

Installation and Operating Instructions

Model: GB FAMILY

Contents:	<u>TITLE</u>	<u>PAGE</u>
	Specifications	1
	Installation Procedures	2
	Installation Checklist	3
	Maintenance	4
	Trouble Shooting	5
	Warranty Information	7
	Material Return Policy	8

Specifications:

Protection Provided L-N; L-G; N-G; L-L

Maximum Surge Current Dissipation per Phase*

GB 50	112,500 Amps
GB 100	225,000 Amps
GB 200	300,000 Amps
GB 300	450,000 Amps
GB 400	600,000 Amps

Maximum Load Current per Phase

Unlimited

Total System Response Time

<1 Nanosecond

Certified Category C3 per ANSI/IEEE C62.41 & .45

Yes

UL 1449 2nd Edition Suppressed Voltage Rating

Yes

Life Cycle Testing Category C3, Operations (10,000 amps @ 8 x 20µSec) *

>1000

Operating Temperature Range

-40°C to +80°C

Operating Humidity

5% to 95%
Noncondensing

Operating Altitude (Feet)

Up to 12,000

Options:		Options Combination:
Dry Contacts/Summary Alarm	Option A	J= A + B

Surge Counter	Option B	$K = A + C$
Audible Alarm	Option C	$M = A + B + C$
Disconnect	Option D	
Fused Input	Option E	
Fused Disconnect	Option F	
Remote Status Monitor	Option G	
Spare Module	Option H	
Dry Contacts	Option I	

*8 x 20 μ Sec I wave per ANSI/IEEE C62.41

Installation Procedures:

The LEA International *GB FAMILY* is intended for installation on AC power systems of unlimited KVA rating due to its parallel connection.

Read the entire installation and maintenance manual before installing this Transient Voltage Surge Suppressor (TVSS).

Check to be certain that the voltage indicated by the model number on the front of the unit matches the AC nominal line voltage of your service. (Example: GB(s) 120/208-3Y)

"120" is the line to neutral voltage; "208" is the line to line voltage; "3Y" indicates the number of Phases and if 3-Phase, W(Y)E or (D)elta. The *GB FAMILY* voltage rating must be the same as the incoming supply voltage. Contact LEA International's field service department with any questions concerning the voltage configuration prior to system power on.

Verify that all nuts, bolts and terminal blocks have good tight connection with clean electrical contact area. Every connection should be checked – not just the input terminal blocks. This will ensure the lowest possible contact resistance, and best performance.

Use non-metallic or non-ferrous (PVC or aluminum) conduit, if possible, to reduce the inductance of the circuit, for the Transient Ground Conductors this is essential.

****WARNING****

Before installing the LEA SPD, AC power must be OFF. Failure to do so could result in damage to the SPD as well as potential electrical shock.

SAFETY GROUND

The wire should be a #14 AWG to 1/0 wire with a recommended wire size #6 AWG. Connect the Safety Ground lug to the existing building Safety Ground system. This is to equalize back panel potential only. No other connections are made to this lug inside the TVSS. See the appropriate layout/installation drawing for wiring illustrations.

NEUTRAL CONNECTION

The wire size for the neutral should be #14 AWG to #4 AWG wire with a recommended wire size #6 AWG. See the appropriate layout/installation

drawing for wiring illustrations. The neutral input wire shall be run in the same conduit as the power-input wires and safety ground wires. Keep lead lengths to 5' or less and avoid sharp bends for optimum performance.

TRANSIENT GROUND

The wire size for the transient ground should be #14 AWG to #4 wire with a recommended wire size #8 AWG. This connection should be made from the transient ground lug to common point Earth ground or building steel if it is tied into the facility ground conductor. Desired resistance is less than 25 ohms. If a separate ground is driven for the transient ground, it must be tied into the existing ground system. Keep the lead length as short as possible and avoid sharp bends to ensure optimum performance. Utilize PVC or aluminum (non-metallic, non-ferrous) conduit with no sharp bends and with a minimum spacing of 4" from the other conductors.

PHASE CONDUCTOR CONNECTIONS

The wire size for the power circuit without a disconnect should be #14 AWG to #4 AWG. Wire size for the power circuit with a disconnect should be #14 AWG to #6 AWG. Both circuits have a recommended wire size #6 AWG. Connect the phase input wires to the terminals marked phase 1, phase 2, or phase 3 input as illustrated on the drawing. Keep lead lengths to 5' or less and avoid sharp bends for optimum performance. LEA recommends a 60 amp breaker depending on the wire size used.

TYPICAL WIRING METHOD

The *GB FAMILY* is connected in parallel with the power system to provide optimum protection.

FINAL CHECK

Check installation of the TVSS as indicated by the provided layout/installation drawing. Upon verification of proper connection and voltages, close the enclosure door. Apply external AC power to the TVSS. The unit is now operational. All green indicator lamps should be illuminated. If not, contact LEA International's field service department at 1-800-654-8087.

Installation Checklist:

For proper performance of the *HSC FAMILY*, the qualified installing electrician shall use the following as a checklist to help ensure proper installation:

YES NO

- | | | |
|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | 1. The voltage of the SPD matches actual system voltage. |
| <input type="checkbox"/> | <input type="checkbox"/> | 2. Ground resistance is less than 25 ohms. |
| <input type="checkbox"/> | <input type="checkbox"/> | 3. All wiring conforms to the national electric code (NEC). |

- ☐ ☐ 4. All conductors are in accordance with the appropriate layout/installation drawing.
- ☐ ☐ 5. The SPD is installed in parallel with the incoming phase conductors.
- ☐ ☐ 6. Check all phase conductor and neutral lead lengths to verify that all connections are within 5' between SPD and protected panel.
- ☐ ☐ 7. Check transient ground lead lengths (except for ground wire) to verify that all connections are as short as possible between SPD and protected panel
- ☐ ☐ 8. After installation, all lights are illuminated and the unit is functional.
- ☐ ☐ 9. All critical loads are protected by the SPD. If not, additional SPD(s) may be required.
- ☐ ☐ 10. The device door is closed and the door lugs secured prior to energizing unit.

Maintenance: **FOREWORD**

GB FAMILY Transient Voltage Surge Suppressors (TVSS) are designed for long life without the need for routine maintenance. The design is of a passive nature, with no degradation expected. LEA International's TVSS system will fail only if an undefined over voltage (a RMS rise in system voltage in excess of the TVSS rating) or a transient in excess of its maximum surge current is experienced.

There are no moving parts. There are neon lamps on the modules, except for the Neutral-to-Ground module, and redundant status lamps on the enclosure door indicate protection status. The Audible Alarm (optional) sounds if any of the protection modules, except for the Neutral-to-Ground module, fail and is removed from the circuit. The Neutral-to-Ground module status is indicated on the enclosure door only (for the GB200/300 modules) by the lights.

VISUAL INSPECTION

Operational status of the TVSS is verified by observing the status indicator lamps. All status lamps ON with input power applied indicates normal operation with all protection modules functioning. If any of the enclosure indicator lamps are OFF, the enclosure should be opened and the individual module operation status lamps checked. Modules with status indicators that are OFF require replacement.

MODULE REPLACEMENT PROCEDURE

****WARNING****

Before attempting to perform module replacement, POWER MUST BE TURNED OFF to the TVSS input. Failure to do so could result in damage to

the TVSS or result in electrical shock. Keep hands and clothing clear of energized conductors to reduce the possibility of electrical shock.

- 1) Identify the modules to be replaced. Refer to the Visual Inspection section. Verify that the replacement modules are of the same type and rating as the ones requiring replacement before proceeding.
- 2) Remove input power to TVSS.
- 3) Disconnect all wires from the defective module making clear note where the wires were removed so that they can be properly reconnected to the replacement module.
- 4) Remove all mounting hardware and retain for use with the replacement module.
- 5) Remove the defective module and exchange with the replacement module. Reverify that the replacement module is of the same type and rating as the one being replaced.
- 6) Secure replacement module with the mounting hardware removed from the defective module.
- 7) Reconnect all wires to the replacement module that were disconnected from the defective module. Care must be taken to reconnect all wires to the same points from which they were removed. Improper connection may result in damage to the TVSS and/or wiring.
- 8) Reapply input power to the TVSS. All module status indicators and enclosure door indicators should illuminate when power is applied.

Spare modules can be ordered from the factory as an option to the original purchase or at a later date. Modules are usually available within 24 hours. See Trouble Shooting Guide for possible repair of malfunctions.

FUSE REPLACEMENT (Model suffix -DS, with option E, or F)

****WARNING****

For TVSS with E or F options replace with only Class J, 60 Amp, 600 Volt AC fuses for continued protection against risk of fire and damage to unit.

Troubleshooting: In servicing malfunctioning equipment, you must:

1. Define the problem and accurately determine the malfunction in the unit.
2. Determine the basic cause of the malfunction by isolating the problem using the following guides below and on the next page.
3. Eliminate the cause and repair the malfunction. (obviously, if the cause is not properly identified and eliminated, the malfunction may reoccur.)

It is usually relatively easy to define the malfunction, but sometimes very difficult to spot the cause.

A trouble shooting guide, which suggest some potential causes of malfunctions, is provided. If the problem remains after following the suggestions listed, contact LEA International's Field Service Department at 1-800-654-8087.

TROUBLE SHOOTING GUIDE

PROBLEM	PROBABLE CAUSE	CORRECTIVE ACTION
Runaway surge counter	Ring on the lines due to motors or other large equipment.	Replace with desensitized Status Alarm Monitor (SAM)
Options not working	Inoperative SAM	Replace SAM
	Loose wires or bad connection	Check wiring on both SAMS and trace wires to options.
Panel door lamp/s are flickering.	Low building service voltage	Check at service entrance for voltage levels and contact utility if they are not within specification.
Panel door lamps are out.	No main power.	Check at service entrance/ unit connection point for voltage. Correct as necessary.
	Loose wire connections.	Open cabinet and check all wire connections for clean tight connections. Correct as necessary.
	Panel door lamp failure.	Check if corresponding module lamp is also out. If the lamp is out, replace the module. If not replace door lamp(s).
Alarm sounds	Module failure.	Check to see if the panel lamp is out. If out, open cabinet and check the corresponding module lamp. If this is out, replace

		the module.
	SAM failure.	Check to ensure that all lamps on the cabinet and module are lit. If there is no indication of module failure, the SAM has failed. Replace the SAM.
Alarm sounds abnormal	Defective alarm horn.	If the alarm sounds abnormal, replace with new horn.
No lights illuminated.	Fuse options F or E have blown fuses	Check for voltage present on each side of fuse. If no voltage through the fuse replace it.
	Service entrance power missing.	Check for incoming power at TVSS. If not present, contact utility.

Warranty Information:

LEA International's **GB FAMILY** Surge Protection Devices are warranted for five (5) years as follows:

WARRANTY

LEA International hereby extends, to the Customer of its products for use, LEA International's current limited warranty. LEA International warrants that its products are free from defects in material and/or factory workmanship. This warranty is effective after delivery of the product to the Customer. This warranty is not transferable. This warranty does not cover defects caused by or damages resulting from improper installation, misuse or alterations made to the product. Operation of the product under conditions exceeding LEA International's specifications or negligence in use of the product, or removal of the LEA International nameplate or serial number (where applicable) from the product will void this warranty in its entirety. Overhaul or modification of the product by other than LEA International or its authorized service center will void this warranty in its entirety.

There are no other warranties which extend beyond the description of the face of this limited warranty, and to the full extent permitted by law, and any and all implied warranties, including implied warranties of merchantability or fitness for a particular purpose or arising from any course of dealing or usage of trade, are hereby expressly disclaimed and excluded, as well as all other obligations or liabilities on the part of LEA International, its agents, representatives, distributors or designates not otherwise expressly covered under this limited warranty.

LIMITATION OF LIABILITY

LEA International's sole liability and the Customer's sole remedy for a failure of this product to perform as warranted shall be limited to the repair or replacement thereof upon return to LEA International's factory at 10701 Airport Drive Hayden, ID 83835, or its authorized service center, transportation prepaid.

NOTICE OF CLAIM

All claims under this warranty must be brought to the attention of Power LEA International's or its designated service center, in writing, within thirty (30) days after discovery of any defect in material or factory workmanship.

**Material
Return Policy:**

No product may be returned without the seller's prior written approval. Transportation charges are to be prepaid by the buyer. Returned item(s) are subject to the seller's inspection and acceptance. Seller may, at its discretion, replace any or all return items within a reasonable time after seller determines that returned item(s) are not in accordance here within; and in such an event, seller shall not be liable for any damage arising from the defective delivery or delay caused thereby. When authorized by the seller in writing, unused products may be returned to the seller, subject to service handling, restocking charges and rebuilding charges to "as new" condition.

Call LEA International's customer service department at 1-800-654-8087 for a return material authorization (RMA) number. No items will be accepted without an RMA number.

Please have the following information on hand when calling for an RMA number:

Model Number
Part Number
Purchase Date
Installation Date
Failure Description
System Operating Voltage
LEA Job Number