



LARGE LOW VOLTAGE ELECTRICAL MACHINES INSULATION MONITOR MODEL LM602IND

Model LM602IND Insulation Monitors are designed to monitor large, low voltage motor installations for insulation deterioration whenever they are not energized. In such installations personnel safety is paramount and Type LM602IND Monitors incorporate features to maximize that safety. They are entirely automatic in operation and are CSA Certified and UL Listed as Industrial Control Devices.

FEATURES:

- ◆ Easy Installation
- ◆ One model covers voltages to 600 V. AC/DC
- ◆ Nuisance trips eliminated
- ◆ Test voltage 400 v. DC, current limited for personnel safety
- ◆ Completely automatic operation
- ◆ Solid state circuitry
- ◆ High/Low alarm selection
- ◆ LED local alarm
- ◆ Remote alarm capability
- ◆ Local/Remote reset capability
- ◆ Small footprint DIN rail mounting



APPLICATION:

The Model LM602IND Insulation Monitor is designed to provide safe monitoring of the electrical insulation integrity of 480/600 volt AC or DC motors, particularly very large machines, such as may be used, for example, in large HVAC installations. Normally installed on machines in intermittent use, to monitor the micro-cracking of the insulation caused by repeated starting and stopping, they are also very useful for monitoring continuously running machines during their annual shutdowns, giving early warning of the moisture-induced degradation of the insulation which causes failure on restarting.

Insulation resistance is monitored at 400 volts DC, current limited for personnel safety, whilst the motor is idle, by connecting terminals 14 & 15 to any two phases on the load side of the final running contactor of the motor starter. The factory preset alarm levels are $5M\Omega$ ("High") and $2.5M\Omega$ ("Low"), but alarm levels to $100M\Omega$ can be provided if required.

The "High" alarm level should be selected when the LM602IND is installed. When an alarm occurs, select the "Low" alarm level. The time interval between alarms at the "High" and "Low" levels is a measure of the insulation deterioration rate.

This unique "early warning" feature gives the operator time to schedule preventative maintenance when it is convenient and thus avoid haphazard shutdowns.

Contacts are provided for both local and remote alarms and also to permit operation in the "start prevention" mode if desired.

An internal time delay of 10 minutes is provided to permit the dissipation of residual charge in the circuit capacitance before the monitoring action begins, but LM602IND units are shipped with bridges between terminals 16 & 17 to short out the time delay to shorten testing time during the installation. The time delay may be restored by removing the bridge.

ORDERING INFORMATION

- Refer to the Specifications and include the control voltage required.
- Installation Kit IK-MHV includes the bracket set DIN-MHV, the flashing alarm light FAL, a Test Resistor and hook-up wire, wire connectors, Ty-wraps and mounting screws sufficient to install the unit, Explanatory and Warning labels.

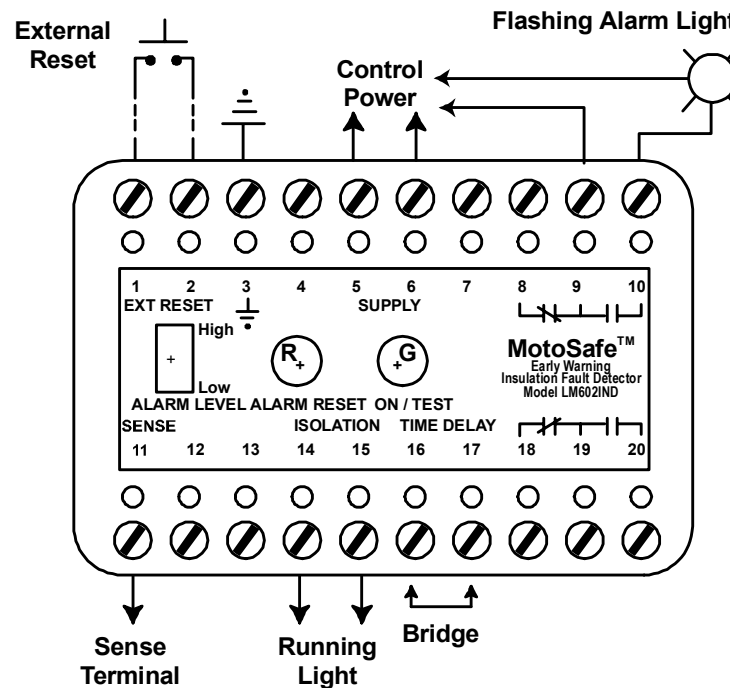
SPECIFICATIONS

MotoSafe Model LM602IND
Insulation Monitors for Large Low Voltage Motors

Max. Line Voltage	600 v. AC/DC
Control voltage	120 or 220, $\pm 20\%$, 50/60 Hz
Control Power	6 va.
Isolation voltage	24 - 600 v. AC/DC
Factory Setpoints*	High - 5M Ω Low - 2.5M Ω
Contact Rating	5 amp., 250 volt Resistive
Isolation Time	0.5 milliseconds
Dimensions (mm) WxHxL (in)	103 x 68 x 112 4.05 x 2.67 x 4.4
Weight (kg)/(oz)	0.42/14.8

- * Setpoints in the range to 100M Ω available - contact factory
- All units suitable for DIN Rail Mounting.
- Maximum short circuit current is 2 milliamperes.
- Operating temperature -20°C to +50°C; storage temperature -40°C to +100°C.
- Environment maximum 95% relative humidity, non-condensing.
- Maximum sense line megger voltage 1,000 DC.
- UL and CSA approved.

CONNECTION DIAGRAM



MOTOSAFE™ MONITOR TYPE LM602IND; INSTALLATION.

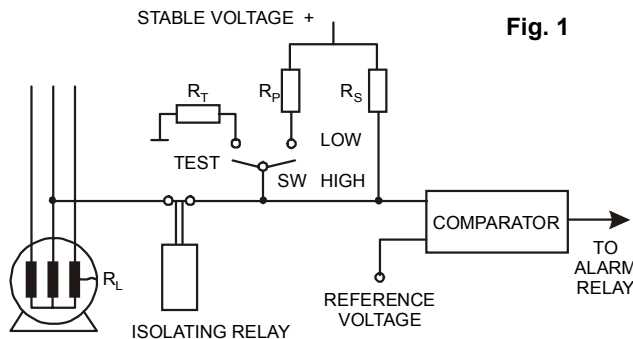
IMPORTANT: READ THE FOLLOWING INSTRUCTIONS BEFORE INSTALLING THE MONITOR.

MotoSafe INSULATION MONITOR FOR LARGE 600 V MOTORS, MODEL LM602IND

The MotoSafe device continuously monitors the insulation resistance of idle machines and operates an alarm relay when the resistance falls below a set value. This value may be 5 Megohms ("High" setting) or 2.5 Megohms ("Low" setting). If other values have been specified by the customer, the device will be so marked.

OPERATION

When the motor is idle, the isolating relay contacts are closed, as shown (see Fig. 1)



This connects the motor windings to a stable voltage source through the series resistor R_S . The series resistor and the generator windings leakage resistance R_L form a voltage divider with a comparator connected to the R_S / R_L junction. The voltage seen by the comparator is therefore a function of the leakage resistance R_L . When this resistance falls below the set value, the comparator voltage falls below the reference voltage and the alarm relay is activated.

INSTALLATION INSTRUCTIONS

To install the MotoSafe device in the low voltage (instrumentation) compartment of the motor control enclosure:

1. Disconnect the power from the enclosure.
2. Fasten the mounting bracket in place with the screws supplied. Clip the device securely to the bracket. If required (and regulations permit), install the long-life local alarm lamp (supplied) on the motor control front panel close to the hinges and affix the adhesive warning label around the lamp.

WIRING INSTRUCTIONS

CAUTION: OBSERVE SAFETY PRECAUTIONS - DO NOT WORK ON LIVE CIRCUITS!

1. Disconnect the supply and control voltages.
2. Connect terminals 5 & 6 of the MotoSafe device to the control voltage supply.
3. Connect terminals 14 & 15 to any two motor phases or alternatively to running light or breaker coil.

4. Connect terminal 3 to ground and terminal 11 to any motor phase.
5. If a local alarm light is required, connect terminal 9 to terminal 6, connect one lead of the flashing alarm light to terminal 10 and the other to terminal 5.
6. Energize the FailSafe monitor.

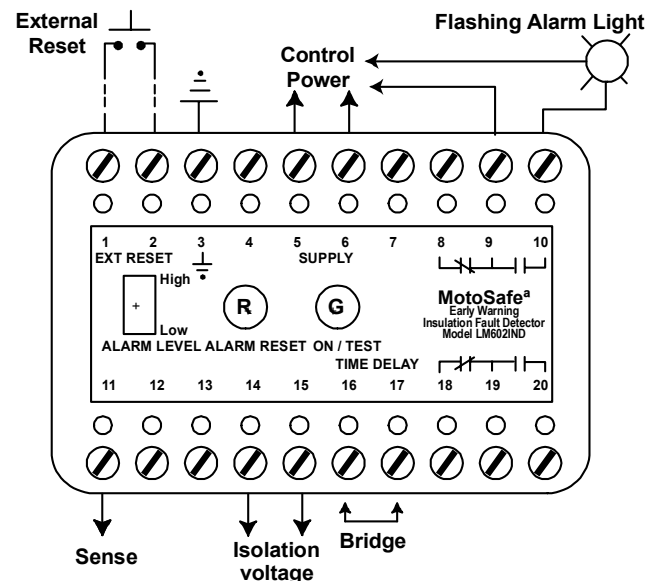
Note:

1. Terminals 1 & 2 may be used for an external, NO push button switch to reset the alarm.
2. Terminals 16 & 17 are time delay terminals. Bridged the unit senses the motor phases 8 - 10 seconds after the motor is stopped. Unbridged, there is a time delay of 10 minutes before sensing begins. The units are shipped with the terminals bridged.

TESTING

1. Ground one of the motor phases momentarily via the test resistor. The red LED should light and the external alarm circuit be activated after a delay of 8 - 10 seconds. Reset the monitor with the RESET button.
2. Start the motor. The red LED should NOT light and the external alarm devices should NOT operate.
3. Stop the motor. If the insulation resistance is satisfactory the alarm should not operate.

Connection Diagram Model LM602IND



Note:

The green LED indicates "Power ON" and the red LED is the alarm indicator. Should the alarm indicator light but the external alarm device does not, recheck the connections. If the connections are correct, test the contacts used for the external alarm (see Wiring Instruction #5) with a low range ohmmeter. If the results are not correct, replace the unit.