3 Phase Voltage Monitor
WVM Series
Motor Protector

ANSI Device #27/47/59

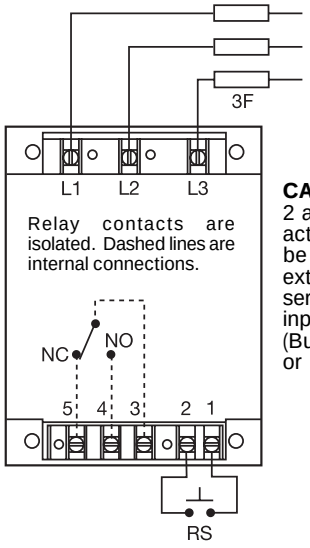
- Protects Against: Phase Loss & Reversal; Over, Under & Unbalanced Voltages; Short Cycling
- 10 Fault Memory & Status Displayed on 6 LED Readout
- Switch Selectable Automatic Restart, Delayed Automatic Restart, & Manual Reset
- Isolated 10 A SPDT Relay Contacts

Description

The WVM Series provides protection against premature equipment (motor) failure caused by voltage faults on the 3 Phase Line. The WVM's microcontroller design provides reliable protection even if regenerated voltages are present. It combines dependable fault sensing with a 10 fault memory and a 6 LED status display. Part instrument, part control, the WVM protects your equipment when you're not there and displays what happened when you return. The WVM is fully adjustable and includes time delays to prevent nuisance tripping and improve system operation. Time delays include a 0.25 to 30 s adjustable trip delay, an adjustable 0.25 to 64 m (in 3 ranges) restart delay, plus a unique 3 to 15 s true random start delay. The random start delay prevents voltage sags caused by simultaneous restarting of numerous motor loads after a power outage.

ASME A17.1 rule 210.6, NEMA MG1 14:30, 14:35, IEEE C62.41-1991 Level B

- Approvals:



CAUTION: 2 amp max fast acting fuses must be installed externally in series with each input. (3) (Bussman KTK-2 or equivalent)

F = Fuses RS = Optional Remote Reset Switch
NO = Normally Open NC = Normally Closed

Ordering Table

WVM Series

X 3 Phase Line Voltage
- **6** - 200 ... 240 V AC
- **8** - 355 ... 425 V AC
- **9** - 400 ... 480 V AC
- **0** - 500 ... 600 V AC

X Unbalance
- **1** - 2 ... 10%

X Trip Delay
- **1** - 0.25 ... 30 s

X Reset Method
- **A** - Switch Selectable: Automatic Restart Upon Fault Trip
- **R** - Switch Selectable: Automatic Restart Upon Fault Correction
- **M** - Manual Reset Only (Onboard Reset Switch-No Restart Delay)

X Restart Delay (Switch Selectable Reset Only)
- **L** - 0.25 ... 64 s
- **N** - 6 ... 300 s
- **H** - 0.25 ... 64 m

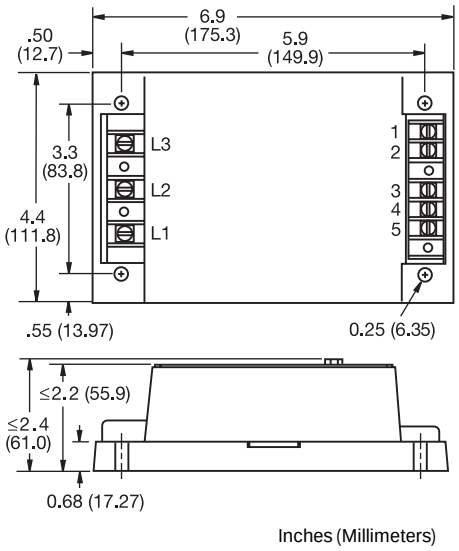
Example P/Ns: **WVM011AL, WVM011M**

Technical Data

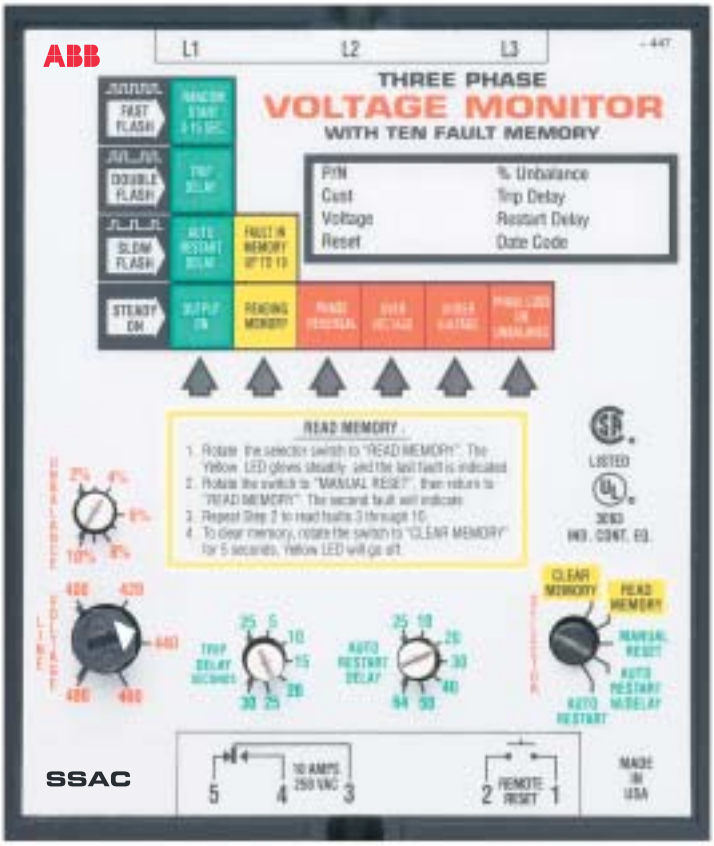
Line Voltage	
Type	3 phase Delta or Wye with no connection to neutral
Operating Voltage	Adjustment Range
240 V AC	200 ... 240 V AC
380 V AC	355 ... 425 V AC
480 V AC	400 ... 480 V AC
600 V AC	500 ... 600 V AC
Overvoltage, Undervoltage, & Voltage Unbalance	
Overvoltage Trip Point	109 ... 113% of adjusted voltage
Reset Voltage	-2% of trip point
Undervoltage Trip Point	88 ... 92% of adjusted voltage
Reset Voltage	+2% of trip point
Voltage Unbalance	Adjustable from 2 ... 10%
Trip Delay	Adjustable from 0.25 ... 30 s +/-15%
Phase Loss	≥ 15% unbalance
Response Time	≤ 200 ms
Random Start Delay Range	3 ... 15 s
Reset (Restart) Delay	
Low Range	0.25 ... 64 s +/-15%
Normal Range	6 ... 300 s +/-15%
High Range	0.25 ... 64 m +/-15%
Fault Memory	
Type	Nonvolatile RAM
Capacity	Stores last 10 faults
Status Indicators	6 LEDs provide existing status & memory readout
Note: 50% of operating line voltage must be applied to L1 & L2 for operation of status indicators	
Output	
Type	Electromechanical relay
Form	Isolated single pole double throw (SPDT)
Rating	10 A resistive @ 250 V AC 6 A inductive (0.4 PF) at 250 V AC
Protection Surge	IEEE C62.41-1991 Level B
Isolation Voltage	≥ 2500 V RMS input to output
Mechanical	
Mounting	Surface with 2 or 4 #8 (M4 x 0.7) screws
Termination	Screw terminals with captive wire clamps for up to #12 AWG (3.2 mm²) wire
Environmental	
Operating/Storage Temperature	-40°C ... +65°C / -40°C ... +85°C
Weight	≅ 25 oz (709 g)

Reset on Balance

Selected Unbalance %	Reset %
2	1.8
3	2.7
4	3.6
5	4.5
6	5.4
7	6.3
8	7.2
9	8.1
10	9



Inches (Millimeters)



Operation

The output relay is energized when all conditions are acceptable and the WVM is reset. A restart and/or random start delay may occur before the output relay is energized.

Field Adjustment: Select the line voltage listed on the motor's name plate. This automatically sets the over and under voltage trip points. Consult the equipment's manufacturer specifications for the correct trip delay, unbalance percentage, and restart/reset operation and restart delay. Make connection to all three line phases as shown in the connection diagram. Apply power. If the relay fails to energize, view the LEDs for the cause, and correct the problem. If the phase sequence is incorrect, swap any two wires. No further adjustment should be required to achieve maximum equipment protection.

Read Memory: Fault(s) stored in the memory are indicated when the yellow LED is flashing. To read memory, rotate selector from Manual to Read Memory. The last fault will be displayed. Repeat this operation to read the second to the last fault. Repeat until up to 10 faults are noted.

Memory Reset: To clear the memory of all faults stored, rotate selector to Clear Memory for 5 seconds. The yellow LED will turn off.

Memory Overload: The 11th fault causes the first to be removed from memory. Only the 10 most recent faults are retained.

Random Start Delay: A new 3 to 15 s random start delay is selected by the microcontroller when a fault is corrected and when the operating voltage (L1, L2, L3) is applied to the WVM. A random start delay does not occur when the reset is manual.

Automatic Restart: Upon fault correction, the output will re-energize after a random start delay.

Automatic Restart Upon Fault Trip: When a fault is sensed for the full trip delay, the output de-energizes and a restart delay is initiated. This delay locks out the output for the delay period. Should the fault be corrected by the end of the restart delay, the output will re-energize after a random start delay. A restart delay will also occur when operating voltage (L1, L2, L3) is applied to the WVM.

Manual Reset: After a fault condition is corrected, the WVM can be manually reset. There are two methods; a switch on the unit or a customer supplied remote switch.

Manual Reset Units: (P/N ends with **M**) These part numbers have a 3 position selector switch. An on board momentary reset switch is provided on the unit for manual reset.

Switch Selected Reset Units: (P/N includes an **A** or **R**) These part numbers have a 5 position selector switch. Rotate selector switch from the Manual Reset position to Auto Restart w/ Delay then back again to Manual Reset within 3 seconds. The output will immediately energize.

Remote Reset: Reset (Restart) is accomplished by a momentary contact closure across terminals 1 & 2. The output will immediately energize. Remote switch requirements are ≥ 10 mA at 20 V DC and the reset terminals are not isolated from line voltage. A resistance of ≤ 20KΩ across terminals 1 & 2 will cause immediate automatic restart.

Automatic Restart Upon Fault Correction: (P/N includes an R)
When a fault is sensed for the full trip delay, the output relay de-energizes. Upon correction of the fault, a restart delay begins. At the end of this delay, the output will re-energize after a random start delay. If a fault occurs during timing, the time delay will be reset to zero, and the output will not energize until the restart delay is completed.

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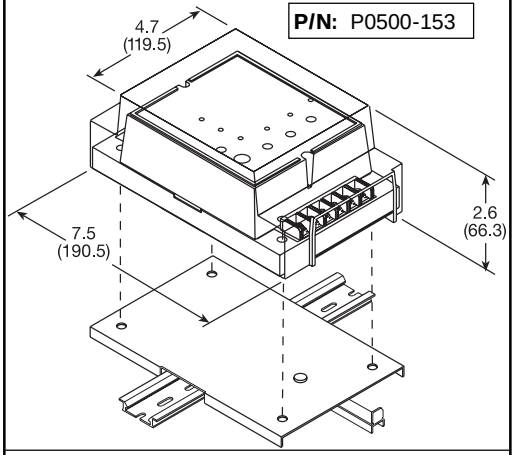
Accessories

Clear Tamperproof Cover
The P0500-153 protects against unauthorized adjustment of the trip points. It prevents the resetting of manual units by the equipment's operator. It isolates line-level connection points preventing contact during troubleshooting operations. Alignment dimples allow drilling (5 places) for limited access to adjustment knobs and the reset switch. Included are (2) spacers, (5) hole plugs. 7.5 x 4.7 x 2.6 in. (190.5 x 119.4 x 66 mm)

P/N: P0500-153



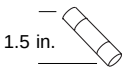
Inches (Millimeters)

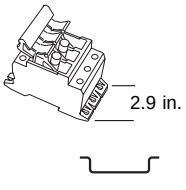
P/N: P1011-38

35mm DIN Rail Adaptor
The P1011-38 provides an easy method of mounting the WVM Series on 35mm DIN rail. Constructed of rugged black anodized steel, the P1011-38 adaptor includes four mounting screws. 7 x 4.5 x .33 in. (177.8 x 114.3 x 8.4 mm)

DIN rail
P/N: C103PM (Al)
17322005 (Steel)

Midget Fuse
Fast acting fuse for use with voltage monitors. Rated 2 A at 500 V AC.
1.5 x 0.41 in. (38.1 x 10.3 mm)
P/N: P0600-11





Three phase fuse block disconnect designed for use with HRC midget fuses [1.5 x 0.41 in.] (38.1 x 10.3 mm) rated up to 25 A at 600 V AC. Surface or 35mm DIN rail mountable. 3.9 x 2.9 x 2.2 in. (99 x 73 x 54 mm)
P/N: P0700-241