

MODEL 16-1-X-X

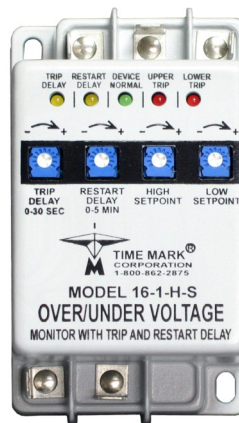
Over / Under Voltage Monitor with Trip and Restart Delay

- Monitors AC or DC single phase voltages for over, under or over/under voltage
- Adjustable Trip & Restart, can be disabled
- 5 LEDs: Trip, Normal & Delay status
- Universal range: 12–30 or 30–277 VAC/VDC
- 8 pin plug-in case - 2 SPDT relays
Surface mount case - 1 SPDT relay

DESCRIPTION

The **Model 16-1-X-X** protects equipment from Over, Under, Over/Under voltage or rapid cycling conditions that can damage valuable equipment. Trip and restart delays are adjustable, or can be disabled. Input voltage ranges are 12-30 VAC/VDC or 30-277 VAC/VDC. The 8-pin plug-in has 2 SPDT relays, while the surface mount case has 1 SPDT relay. See *Ordering Information for details*. 8-pin plug-in versions require an 8-pin socket, such as Time Mark's Model 51X120.

A proprietary microcontroller-based sensing circuit de-energizes the relay(s) after the trip delay (if enabled) upon detection of harmful voltage conditions. The relay(s) will energize after power line conditions return to an acceptable level and the restart delay time has expired (if enabled). Trip delays can be added to avoid nuisance tripping while restart delays can be used to stagger the startup of equipment or protect compressors. Time Mark's proprietary microcontroller-based design offers maximum flexibility with an easy to use interface.



Surface mount case



8-Pin Case

SPECIFICATIONS

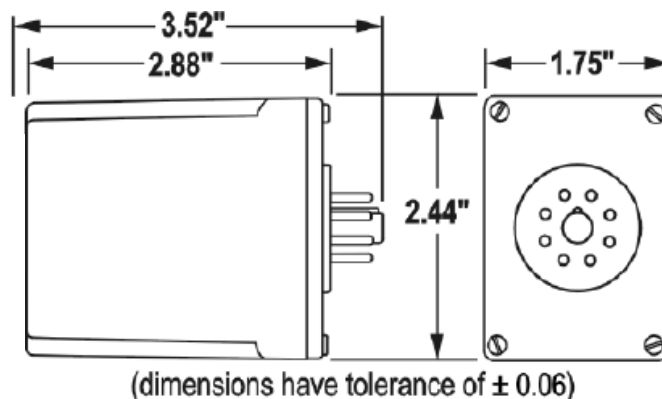
| MODEL | 16-1-X-X |
|---------------------------------------|---|
| Input Voltage-L version -H version | 12 - 30 VAC or VDC Single Phase 30 - 277 VAC or VDC Single Phase |
| Frequency | DC, 50/60Hz |
| Supply Current | 8 pin: 80mA Surface mount: 40mA |
| Initial Startup | < 3 seconds |
| Response time | 48ms (<100ms w/ relay flight time) |
| Restart Delay | 0 - 300 sec |
| Trip Delay | 0 - 30 sec |
| Transient Protection | 1500W/1ms |
| Repeat Accuracy | + /- 0.1% |
| Reset Type | Automatic |
| Dead Band | 2% |
| Output Contacts | 8-pin: SPDT x 2 10A @ 240VAC Surface mount: SPDT 10A @ 240VAC |
| Expected Relay life | Mechanical: 10,000,000 operations Electrical: 100,000 min @ rated load |
| Enclosure Material | ABS plastic |
| Operating Temperature | 0° to +130° F |
| Humidity Tolerance | 0 – 97% w/o condensation |
| Mounting | 8 pin socket (Time Mark # 51X120) Surface mount w/ 5 blade connectors |
| Weight | 8 pin: 4.4 oz Surface mount: 4.0 oz |

ORDERING INFORMATION:

| 16 | - | 1 | - | X | - | X |
|-------|---|--|---|---|---|---|
| Model | | Series | | Input Voltage | | Enclosure |
| 16 | | 1=Over/Under Voltage | | L=12-30 VAC or VDC H=30-277 VAC or VDC | | P=8-pin Plug-in Case Two (2) SPDT Relays S=Surface Mount Case w/ 5 spade connections One (1) SPDT Relay |
| | | 2=Over/Under Voltage % see model 16-2 datasheet | | | | |
| | | 3=Voltage Pickup/Dropout see model 16-3 datasheet | | | | |

Example: 16-1-H-S orders an Over/Under single phase voltage monitor that accepts an AC/DC input voltage between 30 - 277 volts in a surface mount enclosure with 5 spade connections and a SPDT relay

DIMENSIONS - 8 Pin Case



Telephone: Main (918) 438-1220
Sales (800) 862-2875
Fax: (918) 437-7584

E-mail: sales@time-mark.com
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CORPORATION

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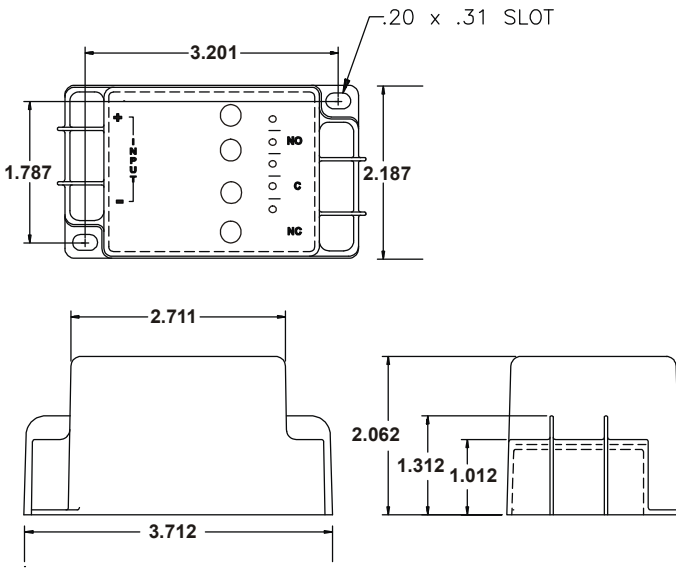
Over/Under Voltage Monitor with Trip and Restart Delay

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 16.
ALL ELECTRICAL POWER SHOULD BE REMOVED WHEN CONNECTING OR DISCONNECTING WIRING.
THIS DEVICE SHOULD BE INSTALLED AND SERVICED BY QUALIFIED PERSONNEL.

DIMENSIONS - Surface Mount Case



INSTALLATION AND ADJUSTMENT

Begin with NO POWER APPLIED to the unit, making adjustments with a non-conductive tool being careful not to apply excessive torque to the controls.

Adjust the HIGH SETPOINT control fully clockwise (right toward +), adjust the LOW SETPOINT control fully counter-clockwise (left toward -).

Adjust the TRIP DELAY fully clockwise (right toward + for max) and RESTART DELAY fully counter-clockwise (left toward - for disabled).

8-Pin Case: Connect the voltage to be monitored to the socket using the pin diagram on the unit **OR**
Surface Mount Case: Attach 1/4" terminal lugs to the input voltage wires, and connect to the terminals marked INPUT (refer to diagram on unit).

Apply power to the unit. The LED lights will sequence on during self test. Complete the setup procedure in the following box for either an **Over Voltage**, **Under Voltage** or **Over/Under Voltage** monitor depending on how you wish to configure your Model 16-1.

(cont.)

Over voltage with trip and restart delay

Slowly rotate the HIGH SETPOINT control counter-clockwise (left toward -), until the UPPER TRIP LED illuminates, and the TRIP DELAY LED blinks. Adjust HIGH SETPOINT control clockwise (right toward +) until the DEVICE NORMAL LED illuminates and the TRIP DELAY LED stops blinking.

Under voltage with trip and restart delay

Slowly rotate the LOW SETPOINT control clockwise (right toward +), until the LOWER TRIP LED illuminates, and the TRIP DELAY LED blinks. Adjust LOW SETPOINT counter-clockwise (left toward -) until the DEVICE NORMAL LED illuminates and the TRIP DELAY LED stops blinking.

Over/Under voltage with trip and restart delay

Follow the instructions above for **Over voltage with trip and restart delay** and **Under voltage with trip and restart delay** to enable both ranges.

Adjust the TRIP DELAY and RESTART DELAY time to the desired setting. A TRIP DELAY or RESTART DELAY is optional, and can be disabled by turning the control fully counter-clockwise (left toward -) if desired.

Specific setpoints will require the use of an adjustable voltage source such as a VARIAC and a voltmeter. Note: TRIAC type light dimmers do not provide a full sine wave and will not provide a reliable calibration voltage.

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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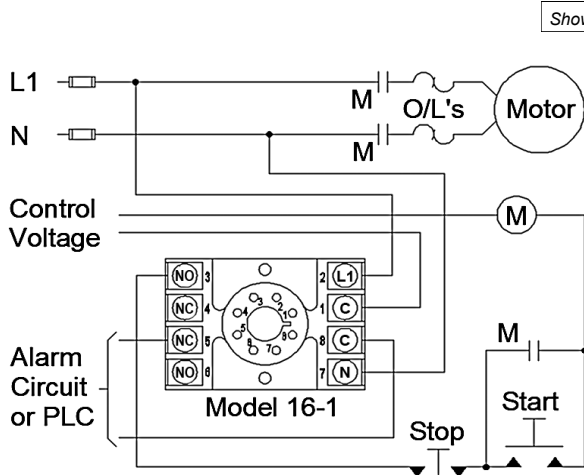
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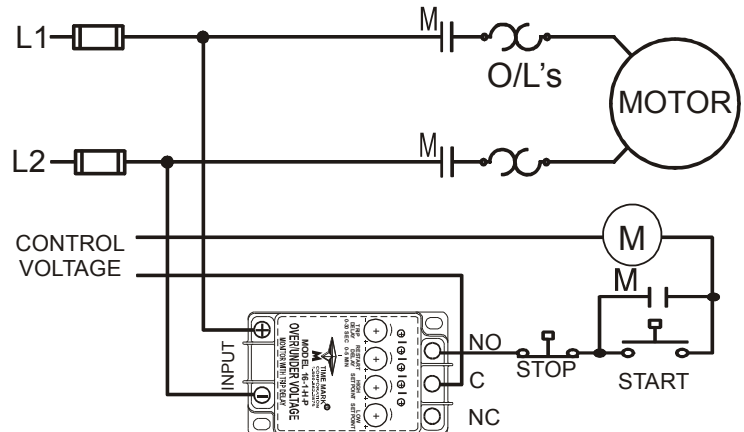
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TYPICAL APPLICATION - 8 pin mount



TYPICAL APPLICATION - Surface mount



TROUBLESHOOTING

| SYMPTOM | LED STATUS | REMARKS |
|--|---|---|
| No LEDs are on and unit is completely dead. | NONE | Measure input voltage and verify voltage falls within range of the unit. |
| Motor is NOT running | UPPER or LOWER TRIP - red blinking DEVICE NORMAL - green OFF | Voltage is outside set parameters. Verify voltage is at an acceptable level before adjustments are made to trip parameters. |
| | RESTART DELAY - yellow blinking DEVICE NORMAL - green blinking | The Model 16 is in a restart delay. Voltage is at an acceptable level. |
| | RESTART DELAY - yellow blinking DEVICE NORMAL - green OFF UPPER/LOWER TRIP - red blinking | The Model 16 was in a restart delay when voltage went outside of trip parameters. |
| Both TRIP LEDs blink while making adjustments to HIGH or LOW SETPOINTS | UPPER and LOWER TRIP - Both LEDs red blinking | HIGH and LOW setpoints overlap. Raise the HIGH setpoint and/or Lower the LOW setpoint. |
| DEVICE NORMAL green LED is on, but the motor does not start. | DEVICE NORMAL - green ON | The Model 16 is in run mode. Check for loose wiring, faulty switches, blown fuses, or other control devices. |

Should problems persist, contact the factory at 800-862-2875 or 918-438-1220, for assistance (Monday thru Friday, 8 a.m. to 5 p.m. CST).


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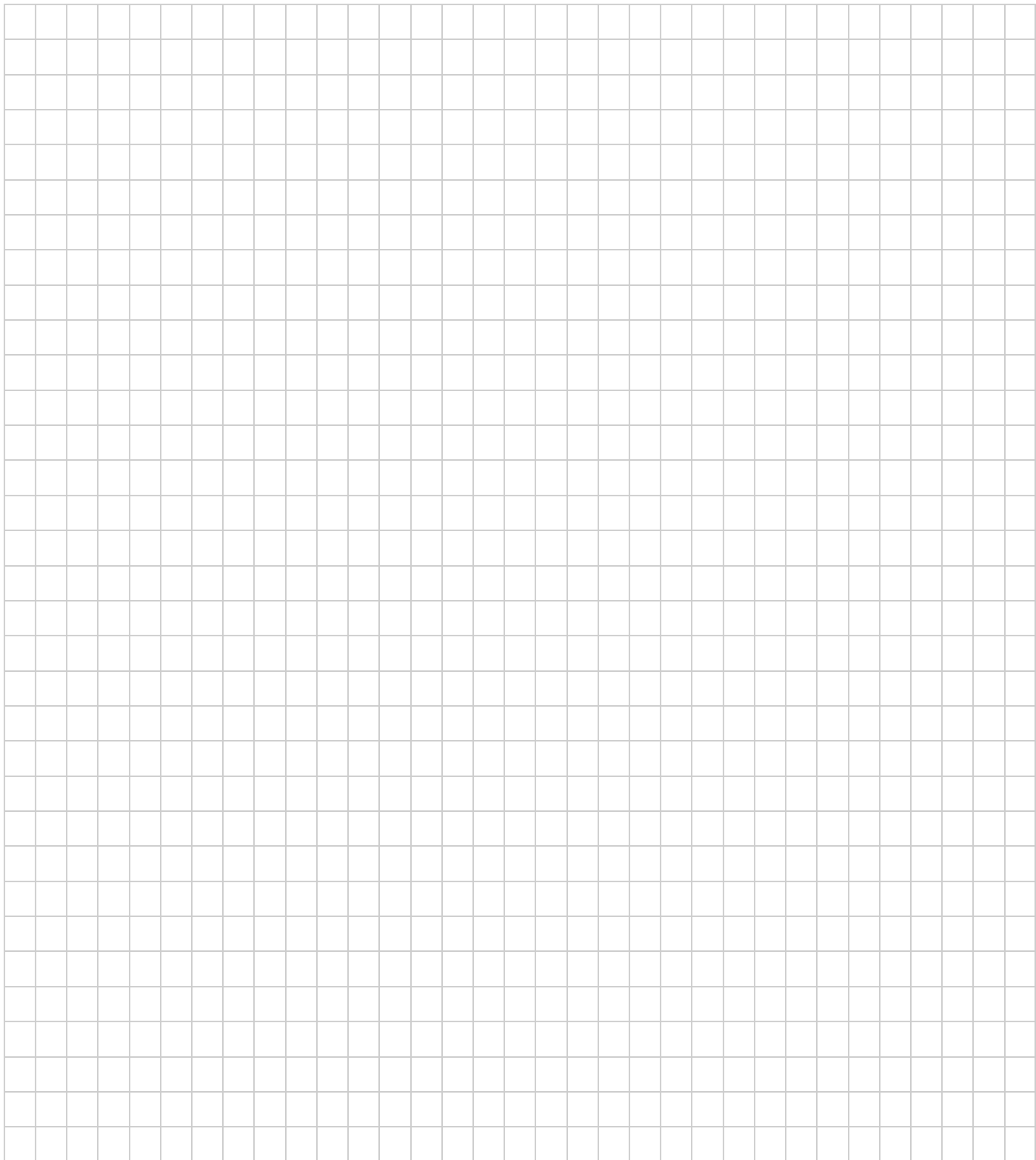


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Have Questions? Call us at (800) 862-2875 and talk to a real live person.



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