

# MODEL 24

## 3-Phase Monitor with Adjustable Trip & Restart Delays

- Monitors for Phase Loss, Phase Reversal, Over/Under Voltage and Voltage Unbalance
- Two Voltage Options
- LED Status Indicators
- DPDT Relay Output
- 11-Pin Socket Mount

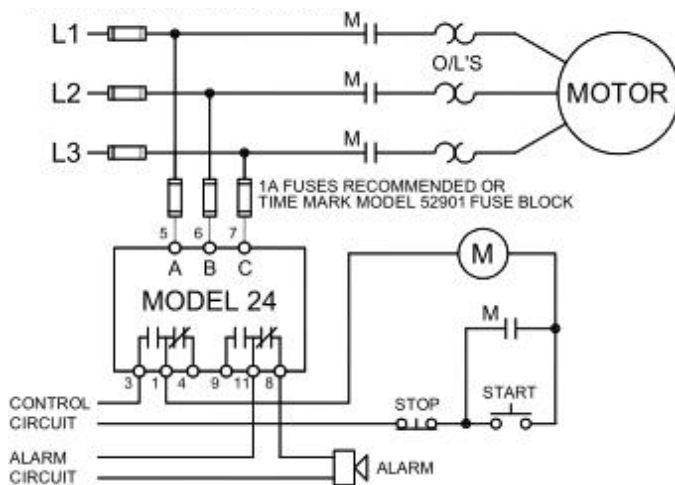
### DESCRIPTION

The Model 24 is a microcontroller-based universal 3-phase monitor for protecting 3-phase motors from abnormal power conditions. It can detect under voltage, over voltage, voltage unbalance, reverse phase, and single-phasing even when regenerated voltage is present. The Model 24 includes adjustable trip and restart delays to prevent nuisance tripping during power fluctuations and short cycling in compressor applications. The LED status indicators and adjustment pots for Voltage Adjustment, % Unbalance, Restart Delay and Trip Delay are mounted on the front of the unit for easy access.

Automatic or manual restart versions are available. The Model 24 does not require a neutral connection and can be used on either Wye or Delta systems.

All versions of the Model 24 are available with optional gold flashed silver contacts for low current applications.

### TYPICAL APPLICATION



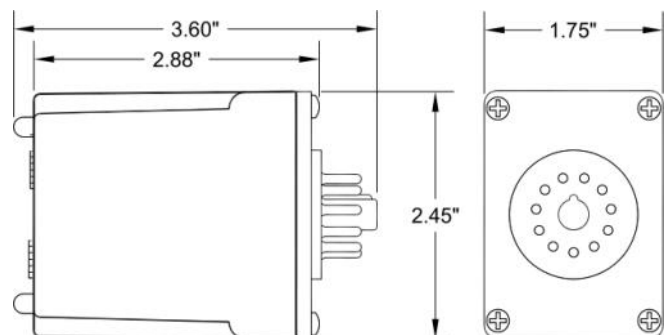
### SPECIFICATIONS

Auto Reset Models Manual Reset Models*	24 24M	24-L 24-LM
Operating Voltage	190-240 VAC	95-120 VAC
Power Consumption	1.3W at 240V	3.7W at 120V
Frequency	50/60Hz	
Type of Measurement	RMS	
Under Voltage	(% of setpoint)	
Trip	90% ±1%	
Reset	93% ±1%	
Over Voltage	(% of setpoint)	
Trip	110% ±1%	
Reset	107% ±1%	
Voltage Unbalance	(conforms to NEMA)	
Trip	2-8%, adjustable	
Reset	Trip setting minus 0.7%	
Trip Delay Time	1-30 sec., adjustable	
Over, Under, & Unbalanced	1 sec., fixed	
Single-Phasing Faults	1 sec., fixed	
Unbalance > 15%	1 sec., fixed	
Restart Delay	1-500 sec., adjustable	
Manual Reset Input*	5V open circuit/500µA short circuit	
Output Contacts	DPDT 8A at 240VAC resistive	
Operating Temp	- 20° to +140° F	
Humidity Tolerance	0-97% w/o condensation	
Enclosure	Noryl plastic	
Mounting	11-Pin Socket (**sold separately)	
Weight	9.5 oz.	
Low Current Options	Models ordered with suffix "/SG" have silver with gold flash contacts	

\* External N.C. momentary pushbutton required for manual reset.

\*\*Order 11-pin socket number 51x016

### DIMENSIONS



(dimensions have a tolerance of ± 0.06)

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# MODEL 24

# Universal 3-Phase Monitor

READ ALL INSTRUCTIONS BEFORE INSTALLING, OPERATING OR SERVICING THIS DEVICE.  
KEEP THIS DATA SHEET FOR FUTURE REFERENCE.

## GENERAL SAFETY

POTENTIALLY HAZARDOUS VOLTAGES ARE PRESENT AT THE TERMINALS OF THE MODEL 24.  
ALL ELECTRICAL POWER SHOULD BE REMOVED WHEN CONNECTING OR DISCONNECTING WIRING.  
THIS DEVICE SHOULD BE INSTALLED AND SERVICED BY QUALIFIED PERSONNEL.

## Installation Instructions

### INSTALLATION

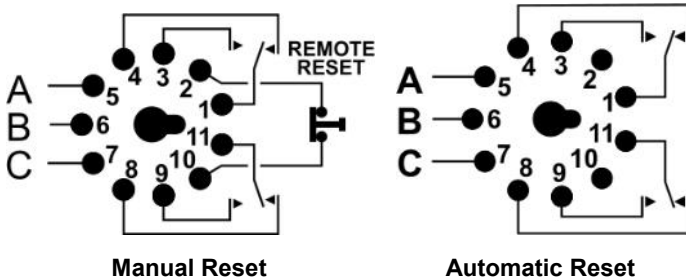
Mount the 11-pin socket in a suitable enclosure. A NEMA-1 rated enclosure, designed for socket-mounted relays is available from Time Mark Corporation.

Connect 3-phase power to terminals 5, 6, and 7 on the socket. Connect the load control wiring to the appropriate terminals on the socket.

When using manual reset versions either connect a N.C. momentary switch to terminals 2 and 10 for manual reset operation or leave open terminals 2 and 10 for automatic reset operation. Refer to wiring diagram for example of typical application.

**NOTE:** When installing the Model 24 monitor in areas of high humidity or contamination, it is recommended that the base area and all exposed metal parts of the socket be coated liberally with a good quality silicone grease, such as Dow Corning DC-4 or DC-4X. Insert the unit into the socket and wipe off excess grease around the base. This will prevent the entrance of moisture and other contaminants into the base and socket areas.

### PIN DIAGRAM



### OPERATION

Set the VOLTAGE adjustment to the nominal operating voltage. Set the UNBALANCE, RESTART, and TRIP adjustments as required for the application.

### OPERATION (cont'd)

#### Automatic Reset Versions

The relay contacts will transfer after applying correct voltage and phase rotation for the length of the restart delay. The green LED will blink during the restart delay and will then remain on indicating the relay contacts have transferred.

#### Manual Reset Versions

When operating in manual reset mode the restart delay is disabled and the monitor must always be reset manually after applying power. Both status lights will blink in unison upon applying power if the monitor was not in the tripped state prior to a loss of power.

If a fault condition is detected and the monitor trips, the relay will remain de-energized until the fault condition clears and the reset switch is pushed. If the monitor remains in the tripped state when a loss of power occurs, the fault causing the trip will be displayed on power up.

#### Automatic and Manual Reset Versions

The status of the 3-phase system is indicated by the red and green LEDs as shown in the LED Status chart:

LED STATUS		
UNDER	ON CONTINUOUSLY	RED
OVER		
UNBAL / SINGLE PH		GREEN
REVERSE PHASE		
RUN	ON CONTINUOUSLY	GRN
RESTART DELAY		

### TROUBLESHOOTING

Should the Model 24 Monitor fail to operate properly, check that all three voltages are present, and are of the correct voltage level and phase rotation (a Model 188 Phase Sequence Detector could be used to verify phase rotation). Check all fuses and verify that all wiring connections are correct. If problems persist, contact your local Time Mark Distributor or the factory for assistance (Monday-Friday, 8 a.m. to 5 p.m. CST)

### WARRANTY

This product is warranted to be free from defects in materials and workmanship, and is covered by our exclusive **5-year Unconditional Warranty**. Should this device fail to operate for any reason, we will repair it for five years from the date of manufacture. For complete warranty details, see the *Terms and Conditions of Sales* page in the front section of the Time Mark catalog or contact Time Mark at 1-800-862-2875.

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