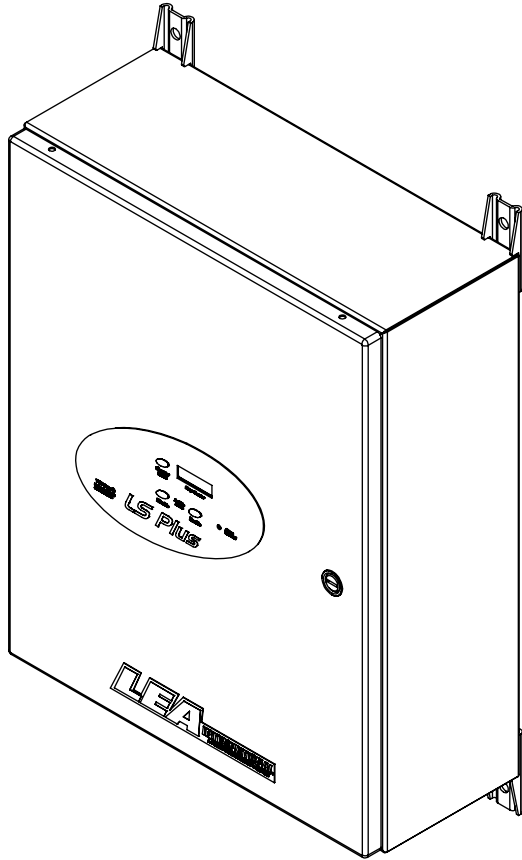
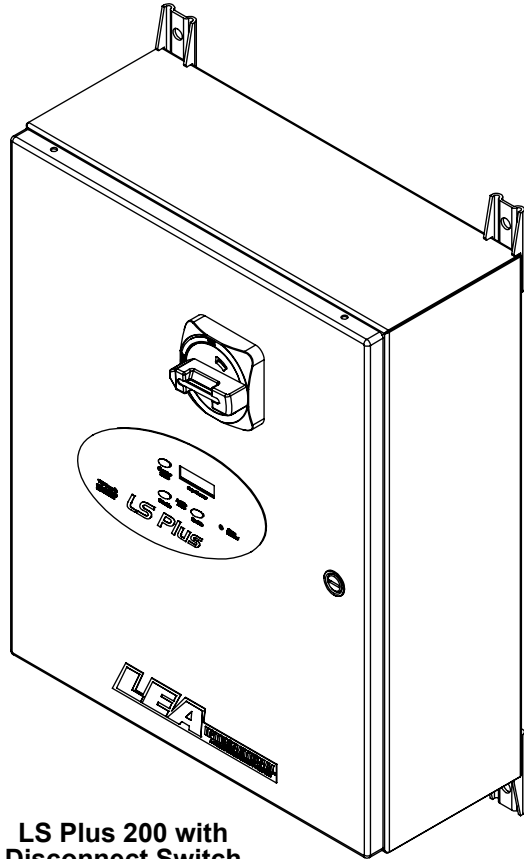



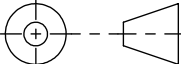
REVISIONS				
REV.	DESCRIPTION	ECN	DATE	APPROVED
A	DOCUMENT RELEASE	DD2922	3/7/2011	MPD



**LS Plus 200**



**LS Plus 200 with Disconnect Switch**

ALL DIMENSIONS IN INCHES UNLESS OTHERWISE SPECIFIED.  TOLERANCES: FRACTIONS=± . .XX=± . ANGLES=± .° .XXX=± .	DRAWN <b>DAW</b>	DATE 2/21/11	 10701 Airport Drive, Hayden, ID 83835, USA +1.208.772.8515 FAX +1.208.762.6117 800.882.9110 www.protectiongroup.com			
	CHECKED <b>JRA</b>	4/6/11				
	ENG APPD <b>DLR</b>	4/6/11				
	PROJ APPD <b>MPD</b>	4/6/11				
MATERIAL NOTED .	PROJECT NO. DD2922		TITLE <b>INSTALLATION MANUAL          LS PLUS 200 AC PROTECTOR</b>			
THIRD-ANGLE PROJECTION 	NOTICE: THE INFORMATION AND DESIGN IN THIS DOCUMENT IS THE PROPERTY OF LEA INTERNATIONAL. ALL RIGHTS RESERVED.		SIZE <b>A</b>	CAGE <b>30992</b>	DRAWING NUMBER <b>B39-38-0002</b>	REV <b>A</b>
		SCALE <b>1:8</b>	PRODUCT CATEGORY <b>ACL</b>	PAGE <b>1</b> OF <b>12</b>		

## Table of Contents

<b>Pre-Install Notes .....</b>	<b>3</b>
<b>Install Procedure.....</b>	<b>4</b>
<b>AC Power Connection .....</b>	<b>5</b>
<b>Troubleshooting .....</b>	<b>6</b>
<b>Operation of Status Indicator on Enclosure Door .....</b>	<b>7</b>
<b>Mechanical Specifications for LS Plus .....</b>	<b>8</b>
<b>Wiring of LS Plus .....</b>	<b>9</b>
<b>Mechanical Specifications for LS Plus with Disconnect Switch .....</b>	<b>10</b>
<b>Wiring of LS Plus with Disconnect Switch .....</b>	<b>11</b>
<b>Disconnect Handle Operation .....</b>	<b>12</b>

## Pre-Install Notes

### **READ ALL WARNINGS BEFORE ANY SERVICE OR TESTING**

Do not install, make any adjustments, or replace any components inside the enclosure with the power supply turned on. Under certain circumstances, dangerous potentials may exist even when the power supply is off. To avoid casualties, always turn the main power supply off before performing maintenance and/or testing.

### **HAZARD OF ELECTRIC SHOCK, BURN, OR EXPLOSION**

#### **CAUTION**

The installation of a surge protection device (SPD) must be done by qualified electrical personnel. A SPD must be grounded through the power system ground for proper operation.

#### **WARNING**

Before installing the suppressor, AC power must be OFF. Failure to do so could result in damage to the suppressor and poses a potential electrical shock hazard to personnel. Always use a properly rated voltage sensing device to confirm that power is off.

Read SPD label on side of the enclosure to verify voltage configuration.

Discontinue installation if the measured voltage is not in the range of the model voltage configuration of the SPD being installed. Contact LEA International technical support with any questions concerning the voltage configuration prior to installation and application of power.

Perform such work only after reading and understanding all of the instructions contained in this manual.

Beware of potential hazards, wear personal protective equipment and take adequate safety precautions.

Before performing visual inspections, tests, or maintenance on the equipment, disconnect all sources of electric power. Assume that all circuits are live until they have been completely de-energized, tested, grounded, and tagged. Pay particular attention to the design of the power system. Consider all sources of power, including the possibility of back feeding.

Handle this equipment carefully and install, operate and maintain it correctly in order for it to function properly. Neglecting fundamental installation and maintenance requirements may lead to personal injury, as well as damage to electrical equipment or other property.

Carefully inspect your work area and remove any tools and objects left on /or in the enclosure.

Replace all devices and covers before turning on the power to this equipment. All instructions in this manual are written with the assumption that the customer has taken these measures before performing installation or testing.

**Failure to follow these instructions could result in DEATH or serious injury.**

## Installation Procedure

### Notes

Please read the entire installation manual before installing this SPD. Carefully unpack the SPD, removing all packaging material. Inspect for any signs of damage that may have occurred during shipment. If any damage is found, stop installation and contact LEA International.

The SPD should only be installed by a licensed electrician.

All local and National Electric Codes must be observed.

Verify the voltage configuration on the SPD label matches the actual system voltage configuration of service point.

For optimal SPD performance, verify that earth ground resistance is less than 25 ohms (per NEC).

Before installation, shut off power to prevent accidental electrical shock or injury.

Make sure all conductors are sized appropriately for this SPD.

### Mounting

The SPD should be mounted as close as possible to the connection of service point.

The SPD is mounted using the four mounting holes located near the enclosure corners.

Electrical conductors should enter the top of the SPD enclosure, or on either side near the top of SPD enclosure.

Electrical conduit should be of sufficient size per NFPA 70 and National Electrical Code. For optimum SPD performance, conduit with no sharp bends.

### Conductor Size

#### Terminal Block

The lugs accept phase and Neutral conductors #8 to #1/0 AWG, the Neutral and Safety Ground accept #8 to #1/0 AWG. All conductors recommended to be insulated stranded copper greater than #6 AWG diameter.

#### Disconnect

The disconnect switch lugs accept phase conductors #10 to # 4 AWG, the Neutral and Safety Ground accept #8 to #1/0 AWG. All conductors recommended to be insulated stranded copper greater than #6 AWG diameter.

## AC Power Connection

The SPD is installed in parallel with the incoming phase conductors.

It is recommended to connect the SPD to a 60A circuit breaker. This allows for servicing of the SPD without shutting power off at the panel main breaker.

Route all SPD conductors taking care to avoiding sharp bends and keeping all leads as short as possible, not exceeding five feet (5').

To ensure optimum SPD performance, verify that all electrical connections are clean.

Connect the phase and neutral wires to the terminals marked Phase 1, Phase 2, Phase 3, and Neutral.

Connect the green safety ground wire (building ground system) to the Safety Ground lug.

Tighten all connections to the recommended torque value.

## Remote Alarm Connection

The SPD offers one set of dry contacts for remote alarm monitoring. These screw terminal connections are located on the PC board as shown on Pages 8 or 10. The three connections are labeled NC (Normally Closed), NO (Normally Open) and C (Common).

Remote Alarm Contact Maximum Ratings:

125 Vdc / 0.24 A

125 Vac / 0.5 A

30 Vdc / 2.0 A

## Final Check

Apply AC power to the SPD.

The SPD **TVSS Status** LED should be illuminated green.

If the **TVSS Status** LED is red or not illuminated, contact LEA International's technical support at 800.882.9110.

If the **Alarm Disabled** LED is red, press the audible alarm **Enable** button to **Enable** the audible alarm. The **Alarm Disabled** LED will turn dark

## Troubleshooting

The SPD operational status can be seen on the front door of the enclosure. There is no need to open the unit for any reason.

### TVSS Status LED

A green LED indicates power is applied and all SPD protection modes are normal.  
A red LED indicates the SPD needs servicing.

### Surge Counter

#### Surge Counter Display

The LCD display indicates there was an event and has recorded the number of surge/transients events since the counter has been reset.  
If the surge counter display is blank, the battery may be defective or dead. Please contact LEA Technical support.

#### Counter Reset button

Press to reset the surge counter to zero.

### Audible Alarm

#### Alarm Disabled LED

A dark LED indicates the audible alarm circuit is enabled.  
A red LED indicates the Audible Alarm has been silenced and serves as a reminder that the SPD needs to be serviced.

#### Audible Alarm Disable button

Press to turn off the audible alarm. The **Alarm Disabled LED** will turn red and serves as a reminder that the SPD needs to be serviced. If the SPD has been severely damaged disconnect power to the SPD using the circuit breaker or disconnect switch to silence the alarm.  
Maintenance of electrical devices should be done only by trained professional electrician.

#### Audible Alarm Enable button

Press the Enable Button for the audible alarm. The **Alarm Disabled LED** will turn dark

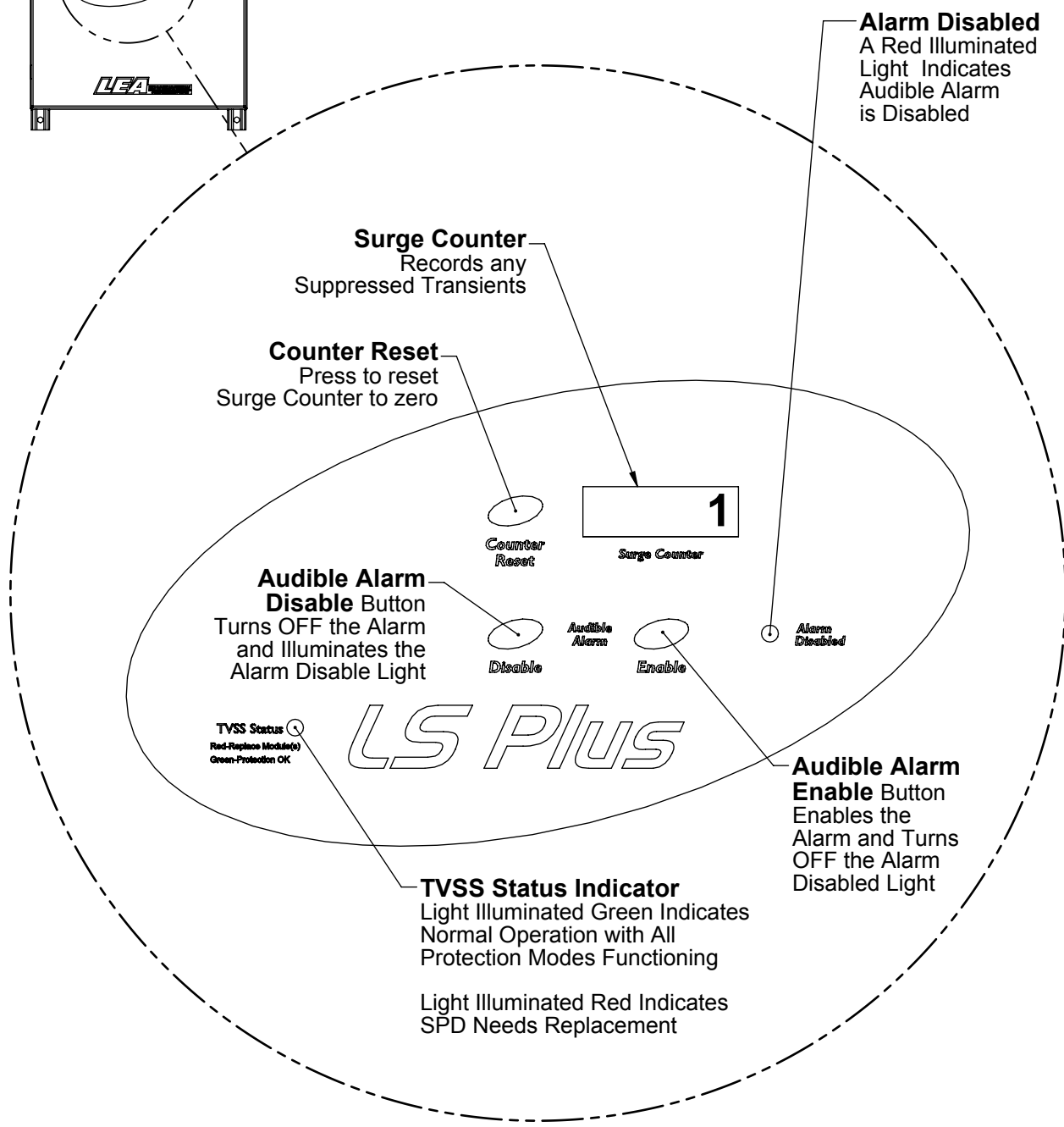
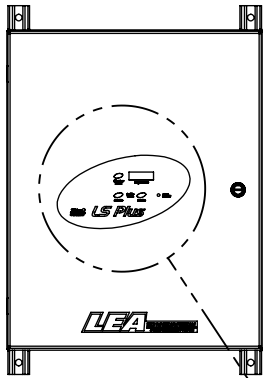
### Maintenance

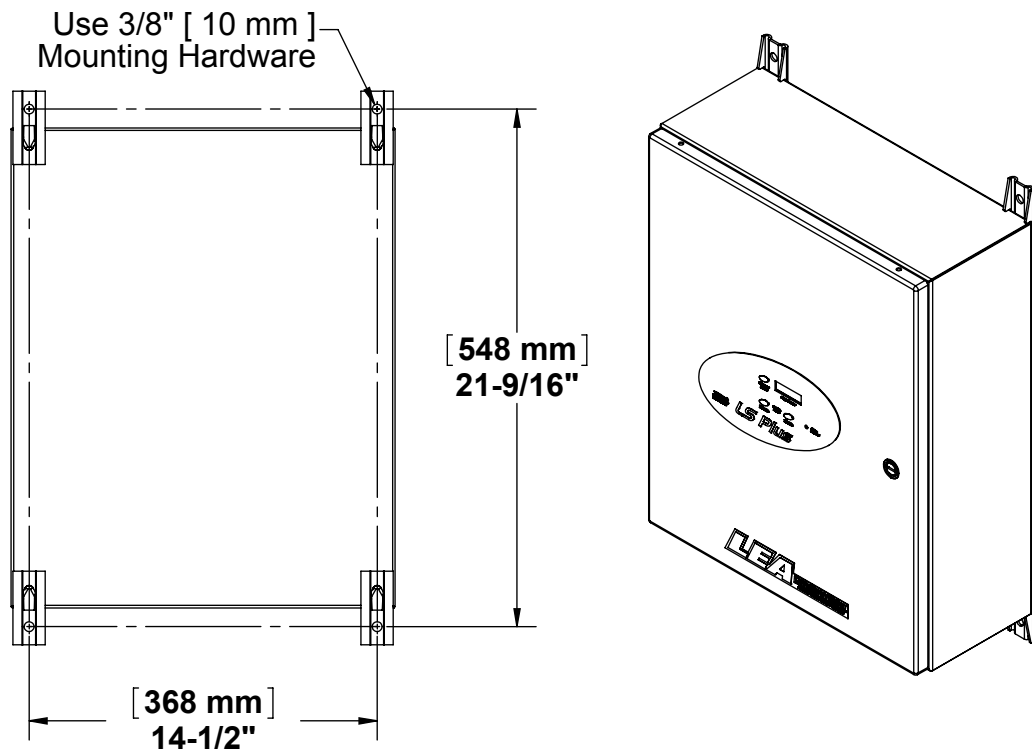
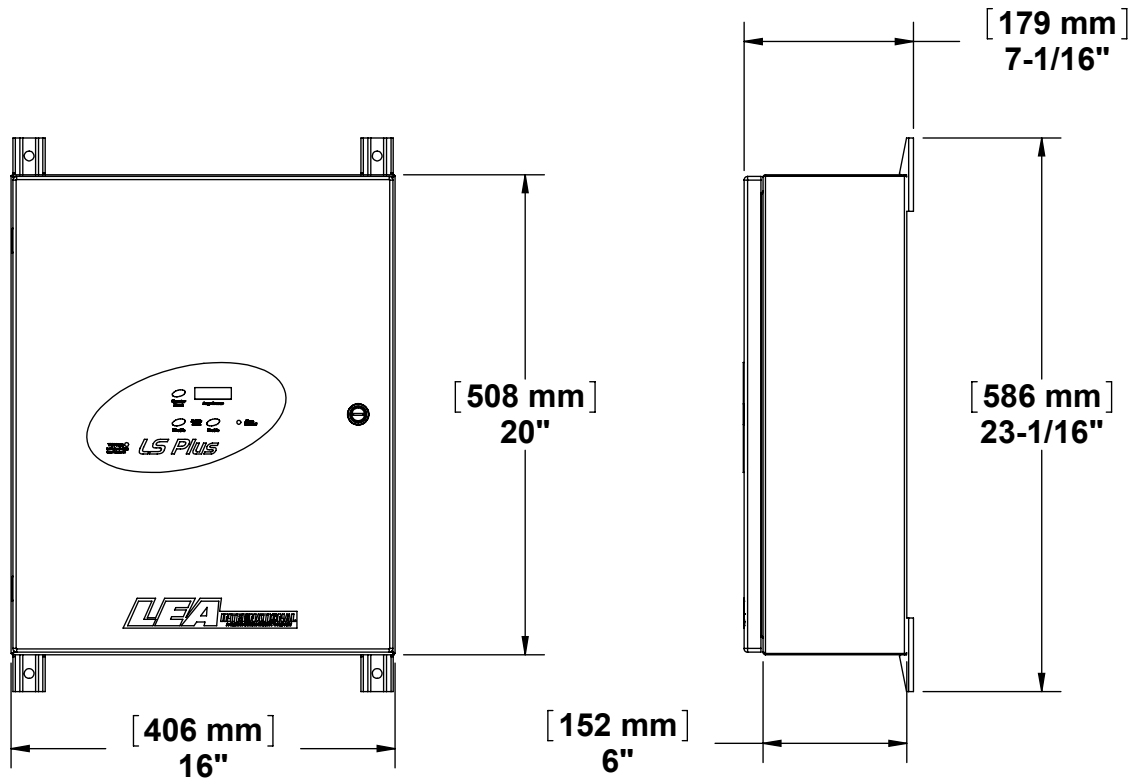
The SPD should be scheduled for periodic inspection to ensure the SPD is operational and all wire connections are tight.

If the SPD needs replacement, please contact LEA International for replacement at 800.882.9110 or online at [www.protectiongroup.com](http://www.protectiongroup.com).

**Please Note:**

LS Plus 200 shown without the Disconnect Switch.  
The Operation of the Surge Counter and  
Audible Alarm Switch is same for  
both models.





**Mechanical Specifications for LS Plus 200**  
 [ Dimensions are for Reference Only ]

**Mounting:** External mounting brackets with 0.41" [ 10.3 mm ] mounting holes.  
**Dimensions:** 20" X 16" X 6" [ 508 mm X 406 mm X 152 mm ]  
**Weight:** 32 lbs / 14.5 kg

**Note:**  
**Remote Alarm Contacts**

Change State with Loss of Power

**Remote Alarm Contacts**

**Normally Open**

**Common**

**Normally Closed**

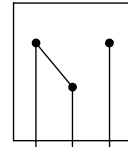
Contact is Closed when SPD is Powered and Functional [ Normal State ]

**Wire Range**  
**#24 to #14 AWG**

**3X Torque Specification**  
**4.5 in-lbs**  
**[ 0.5Nm ]**

**Remote Alarm Contacts**

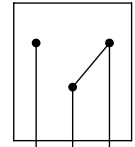
**NC Contact Closed** with SPD powered and Functional [ Normal State ]



**NC C NO**

**Remote Alarm Contacts**

**NO Contact Open** with Power OFF or SPD Requires Replacement



**NC C NO**

**4X Wire Strip Lengths** for Phase & Neutral Connections  
**0.5" [ 13 mm ]**

**4X Torque Specification**  
**50 in-lbs [ 5.6 Nm ]**

**Wire Range**  
**#8 to #1/0 AWG**

**Lug Torque Specification**  
**50 in-lbs**  
**[ 5.6 Nm ]**

**Wire Range**  
**#8 to #1/0 AWG**

**Wire Strip Length**  
**0.5" [ 13 mm ]**

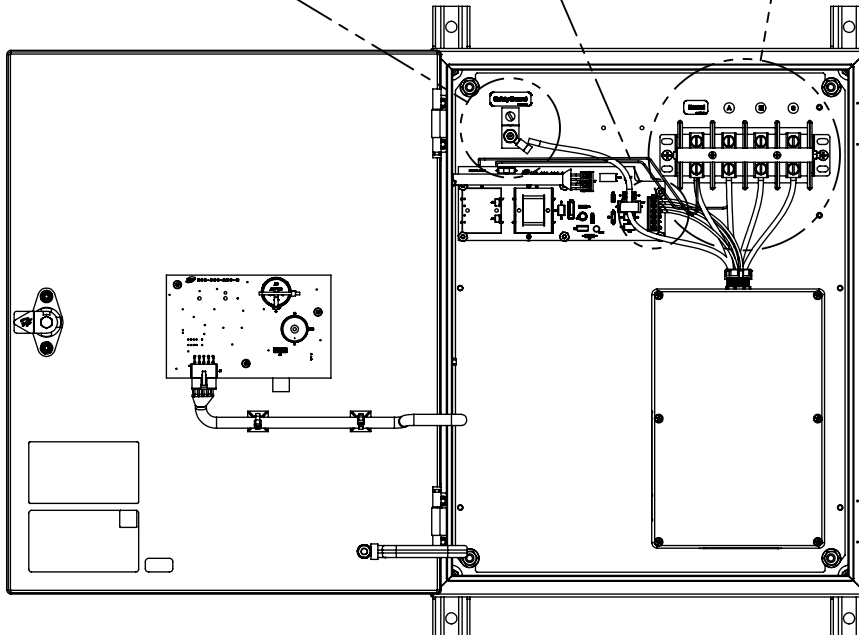
**Safety Ground**

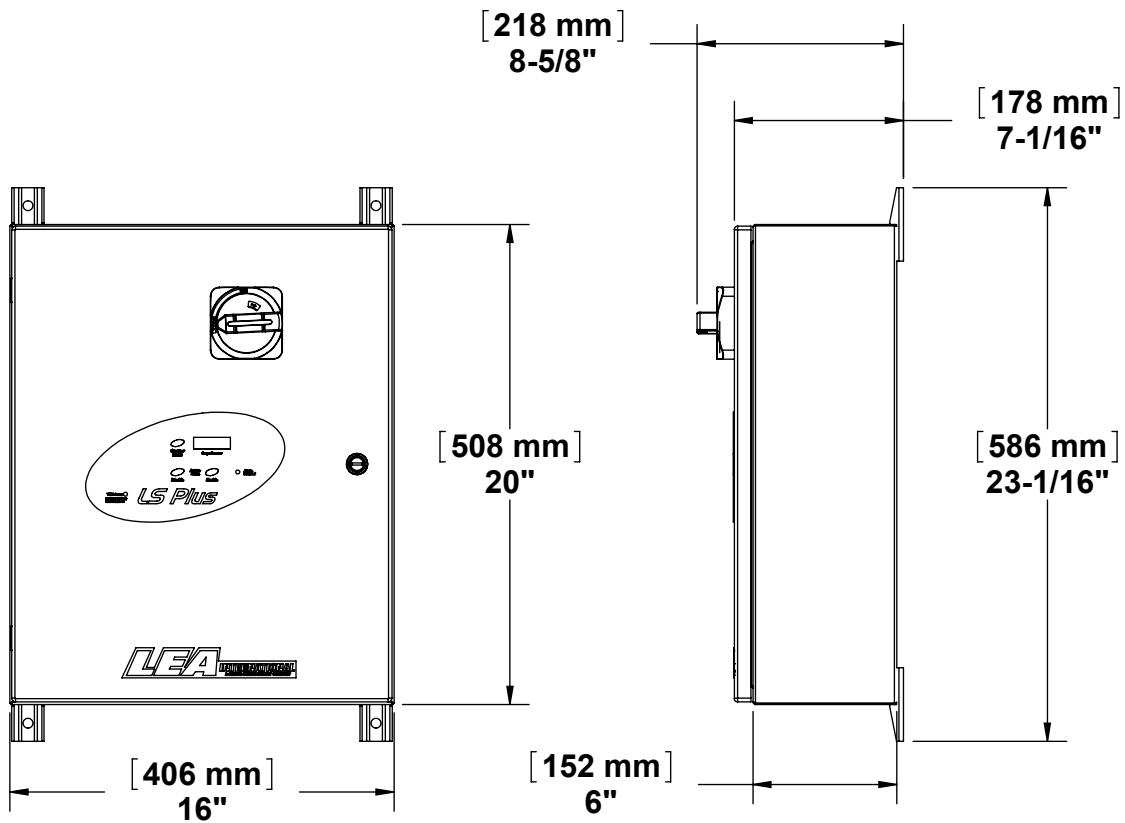
**Neutral**

**A**

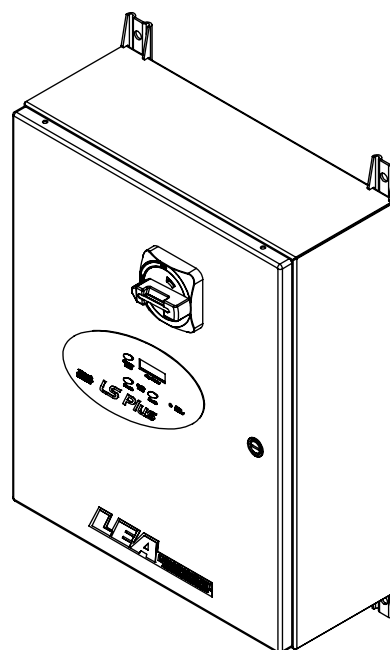
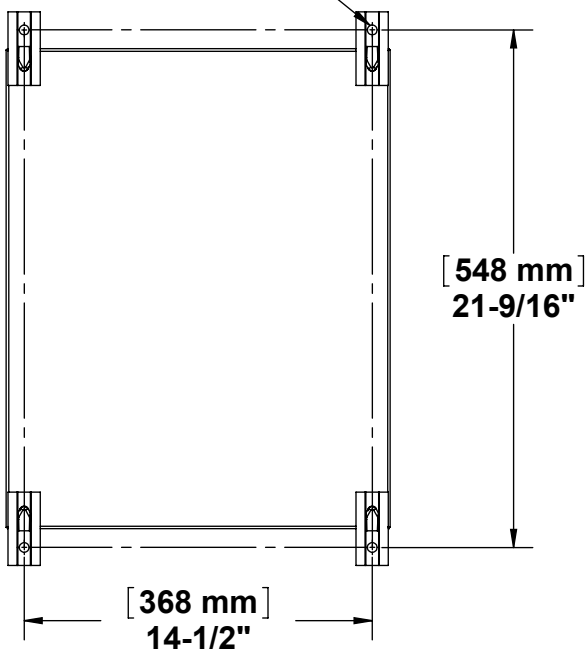
**B**

**C**





Use 3/8" [ 10 mm ]  
Mounting Hardware



**Mechanical Specifications for LS Plus 200  
with Disconnect Switch  
[ Dimensions are for Reference Only ]**

**Mounting:** External mounting brackets with 0.41" [ 10.3 mm ] mounting holes.  
**Dimensions:** 20" X 16" X 6" [ 508 mm X 406 mm X 152 mm )  
**Weight:** 33 lbs / 15 kg

**Note:**

**Remote Alarm Contacts**

Change State with Loss of Power

Wire Range

**Remote Alarm Contacts**

Normally Open

Common

Normally Closed

Contact is Closed when SPD is Powered and Functional

3X Torque Specification  
4.5 in-lbs  
[ 0.5 Nm ]

Torque

50 in-lbs [ 5.6 Nm ]

Wire Range  
#8 to #1/0 AWG

Wire Range

Wire Strip Length  
Neutral Block

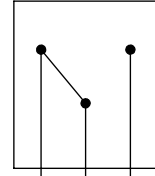
**Remote Alarm Contacts**

NC

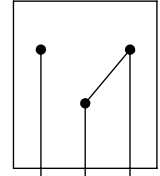
**Remote Alarm Contacts**

NO

Replacement



NC C NO



NC C NO

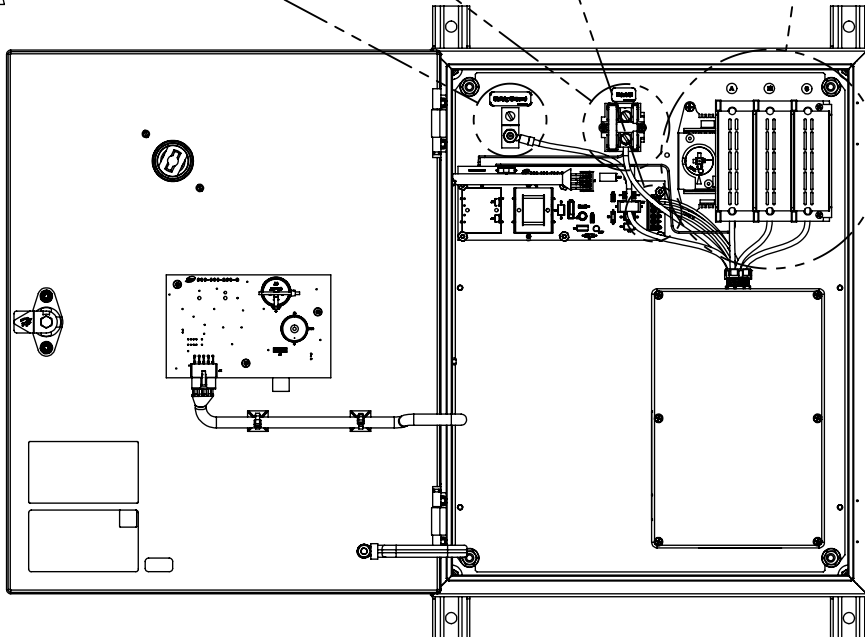
3X Wire Strip Lengths  
for Phase Connections  
into the Disconnect  
Switch

0.5" [ 13 mm ]

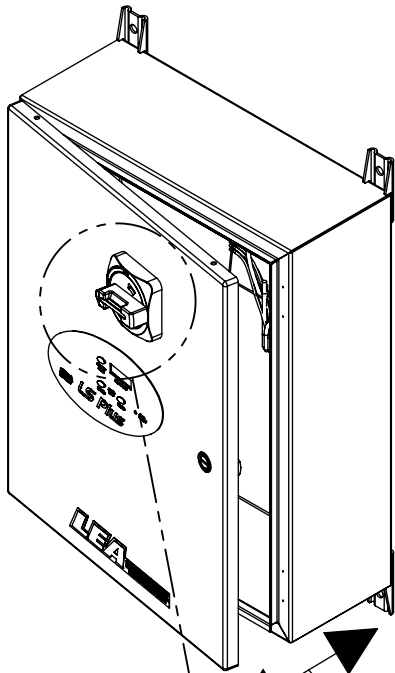
3X Torque Specification  
for Disconnect Switch  
25 in-lbs [ 2.8 Nm ]

Wire Range  
#10 to #4 AWG

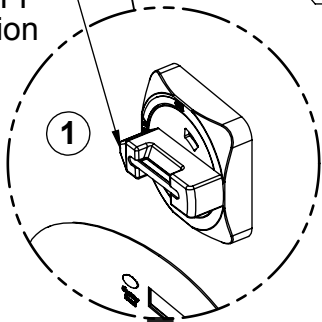
Ground  
Lug  
Strip  
Length  
0.5" [ 13 mm ]



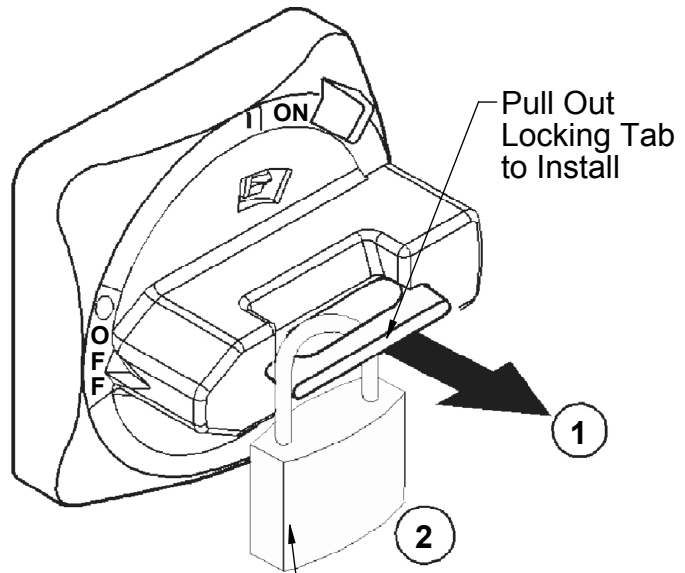
Lock Out of Enclosure in the OFF Position  
if Required



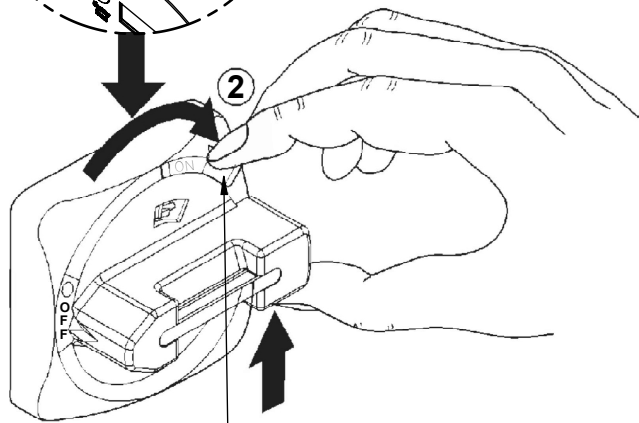
**Step 1**  
Turn Handle  
to the OFF  
Position



Disconnect Handle must  
be in the OFF Position  
to Open or Close  
the Enclosure Door



Install Lock

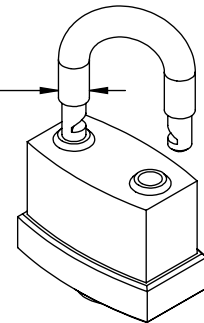


**Step 2**

Disconnect Handle  
from the Disconnect  
or Close the

Disconnect Handle Operation

3/16"-5/16"  
[ 5-8 mm ]



Handle Locking Tab only  
accepts a Shackle  
Diameter as shown.  
(Lock not supplied by LEA)