

SURGITRON I

AC SURGE PROTECTOR

Model 1456-85-L

**480Y/277 Vac, 3-PHASE, 4-WIRE, GROUNDED WYE
INSTALLATION AND MAINTENANCE MANUAL**



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Excellence in Systems Protection

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I. SPECIFICATIONS

APPLICATION:	480Y/277 Vac, 3 ϕ , 4 Wire plus Ground, Grounded Wye
Voltage Rating Line-to-Neutral	277 Vac
Power Rating	Unlimited
Varistor Voltage, @ 1 mA dc,	420-520 V
Clamping Voltage at Protector Terminals with	
3 kA 8/20 ms	730 V
10 kA 8/20 ms	820 V
20 kA 8/20 ms	1270 V
Minimum Life with 10 kA, 8/20 msec, per phase	4,000 Operations
Maximum Surge Current Rating, per phase	200 kA 8/20 ms
Operating Temperature Range	-40° C to +85° C
Maximum Operating Altitude	4,000 Meters
Power Consumption	Less Than 9 Watts
Remote Monitoring Circuit Contact Rating	3 A @ 240 Vac 3 A @ 32 Vdc

II. INSTALLATION

The **JOSLYN** AC Surge Protector MODEL 1456-85-L is intended for installation on power systems of 480Y/277 Vac, 4 wires plus ground, 3 phase, grounded wye, 50-60 Hz, unlimited kVA rating. It is intended to be installed at the service entrance.

Location: Locate the protector on or as close to the service entrance cabinet as possible. It should be short-nipped directly to the service cabinet and located so that the wires used to connect to the bus are as short as possible. (The inductance of the wiring, about 1 microhenry per 3 feet, results in every 4 inches adding about 100 volts to the suppression voltage of the protector on a typical 10 kA lightning surge.) If the wire length exceeds 1 foot and very sensitive electronic equipment is to be protected, a sub-panel rated surge suppressor should be connected 30 feet or more downstream.

Mounting: The protector may be mounted in any position using the four 5/16" (7.8 mm) mounting holes. See Figure 1 for protector dimensions.

Connections: Use the shortest and straightest path possible to connect the protector to the power system, avoiding sharp bends or loops in the wire. Twist the wires together if possible. See Figure 2 for connection diagram. The protector should be connected directly to the bus on the load side of the main service disconnect. If no tap is available on the bus, it may be connected to a 100 amp circuit breaker.

Wire Size: The wire size for the cables between the mains and arrester terminals should be 6 AWG to 2/0 AWG, 2 AWG is typically used. Connect the Ground wire to the lug provided inside the protector cabinet. Connect the Neutral wire to the terminal marked “Neutral” on the metallic circuit board. Connect the 3 Phase wires to the isolated terminals marked “Phase A”, “Phase B”, and “Phase C” in any sequence.

Remote Sensing Circuit: The terminal blocks on top of the relay bracket at either end provide connections to the unpowered sensing relay contacts. If a closing of relay contacts is desired when an arrester module becomes defective or is no longer providing adequate protection, connect sensing wires to terminals 1 and 2. If an opening of relay contacts is desired, connect sensing wires to terminals 2 and 3. See Figure 2 for details.

III. THEORY OF OPERATION

The purpose of the Joslyn AC Surge Protector, Model 1456-85-L, is to clamp the voltage whenever instantaneous (surge) voltage on any phase exceeds a level of approximately 500 volts peak. The protector responds in nanoseconds, and automatically restores itself to normal condition after termination of the surge condition. No power-follow occurs and the disturbance to the line voltage is minimal.

Each phase of the protector has four protector modules, two connected L-N, two connected L-G, and two monitoring circuits. Refer to connection diagram of Figure 2.

Each protector module consists of several Metal Oxide Varistors (MOV) connected in parallel. Each MOV has its own fuse. The fuse will blow before the maximum surge current rating of the MOV is exceeded. The fuses also help to balance the current distribution among the MOV's.

Each phase of the protector has a monitoring circuit with two indicator lights on the cover of the protector enclosure. One light shows that the Line to Neutral (L-N) protection is operating and the other shows the Line to Ground (L-G) protection is operating.

Each phase also has two relays that are sensing the presence of L-N and L-G protection of the modules. The 2 individual unpowered sets of relay contacts are presented on two terminal strips above and below the relays; these provide connection points for remote monitoring/external alarming. Terminals 1 and 2 on the terminal strip provide connections to the open contacts of all relays are in parallel. Terminals 2 and 3 provide connections to the closed contacts of all relays in series.

IV. MAINTENANCE

The Joslyn AC Surge Protector, Model 1456-85-L, requires no scheduled maintenance. Except for the relay contacts in the monitoring circuit, there are no moving parts. There are no adjustments to make. Simple electrical tests will indicate the condition of the unit.

The lights on the cover and the remote alarm circuits are used to monitor the condition of the protector. Proper operating conditions are indicated by the lights being on and the relay energized. If the lights are off or a remote alarm signal is obtained, one or a combination of the following conditions exists:

1. The bulbs have burned out;
2. The system voltage is off;
3. Internal fuses in modules have opened;
4. Resistors in the light circuit have opened;
5. Relays are defective;
6. The protector is defective.

If one or more lights are off:

1. Check the system voltage.
2. Replace the bulb if the fuse is intact and the system voltage is on.

If the system voltage is on and the bulb has been replaced and is still not on or a remote alarm signal is obtained:

1. Measure voltage between monitoring wire terminal (located on side of relay bracket) of corresponding phase (A, B or C) and neutral. Voltage must read same as supply voltage. If no voltage can be measured, the module is defective and should be replaced.
2. If modules are operational, the light is on, but a remote alarm signal is obtained, replace the relay.
3. If light still is not on, a series limiting resistor for the light may be open. Check resistors for continuity and value.

The following test will determine the condition of the protector modules: _

CAUTION

***Hazardous voltages are present at the terminals inside the protector.
Test the protector only with the power off.***

1. DC Varistor Voltage Test

The DC Varistor voltage of the Protector Modules may be tested as follows:

- a) Disconnect power.
- b) Remove the relays and light bulbs on the phase to be tested.
- c) Use a suitable Surge Protector Test Set capable of measuring the 1 mA clamping voltage of MOV-type components, such as Joslyn Model 4010, and connect test leads between the phase A, B or C terminal and the neutral terminal. Take a second set of measurements referenced to the ground terminal. Operate Test Set in accordance with instructions and read the displayed value. This is the DC Varistor voltage at 1 mA. Reverse leads and test again as above.

The following DC Varistor voltage values are considered acceptable:

- Factory specification for new Protector: 420 to 520 Vdc
- Protector in Use 410 to 530 Vdc

2. To replace a Protector Module, proceed as follows:

1. Disconnect power.
2. Disconnect monitoring lead of module to be removed from terminal block.
3. Remove 10-32 Screw from protector module bracket and neutral or ground plate.
4. Loosen 8-32 Nuts on top of protector module.
5. Loosen 3/8 Bolt, if necessary, and remove module.

3. To install a new Protector Module the steps above are reversed.

Replaceable Parts:

- Protector Module (L-N & L-G): Joslyn P/N 72396
- Protector Assembly (N-G) Joslyn P/N 72362-02
- Light Bulb: B2A (NE51H), Joslyn P/N 49504
- Relay: Omron MY2-AC240 V, Joslyn P/N 51516

Optional Equipment:

Joslyn Model 4010 Surge Protector Test Set

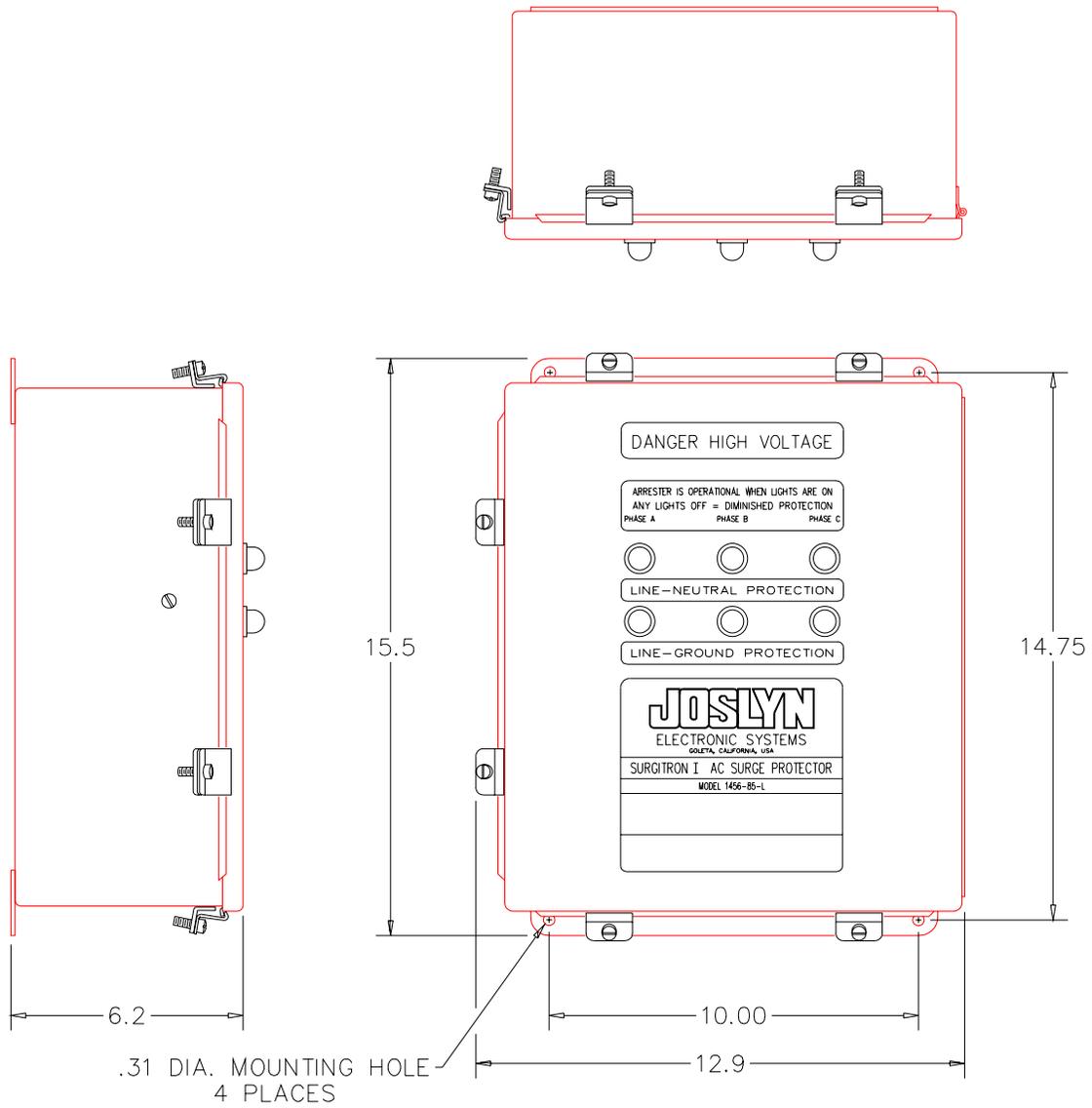
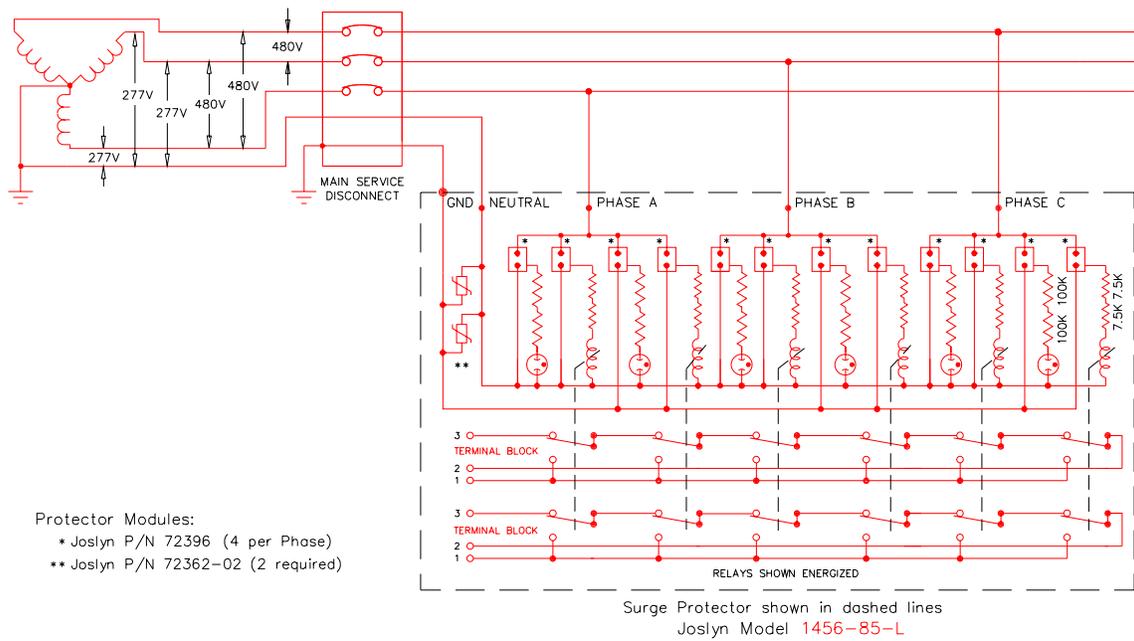


Figure 1 Outline of Supplied NEMA 4 Enclosure



24638 NC

Figure 2 Connection Diagram