



LAKE SHORE
ELECTRIC CORPORATION

Generator Surge Protector (GSP)



Installation / Operation / Maintenance Manual

**Delta or Ungrounded Neutral Systems / or
Grounded Neutral Systems**

WARNING!

WHEN WORKING ON EQUIPMENT OF THIS TYPE, EXTREME DANGER OF ELECTROCUTION EXISTS THAT MAY RESULT IN INJURY OR DEATH. DO NOT ATTEMPT ANY REPAIRS OR ADJUSTMENTS TO THIS EQUIPMENT WITHOUT FIRST TAKING THE APPROPRIATE PRECAUTIONS TO PREVENT PERSONAL INJURY AND EQUIPMENT DAMAGE.

DURING INSTALLATION AND USE OF THIS PRODUCT, COMPLY WITH THE NATIONAL ELECTRICAL CODE (NEC), FEDERAL, STATE AND LOCAL CODES, AND ALL OTHER APPLICABLE SAFETY CODES.

MAIN UTILITY POWER MUST BE OFF DURING INSTALLATION, WHEN PERFORMING EQUIPMENT MAINTENANCE OUTSIDE THE EQUIPMENTS NORMAL MAINTENANCE SCOPE AND WHEN PERFORMING REQUIRED MAINTENANCE ON ANY POWER CABLE(S) CONNECTED TO THE EQUIPMENT.

WARRANTY

Lake Shore Electric Automatic Transfer Switches are guaranteed against defective materials and workmanship for a period of one year from date of shipment. If, within one year after shipment, it is proved to Lake Shore's satisfaction that the equipment requires valid warranty and Lake Shore is promptly notified of same, Lake Shore will make necessary corrections, free of charge. F.O.B. works where manufactured.

Such necessary corrections constitute the full extent of Lake Shore's warranty. There are no warranties, which extend beyond those described herein. This warranty is exclusive and is in lieu of all other warranties, whether written, oral, implied or statutory. No warranty of merchantability or of fitness for purpose shall apply.

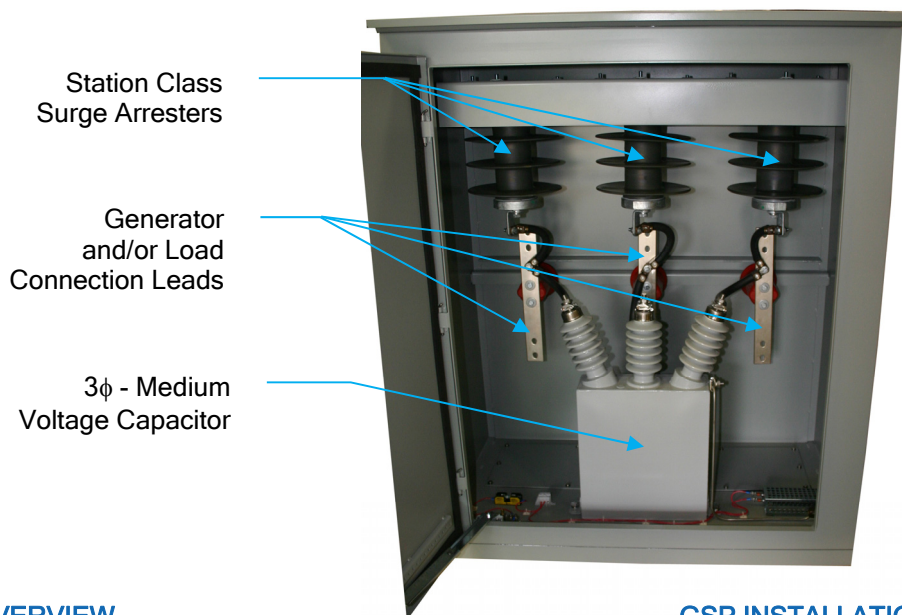
Lake Shore is not responsible for damage to its equipment through improper installation or use, unauthorized repair or modifications, or attempts to operate it above its rated capacities or in abnormal environments. In no event, whether as a failure to meet conditions of the warranty or otherwise, shall Lake Shore be liable for any special, incidental, or consequential damages, including, but not limited to, loss of profit or revenues, loss of good will, damages to associated equipment, cost of capital, cost of substitute products, facilities, service or replacement power, costs of downtime or claims of third parties for such damages.

Notice: The owner of this quick connection cabinet must perform periodic maintenance as described in this manual in order to maintain Lake Shore Electric Corporation's one year exclusive warranty. Failure to perform this maintenance shall void this warranty.

NOTE

Engineering changes may have been made after publication date. Any departure from this manual should be checked with Lake Shore Electric Corporation.

Lake Shore Electric Corporation reserves the right to change specifications without prior notice.



OVERVIEW

The Lake Shore Electric Corporation Generator Surge Protectors (GSP) provides surge protection for Medium Voltage rotating machines operating at voltages from 2400 VAC to 24,000VAC. They are typically installed directly at the generator output terminals.

Overvoltage conditions in electrical systems can reduce the useful life of insulation, which will appear as insulation failures, resulting in circuit faults. In rotating electrical machines such as generators, insulation space is limited. This creates a design balance and conflict between voltage stress and size which has an acute impact on useful life. To help reduce the electrical stress on a medium voltage generator caused by overvoltage, lightning, ground faults, switching surges, static, etc., Lake Shore Electric Corporation recommends that the use of Generator Surge Protection, as outlined in IEEE Standard 142, be considered.

The GSP integrates the combination of a station class arrester with a protective capacitor to limit voltage peaks which can commonly stress the generator beyond its impulse rating. The arrester helps protect the generator insulation by limiting the amplitude of applied impulse waves or reflections within the machine windings, shunting these high voltages to ground. The protective capacitors reduce the slope of the voltage peak by shunting the high rate of voltage change, (dv/dt), to ground.

It has been shown that the protection of rotating machinery from overvoltage conditions has resulted in increased reliability and decreased downtime.

GSP INSTALLATION & MAINTENANCE

IMPORTANT! When cables are first installed to the GSP, the generator must be "OFF"!

Cables size and quantities should be pre-determined, by the Engineer(s) in charge of the project, to the system requirements in which the Generator Surge Protector is being installed.

There are removable, gasketed, panels located at the top and bottom of the GSP enclosures for the customer conduit and cable installation.

NEVER enter conduits from the sides of the cabinet. In order to maintain the NEMA 3R ratings, insure that appropriate gaskets and/or seals are utilized during installation. The cabinet must be mounted level to allow for proper drainage through the integral weep holes located in the bottom of the unit.

Minimal periodic maintenance is required other than visual inspection to insure proper operation. Inspect sealing of the doors and gaskets and check that the proper torque is maintained on the compression lugs (supplied by installer) at the generator connection to the bus bars.

The required torque values are visible on a label located on the inside of the front door.

GSP OPERATION

Once Installation is complete, this unit will operate continuously while the generator is running to provide constant protection to the generator for any overvoltage / frequency conditions, provided that the unit has been sized properly to the system in which it is being used. Please see Table 1 & Table 2 on page 4 for size guide. If the required system is not listed, please call or email us at 1.800.225.0141 or sales@lake-shore-electric.com.

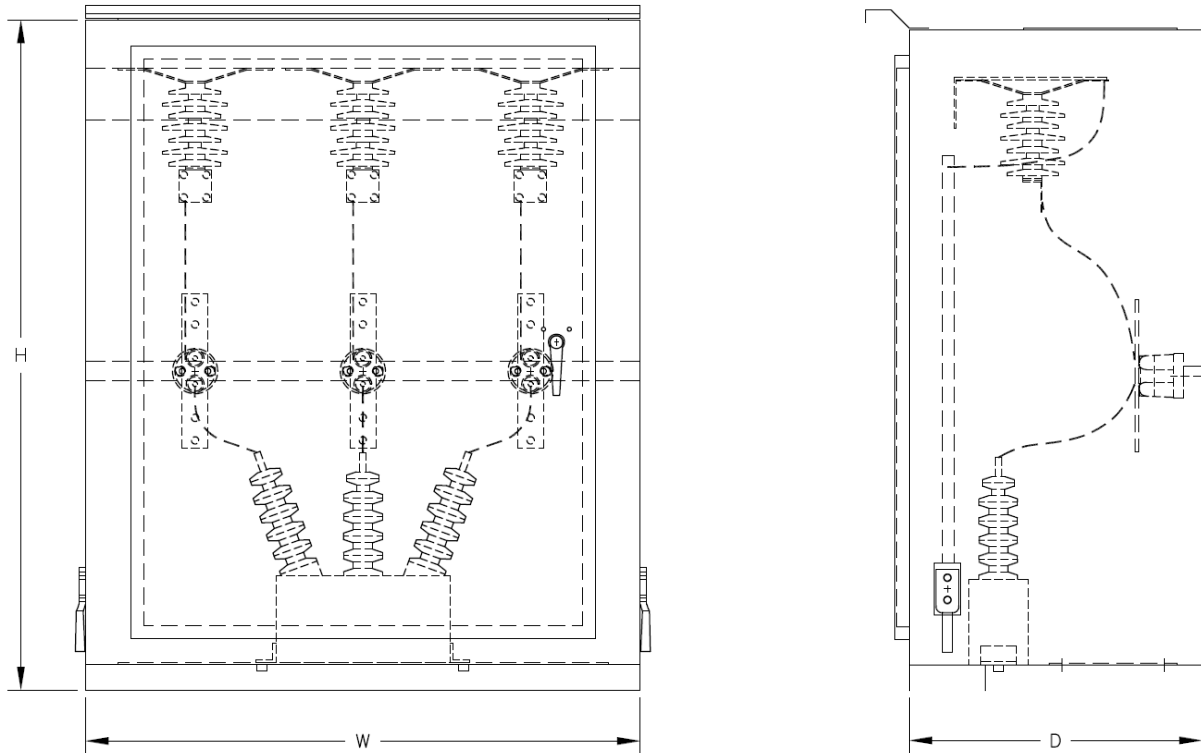


Table 1 - Delta & Ungrounded Neutral Systems (Standard Part Numbers)

VOLTAGE RATING VOLTS RMS (L-L)	MODEL NUMBER	ARRESTER RATING KV RMS	ARRESTER MCOV KV RMS	CAPACITOR MICROFARADS PER POLE	"H"	"W"	"D"
					HEIGHT	WIDTH	DEPTH
2400	60F2400	3.00	2.55	0.50	52	42	23
4160	60F4160	6.00	5.10	0.50	52	43	23
4800	60F4800	6.00	5.10	0.50	52	43	36
6900	60F6900	8.50	6.90	0.50	52	43	36
7200	60F7200	9.00	7.85	0.50	52	43	36
13800	60F13800	18.00	15.30	0.25	52	43	36
24000	60F24000	30.00	24.40	0.125	52	43	36

Table 2 - Grounded Neutral System (Standard Part Numbers)

VOLTAGE RATING VOLTS RMS (L-L)	MODEL NUMBER	ARRESTER RATING KV RMS	ARRESTER MCOV KV RMS	CAPACITOR MICROFARADS PER POLE	"H"	"W"	"D"
					HEIGHT	WIDTH	DEPTH
4160	60G4160	3.00	2.55	0.50	52	43	23
13800	60G13800	12.00	10.20	0.25	52	43	36
24000	60G24000	21.00	17.00	0.125	52	43	36



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