Indoor Intrinsically Safe Telephone and Exp Proof Isolation Barrier C1/2/3,D1/2 - 120V/240V Instruction Manual

Installation

Installation Guidelines

When installing any Larson Electronics telephone equipment, please adhere to the following guidelines to ensure the safety of all personnel:

- NEVER install telephone wiring during a lightning storm.
- **Install a UL Listed lightning arrestor** on any telephone installed where the telephone or telephone cable is at risk of being exposed to lightning strikes. The lightning arrestor must be installed as close to the telephone as possible to maximize the protection. The lightning arrestor must not be installed within the enclosure supplied with the telephone.
- NEVER install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- NEVER touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- USE CAUTION when installing or modifying telephone lines.
- Install UL Listed telephone line suppressor (customer-supplied) on the telephone line.
- Use silicone sealant or equivalent around and inside all conduit entries.

Wiring Requirements

Design Limits

In order to be *intrinsically safe*, energy and energy storage must be constrained to "safe" levels in hazardous area apparatus. Wiring inherently has capacitance formed by a dielectric material between two conductors. A buildup of this capacitance can form a surge of electricity, a dangerous situation in a hazardous area.

Intrinsically-safe telephones require cabling that will limit the amount of capacitance formed. The limitation on cable length was set by Underwriter's Laboratory (UL) based on test results. This "worst case" cable available was found to have a capacitance of 60 picofarads/foot. Therefore, UL set the cable limitation at one mile, the length at which this worst-case cable capacitance level was still within acceptable bounds.

Shielded Cable

Where multiple intrinsically-safe telephone wires are routed together, shielded cable should be used. The use of shielded cable prevents cross-talk from occurring between multiple intrinsically-safe telephone circuits. The shield must be grounded to an intrinsically-safe ground and connected only at the IBU.

Wiring Guidelines/Control Drawing

The NEC and the CEC provide additional installation details that are recommended for safe installation, follow those guidelines, as well as all applicable local and national electrical code and building code when installing.

General Wire Types					
	24 AWG	22 AWG	20 AWG	19 AWG	18 AWG
Maximum capacitance, C (picofarads/mile)	316,800 pF/mile				
Maximum resistance, R (ohms/mile)	271	171	107	85	67
*Ring signal loss, decibels (dB/mile)	-16	-12	-8	-6	-4

*Nominal ring signal is 98 dB @ 10 feet.

Installing the **EPPH-229AH** Outdoor Telephone

The EPPH-229AH Outdoor Telephone is intrinsically safe when connected in accordance with these instructions and the control drawing included with your unit.

1. Open the front door of the enclosure and locate the four outermost screws.
2. Loosen these four screws, and carefully pull the enclosure apart until there is a slight resistance on the left side of the enclosure.
3. Separate the front half of the enclosure from the rear half by pulling on the left side of the enclosure until the hinge plugs pull loose.
4. Put the front half of the enclosure aside, and mount the enclosure to the wall using four ¼-inch screws of the appropriate length, depending on the mounting surface.
5. Feed the station wire through the hub at the bottom of the enclosure.
6. Refer to the separate included control drawing for wiring details. The station wire is the pair of wires coming directly from the Isolation Barrier Unit. This unit must not be connected directly to the telephone system.
7. Close the front half of the enclosure, and secure it by tightening the four outermost screws.

⚠ **WARNING** ⚠

Substitution of components may impair intrinsic safety.

System Setup

Larson Electronics recommends taking the following steps to ensure a safe and trouble-free installation:

1. Install the Isolation Barrier Unit (IBU) and wire it completely, except for the hazardous area signal wires.

   ⚠**WARNING**⚠ **The unit must be wired in accordance with included control drawing to ensure intrinsic safety.**

2. Next, temporarily connect the I.S. telephone to the IBU with a short pair of conductors, and operate the unit by making a test telephone call. If any problems are detected, see the Troubleshooting section.

3. Call the I.S. telephone from another telephone, and adjust the RING PITCH (located on the IBU) to the desired pitch.

4. Disconnect the I.S. telephone and install it in the intended permanent location.

   ⚠**WARNING**⚠ **The unit must be wired in accordance with included control drawing to ensure intrinsic safety.**

5. Make a call from the I.S. telephone. If any problems are detected, see the Troubleshooting section.

External Ringers

The Larson Electronics Intrinsically-Safe Telephones are designed with loud broadcast ringers. In some instances, however, it is advantageous to install external ringers on these units. Examples of such situations include areas where the noise level exceeds 95 dB, and locations where a large area must be covered by a single telephone.

To install an external ringer, it is necessary to attach an explosion-proof relay to the telephone line. The relay must not interfere with the direct connection between the IBU and the intrinsically-safe telephone. The relay must also be wired to an explosion-proof ringer purchased separately by the customer. The customer must install sealed conduit from the relay to the ringer. Refer to Figure 2. Contact your local electrical distributor for information on relays and explosion-proof ringers.

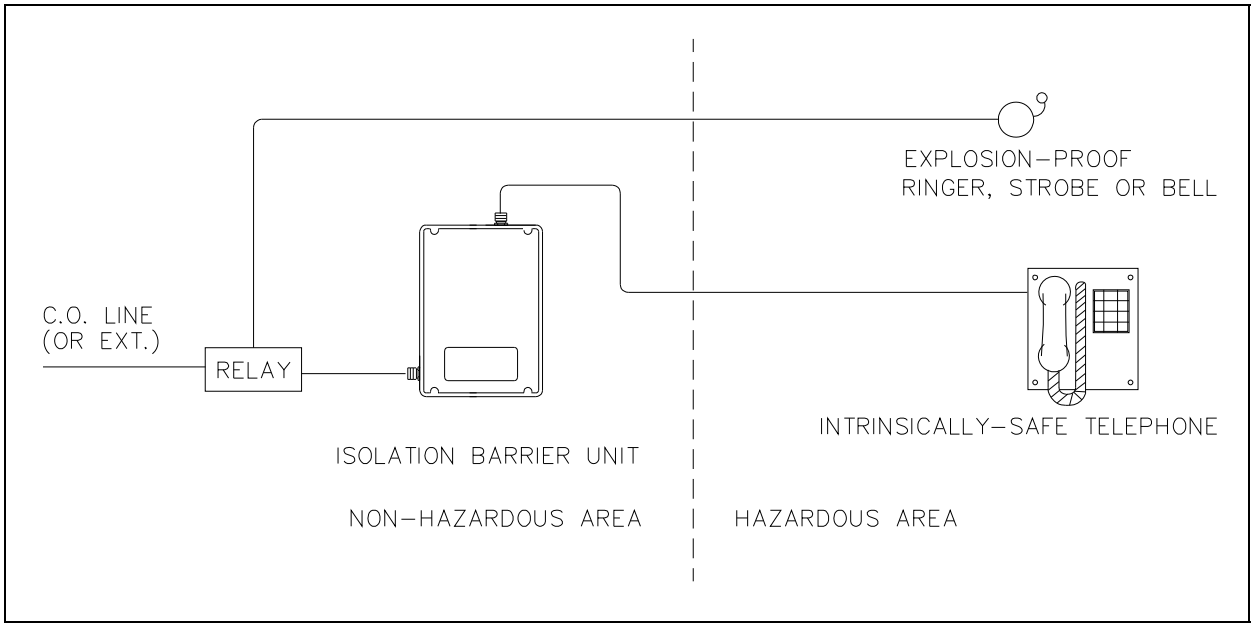


Figure 2. Placement of Explosion-proof Ringer in the Hazardous Area

Operation

1. Lift the I.S. telephone handset to place a call.
2. Adjust handset receiver volume control, if necessary, by pressing the handset pressbar.

   NOTE: Pressing the handset pressbar increases the volume in increments of 4 dB. The volume starts at 0 dB and increases to a maximum volume of 8 dB. Pressing the pressbar a fourth time will return the volume to -4 dB. Pressing the pressbar one more time will return the gain to 0 dB.
3. Dial the desired number.
4. After completion of the call, place the handset on-hook.

Maintenance

This section includes two troubleshooting charts designed to quickly pinpoint the source of problems.

Troubleshooting

NOTE: It may be advantageous to temporarily connect a Telephone panel directly to the output terminals of the IBU when troubleshooting. Then, using the charts below, the cause of the problem should more easily be determined.

Non-Equipment Related Problems

Problem	Solution
The I.S. telephone is inactive with no lights on the IBU when the telephone is off-hook.	1. Check the ac power to the IBU. 2. Check the ac fuse F4 at the IBU. 3. Ensure there is no wiring open at the I.S. telephone.
The I.S. telephone has no dial tone.	1. If the I.S. telephone has a wiring short, the IBU lights will be lit in the following pattern: λ = On, μ = Off ISLOOP LOCK λ μ HOOK TELCO μ μ
	2. If the TELCO line has an open, the IBU lights will be lit in the following pattern: λ = On, μ = Off ISLOOP LOCK λ λ HOOK TELCO λ μ
The lights on the IBU flash randomly.	The I.S. telephone has an intermittent wiring short. The short may be between the conductors or either/both conductor(s) to ground/shield.

Equipment-Related Problems

Problem	Solution
There is no incoming ring tone.	1. Check the I.S. telephone panel. 2. Check the IBU.
No receiver audio, no sidetone, and cannot hear touch tones when pressed.	1. Check the I.S. telephone panel. 2. Check the IBU. 3. There may be a wiring open or a short in the connecting cable.
Cannot dial out, but can hear touch tones when pressed.	1. Check the IBU. 2. There is no TELCO connection or it is faulty.
I.S. telephone appears inactive.	1. Check the I.S. telephone panel. 2. Check the IBU. 3. Ensure there is no wiring open in the connecting cable or at the I.S. telephone.

⚠ **CAUTION** ⚠

Any field repairs on the intrinsically-safe design of the telephone are strictly prohibited. Any such change will void ALL hazardous approvals.

Lightning Protection

Telephone lines are susceptible to lightning strikes and must be properly protected and maintained. On-premise line protection is usually provided at the building entrance by the responsible telephone company when installed. It is common that this protection is neglected after installation.

Degradation of conventional protection, such as carbon blocks or gas discharge types, will occur with each lightning strike. To ensure safe operation, protective elements should be replaced frequently and checked for proper connection and grounding. Gas discharge types are by far the most robust, cost-effective means of protection.

The registered I.S. equipment meets all isolation and safety requirements of FCC, Part 68, DOC CS-03, UL 913, and CSA C22.2-No. 157; however, lightning strikes are not predictable or considered to be a condition of fault likely to occur in practice as defined by the guidelines for intrinsic safety. Therefore, it is imperative that the user employ and maintain a proper lightning protection scheme. This is true for all hazardous area equipment and all telecommunications equipment subject to lightning.

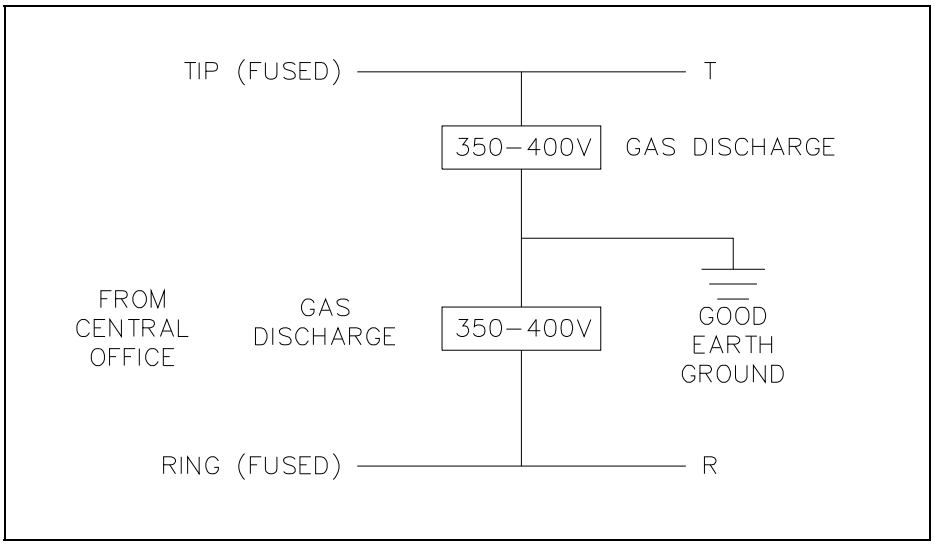


Figure 3. Example of Lightning Protection Design