

# PHASE LOSS, PHASE REVERSAL, PHASE UNBALANCE, UNDERVOLTAGE & OVERVOLTAGE

## PMD SERIES



- ◆ Protects against phase loss, phase reversal, phase unbalance, undervoltage, overvoltage & rapid cycling
- ◆ Wide voltage ranges to cover more global applications
- ◆ True RMS voltage measurement ensures accurate sensing across more applications
- ◆ Retains fault indication and continues monitoring all voltages even with a lost phase
- ◆ Full fault indication on top of unit for easy troubleshooting
- ◆ Manual reset option works with external switch to reset the relay from outside the enclosure
- ◆ Mounts on 35mm DIN-rail
- ◆ 10A DPDT output contacts



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The PMD Series Three-Phase Monitor Relays continuously monitor all voltages to protect motors and equipment from expensive damage due to phase loss, phase reversal, phase unbalance, undervoltage and overvoltage. These products detect single phasing and unbalanced voltages regardless of any regenerative voltages.

Utilizing an advanced microprocessor-based design allows true RMS voltage measurement with full wave monitoring. This provides a more accurate method to measure the voltages, regardless of load type or wave shape, and results in improved protection across more applications.

True RMS voltage measurement ensures accurate sensing in most generator and other applications with non-sinusoidal wave forms, eliminating nuisance tripping. Full wave monitoring provides a more accurate method to measure the voltages, regardless of load type or wave shape, resulting in improved protection across more applications.

Unlike similar three-phase monitor relays, the PMD Series will continue to function even with a lost phase. They are the only line-powered units in their class to retain fault indication and continuous monitoring of all voltages during a phase loss, increasing the ease of troubleshooting and the level of protection.

The PMD Series is a true universal product, with three units that work on a wide variety of adjustable line-line voltages to cover more global applications. Additional knobs allow adjustment of the undervoltage trip point, trip delay, restart delay and unbalance trip point. They utilize an enclosure for DIN-rail mounting that meets IEC Standards.

### Operation:

When the proper three-phase line voltage is applied to the unit and the phase sequence (rotation) is correct, the relay is energized after the Restart Delay is completed. Any one of five fault conditions will de-energize the relay after a delay. As standard, re-energization is automatic upon correction of the fault condition. Manual reset is available if an external momentary N.C. switch is connected to terminals 4 & 5. A bi-color status LED indicates normal condition and also provides specific fault indication to simplify troubleshooting.

PROTECTS AGAINST	NOMINAL VOLTAGE ▲ 50/60 Hz	CATALOG NUMBER	WIRING
Phase Loss, Phase Reversal, Phase Unbalance, Undervoltage & Overvoltage	102-138V	PMD120	
	190-500V	PMDU ■	
	460-600V	PMD575	

▲ Phase-to-Phase (Line-to-Line).

■ Dual range unit auto-senses between the 190-250V AC and 350-500V AC ranges (see Application Data on next page).

Accessories available

# PHASE LOSS, PHASE REVERSAL, PHASE UNBALANCE, UNDERVOLTAGE & OVERVOLTAGE

## PMD SERIES

### APPLICATION DATA

#### Voltage Requirements:

RANGE (50/60Hz ±5%)	MIN VOLTAGE	MAX VOLTAGE	CATALOG NUMBER
102-138V AC	77V AC	152V AC	PMD120
190-500V AC (see below)	156V AC	550V AC	PMDU
460-600V AC	345V AC	660V AC	PMD575

#### Three-Phase Line-Line Voltage:



The Voltage Line-Line knob on the PMDU has two ranges (left): a 190-250V low voltage scale and a 380-500V high voltage scale. The unit auto senses the three-phase line-line voltage when applied and automatically selects the appropriate range.

The PMD120 has a single adjustable range of 102-138V and the PMD575 has a single adjustable range of 460-600V.

**Power Consumption:** Less than 40VA.

**Phase Loss:** Unit trips on loss of any Phase A, B or C, regardless of any regenerative voltages.

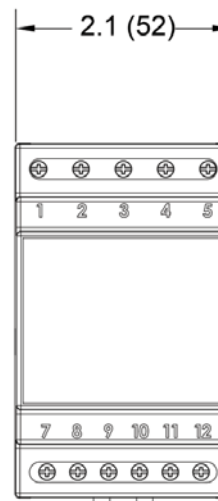
**Phase Reversal (Out-of-Sequence):** Unit trips if sequence (rotation) of the three phases is anything other than A-B-C. It will not work on C-B-A.

**Undervoltage:** Adjustable from 80-95% of the line voltage setting. Unit trips when the average of all three lines is less than the adjusted set point for a period longer than the adjustable trip delay. It will reset at +3% of the Undervoltage trip setting.

**Overvoltage:** Fixed at 110% of the line voltage setting. Unit trips when the average of all three lines is greater than the fixed set point for a period longer than the adjustable trip delay. It will reset at 107% of the line voltage setting.

**Phase Unbalance:** Adjustable from 2 - 10% unbalance. 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.

### DIMENSIONS



All Dimensions in Inches (Millimeters)

#### Response Times:

Restart:	1 - 300 seconds adjustable
Drop-out Due to Fault:	
Phase Loss and Reversal:	100ms fixed
Undervoltage and Overvoltage:	0.3 - 30 seconds adjustable
Unbalance:	
Normal:	0.3 - 30 seconds adjustable
Severe (Twice Knob Setting):	0.3 - 2 seconds

**Output Contacts:** DPDT 10 A @ 277V AC / 10A @ 30V DC;  
1/2HP @ 120/240V AC (N.O.),  
1/3HP @ 120/240V AC (N.C.),  
B300 Pilot Duty, R300 (N.O.)

**Life:** Mechanical: 10,000,000 operations; Full Load: 100,000 operations

**Temperature:** Operating: -28° to 65°C (-18° to 149°F)  
Storage: -40° to 85°C (-40° to 185°F)

**Mounting:** Mounts on 35mm DIN-rail, recommended terminal tightening torque, 7 in-lbs

#### Status LED:

LED STATUS	STATUS
GREEN	NORMAL (RELAY ON)
GREEN	RESTART (DELAY)
RED	REVERSAL
RED	LOSS/UB (UNBALANCE)
RED	LOW VOLT (UNDERVOLTAGE)
RED	HIGH VOLT (OVERVOLTAGE)

**Reset:** As standard, the PMD Series relays are in the Automatic Reset mode. However, they can be set in the Manual Reset mode by connecting an external N.C. switch across terminals 4 and 5. Upon application of line voltage, the PMD Series will go into Manual Reset mode if it recognizes a closure across terminals 4 and 5. After a fault clears, the relay will not reset until the N.C. switch is opened.

**Termination:** Cage-clamp screw terminals  
Plus-minus screws accept flat and phillips head tools  
Recommended tightening torque of 7 in-lbs  
Accepts solid or stranded wire 12-30 AWG

#### Approvals:



# SOCKETS & ACCESSORIES

## 8 Pin Octal Socket- Surface or DIN Rail-Mounted

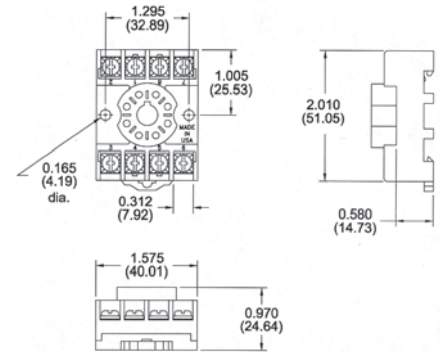
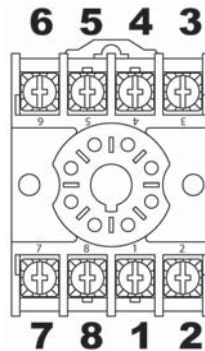
- ◆ 10A @ 600V
- ◆ 1 or 2 #12-20 AWG Wire
- ◆ Pressure Wire Clamp Terminations
- ◆ Recommended Tightening Torque  
12 in-lbs



File #E169693 File #LR701114



Catalog Number:  
70169-D



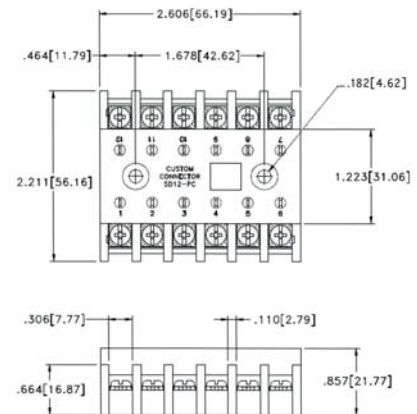
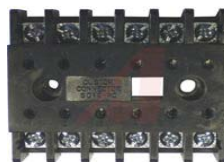
## 12 Pin Socket Surface-Mounted

- ◆ 10A @ 600V
- ◆ #12-20 AWG Wire
- ◆ Pressure Wire Clamp Terminations
- ◆ Recommended Tightening Torque  
12 in-lbs

**NOTE:** If a 12 Pin Socket is required for DIN-rail mounting, please contact Macromatic.



Catalog Number SD12-PC



## Hold Down Spring

Can be used for:

- ◆ Panel-Mounted Sockets
  - ◆ Sockets Mounted to 35mm DIN Rail \*
- \* Requires two #8, 3/4" length machine screws with washers & nuts--contact Macromatic or [www.macromatic.com/70166](http://www.macromatic.com/70166) for more information.



Catalog Number: 70166



# MACROMATIC INDUSTRIAL CONTROLS

Located in Menomonee Falls, Wisconsin, Macromatic Industrial Controls engineers and manufactures industrial relays that control electrical processes and monitor power for damaging fault conditions.

Macromatic provides solutions for almost any application in any industry. Macromatic's products are used in the HVACR, pump control, material handling, motor control, generator, and lift and elevator industries, plus more.

As an independently-owned manufacturer of state-of-the-art control and monitoring products for over 40 years, Macromatic takes pride in its short lead-time, flexible product design, and exceptional technical support.

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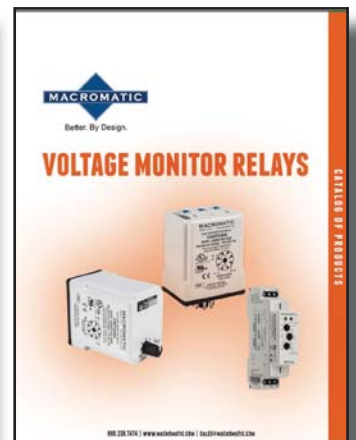
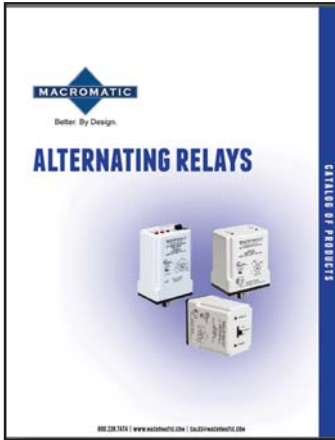
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## FAMILY OF PRODUCTS

MACROMATIC INDUSTRIAL CONTROLS



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