperature:
Operating, -25 to +55°C (ambient temperatures above 40°C, a side distance to other units of 5 mm must be observed).
Storage, -25 to 75°C

Humidity: -15% to 85%

Mounting: Mounts on 35mm DIN-rail

Indicators:
Green LED ON, indicates Power ON
Yellow LED ON, indicates relay status is energized

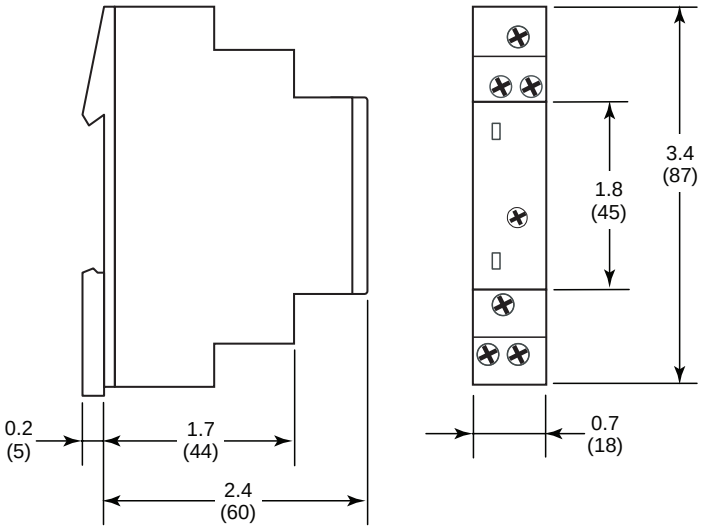
Termination:
1 x #14-20 AWG
2 x #16-20 AWG
Recommended tightening torque of 0.7 ft.lb. (1 Nm) maximum

Weight:
Single packing, 0.16 lb (72 g)

Approvals:

File # E236146

Dimensions



All Dimensions in
Inches (Millimeters)