



## INSTALLATION AND TESTING PROCEDURE



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### **IMPORTANT!**

THIS DEVICE MUST BE INSTALLED BY A QUALIFIED PERSON WHO UNDERSTANDS ELECTRICAL CIRCUITS.

**Please read all the information on this sheet.**

### **WARNING**

An Equipment Leakage Circuit Interrupter (ELCI) is an electrical safety device that under normal use is intended to provide supplementary leakage protection for equipment. Use this product only within the specified operating parameters. (Failure to do so may result in damage to equipment.) Consult a licensed electrician for assistance on installation and repairs. Do not use this ELCI if it fails to function as instructed. Never attempt to tamper with this device. This ELCI must never be used as a switch to connect or disconnect power. (Power should be disconnected at main power feed or by secondary switch located at the primary feed of ELCI.) This ELCI is not an over-current protection device. (An appropriate fuse or circuit breaker must be used in series at primary power feed.) This ELCI does not provide protection against leakage between both circuit conductors. This ELCI does not provide protection against electrical leakage generated by the conductors supplying power to the device. **Note: primary feed to ELCI is live even when ELCI is tripped. (Power should be disconnected at main service panel before servicing load side of ELCI.)**

- Do not use this device to feed power to life support apparatus.  
Installation must comply with local and national
- electrical codes (NEC).  
During installation, turn power off at the service panel to prevent serious injuries.

### **What is an ELCI?**

An ELCI is a device designed to interrupt power when a ground fault (a current that takes a path to ground) exceeds a predetermined value. This power interruption is quickly accomplished removing the hazardous situation within the vicinity of the effected equipment.

### **Why do we need an ELCI?**

Certain electrical applications are prone to insulation breakdown of equipment, causing risk of fire and other hazardous conditions for personnel, especially when used near wet locations; this is where an ELCI is needed the most. This is also why electrical codes require ELCI protection in pedestal shore power and marina feeders, de-icing and pipe heating equipment, as well as floating structures such as piers.

North Shore Safety's ELCI, LineGard®, will offer such protection. Its safety scope surpasses its peers to include open supply indication as well as dual indication of operating modes, with fault indication or power status.

### **How does a ELCI operate?**

The ELCI constantly monitors the current-balance of the conductors supplying power to the load. When a ground fault occurs - by a leakage - the imbalance of current is sensed and the ELCI trips when the ground fault exceeds the required setpoints of either 6-10-30mA.

### **What an ELCI cannot do:**

- Will not protect the circuit's line side.
- Will not protect against leakage between two current carrying conductors of opposite polarity (the ELCI sees this as a load).
- Will not protect a line of another circuit.
- Will not detect over-current.

## **North Shore Safety TWO YEAR LIMITED MANUFACTURER'S WARRANTY**

North Shore Safety warrants to the consumer its Line-Gard Ground Fault Circuit Interrupter (GFCI) to be free from defects in materials and workmanship, under normal use and service, for a period of two years from date of purchase. North Shore Safety, at its option, will repair or replace the defective GFCI without charge within 2-years of the date of the product's purchase provided that the defect occurred during normal use. The defective unit must be returned freight prepaid, with a RGA (Returned Goods Authorization) including a description of the problem, and a proof of purchase date to the Quality Assurance Dept. North Shore Safety, Ltd. 7335 Production Drive, Mentor, OH 44060.

North Shore Safety will not be liable, directly or indirectly, for installation or removal of this device, or for any personal injury, or property damages, or incidental, indirect, or consequential damages of any kind, as a result of a defective device. The exclusive remedy, under this warranty, is the repair or replacement of the defective device. In no case shall North Shore Safety's liability exceed the purchase price. This warranty is void or not covered if this device is found to be: not properly installed, tampered with, not used according to label instructions and ratings, enclosure breached (button cover label, conduit hubs, vent, or lid fasteners), surged, short circuited, or abused.

# Specifications

## TECHNICAL

Rated Voltage:	120VAC, 208VAC, 240VAC, 120/240VAC, 480VAC, 600VAC, 120/208VAC, 277/480VAC, 347/600VAC, 220/380VAC (custom)
Operating Voltage Range:	85% to 110% of rated
Current:	40, 50, 60 Amps
Frequency:	60Hz, (50Hz available)
Trip Level:	6mA, 10mA, 30mA (selectable)
Phase:	Single, Split and Three Phase (3, 4, and 5 wire circuits)
Dielectric Withstand:	1500 VRMS across contact 4000 VRMS between conductors and enclosure
Voltage Surge Withstand:	Up to twenty 4kV/2kA impulses, per IEC 61000-4-5
Operating Temperature range:	-35°C to +66°C
Leakage Current@ 93% Humidity:	Zero
Overload Current:	Up to 360 Amps (for 60 Amp), 0.45PF (240 Amps for 40 Amp, 300 Amps for 50 Amp)
RF Noise Susceptibility:	Normal Operation with 0.5 VRMS injected on power line with Frequencies up to 230 MHz.

## GENERAL:

Construction:	
Power - Up Type *:	
Endurance:	Industrial Grade Design
Power ON Indication:	Auto or Manual (selectable)
Power FAULT Indication:	3000 Operations Minimum
Enclosure:	Lighted Green LED
Mounting Type:	Blinking Red LED
Wiring Application:	TYPE 4X Permanent, and Portable 3 Wire, Single Phase (Hot, Neutral, and Ground**) 4 Wire, Single Phase (L1ne 1, Line 2, Neutral, Ground**)
Wiring Connections:	4 Wire, Three Phase Delta (L1ne 1, Line 2, Line 3, Ground**) 5 Wire, Three Phase Wye (L1ne 1, Line 2, Line 3, Neutral, Ground**)
Switch Interface:	Permanent Hardwire (See Type under Model Configuration Chart) Portable Field Wire able (See Type under Model Configuration Chart) Double Insulated

## IMPORTANT NOTE:

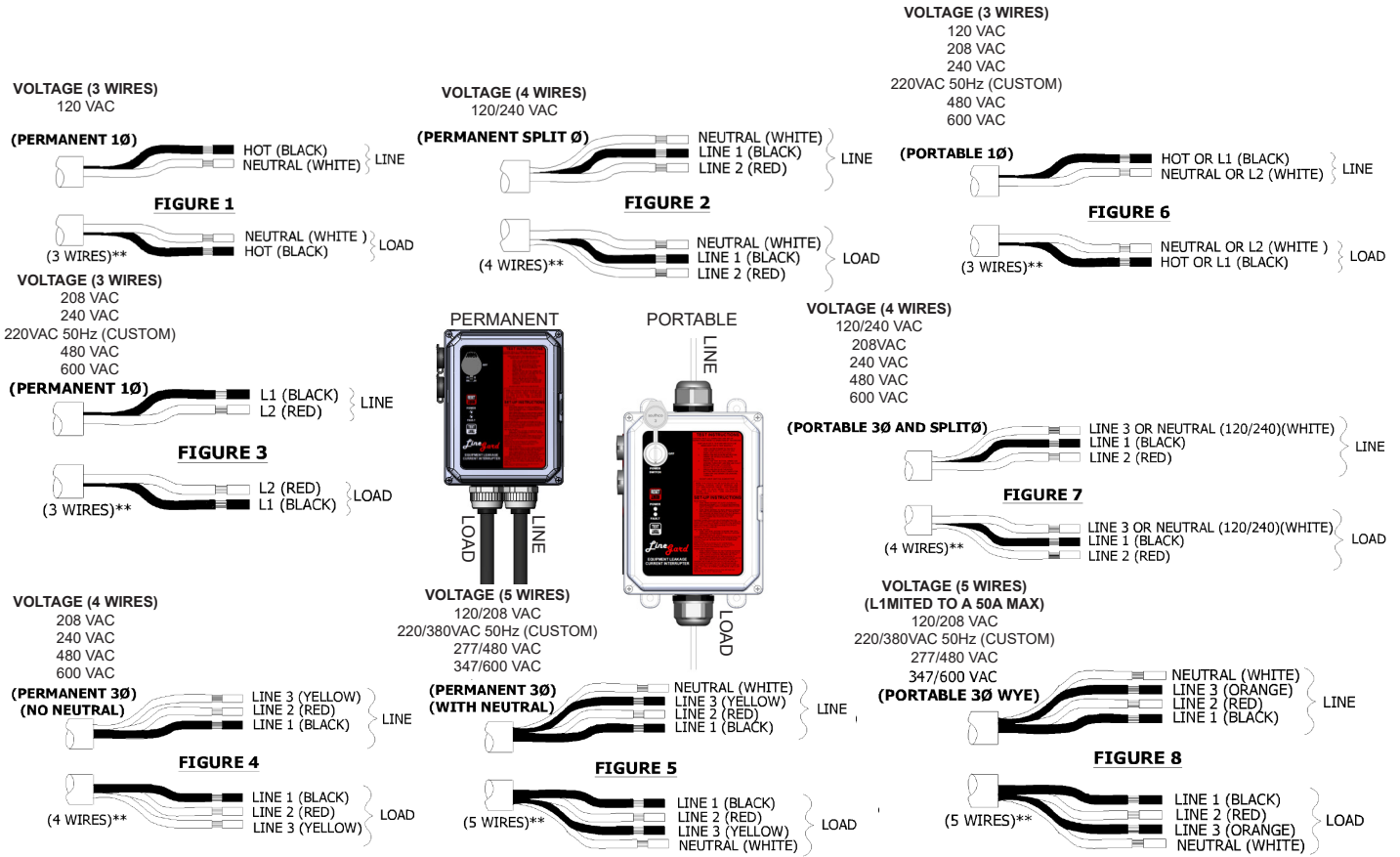
\*Manual configuration should be specified when automatic power-up would create an unsafe condition after restoration of circuit power.

## IMPORTANT NOTE:

**\*Manual configuration should be specified when automatic power up would create an unsafe condition after restoration of circuit power.**

**\*\*Ground connection is done external to device enclosure. (Ground integration is available upon request and is considered a NSS custom build.)**

**DANGER: HAZARD OF ELECTRICAL SHOCK, BURN, OR EXPLOSION.** Disconnect power at main panel before you start the installation. Failure to do so will cause severe shock, personal injury and death.



\*\* GROUND WIRE IS CONNECTED (BYPASSED) EXTERNALLY (FOR PERMANENT MODELS ONLY). A GROUND WIRE DOES NOT ENTER OR EXIT THE ELCI ENCLOSURE. ALTHOUGH AN ELCI DOES NOT REQUIRE A GROUND TO OPERATE, A GROUND CONNECTION IS REQUIRED AND SHOULD BE MADE AT THE JUNCTION BOX, GROUND WIRE IS CONNECTED IN ALL PORTABLE UNITS.

**IMPORTANT!**

1. Read all the instructions in this leaflet and on the device label.
2. Identify all the features and wires (see above drawings).
3. Identify Line wires and Load wires.
4. Verify that the ratings on the device match your field line ratings.
5. Disconnect power at main panel!
6. Determine ELCI location and drill mounting holes using template provided.
7. Strip wires to 5/8".
8. Feed wires into junction box through appropriate hole and secure cable or conduit end of ELCI to junction box.
9. Choose the right wiring application and connect wires according to the above drawings and instructions provided.
10. Secure ELCI box to mounting panel.
11. ELCI may or may not interrupt on phase loss: see ELCI circuit on power-up.

**Figure 1: Permanent Series 120VAC, 220VAC (custom), (single-phase, 3-wire)**

- Connect field service (Hot) to ELCI line side (Hot - black wire) utilizing an appropriate rated wire connector.
- Connect field service (Neutral) to ELCI line side (Neutral - white wire) utilizing an appropriate rated wire connector.
- Connect device or circuit load (Hot) to ELCI load side (Hot- black wire) utilizing an appropriate rated wire connector.
- Connect device or circuit load (Neutral) to ELCI load side (Neutral - white wire) utilizing an appropriate rated wire connector.
- Connect field service safety ground to load side device or equipment grounding point. "Safely ground does not enter or exit ELCI and is bypassed."

**NOTE:** ELCI circuitry is powered by (Hot and Neutral) and thus circuit must be maintained for ELCI to operate.

**Figure 2: Permanent Series 120/240VAC (split-phase, 3-wire)**

- Connect field service (Hot/L1) to ELCI line side (Hot/L1 - black wire) utilizing an appropriate rated wire connector.
- Connect field service (Hot/L2) to ELCI line side (Hot/L2 - red wire) utilizing an appropriate rated wire connector.
- Connect field service (Neutral) to ELCI line side (Neutral - white wire) utilizing an appropriate rated wire connector.
- Connect device or circuit load (Hot/L1) to ELCI load side (Hot/L1 - black wire) utilizing an appropriate rated wire connector.
- Connect device or circuit load (Hot/L2) to ELCI load side (Hot/L2 - red wire) utilizing an appropriate rated wire connector.
- Connect device or circuit load (Neutral) to ELCI load side (Neutral- white wire) utilizing an appropriate rated wire connector.
- Connect field service safety ground to load side device or equipment grounding point. "Safety ground does not enter or exit ELCI and is bypassed."

**NOTE:** ELCI circuitry is powered by (L1 and Neutral) and thus circuit must be maintained for ELCI to operate.

**Figure 3: Permanent Series 208VAC, 240VAC, 480VAC, 600VAC (single-phase, 3-wire)**

- Connect field service (Hot/L1) to ELCI line side (Hot/L1 - black wire) utilizing an appropriate rated wire connector.
- Connect field service (Hot/L2) to ELCI line side (Hot/L2 - red wire) utilizing an appropriate rated wire connector.
- Connect device or circuit load (Hot/L1) to ELCI load side (Hot/L1 - black wire) utilizing an appropriate rated wire connector.
- Connect device or circuit load (Hot/L2) to ELCI load side (Hot/L2 - red wire) utilizing an appropriate rated wire connector.
- Connect field service safety ground to load side device or equipment grounding point. "Safety ground does not enter or exit ELCI and is bypassed."

**NOTE:** ELCI circuitry is powered by (L1 and L2) and thus circuit must be maintained for ELCI to operate.

**Figure 4: Permanent Series 208VAC, 240VAC, 480VAC, 600VAC (three-phase, 4-wire)**

- Connect field service (Hot/L1) to ELCI line side (Hot/L1 - black wire) utilizing an appropriate rated wire connector.
- Connect field service (Hot/L2) to ELCI line side (Hot/L2 - red wire) utilizing an appropriate rated wire connector.
- Connect field service (Hot/L3) to ELCI line side (Hot/L3 - yellow wire) utilizing an appropriate rated wire connector.
- Connect device or circuit load (Hot/L1) to ELCI load side (Hot/L1 - black wire) utilizing an appropriate rated wire connector.
- Connect device or circuit load (Hot/L2) to ELCI load side (Hot/L2 - red wire) utilizing an appropriate rated wire connector.
- Connect device or circuit load (Hot/L3) to ELCI load side (Hot/L3 - yellow wire) utilizing an appropriate rated wire connector.
- Connect field service safety ground to load side device or equipment grounding point. "Safety ground does not enter or exit ELCI and is bypassed."
- NOTE: ELCI circuitry is powered by (L1 and L2) and thus circuit must be maintained for ELCI to operate.

**Figure 5: Permanent Series 120/208VAC, 220/380VAC (custom), 277/480VAC, 347/600VAC (three-phase, 5-wire)**

- Connect field service (Hot/L1) to ELCI line side (Hot/L1 - black wire) utilizing an appropriate rated wire connector.
- Connect field service (Hot/L2) to ELCI line side (Hot/L2 - red wire) utilizing an appropriate rated wire connector.
- Connect field service (Hot/L3) to ELCI line side (Hot/L3 - yellow wire) utilizing an appropriate rated wire connector.
- Connect field service (Neutral) to ELCI line side (Neutral - white wire) utilizing an appropriate rated wire connector.
- Connect device or circuit load (Hot/L1) to ELCI load side (Hot/L1 - black wire) utilizing an appropriate rated wire connector.
- Connect device or circuit load (Hot/L2) to ELCI load side (Hot/L2 - red wire) utilizing an appropriate rated wire connector.
- Connect device or circuit load (Hot/L3) to ELCI load side (Hot/L3 - yellow wire) utilizing an appropriate rated wire connector.
- Connect device or circuit load (Neutral) to ELCI load side (Neutral - white wire) utilizing an appropriate rated wire connector.
- Connect field service safety ground to load side device or equipment grounding point. "Safety ground does not enter or exit ELCI and is bypassed."

**NOTE:** ELCI circuitry is powered by (L1 and L2 on 277/480VAC and 347/600V AC Circuits) and thus circuit must be maintained for ELCI to operate. Exception: 120/208VAC and 220/380VAC are powered by (L1 and Neutral)

**Figure 6: Portable Series 120VAC, 208VAC, 240VAC, 277VAC, 480VAC, 600VAC (single-phase, 3-wire)**

- Connect field service (Hot/L1) to ELCI line side (Hot/L1 - black wire) utilizing an appropriate rated wire connector.
- Connect field service (Neutral/L2) to ELCI line side (Neutral/L2 - white wire) utilizing an appropriate rated wire connector.
- Connect field service (Safety Ground) to ELCI line side (Safety Ground - green wire) utilizing an appropriate rated wire connector.
- Connect device or circuit load (Hot/L1) to ELCI load side (Hot/L1 - black wire) utilizing an appropriate rated wire connector.
- Connect device or circuit load (Neutral/L2) to ELCI load side (Neutral/L2 - white wire) utilizing an appropriate rated wire connector.
- Connect device or circuit load (Safety Ground) to ELCI load side (Safety Ground -green wire) utilizing an appropriate rated wire connector.
- **NOTE:** ELCI circuitry is powered by (L1 and N/L2) and thus circuit must be maintained for ELCI to operate. White wire is Neutral for 120VAC circuits.

**Figure 7: Portable Series 120/240VAC, 208VAC, 240VAC, 480VAC, 600V AC (split and three-phase, 4-wire)**

- Connect field service (Hot/L1) to ELCI line side (Hot/L1 - black wire).
- Connect field service (Hot/L2) to ELCI line side (Hot/L2 - red wire).
- Connect field service (Neutral or L3) to ELCI line side (Neutral or L3 - white wire) (Neutral for 120/240VAC).
- Connect field service (Safety Ground) to ELCI line side (Safety Ground - green wire).
- Connect device or circuit load (Hot/L1) to ELCI load side (Hot/L1 - black wire).
- Connect device or circuit load (Hot/L2) to ELCI load side (Hot/L2 - red wire). Connect device or circuit load (Neutral or L3) to ELCI load side (Neutral or L3 - white wire) (Neutral for 120/240VAC).
- Connect device or circuit load (Safety Ground) to ELCI load side (Safety Ground - green wire).

**NOTE:** ELCI circuitry is powered by (L1 and L2) and thus circuit must be maintained for ELCI to operate. Exception: Split phase is powered by (L1 and Neutral).

**Figure 8: Portable Series 120/208VAC, 220/380VAC (custom), 277/480VAC,**

**347/600VAC (three-phase WYE, 5-wire)**

- Connect field service (Hot/L1) to ELCI line side (Hot/L1 - black wire).
- Connect field service (Hot/L2) to ELCI line side (Hot/L2 - red wire).
- Connect field service (Hot/L3) to ELCI line side (Hot/L3 - orange wire).
- Connect field service (Neutral) to ELCI line side (Neutral - white wire).
- Connect field service (Safety Ground) to ELCI line side (Safety Ground - green wire).
- Connect device or circuit load (Hot/L1) to ELCI load side (Hot/L1 - black wire).
- Connect device or circuit load (Hot/L2) to ELCI load side (Hot/L2 - red wire).
- Connect device or circuit load (Hot/L3) to ELCI load side (Hot/L3 - orange wire).
- Connect device or circuit load (Neutral) to ELCI load side (Neutral - white wire).
- Connect device or circuit load (Safety Ground) to ELCI load side (Safety Ground - green wire).

**NOTE:** ELCI circuitry is powered by (L1 and L2 on 220/380VAC, 277/480V AC, and 347/600VAC) and thus circuit must be maintained for ELCI to operate.

**Exception:** 120/208V AC is powered by (L1 and Neutral).

#### TESTING AND TROUBLESHOOTING

1. Restore the power to the ELCI (power switch to on position).
2. Press and release RESET button, Green Light (Power) should turn ON (Auto Reset will automatically come on).
3. Press Test Button. Green Light (Power) turns off and Red Blinking Light (Fault) turns on.
4. Press and Release the RESET button. Red Light (Fault) turns OFF and Green Light (Power) turns ON.
5. CHECKING FOR CORRECT WIRING:  
If ELCI is wired to protect equipment, press and release RESET button. Verify that equipment power is on. Press TEST button. Equipment power should turn off. If equipment power does not come on when pressing and releasing RESET button, or if power stays on when pressing TEST button, turn main power off, check and correct your wiring connections. Repeat steps 1 - 4. If problem persists, **do not use this ELCI**. Consult a qualified electrician for assistance or replacement.

#### SET UP

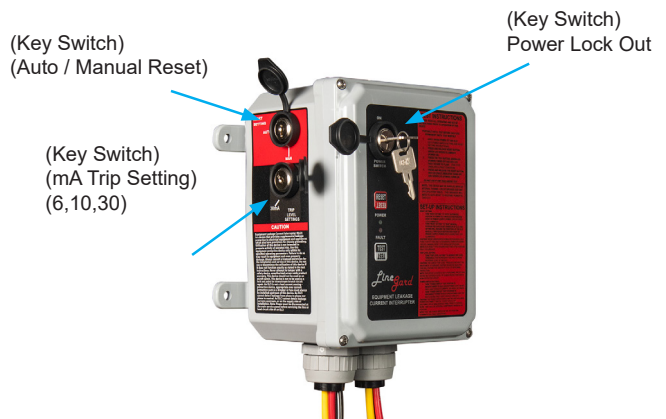
- Turn "Reset Setting" to "auto" position to power ELCI with each restoration event of primary (supply) power, Green Light (Power) turns on.
- Turn "Reset Setting" to "MAN" (manual) position for safe start power up of ELCI. This setting requires the resetting of the ELCI manually with each restoration event of primary (supply) power, Red Blinking Light (Fault) turns on.
- **CAUTION:** Where unanticipated power restoration could pose a safety risk due to accidental power-ups, a manual reset setting should be key selected. **NOTE:** Both reset types require resetting after a ground fault occurrence.

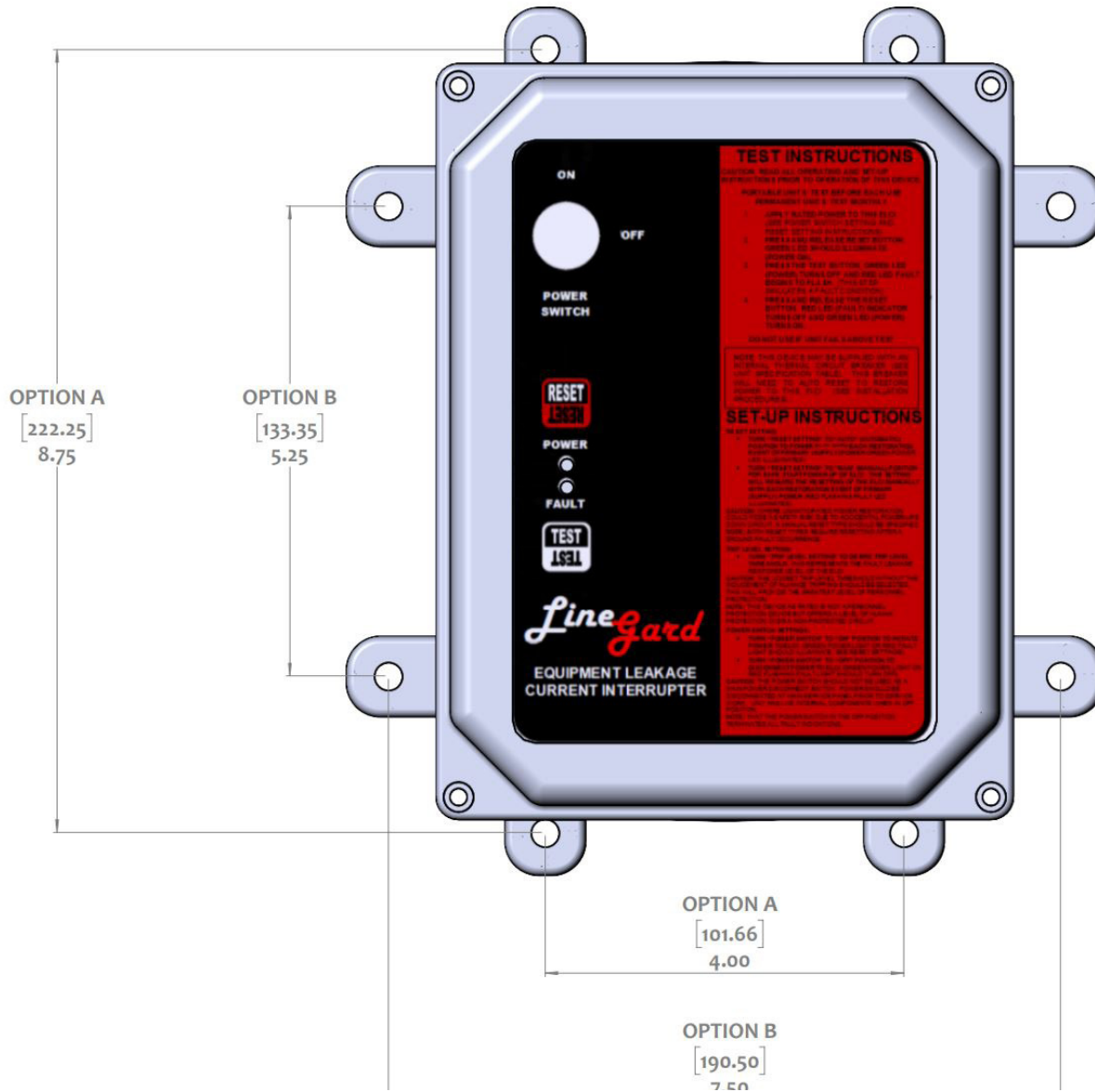
#### TRIP LEVEL SETTING

- Turn "Trip Level Setting" to desired trip level threshold. This represents the fault leakage response level of the ELCI.
- **CAUTION:** The lowest trip level threshold without the inducement of nuisance tripping should be selected; this will provide the greatest level of protection.
- **NOTE:** This device as rated is not a personnel protection device but offers a significant level of protection over a non-protected circuit.

#### POWER SWITCH SETTINGS

- Turn "Power Switch" to "ON" position to initiate power to ELCI, Green Light (Power) or Red Light (Fault) should turn on.
- Turn "Power Switch" to "OFF" position to disconnect power to ELCI, Green Light (Power) or Red Light (Fault) should turn off.
- **CAUTION:** The power switch should not be used as a main power disconnect switch. Power should be disconnected at main service panel prior to service work. Unit has live internal components even when in power off position.
- **NOTE:** The power switch in the off position terminates all fault indications.





# INSTALLATION TEMPLATE (NOT ACTUAL SIZE)