

# Single-Phase Voltage Monitors

All of SymCom's single-phase voltage monitors are micro-controller based and are factory calibrated for highly accurate and precise voltage measurements to provide high sensitivity while minimizing nuisance tripping. They are built with transformer power supplies, which makes them highly resistant to damage caused by small voltage transients on the power system. Other types of power supplies such as switching, resistor limited and capacitor limited are typically more easily damaged by transients.

## Product Selection Matrix

Model	Low Voltage	High Voltage	Variable Restart Delay	Variable Trip Delay	Manual Reset	DPDT Relay	10 Amp	General Purpose	480VA @ 240VAC Pilot Duty	OT08 Socket Style	470VA @ 600VAC Pilot Duty	Diagnostic LEDs
50R-100	•											
50R-100-2	•		•		•							
50R-200	•											
50R-200-2	•		•		•							
50R-200-3	•			•								
50R-200-2-9	•	•	•		•							
50R-400	•										•	
50R-400-2	•		•		•						•	
50R-400-3	•			•							•	
50R-400-2-9	•	•	•		•						•	
201-100-SP	•								•			
201-200-SP	•								•			
201-200-SP-T-9	•	•							•			
201-100-SP-DPDT	•					•	•	•	•	•		
201-200-SP-DPDT	•					•	•	•	•	•		
202-200-SP	•	•	•		•							
202-200-SP-NHV	•		•		•							
460-100-SP	•	•	•									
460-200-SP	•	•	•									

••Indicates two relays

# Single-Phase Voltage Monitor

single-phase voltage monitor, panel mount, optional high voltage, variable restart or trip delay

# Model 50R



## The Model 50R

single-phase voltage monitor has a voltage-sensing circuit which constantly monitors the single-phase power for a low voltage condition. Single-phase motors on fans, compressors, air conditioners, heat pumps, well pumps, sump pumps and small conveyor motors are all applicable to the Model 50R.

When a harmful condition is detected, the MotorSaver's output relay is deactivated after a specified trip delay. The output relay reactivates after power line conditions return to an acceptable level and a specified amount of time has elapsed (restart delay). The trip delay prevents nuisance tripping due to rapidly fluctuating power line conditions.

For more information see:

See Appendix A, page 68, Figure 7 for dimensional drawing.



See Appendix B, page 76, Figure 28 for typical wiring diagrams.

### Options

- 2 - Variable Restart Delay (Manual, 2-300 seconds)
- 3 - Variable Trip Delay (2-30 seconds)
- 9 - High Voltage Detection

## Features:

- Protects against low voltage
- Optional
  - High voltage protection
  - Variable restart delay
  - Variable trip delay

Approvals:  

## Available Models:

- 50R-100
- 50R-100-2
- 50R-200
- 50R-200-2
- 50R-200-3
- 50R-200-2-9
- 50R-400
- 50R-400-2
- 50R-400-3
- 50R-400-2-9

## Specifications

### Input Characteristics

Line Voltage	
50R-100	.95-120VAC
50R-200	.190-240VAC
50R-400	.380-480VAC
Frequency	.50*/60Hz

### Functional Characteristics

#### Low Voltage

Trip (% of setpoint)	.90%
Reset (% of setpoint)	.93%
Delay Time (Nominal)	
Trip	.4 seconds
Restart (low voltage)	.2 seconds
Restart (complete power loss)	.2 seconds

### Output Characteristics

Output Contact Rating (SPDT - 1 Form C)	
50R-100, 50R-200	
Pilot Duty	.480VA @ 240VAC
General Purpose	.10A @ 240VAC
50R-400	
Pilot Duty	.470VA @ 600VAC

### General Characteristics

Ambient Temperature Range	
Operating	-.20° to 70°C (-4° to 158°F)
Storage	-.40° to 80°C (-40° to 176°F)
Maximum Input Power	.5 W
Relative Humidity	.10-95%, non-condensing per IEC 68-2-3
Terminal	
Torque	.7 in.-lbs.
Wire Size	.12-18AWG
Electrostatic Discharge (ESD)	.IEC 61000-4-2, Level 3, 6kV contact, 8kV air
Fast Transient Burst	.IEC 61000-4-4, Level 3, 3.5kV input power and controls
Transient Protection (Internal)	.IEC 61000-4-5; 1995 ±6kV
Safety Marks	
UL	.UL508 (File #E68520)
CE	.IEC 60947-6-2
Dimensions	.2.93"H x 5.27"W x 2.95"D (74.4 x 133.9 x 74.9mm)
Weight	.0.98 lb. (15.68 oz., 444.52 g)
Mounting Method	.#8 screws

### Special Options

Option 2 - Variable Restart Delay	.Manual, 2-300 seconds
Option 3 - Variable Trip Delay	.2-30 seconds
Option 9 - High Voltage Detection Operating Points	
Trip (% of Setpoint)	.110%
Reset (% of Setpoint)	.107%

\*Note: 50Hz will increase all delay timers by 20%



Must use Model OT08 socket for UL Rating!

### The Model 201-xxx-SP

is an 8-pin octal-base, plug-in voltage monitor designed to protect single-phase motors regardless of size. The 201-100-SP is used on 95-120VAC, 50/60Hz motors to prevent damage caused by low voltage. The Model 201-200-SP is used on 190-240VAC, 50/60Hz motors. The 201-200-SP-T-9 is a pin-for-pin replacement for a Time Mark® #260 Series voltage monitor. High voltage protection is included in the 201-200-SP-T-9.

The unique microcontroller-based voltage and voltage-sensing circuit constantly monitors the voltage to detect harmful power line conditions. When a harmful condition is detected, the MotorSaver's output relay is deactivated after a specified trip delay. The output relay reactivates after power line conditions return to an acceptable level and a specified amount of time has elapsed (restart delay). The trip delay prevents nuisance tripping due to rapidly fluctuating power line conditions.



For more information see:

See Appendix A, page 68, Figure 8 for dimensional drawing.

See Appendix B, page 76, Figure 29 for typical wiring diagrams.

### Features:

- Low voltage protection
- Diagnostic LED
- 8-pin plug in; DIN rail or surface mount

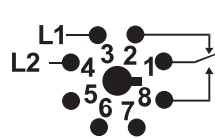
Approvals:  

### Auxiliary Products:

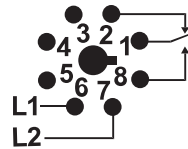
- 8-pin octal socket (P/N: CTOT08-PC)

### Available Models:

- 201-100-SP
- 201-200-SP
- 201-200-SP-T-9



Pin-out 1  
(201-xxx-SP)  
(view of socket)



Pin-out 2  
(201-200-SP-T-9)  
(view of socket)

## Specifications

### Input Characteristics

Line Voltage	
201-100-SP	95-120VAC
201-200-SP, 201-200-SP-T-9	190-240VAC
Frequency	50/60Hz

### Functional Characteristics

Low Voltage (% of setpoint)	
Trip	90%
Reset	93%
For 201-200-SP-T-9 only: High Voltage (% of setpoint)	
Trip	110%
Reset	107%
Trip Delay Time	
High/Low Voltage Fault	4 seconds
Restart Delay Time	
After a Fault	2 seconds
After a Complete Power Loss	2 seconds

### Output Characteristics

Output Contact Rating (SPDT)	
Pilot Duty	480VA @ 240VAC
General Purpose	10A @ 240VAC

### General Characteristics

Ambient Temperature Range	
Operating	-40° to 70°C (-40° to 158°F)
Storage	-40° to 80°C (-40° to 176°F)
Maximum Input Power	5 W
Transient Protection (Internal)	2500V for 10 ms
Safety Marks	
UL (OT08 octal socket required)	UL508 (File #E68520)
CE	IEC 60947-6-2
Dimensions	1.750" H x 2.375" W x 4.125" D (with socket) (44.45 x 60.325 x 104.775mm)
Weight	0.8 lb. (12.8 oz., 362.87 g)
Mounting Method	DIN rail or surface mount (plug in to OT08 socket)

Socket Available ..... Model # OT08 (UL Rating 600V)  
The 600V socket can be surface mounted or installed on DIN Rail.

# Single-Phase Voltage Monitor

single-phase voltage/phase monitor, 8-pin socket mount, two isolated Form C relays

# Model 201-xxx-SP-DPDT



Must use Model OT08 socket for UL Rating!

## The Model 201-xxx-SP-DPDT

is an 8-pin octal-base, plug-in voltage monitor designed to protect single-phase motors regardless of size. The 201-100-SP-DPDT is used on 95-120VAC, 50/60Hz motors to prevent damage caused by low voltage. The 201-200-SP-DPDT is used on 190-240VAC, 50/60Hz motors. The units feature two isolated sets of contacts that are ideal for use with two control circuits with different voltages.

The unique microcontroller-based voltage and voltage-sensing circuit constantly monitors the voltage to detect harmful power line conditions. When a harmful condition is detected, the MotorSaver's output relays are deactivated after a specified trip delay. The output relays reactivate after power line conditions return to an acceptable level and a specified amount of time has elapsed (restart delay). The trip delay prevents nuisance tripping due to rapidly fluctuating power line conditions.



For more information see:

See Appendix A, page 68, Figure 8 for dimensional drawing.

See Appendix B, page 76, Figure 30 for typical wiring diagrams.

## Features:

- Low voltage protection
- Two isolated Form C relays (DPDT)
- Diagnostic LED
- 8-pin plug-in; DIN rail or surface mount

Approvals:  

## Auxiliary Products:

- 8-pin octal socket (P/N: CT0T08-PC)

## Available Models:

201-100-SP-DPDT  
201-200-SP-DPDT

## Specifications

### Input Characteristics

Line Voltage	
201-100-SP-DPDT	95-120VAC
201-200-SP-DPDT	190-240VAC
Frequency	50/60Hz

### Functional Characteristics

Low Voltage (% of setpoint)	
Trip	90% $\pm$ 1%
Reset	93% $\pm$ 1%
Trip Delay Times	
Low Voltage	4 seconds
Restart Delay Times	
After a Fault or Complete Power Loss	2 seconds

### Output Characteristics

Output Contact Rating (DPDT)	
Pilot Duty	480VA @ 240VAC
General Purpose	10A @ 240VAC

### General Characteristics

Ambient Temperature Range	
Operating	-20° to 70°C (-4° to 158°F)
Storage	-40° to 80°C (-40° to 176°F)
Maximum Input Power	5 W
Relative Humidity	10-95%, non-condensing per IEC 68-2-3
Standards Passed	
Electrostatic Discharge (ESD)	IEC 61000-4-2, Level 3, 6kV contact, 8kV air
Radio Frequency Immunity, Radiated	150MHz, 10V/m
Fast Transient Burst	IEC 61000-4-4, Level 3, 3.5kV input power and controls
Safety Marks	
UL (OT08 octal socket required)	UL508 (File #E68520)
CE	IEC 60947-6-2
Dimensions	1.750" H x 2.375" W x 4.125" D (with socket) (44.45 x 60.325 x 104.775mm)
Weight	0.65 lb. (10.4 oz., 294.84 g)
Mounting Method	DIN rail or surface mount (plug in to OT08 socket)

# 3-Phase Voltage Monitor

single-phase voltage monitor, panel mount, adjustable or manual restart delay

# Model 202-200-SP



## The Model 202-200-SP

voltage monitor is designed to protect single-phase motors regardless of size. It can be used with 190V-240VAC, 50/60Hz motors to prevent damage caused by incoming power problems.

A unique microcontroller-based voltage-sensing circuit constantly monitors the voltage to detect harmful power line conditions. When a harmful condition is detected, the MotorSaver's output relay is deactivated after a specified trip delay. The output relay reactivates after power line conditions return to an acceptable level and a specified amount of time has elapsed (restart delay). The trip delay prevents nuisance tripping due to rapidly fluctuating power line conditions.

For more information see:

See Appendix A, page 68, Figure 9 for dimensional drawing.

See Appendix B, page 77, Figures 31 & 32 for typical wiring diagrams.

## Features:

- Protects from high and low voltage (low voltage only for 202-200-SP-NHV)
- Protects against rapid cycling
- Quick mounting with single screw
- Adjustable restart delay setting
- Small package, ideal for assembly into panels
- Standard 1/4" quick connects

Approvals: 

## Available Models:

202-200-SP  
202-200-SP-NHV

## Specifications

### Input Characteristics

Line Voltage	
202-200-SP, 202-200-SP-NHV	.190-240VAC
Frequency	.50*/60Hz

### Functional Characteristics

Low Voltage (% of setpoint)	
Trip	.90%
Reset	.93%
High Voltage (% of setpoint) (Not available on -NHV model)	
Trip	.110%
Reset	.107%
Trip Delay Time	
High and Low Voltage	.4 seconds
Restart Delay Time	
After a fault or	
complete power loss	.Manual, 2-300 seconds adj.

### Output Characteristics

Output Contact Rating (SPDT)	
Pilot Duty	.480VA @ 240VAC
General Purpose	.10A @ 240VAC

### General Characteristics

Temperature Range	-.40° to 70°C (-40° to 158°F)
Trip & Reset Accuracy	±1%
Repeatability	±0.5%
Input to Output Dielectric	.1960 Vrms (min.)
Termination	.0.25" male quick connect
Maximum Input Power	.5 W
Relative Humidity	.95%, non-condensing
Transient Protection	.IEC 61000-4-5, ±4kV
Safety Marks	
UL, UL Recognized	.UL508 (File #E68520)
Dimensions	.2.5" H x 2.5" W x 1.4" D (63.5 x 63.5 x 35.56mm)
Weight	.0.5 lb. (8 oz., 226.8 g)
Mounting Method	.1/4" socket head cap screw (customer supplied)

\*Note: 50Hz will increase all delay timers by 20%.

# Single-Phase Voltage Monitor

single-phase voltage monitor, din rail mount, adjustable restart delay

# Model 460-xxx-SP



## The Model 460-100-SP

is used on 95-120VAC, 50\*/60Hz single-phase motors and the 460-200-SP is used on 190-240VAC, 50\*/60Hz single-phase motors to protect them from damaging high and low voltage conditions. An adjustment knob allows the user to set a 1-500 second restart delay. The variable restart delay is also a power-up delay and can be utilized to stagger-start motors on the same system.

A unique microcontroller-based, voltage-sensing circuit constantly monitors the voltage to detect harmful power line conditions. When a harmful condition is detected, the MotorSaver's output relay is deactivated after a specified trip delay. The output relay reactivates after power line conditions return to an acceptable level and a specified amount of time has elapsed (restart delay). The trip delay prevents nuisance tripping due to rapidly fluctuating power line conditions.

For more information see:

See Appendix A, page 69, Figure 11 for dimensional drawing.

See Appendix B, page 77, Figure 33 for typical wiring diagrams.

## Features:

- Protects from low and high voltage, and rapid cycle
- DIN rail or surface mountable
- LED Diagnostics
- Adjustable restart delay setting

Approvals:  

## Available Models:

460-100-SP  
460-200-SP

## Specifications

### Input Characteristics

Line Voltage	
460-100-SP	95-120VAC
460-200-SP	190-240VAC
Frequency	50*/60Hz

### Functional Characteristics

Low Voltage (% of setpoint)	
Trip	90% ±1%
Reset	93% ±1%
High Voltage (% of setpoint)	
Trip	110% ±1%
Reset	107% ±1%
Trip Delay Time	
Low or High Voltage	4 seconds fixed
Restart Delay Time	
After a Fault	1-500 seconds adjustable
After a Complete Power Loss	1-500 seconds adjustable

### Output Characteristics

Output Contact Rating (1 Form C)	
Pilot Duty	480VA @ 240VAC, B300
General Purpose	10A @ 240VAC

### General Characteristics

Ambient Temperature Range	
Operating	-40° to 70°C (-40° to 158°F)
Storage	-40° to 80°C (-40° to 176°F)
Maximum Input Power	.6 W

Class of Protection	IP20, NEMA 1 (finger safe)
Relative Humidity	10-95%, non-condensing per IEC 68-2-3
Terminal Torque	.6 in.-lbs.
Wire Type	Stranded or solid 12-20 AWG, one per terminal
Standards Passed	
Electrostatic Discharge (ESD)	IEC 61000-4-2, Level 3, 6kV contact, 8kV air
Radio Frequency Immunity	
Radiated	150 MHz, 10V/m
Fast Transient Burst	IEC 61000-4-4, Level 3, 3.5 kV input power & controls
Surge	
IEC	IEC 61000-4-5, Level 3, 4kV line-to-line; Level 4, 4kV line-to-ground
ANSI/IEEE	C62.41 Surge and Ring Wave Compliance to a level of 6kV line-to-line
Hi-potential Test	Meets UL508 (2 x rated V +1000V for 1 min)
Safety Marks	
UL	UL508 (File #E68520)
CE	IEC 60947-6-2
Enclosure	Polycarbonate
Dimensions	3.5" H X 2.084" W X 2.350" D (88.9 x 52.93 x 59.69mm)
Weight	0.9 lb. (14.4 oz., 408.23 g)
Mounting Method	35mm DIN rail or Surface Mount (#6 or #8 screws)

\*Note: 50 Hz will increase all delay timers by 20%