

# MODEL 21

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

- Monitors for Phase Loss, Phase Reversal, Over/Under Voltage and Voltage Unbalance
- Three Voltage Options
- LED Status Indicators
- 8-Pin Socket Mount

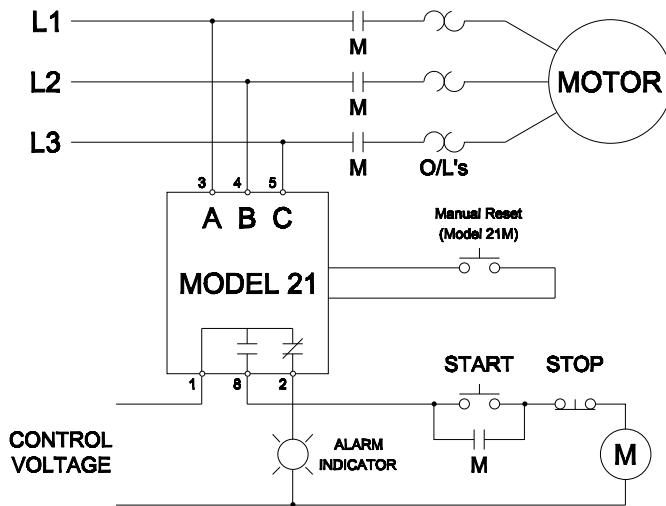
### DESCRIPTION

The Model 21 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 21 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 21 does not require a neutral connection and can be used on either Wye or Delta systems.

All versions of the Model 21 are available with optional gold flashed silver contacts for low current applications.

### TYPICAL APPLICATION



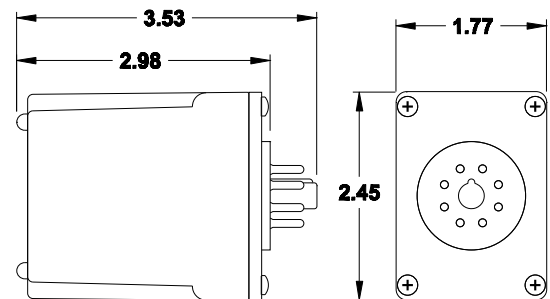
### SPECIFICATIONS

Auto Reset Models Manual Reset Models*	21 21M	21-L 21-LM	21-H 21-HM
Operating Voltage	190-480 VAC	95-120 VAC	475-600 VAC
Power Consumption	3.7W at 480V	3.7W at 120V	4.5V at 600V
Auto Ranges	Yes	No	
Frequency	50/60Hz		
Type of Measurement	RMS		
Under Voltage Trip Reset	(% of setpoint) 90% ±1% 93% ±1%		
Over Voltage Trip Reset	(% of setpoint) 110% ±1% 107% ±1%		
Voltage Unbalance Trip Reset	(conforms to NEMA) 2-8%, adjustable Trip setting minus 0.7%		
Trip Delay Time Over, Under, & Unbalanced Single-Phasing Faults Unbalance > 15%	1-30 sec., adjustable 1 sec., fixed 1 sec., fixed		
Restart Delay	1-500 sec., adjustable		
Manual Reset Input	5V open circuit/500µA short circuit		
Output Contacts	SPDT 10A at 240VAC resistive		
Operating Temp	- 20° to +140° F		
Humidity Tolerance	0-97% w/o condensation		
Enclosure	Noryl plastic		
Mounting	8-Pin Socket (**sold separately)		
Weight	9.5 oz.		
Additional Options	/SG = Silver with Gold Flash Contacts		

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

\*\*Order 8-pin socket number 51x120

### DIMENSIONS



(dimensions have a tolerance of ± 0.06)

Telephone: Main - (918) 438-1220  
Sales - (800) 862-2875  
Fax: (918) 437-7584  
E-mail: sales@time-mark.com  
Internet: http://www.time-mark.com



11440 East Pine Street  
Tulsa, Oklahoma 74116

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# MODEL 21

# 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 21.  
ALL ELECTRICAL POWER SHOULD BE REMOVED WHEN CONNECTING OR DISCONNECTING WIRING.  
THIS DEVICE SHOULD BE INSTALLED AND SERVICED BY QUALIFIED PERSONNEL.

## Installation Instructions

### WARNING

IN APPLICATIONS WHERE VOLTAGES IN EXCESS OF 300VAC ARE TO BE MONITORED, BE CERTAIN TO USE THE TIME MARK MODEL 51X120 8-PIN SOCKET, OR AN EQUIVALENT 600VAC RATED SOCKET.

### INSTALLATION

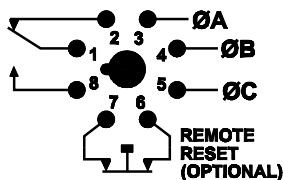
Mount the 8-pin socket in a suitable enclosure. A NEMA-1 rated enclosure, designed for socket-mounted relays is available from Time Mark Corporation.

Connect 3-phase power to terminals 3, 4, and 5 on the socket. Connect the load control wiring to the appropriate terminals on the socket.

When using manual reset versions either connect a N.O. momentary switch to terminals 6 and 7 for manual reset operation or jumper terminals 6 and 7 for automatic reset operation. Refer to wiring diagram for example of typical application.

**NOTE:** When installing the Model 21 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. Models 21 and 21M will auto-range to either the 190-240VAC or 380-480VAC scale. 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		
REVERSE PHASE		GRN
RUN	ON CONTINUOUSLY	
RESTART DELAY		

### TROUBLESHOOTING

Should the Model 21 Monitor fail to operate properly, check that all three voltages are present, and are of the correct voltage level and phase rotation (a Model 108A or 108B 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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