

INSTALLATION INSTRUCTIONS FOR SYMCOM'S MOTORSAVER® MODEL 460-MR

**BE SURE POWER IS DISCONNECTED PRIOR TO INSTALLATION!!
FOLLOW NATIONAL, STATE AND LOCAL CODES!**

CONNECTIONS

1. Mount the MOTORSAVER® in a convenient location in or near the motor control panel. If the location is wet or dusty, then the MOTORSAVER® should be mounted in a NEMA 4 or 12 enclosure. The 460 can be mounted to a back panel using two #6 or #8 x 5/8 screws or can be snapped on to a DIN rail.
2. Connect L1, L2 and L3 on the MotorSaver's terminal strip to the **LINE SIDE** of the magnetic contactor. (See Figure No. 1).
3. Connect the output relay to the circuitry to be controlled. Connect the normally open contact in series with the magnetic coil of the motor starter as shown in Figure No. 1 for motor control. Connect normally closed contact in control circuit as shown in Figure No. 2 for alarm operation.

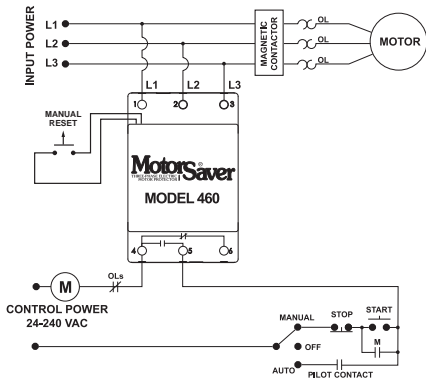


Figure No. 1: Motor Control Wiring Diagram

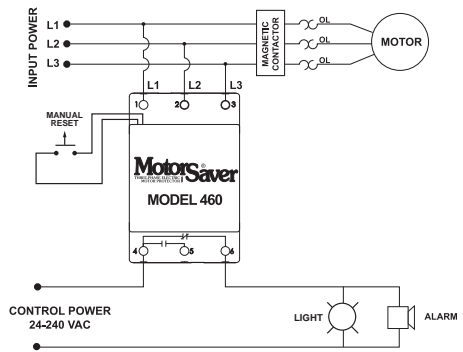


Figure No. 2: Alarm Wiring Diagram

SETTINGS

1. LINE VOLTAGE ADJUSTMENT: Rotate the **LINE VOLTAGE ADJUSTMENT** to the nominal three-phase line voltage feeding the motor to be protected. The Model 460 will automatically sense whether it is connected to a 200V or 400V 60 Hz or 380V - 416V 50Hz power system.

2. RESTART delay: (Restart delay is nonoperative when configured for manual reset) Rotate the **RESTART** delay to the desired position. The restart delay is the time between the MOTORSAVER® seeing acceptable power and the MOTORSAVER® closing its output contacts. For compressor applications, the restart delay should be set for the approximate time it takes for the head pressure to bleed off of the compressor. For other applications, the restart delay is typically set at 2 seconds. (NOTE: This delay is also the minimum cycle time or rapid cycle timer for the motor or compressor when control power is lost such as the operation of a Thermostat.)

3. UNBALANCE TRIP: Rotate the **UNBALANCE TRIP** to the desired voltage unbalance trip level. The NEMA MG1 standard does not recommend operating a motor above a 1% voltage unbalance as determined by the following formula without derating the motor.

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

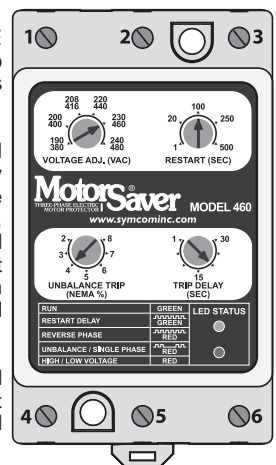


FIGURE 3

The NEMA MG1 standard also recommends against operating a motor above a 5% voltage unbalance under any circumstances. Therefore, a 5% setting on "UB" is a good place to start but SymCom recommends consulting the motor manufacturer for specific tolerances.

4. **TRIP DELAY ADJUSTMENT:** Rotate the TRIP DELAY ADJUSTMENT to the desired setting. The adjustment does not affect the trip delay on a single-phasing fault. Typically, the TRIP DELAY ADJUSTMENT is set to 4 seconds. In areas where voltage fluctuations are frequent, the TRIP DELAY ADJUSTMENT may be set between 10 and 20 seconds.

POWER-UP

Turn on the power to the motor. If the manual reset pins are shorted the green RUN LIGHT will blink during the RESTART delay. After the RESTART delay, the MOTORSAVER[®] will energize its output contacts and the green RUN LIGHT will light. If the contacts do not energize and the RUN LIGHT does not light, then see the TROUBLESHOOTING section. If the manual reset pins are not shorted the output contacts will remain de-energized until the reset button is pressed. The green and red lights will indicate the last fault or current fault if the unit has tripped off. Otherwise the green and red lights will flash in unison until the reset button is pressed.

MANUAL RESET SWITCH INSTALLATION

The Model 460-MR is shipped from SymCom's factory with a jumper across the two manual reset pins. See Fig. 4. If the jumper is left in place, or the manual reset button is pressed when the 460-MR is energized, it will operate as a standard Model 460.

To use the Model 460-MR in manual reset mode, the jumper must be removed and a normally open switch must be wired to the manual reset input pins. Two wire crimp contacts and a plastic housing are shipped with each 460-MR. Insulated wires, 22-26 AWG, must be connected to a normally open momentary push button switch and to the crimp contacts provided. The contacts must be inserted into the housing, which is then plugged into the Model 460-MR. See Fig. 5.

To properly crimp the contacts to the wires, the Tyco/Amp[®] Crimper Tool Assembly Part Number 58517-1 should be used. The wire insulation should be stripped approximately .100 to .125 inches and the contacts should be crimped according to the instructions provided with the tool. See the Tyco/Amp[®] instruction sheet 408-4064 for more detailed instructions for use of the crimp tool.

After crimping both contacts, insert them into the housing so that the locking tabs line up with the holes in the housing. The connector assembly must then be plugged into the Model 460-MR with the locking tabs down. This allows the connector to be fastened securely.

MANUAL RESET SWITCH OPERATION

When a fault is detected, the 460-MR will flash the fault code until the fault condition clears and the reset button is pressed. If the fault clears, and the reset button has not been pressed, the 460-MR will keep flashing the same fault. This allows someone to identify the fault even after it has cleared. As soon as the reset button is pressed, the unit will then reset.

The 460-MR will keep displaying the last fault until someone resets it even if power is removed and reapplied.

The 460-MR always requires resetting after a power loss. If no faults are currently detected, and no faults were detected before power was removed, then both lights will flash in unison until the reset button is pressed.

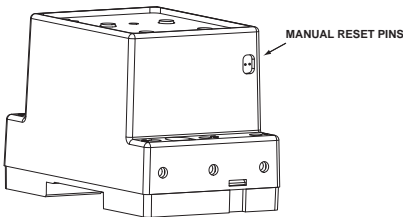


FIGURE 4

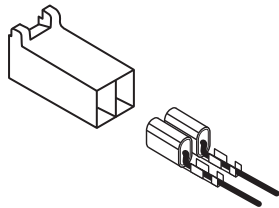











FIGURE 5

TROUBLESHOOTING

SYMPTOM	LIGHT PATTERN	SOLUTION
No lights are on. The unit seems completely dead.	NA	Measure the three line-to-line voltages. If any of the voltages are below 150 VAC, the Model 460 does not have enough power to operate its internal electronics. This may occur on a single-phased system. If the voltages are correct, call SymCom @ 1-800-843-8848.
Red light is blinking on initial installation power up.	 RED	Turn off the three-phase power. Swap any two leads powering the Model 460:L1, L2 or L3. You have a 50-50 chance of connecting L1, L2 and L3 up correctly the first time. Turn on the three-phase power.
Red light is blinking after the motor has been previously running.	 RED	The incoming lines have been reverse phased. The Model 460 is preventing the motor from running backwards. Correct the phase sequence.
Red light is blinking in this pattern.	 RED	Indicates voltage unbalance. Measure incoming line voltages and calculate % unbalance as shown on page 1. If voltage unbalance does not exceed the % unbalance set on the front, try pressing the manual reset button. If this does not reset the 460, call SymCom at 1-800-843-8848.
Red light is on steady.	NA	Measure the three line-to-line voltages. Calculate the average of the three voltages. If the average is outside of $\pm 7\%$ of the nominal voltage as set by LINE VOLTAGE ADJUST, then the Model 460 is functioning properly. If the voltage is within the reset window, try pressing the manual reset button. If this does not reset the 460, call SymCom @ 1-800-843-8848.
Green light blinks but motor does not start.	 GREEN	The Model 460 is in restart delay. (This occurs only when the manual reset jumper is in place)
Green light is on steady but motor does not start.	NA	Check control circuit for loose wires or malfunctioning switches.
Red and green light flash in unison	 RED & GREEN	The 460 is waiting for a manual reset.

INDICATOR LIGHT DIAGNOSTICS

RUN	GREEN
RESTART DELAY	 GREEN
REVERSE PHASE	 RED
UNBALANCE / SINGLE PHASE	 RED
HIGH / LOW VOLTAGE	RED
MANUAL RESET REQUIRED	 RED & GREEN

Specifications

3-Phase Line Voltage	190 - 480 VAC (475 - 600 VAC Optional) (95 - 120 VAC Optional)
Frequency	50* or 60 Hz
Low Voltage (% of set point)	
•Trip	90% ±1%
•Reset	93% ±1%
High Voltage (% of set point)	
•Trip	110% ±1%
•Reset	107% ±1%
Voltage Unbalance (NEMA)	
•Trip	2 - 8% Adjustable
•Reset	Trip setting minus 1% (5 - 8%) Trip setting minus .5% (2 - 4%)
Trip Delay Time	
•Low & High Voltage and Unbalance	1 - 30 seconds adjustable
•Single Phasing Faults	1 second fixed
Restart Delay Time	- When manual reset pins are shorted.
•After a Fault	1 - 500 seconds adjustable
•After a Complete Power Loss	1 - 500 seconds adjustable
Output Contact Rating	
•1-Form C	10 A General Purpose @240 VAC Pilot Duty 480VA @ 240 VAC, B300
Power Consumption	6 Watts (Max.)
Weight	14 oz.
Enclosure	polycarbonate
Terminal Torque	.6 in-lbs.
Wire Type	Stranded or solid 12-20 AWG, one per terminal
Safety Marks	
•UL	UL508
•CE	IEC 60947-6-2
Standards Passed	
•Electrostatic Discharge (ESD)	IEC 1000-4-2, Level 3, 6kv contact, 15kv air
•Radio Frequency Immunity, Radiated	150 MHz, 10V/m
•Fast Transient Burst	IEC 1000-4-4, Level 3, 3.5kv input power & controls
Surge	
•IEC	IEC 1000-4-5, 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)
Environmental	
Temperature Range	Ambient Operating: -20° - 70° C (-4° - 158°F) Ambient Storage: -40° - 80° C (-40° - 176°F)
Class of Protection	IP20, NEMA 1 (FINGER SAFE)
Relative Humidity	10-95%, non-condensing per IEC 68-2-3

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

SymCom warrants its microcontroller based products against defects in material or workmanship for a period of five (5) years from the date of manufacture. All other products manufactured by SymCom shall be warranted against defects in material and workmanship for a period of two (2) years from the date of manufacture. For complete information on warranty, liability, terms, returns, and cancellations, please refer to the SymCom Terms and Conditions of Sale document.