MODEL 20AA

3-Phase Monitor
with Adjustable Trip & Restart Delays

- **Monitors for Phase Loss, Phase Reversal, Over/Under Voltage and Voltage Unbalance**

- **Isolated Contacts (2x N.O.)**

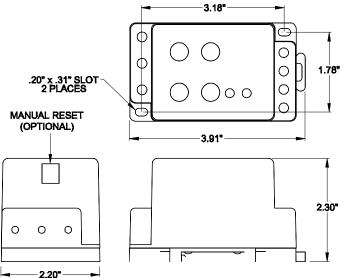- **LED Status Indicators**

- **DIN Rail or Surface Mount**

DESCRIPTION

The Model 20AA 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 20AA 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 20AA has 2 normally open (N.O.) isolated contacts.

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

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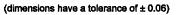
DIMENSIONS

.20" x .31" SLOT
2 PLACES

3.18"

1.78"

3.91"

MANUAL RESET
(OPTIONAL)

2.30"

2.20"

(dimensions have a tolerance of ± 0.06)

SPECIFICATIONS

Auto Reset Models Manual Reset Models*	20AA 20AA-M	20AA-L 20AA-LM	20AA-H 20AA-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
  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	2x N.O. 7.5A at 240VAC resistive		
Operating Temp	- 20º to +140º 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 Applications	Models ordered with suffix "/SG" have silver with gold flash contacts		
Agency Approval	**UL Recognized (U.S. and Canada)** (For use in a Pollution Degree 2 Environment)		

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

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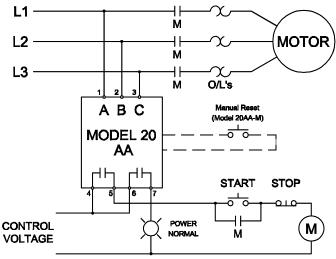
GENERAL SAFETY

**POTENTIALLY HAZARDOUS VOLTAGES ARE PRESENT AT THE TERMINALS OF THE MODEL 20AA.
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 20AA 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 20AA and 20AA-M 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	R
OVER		E
UNBAL / SINGLE PH		D
REVERSE PHASE		
RUN	ON CONTINUOUSLY	G R E E N
RESTART DELAY		

TROUBLESHOOTING

Should the Model 20AA 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 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.