

# INSTALLATION INSTRUCTIONS

Revision B1  
Rapid City, SD, USA, 03/2010

# Motors<sup>®</sup>Saver

ELECTRONIC MOTOR  
CONTROL & PROTECTION

## MODELS 201-100-DPDT 201-200-DPDT 201-100-DPDT-60MS 201-200-DPDT-60MS



II-201-DPDT-B

## **DANGER!**



**HAZARDOUS VOLTAGES MAY BE PRESENT DURING INSTALLATION.**

Electrical shock can cause death or serious injury.

Installation should be done by qualified personnel following all national, state and local electrical codes.



**BE SURE POWER IS DISCONNECTED PRIOR TO INSTALLATION!  
FOLLOW NATIONAL, STATE AND LOCAL CODES.  
READ THESE INSTRUCTIONS ENTIRELY BEFORE INSTALLATION.**

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SymCom's MotorSaver<sup>®</sup> Model 201-XXX-DPDT is a voltage monitor designed to protect 3-phase motors regardless of size. The MotorSaver<sup>®</sup> is used on 120V or 240V, 50/60 Hz motors to protect from damage caused by single-phasing, low voltage, phase-reversal, and voltage unbalance. The 201-XXX-DPDT products feature two isolated Form C relay outputs.

### **CONNECTIONS**

1. Mount the MotorSaver<sup>®</sup> in a convenient location in or near the motor control panel. If the location is wet or dusty, it should be mounted in a NEMA 4 or 12 enclosure.
2. Mount an 11-pin socket to the motor control back panel (SymCom P/N OT11-PC, sold separately, is required for UL rating).
3. Connect L1, L2 and L3 (terminals 5, 6 & 7 on the relay socket) to the LINE SIDE of the motor starter (Figure 2).
4. Connect the output relays to the circuitry to be controlled. See Figure 1 for pin-out diagram. The output relays are isolated, so different control voltages may be applied to each one. For motor control, connect a normally open contact in series with the magnetic coil of the motor starter as shown in Figure 2. For alarm operation, connect a normally closed contact in series with the control circuit as shown in Figure 2.
5. Plug the relay into the relay socket.

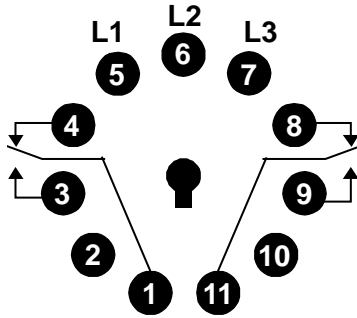


Figure 1: Pin-Out Diagram

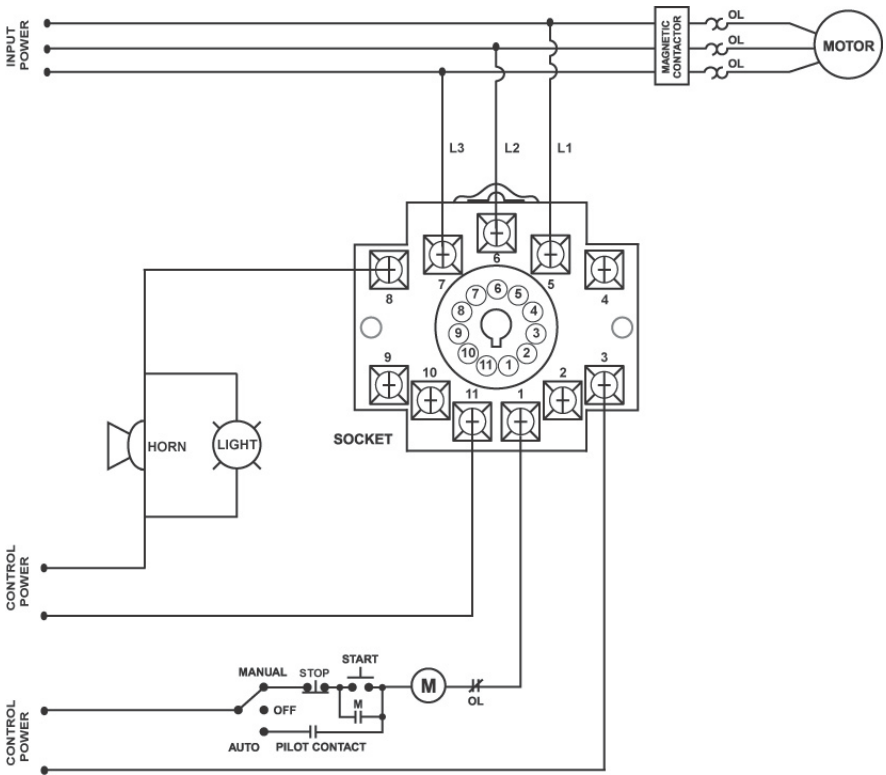


Figure 2: Typical Motor and Alarm Control Wiring Diagram

## SETTING

**LINE VOLTAGE ADJUSTMENT:** Rotate the **VOLT ADJUSTMENT (VAC)** knob to the nominal 3-phase line voltage feeding the motor to be protected.

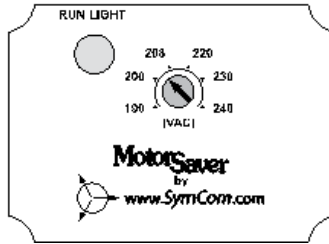


Figure 3: Voltage Adjustment (201-200-DPDT Model Shown)

## OPERATION

Apply 3-phase power to the motor. The MotorSaver's green RUN light will blink during the one second<sup>1</sup> restart delay. Once the restart delay time has expired, the MotorSaver<sup>®</sup> will energize its output contacts (open the normally closed and close the normally open contacts) and the green RUN light will illuminate.

If the contacts do not energize and the green RUN light does not illuminate, see the troubleshooting section.




STATUS	LIGHT PATTERN
RUN	GREEN
RESTART DELAY	 GREEN
REVERSE-PHASE	 RED
UNBALANCE / SINGLE-PHASE	 RED
LOW VOLTAGE	RED

Table 1: Diagnostic Indicator Lights

### NEMA MG1 UNBALANCE FORMULA

$$\% \text{ Voltage Unbalance} = \frac{\text{Maximum Deviation from the Average}}{\text{Average}} \times 100\%$$

Example: The measured line-to-line voltages are 203, 210, and 212.

$$\text{Average} = \frac{203 + 210 + 212}{3} = 208.3$$

The maximum deviation from the average is the largest difference between the average voltage (208.3) and any one voltage reading.





$$208.3 - 203 = 5.3 \quad 210 - 208.3 = 1.7 \quad 212 - 208.3 = 3.7$$

The maximum deviation from the average is 5.3.

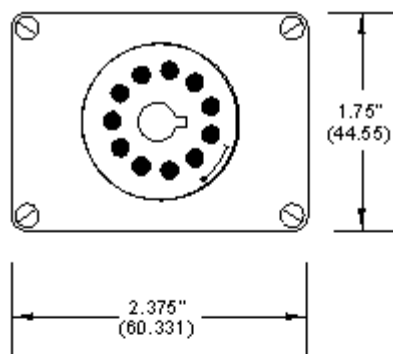
$$\frac{5.3}{208.3} \times 100 = 2.5\% \text{ unbalance}$$

<sup>1</sup> Models 201-XXX-DPDT-60mS have a 60mS restart delay

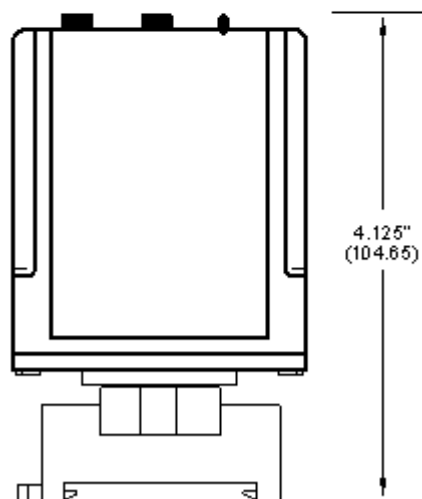
## TROUBLESHOOTING

<b>SYMPTOM</b>	<b>LIGHT PATTERN</b>	<b>SOLUTION</b>
No lights are on - the unit seems completely dead	N/A	Measure the three line-to-line voltages. If any of the voltages are below the specified operating voltage, the MotorSaver <sup>®</sup> does not have enough power to operate its internal electronics. See specifications for allowable voltage ranges. If the voltages are correct, call SymCom at (800) 843-8848 or (605) 348-5580.
Red light is blinking (on initial power-up)	 RED	Turn off the 3-phase power. Swap any two leads powering the MotorSaver <sup>®</sup> (L1, L2, or L3). There is a 50-50 chance of connecting L1, L2 and L3 correctly the first time. Reapply 3-phase power.
Red light is blinking (after the motor has previously been running)	 RED	The incoming lines have been reverse-phased. The MotorSaver <sup>®</sup> is preventing the motor from running backwards. Correct the phase sequence.
Red light is blinking in this pattern	 RED	The voltage is unbalanced or single-phased. Measure the incoming line voltages and calculate the % unbalance. If the voltage unbalance does not exceed the 4.5% unbalance reset value, call SymCom at (800) 843-8848 or (605) 348-5580.
Red light is on steady	RED	The voltage is low. Measure the three line-to-line voltages. Calculate the average. If the average is 7% or more below the nominal voltage as selected by the LINE VOLTAGE ADJUST, the MotorSaver <sup>®</sup> is functioning properly. If the voltage is within 7%, call SymCom at (800) 843-8848 or (605) 348-5580.
Green light blinks and motor is not running	 GREEN	The MotorSaver <sup>®</sup> is timing through the restart delay and will energize its contacts when finished.
Green light is on steady, but motor does not start	GREEN	The MotorSaver <sup>®</sup> is in run mode. Ensure other control devices are allowing the motor to start. Check control circuit for loose wires or malfunctioning switches.

## DIMENSIONS



**BOTTOM**



**SIDE  
WITH OT 11\* SOCKET**

\*The OT11 socket is 35mm DIN rail compatible. The use of OT11 socket is required for Models 201-XXX-DPDT to qualify as UL Listed devices.

## MOTOR SAVER® 201-XXX-DPDT SPECIFICATIONS

<b>Functional Characteristics</b>	
<b>Adjustments/Settings</b>	
Low Voltage (% of setpoint)	
Trip	90%±1%
Reset	93%±1%
Voltage Unbalance	
Trip	6%
Reset	4.5%
<b>Trip Delay Time</b>	
Low voltage and unbalanced voltage	4 seconds
Models with -60mS Option	0.5 seconds
Single-phasing faults (>15%UB)	2 seconds
Models with -60mS Option	0.5 seconds
<b>Reset Delay Times</b>	
After a fault	2 seconds
Models with -60mS Option	60 milliseconds
After a complete power loss	2 seconds
Models with -60mS Option	60 milliseconds
<b>Input Characteristics</b>	
3-Phase Line Supply Voltage	
201-100-DPDT (-60mS)	95-120VAC
201-200-DPDT (-60mS)	190-240VAC
Frequency	50/60 Hz
<b>Output Characteristics</b>	
<b>Output Contact Rating - DPDT</b>	
Pilot Duty	480VA @ 240VAC
General Purpose	10A @ 240VAC
<b>General Characteristics</b>	
<b>Environmental</b>	
Ambient Operating Temperature <sup>2</sup>	-40° to 70°C (-40° to 158°F)
Relative Humidity	10-95%, non-condensing per IEC 68-2-3
<b>Maximum Input Power</b>	
	5 W
<b>Standards Passed</b>	
Electrostatic Discharge (ESD)	IEC 61000-4-2, Level 3, 6kV contact, 8kV air
Models with -60mS Option	IEC 61000-4-2, 3kV contact, 6kV air
Radio Frequency Immunity, Radiated	150 MHz, 10V/m
Fast Transient Burst	IEC 61000-4-4, Level 3, 3.5kV input power and controls
Models with -60mS Option	IEC 61000-4-4, Level 3, 2.5kV input power and controls
Surge Immunity	
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 minute)
<b>Safety Marks</b>	
UL listed (OT11 octal socket required)	UL508 (File #E68520)
CE	IEC 60947-6-2
<b>Dimensions</b>	2.330" H x 2.375" W x 4.125" D (with socket)
<b>Weight</b>	9 oz
<b>Enclosure</b>	Polycarbonate
<b>Mounting Method</b>	Plugs into 11-Pin OT11 Socket
<b>Wire Gauge</b>	12-22 AWG Solid or Stranded
<b>Terminal Torque for P/N OT11 Socket</b>	12 in.-lb.

<sup>2</sup> The ambient air temperature is the air temperature directly surrounding the product.

For warranty information, please see **Terms and Conditions** at  
[www.symcom.com](http://www.symcom.com)

*Visit us at [www.symcom.com](http://www.symcom.com) to see  
our complete product listing!*

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