SYSTEM/MODEL: LEF

MODIFICATION: Prevention of AC power surge and/or lightning damage

DIFFICULTY LEVEL: 2 - Easy/moderate - Component connection to external points.

COMPONENTS REQUIRED: 1. SA-1: Surge arrestors, one for every two terminals being protected.

2. Surge sensitive power strip.

INSTR/OPERATIONS: 1. Plug all system power supplies into surge sensitive power strip, then plug the strip into an AC outlet.

2. Wire SA-1's on all intercom terminals as shown on the diagram, with output side connected to an earth ground.

3. SA-1's are recommended to be installed on master stations only, and are not necessary on remote stations.

REFERENCE DRAWING #: 0998-1303

Aiphone's product warranty applies to products properly modified using these instructions. However, if a unit is damaged as a result of improper modification, the warranty does not apply.

TROUBLESHOOTING
Power Surge and Lightning Damage

Modern intercom systems, with solid state circuitry, are much more efficient and compact than older systems with relays, coils, and vacuum tubes. Unfortunately, they are also more susceptible to malfunction or failure due to transient overvoltages, such as lightning and AC power surges.

LIGHTNING

Lightning overvoltage is caused by a strike of lightning to or near a conductor or shield of an intercom cable. Shielded wire does not provide complete protection against lightning damage.

When lightning or other voltage spikes flow on the shield of a cable, voltage is induced between the internal conductors and the shield. The amount of induced current depends on the resistance of the shield material and construction of the cable.

AC POWER SURGE

A typical example of power surge is the voltage spike that occurs when heavy duty generators are powered up, or when there are surges on the main electrical system. Lightning can also create power surge in AC power lines. It can range in amplitude from harmless amounts just above normal voltage to several kilovolts. If the intercom cables are run with the AC power lines (which is strongly discouraged), the AC power surge can bleed over into the intercom cables.

Voltage spikes affect all semiconductors, which are intolerant of voltage transients in excess of their ratings. Even a slight amount of excess voltage can cause a semiconductor to fail, or be degraded enough to shorten its useful life.

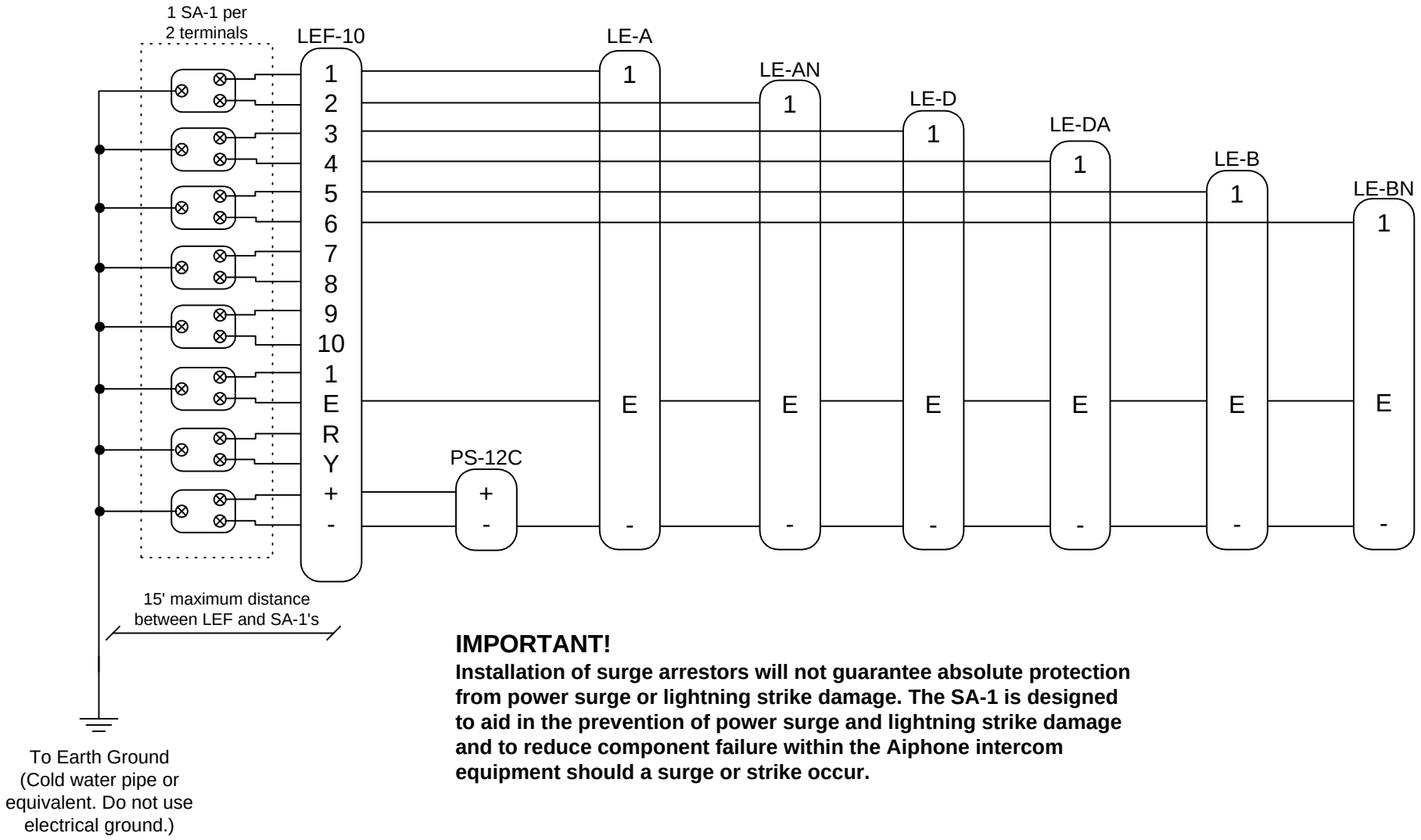
Most lightning damage to intercom systems is caused by lightning opening or shorting semiconductors. A voltage clamping device such as a **metal oxide varistor (MOV)** is recommended to absorb the voltage spike before it enters the intercom unit. An MOV has the best volt-ampere characteristics, energy absorption, and peak current capabilities compared to other voltage clamping devices. The specifications for an MOV used on an Aiphone system are as follows:

- Continuous DC voltage: 50 ~ 100 V
- Transient Peak Current: ≈ 250 A
- Maximum Clamping Voltage: 100 ~ 150 V

One MOV is to be installed between each wire in the cable and an earth ground for each intercom unit. In lightning-prone areas and where power surges are possible, surge protection should be installed.

MODIFICATION DIAGRAM

PROTECTION FROM AC POWER SURGE AND LIGHTNING DAMAGE



IMPORTANT!

Installation of surge arrestors will not guarantee absolute protection from power surge or lightning strike damage. The SA-1 is designed to aid in the prevention of power surge and lightning strike damage and to reduce component failure within the Aiphone intercom equipment should a surge or strike occur.

Drawing Name:
1303-LEF-PS Prot
Drawing # 0798-1303