

# MODEL 20

## 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
- DIN Rail or Surface Mount
- UL Recognized in the U.S. and Canada



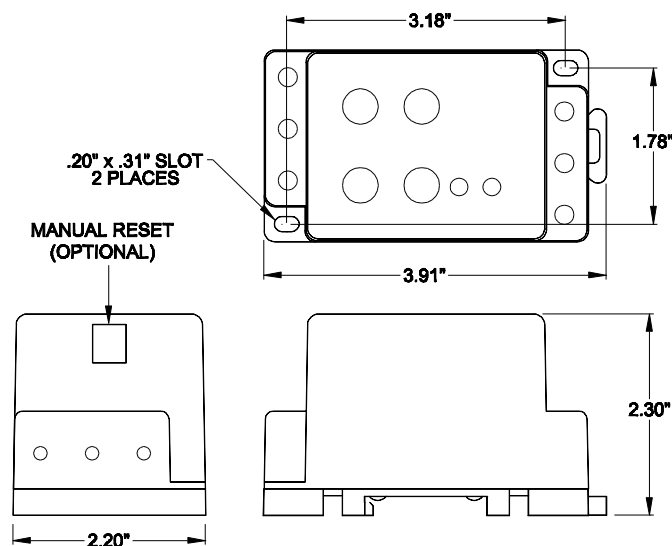
### DESCRIPTION

The Model 20 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 20 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. The Model 20 is UL Recognized in the U.S. and Canada.

Automatic or manual restart versions are available. The Model 20 does not require a neutral connection and can be used on either Wye or Delta systems.

All versions of the Model 20 are available with optional gold flashed silver contacts for low current applications.

### DIMENSIONS



(dimensions have a tolerance of  $\pm 0.06$ )

### SPECIFICATIONS

| Auto Reset Models<br>Manual Reset Models*  | 20<br>20M   | 20-L<br>20-LM | 20-H<br>20-HM |
|--|---|---------------|---------------|
| Operating Voltage  | 190-480 VAC   | 95-120 VAC    | 475-600 VAC   |
| Power Consumption  | 3.7W at 480V  | 3.7W at 120V  | 4.5W at 600V  |
| Auto Ranges  | Yes   | No            |               |
| Frequency  | 50/60Hz   |               |               |
| Type of Measurement  | RMS   |               |               |
| Under Voltage<br>Trip<br>Reset   | (% of setpoint)<br>90% $\pm 1\%$<br>93% $\pm 1\%$                                       |               |               |
| Over Voltage<br>Trip<br>Reset  | (% of setpoint)<br>110% $\pm 1\%$<br>107% $\pm 1\%$                                     |               |               |
| Voltage Unbalance<br>Trip<br>Reset   | (conforms to NEMA)<br>2-8%, adjustable<br>Trip setting minus 0.7%                       |               |               |
| Trip Delay Time<br>Over, Under, & Unbalanced<br>Single-Phasing Faults<br>Unbalance > 15% | 1-30 sec., adjustable<br>1 sec., fixed<br>1 sec., fixed                                 |               |               |
| Restart Delay  | 1-500 sec., adjustable  |               |               |
| Manual Reset Input   | 5V open circuit/500 $\mu$ A short circuit   |               |               |
| Output Contacts  | SPDT 10 amps at 240VAC resistive  |               |               |
| Operating Temp   | - 20° to +140° F  |               |               |
| Humidity Tolerance   | 0-97% w/o condensation  |               |               |
| Terminal Torque  | 3.5 in. lbs. maximum  |               |               |
| Wire Type  | Stranded or solid 14-26 AWG, 1/terminal   |               |               |
| Enclosure  | Noryl plastic   |               |               |
| Mounting   | DIN Rail or Surface Mount   |               |               |
| Weight   | 11 oz.  |               |               |
| Option for Low Current<br>Applications   | Models ordered with suffix "ISG"<br>have silver with gold flash contacts                |               |               |
| Agency Approval  | <b>UL Recognized (U.S. and Canada)</b><br>(For use in a Pollution Degree 2 Environment) |               |               |

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

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10/2021  
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# MODEL 20

# Universal 3-Phase Monitor

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

## GENERAL SAFETY

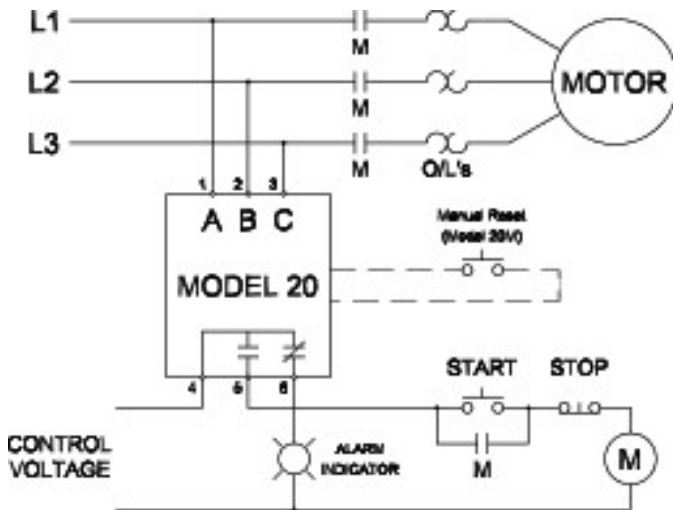
POTENTIALLY HAZARDOUS VOLTAGES ARE PRESENT AT THE TERMINALS OF THE MODEL 20.  
ALL ELECTRICAL POWER SHOULD BE REMOVED WHEN CONNECTING OR DISCONNECTING WIRING.  
THIS DEVICE SHOULD BE INSTALLED AND SERVICED BY QUALIFIED PERSONNEL.

## Installation Instructions

### INSTALLATION

Mount the Model 20 in a suitable enclosure either to the back panel of the enclosure using two #6 x 9/16" screws (not included) or to a DIN rail.

Connect terminals A, B, and C to the line side of the motor starter. Connect the output relay to the control circuit. When using manual reset versions either connect a N.O. momentary switch to the manual reset input for manual reset operation or jumper the manual reset input for automatic reset operation. Refer to wiring diagram for example of typical application.



### OPERATION

Set the VOLTAGE adjustment to the nominal operating voltage. Models 20 and 20M will auto-range to either the 190-240VAC or 380-480VAC scale. Set the UNBALANCE, RESTART, and TRIP adjustments as required for the application.

#### 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.

### OPERATION (Cont'd)

#### 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 follows:

#### LED STATUS

| UNDER             | ON CONTINUOUSLY | RED   |
|-------------------|-----------------|-------|
| OVER              |                 |       |
| UNBAL / SINGLE PH |                 | GREEN |
| REVERSE PHASE     |                 |       |
| RUN               | ON CONTINUOUSLY |       |
| RESTART DELAY     |                 |       |

### TROUBLESHOOTING

Should the Model 20 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 should 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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