

## 460 SERIES

### 3-Phase Voltage Monitor



### Wiring Diagram

TYPICAL WIRING DIAGRAM FOR MODEL 460 WITH MOTOR CONTROL



### Description

The 460 is a 3-phase voltage monitor that protects 190-480VAC or 475-600V, 50/60Hz motors regardless of size. The product provides a user selectable nominal voltage setpoint and the voltage monitor automatically senses line voltage.

This unique microcontroller-based voltage and phase-sensing device constantly monitors the 3-phase voltages to detect harmful power line conditions such as low, high, and unbalanced voltage, loss of any phase, and phase reversal. When a harmful condition is detected, the MotorSaver® output relay is deactivated after a specified trip delay. The output relay reactivates after power line conditions return to an acceptable level for a specified amount of time (restart delay). The trip and restart delays prevent nuisance tripping due to rapidly fluctuating power line conditions.

All 460 models feature adjustable 1-30 second trip delay, 1-500 second restart delay, 2-8% voltage unbalance trip point, and one form C contact except where noted below.

### Features & Benefits

| FEATURES                                            | BENEFITS                                                                                  |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------|
| <b>Auto-sensing wide voltage range</b>              | Automatically senses system voltage between 190 - 480VAC or 475-600VAC. Saves set-up time |
| <b>Adjustable trip &amp; restart delay settings</b> | Prevent nuisance tripping due to rapidly fluctuating power line conditions                |
| <b>Microcontroller based circuitry</b>              | Improved accuracy and higher reliability                                                  |
| <b>Advanced LED diagnostics</b>                     | Quick visual indicator for cause of trip and relay status                                 |
| <b>Adjustable voltage unbalance trip setting</b>    | Provides reliable protection when regenerative voltage is present                         |

### Ordering Information

| MODEL      | VOLTAGE    | DESCRIPTION                                                                                                                                                                                    |
|------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 460        | 190-480VAC | Automatically senses line voltage, adjustable 1-30 second trip delay, 1-500 second restart delay, and 2-8% voltage unbalance trip point                                                        |
| 460-L      | 190-480VAC | Fixed 4 second trip delay and 1 second for single-phase faults, and fixed 6% voltage unbalance trip point                                                                                      |
| 460-14     | 190-480VAC | Equipped with 2 sets of contacts: Form A (NO) and Form B (NC). Used for applications requiring 2 different voltages such as 5VDC for a PLC input and 115VAC for an alarm                       |
| 460-575    | 475-600VAC | Commonly used in Eastern Canada and on generator units that generate 600 VAC power                                                                                                             |
| 460-575-14 | 475-600VAC | Commonly used in Eastern Canada and on generator units that generate 600 VAC power. Equipped with 2 sets of contacts: Form A and Form B                                                        |
| 460-15     | 190-480VAC | Equipped with 2 sets of Form A (NO) contacts. Used on applications where two different units are to be controlled at once such as a unit that has separate contacts for a compressor and a fan |
| 460-MR     | 190-480VAC | Equipped with a 2-prong connection for a normally open push button mounted outside the panel. Used in applications requiring an external manual reset button                                   |
| 460-VBM    | 190-480VAC | Fixed 6% voltage unbalance trip point. User adjustable low and high voltage trip points                                                                                                        |
| 460-400HZ  | 190-480VAC | For use with 400Hz power supply                                                                                                                                                                |
| 460-OEM    | 190-480VAC | Bulk package of 460, 20 units                                                                                                                                                                  |
| 460L-OEM   | 190-480VAC | Bulk package of 460-L, 20 units                                                                                                                                                                |

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### Specifications

|                                         |                                                                |
|-----------------------------------------|----------------------------------------------------------------|
| <b>Frequency</b>                        | 50/60Hz                                                        |
| <b>Low Voltage (% of setpoint)</b>      |                                                                |
| <b>Trip</b>                             | 90% ±1%                                                        |
| <b>Reset</b>                            | 93% ±1%                                                        |
| <b>High Voltage (% of setpoint)</b>     |                                                                |
| <b>Trip</b>                             | 110% ±1%                                                       |
| <b>Reset</b>                            | 107% ±1%                                                       |
| <b>Voltage Unbalance (NEMA)</b>         |                                                                |
| <b>Trip</b>                             | 2-8% adjustable                                                |
| <b>Reset</b>                            | Trip setting minus 1% (5-8%)<br>Trip setting minus 0.5% (2-4%) |
| <b>460L</b>                             | 6% UB fixed (4.5% reset)                                       |
| <b>Trip Delay Time</b>                  |                                                                |
| <b>Low, High and Unbalanced Voltage</b> | 1-30 seconds adjustable                                        |
| <b>460L</b>                             | 4 seconds fixed                                                |
| <b>Single-Phase Faults (&gt;15% UB)</b> | 1 second fixed                                                 |
| <b>Restart Delay Time</b>               |                                                                |
| <b>After a Fault</b>                    | 1-500 seconds adjustable                                       |
| <b>After a Complete Power Loss</b>      | 1-500 seconds adjustable                                       |
| <b>Output Contact Rating</b>            |                                                                |
| <b>Form C</b>                           |                                                                |
| <b>Pilot Duty</b>                       | 480VA @ 240VAC, B300                                           |
| <b>General Purpose</b>                  | 10A @ 240VAC                                                   |
| <b>Form A &amp; Form B</b>              |                                                                |
| <b>Pilot Duty</b>                       | 360VA @ 240VAC, B300                                           |
| <b>General Purpose</b>                  | 8A @ 240VAC                                                    |

### Ambient Temperature Range

|                                      |                                                           |
|--------------------------------------|-----------------------------------------------------------|
| <b>Operating</b>                     | -20° to 70°C (-4° to 158°F)                               |
| <b>Storage</b>                       | -40° to 80°C (-40° to 176°F)                              |
| <b>Maximum Input Power</b>           | 6 W                                                       |
| <b>Class of Protection</b>           | IP20, NEMA 1 (finger safe)                                |
| <b>Relative Humidity</b>             | 10-95%, non-condensing per IEC 68-2-3                     |
| <b>Terminal Torque</b>               | 4.5 in.-lbs.                                              |
| <b>Wire Type</b>                     | Stranded or solid 12-20 AWG, one per terminal             |
| <b>Standards Passed</b>              |                                                           |
| <b>Electrostatic Discharge (ESD)</b> | IEC 61000-4-2, Level 3, 6kV contact, 8kV air              |
| <b>RFI, Radiated</b>                 | 150 MHz, 10V/m                                            |
| <b>Fast Transient Burst</b>          | IEC 61000-4-4, Level 3,<br>3.5kV input power and controls |

### Surge

|                          |                                                                          |
|--------------------------|--------------------------------------------------------------------------|
| <b>IEC</b>               | IEC 61000-4-5, Level 3, 4kV line-to-line;<br>Level 4, 4kV line-to-ground |
| <b>ANSI/IEEE</b>         | C62.41 Surge and Ring Wave Compliance<br>to a level of 6kV line-to-line  |
| <b>Hi-potential Test</b> | Meets UL508 (2 x rated V +1000V for 1 minute)                            |

### Safety Marks

|                              |                                                                                 |
|------------------------------|---------------------------------------------------------------------------------|
| <b>UL</b>                    | UL508 (File #E68520)                                                            |
| <b>CE</b>                    | IEC 60947-6-2                                                                   |
| <b>Enclosure</b>             | Polycarbonate                                                                   |
| <b>Dimensions</b>            | <b>H</b> 88.9 mm (3.5"); <b>W</b> 52.9 mm (2.08");<br><b>D</b> 59.69 mm (2.35") |
| <b>Weight</b>                | 0.7 lb. (11.2 oz., 317.51 g)                                                    |
| <b>Mounting Method</b>       | 35 mm DIN rail or Surface Mount<br>(#6 or #8 screws)                            |
| <b>460-MR (manual reset)</b> | External NO pushbutton required.                                                |

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