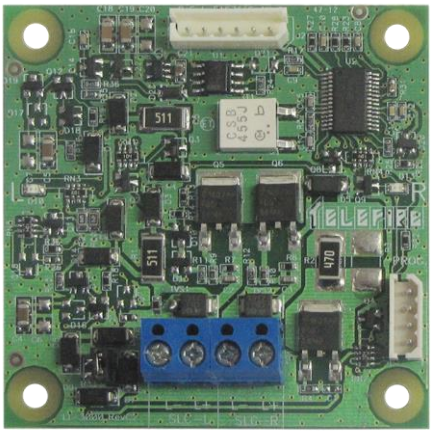
Addressable Modules

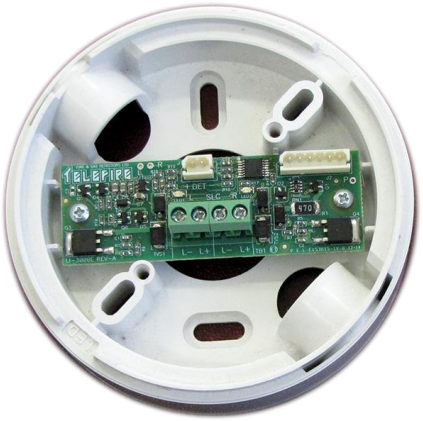
TELEFIRE
FIRE & GAS DETECTORS

LI-3000 / LI-3000E

Short-Circuit Line Isolation Module

Technical Manual





TELEFIRE FIRE & GAS DETECTORS LTD
PO Box 7036
Petach Tikva 49250
Israel
Tel: 972 3 970 0400
Fax: 972 3 921 1816
eMail: info@telefire.com
Web: www.telefire.com

LI-3000EN114.PDF

Revision 1.14
RelDate

i

Note

The terms “**Trouble**” as used in NFPA 72 guideline and UL standards and “**Fault**” as used in EN 54 standards are used interchangeably throughout this manual.

i

Note

Do not install, operate, and maintain this LI-3000 or LI-3000E before fully reading this manual.

1 Introduction

The LI-3000 and LI-3000E short-circuit line isolators are intended for use in the signaling line circuit (SLC) of Telefire's addressable control panels.

The devices are connected to and powered by the SLC and are used to protect against short circuit by disconnecting the short circuit from the rest of the SLC.

The LI-3000 requires an address that is set by the PROG-4000 device programmer.

The LI-3000 and LI-3000E enable wiring the SLC Loop in a closed loop (NFPA Class A) as well as branching T-shaped (NFPA Class B) wiring configuration.

Class A configuration does not reduce system capacity.

Each SLC Loop is capable of addressing 127 devices, including the addresses occupied by the LI-3000 modules. A line card that is configured as Class A can address up to 127 addresses (including LI-3000 line isolators).

2 Compatibility

The LI-3000 and LI-3000E are compatible with the full range of Telefire's ADR-7000 control panels.

3 Application

3.1 Characteristics

After power up or reset of the system, the isolator checks for short-circuit condition. If no short-circuit is detected the isolator switches the circuit on and enables normal operation of the second connection of the SLC Loop.

Whenever a short-circuit condition occurs the Isolator opens the circuit automatically and disconnects the faulty side of the loop. Three seconds later it resets and performs a second test, and then again a minute later. It repeats the test for eight minutes, and then periodically it will re-test every two minutes. The test cycle restarts when the module is reset.

The yellow LED flashes each time the module is addressed by the control panel. A short-circuit condition will cause the LED of the shorted side to latch on.

An open circuit in a Class A configuration will send a trouble message to the control panel. The LI-3000 will latch on the LED corresponding to the open side.

3.2 Class A Configuration

Configuring a loop as Class A does not reduce loop capacity, other than the addresses used by the short circuit line isolators themselves – each loop is still able to work with 127 addresses.

i

Note

Short circuit line isolators model LI-3000 have an address and report of a disconnection on one of the sides to the control panel.

LI-3000E line isolators do not have an address. The control panel will report missing devices in case of disconnection.

Note

For each Class A loop one of the line isolators that is connected to the line card shall have the lowest address of all addressable line isolators. Remove jumper Jp1 from this module and connect it as per Figure 1. Other line isolators can be either LI-3000 or LI-3000E. Other LI-3000 modules shall have the jumper in place.

Figure 1 Connecting Class A loop for ADR-7000

3.3 Class B Configuration

3.3.1 Branching SLC Loop without Isolators

When a short-circuit occurs in this configuration the system will stop communicating with the entire loop, and a trouble message will be displayed indicating the fault.

If a disconnection occurs, devices connected to the circuit beyond the open wire will stop operating and a trouble message will be displayed on the control panel indicating the faults.

3.3.2 Branching SLC Loop with Isolators

When an isolator in a branching SLC Loop with isolators senses a short it will disconnect one of the branches and the other branches will be unaffected.

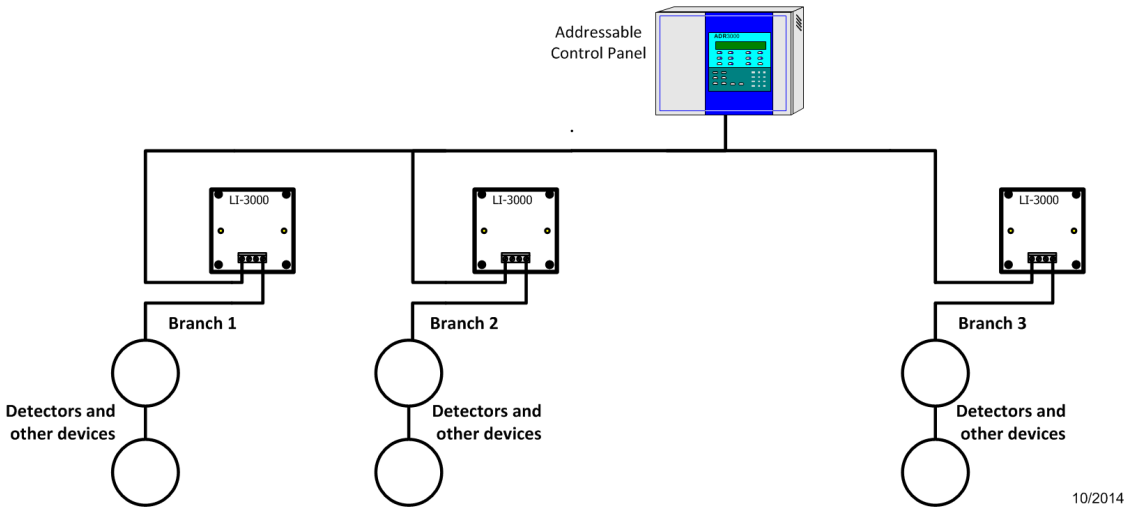


Figure 2 NFPA Style-4 (Class B) Loop with Branching Configuration

4 Installation

Note

Notify the operator or the security personnel that the system will be temporary disconnected before adding devices to a control panel.

Measure the wiring to ensure there are no shorts before connecting the wiring to the control panel.

Connecting or adding devices to a control panel shall be done when all power to the control power (AC and batteries) is off.

4.1 Pre-Installation Planning

4.1.1 Topology

Plan the SLC Loop's topology according to the local codes and regulations and in accordance to the planning requirements.

4.1.2 Capacity Planning

Ensure that you have sufficient available addresses on the control panel. Each LI-3000 line isolator occupies a single address; LI-3000E isolators do not have an address.

4.1.3 Cabling Planning – Signaling Line Circuits (SLC)

UL 864

UL 864 Requirement

To comply with UL 864 edition 10 paragraph 56.4.3 ensure that when using Class A SLC communication ensure to have LI-3000 line isolators between addressable NACs (ADR-723) that serve different zones.

The module connects to the control panel via a two-wire solid copper cable 20 – 12 AWG (cross section of 0.5mm^2 to 3.3mm^2). Twisted-pair cable is recommended.

Cable type			Max SLC Length
AWG	Dia. (mm)	Cross Section. (mm^2)	
20	0.812	0.518	570
19	0.912	0.653	710
18	1.024	0.823	900
17	1.15	1.04	1,125
16	1.291	1.31	1,425
15	1.450	1.65	1,800
14	1.628	2.08	2,275
13	1.828	2.62	2,875
12	2.053	3.31	3,625

Table 1 Selecting SLC Wires

4.2 Installing the LI-3000

4.2.1 Address Programming

The module's address should be programmed prior to installation by connecting the PROG-4000 unit to connector JP1 (please refer to the PROG-4000 manual for further details on address programming).

4.2.2 Control Panel configuration

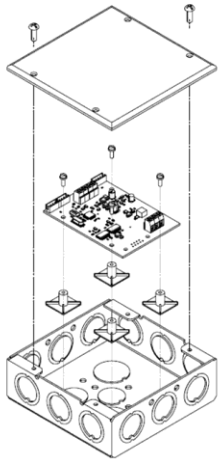
When configuring the line card from the control panel, open the "**System Config**" menu, move the cursor to the "**Card**" field, and press the up or down key as necessary to select the appropriate line card.

Switch between Class A and Class B by pressing the **Enable** key. Press the **Enable** key again to switch between Class A and Class B again. To disable the line card press the **Disable** key.

To add an Isolator module to the system, select the manual device programming screen in the control panel, move the cursor to the "**Type**" field and select **Isolator** by pressing the up or down keys. Make sure the Isolator's address was programmed prior to installation. Please refer to the control panel's technical manual for additional details on system programming.

4.2.3 Location

The module should be installed in a closed location. Avoid exposure to outdoor environment to prevent high humidity or dust or air pollution.



The PCB mounts to a 4-inch electrical gang box. The box must have a minimum depth of $2\,^{1}/_{8}$ inches.

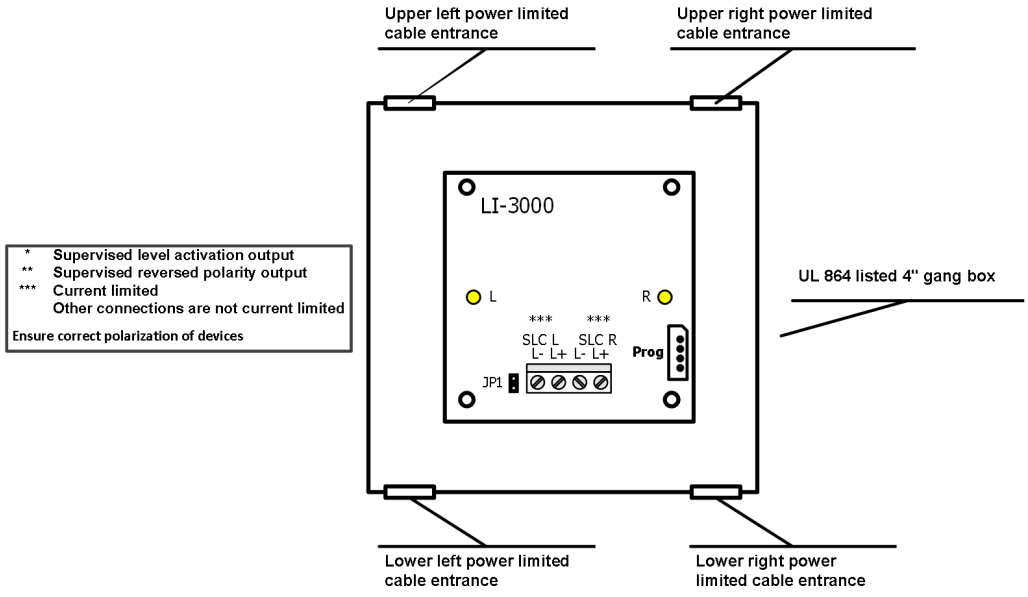
The PCB is shipped with four 12mm spacers and four screws. Insert the screws into the PCB's mounting holes and screw them into the spacers; peel the sticker on the back of the spacers and carefully place the PCB and spacer assembly on the back of the box, maintaining a minimum of $^{1}/_{4}$ inch from al sides of the gang box.

Press the PCB down to the back of the gang box for about 30 seconds to ensure proper adhesion.

Please see next figure for cable routing.

10/2018

Figure 3 Gang box installation: module mounting



07/2018

Figure 4 Gang box installation: cabling

4.2.4 Connecting the SLC

Connect the SLC from the control panel or previous device to the SLC L side of the LI-3000. Connect the SLC to the next device from the SLC R side of the LI-3000.

4.2.5 Connecting Wiring

Use an anti-static ground wrist-strap when handling any system circuits to prevent static discharge to the modules.

Connect the incoming SLC wires to SLC L and the outgoing SLC wires to SLC R. Connect all wires according to marked polarity (see Figure 5).

All wiring must conform to NFPA 72 or the authority having jurisdiction.

i

Note

Measure the wiring to ensure there are no shorts before connecting the wiring to the control panel.

Connecting or adding devices shall be done when all power to the control power (AC and batteries) is off.

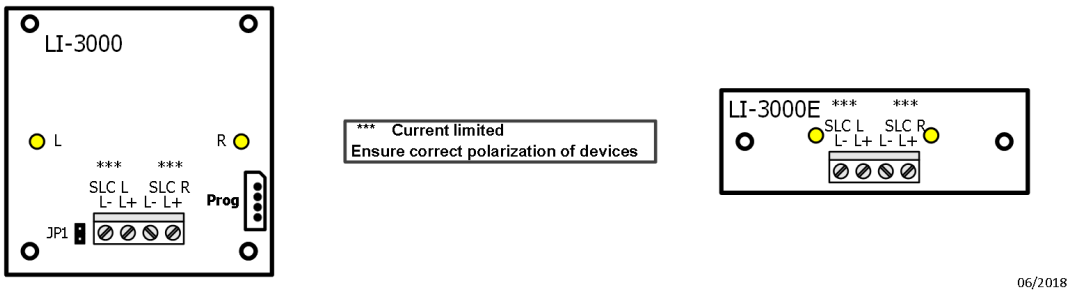


Figure 5 LI-3000 and LI-3000E Line Isolation Modules

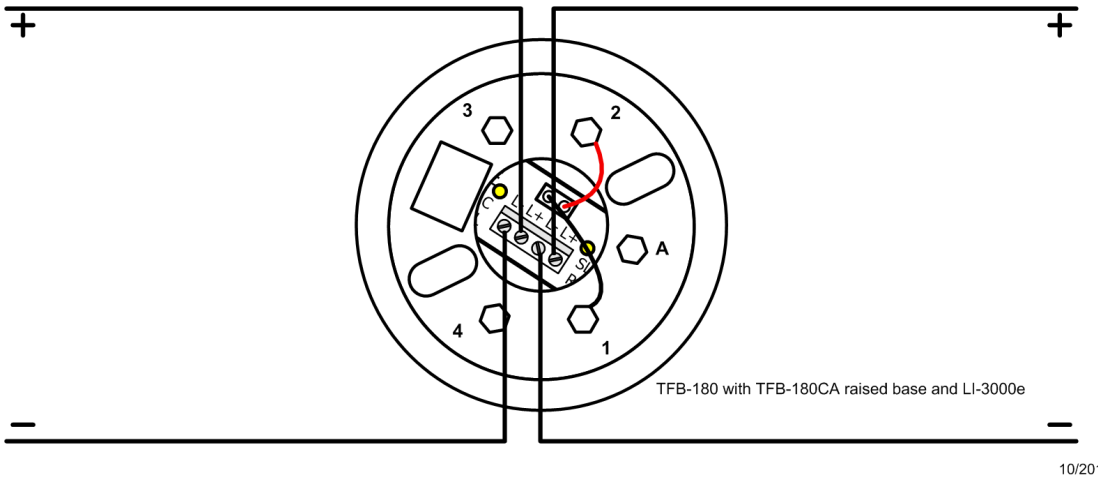


Figure 6 Connecting an LI-3000E in a raised base

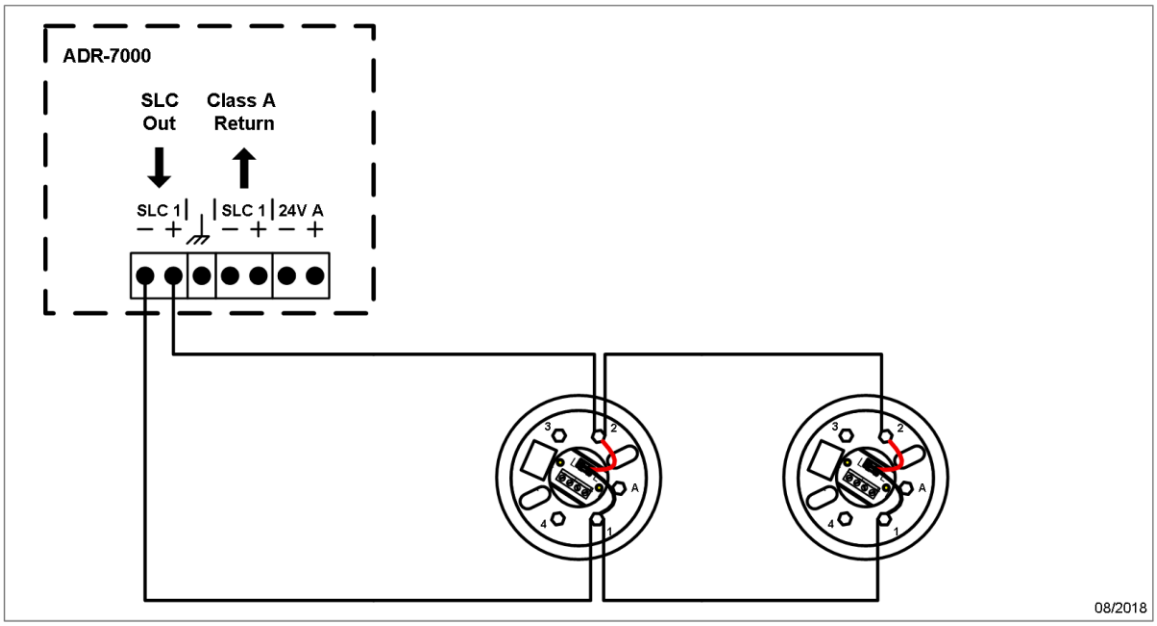


Figure 7 ADR-7000 Class B connection

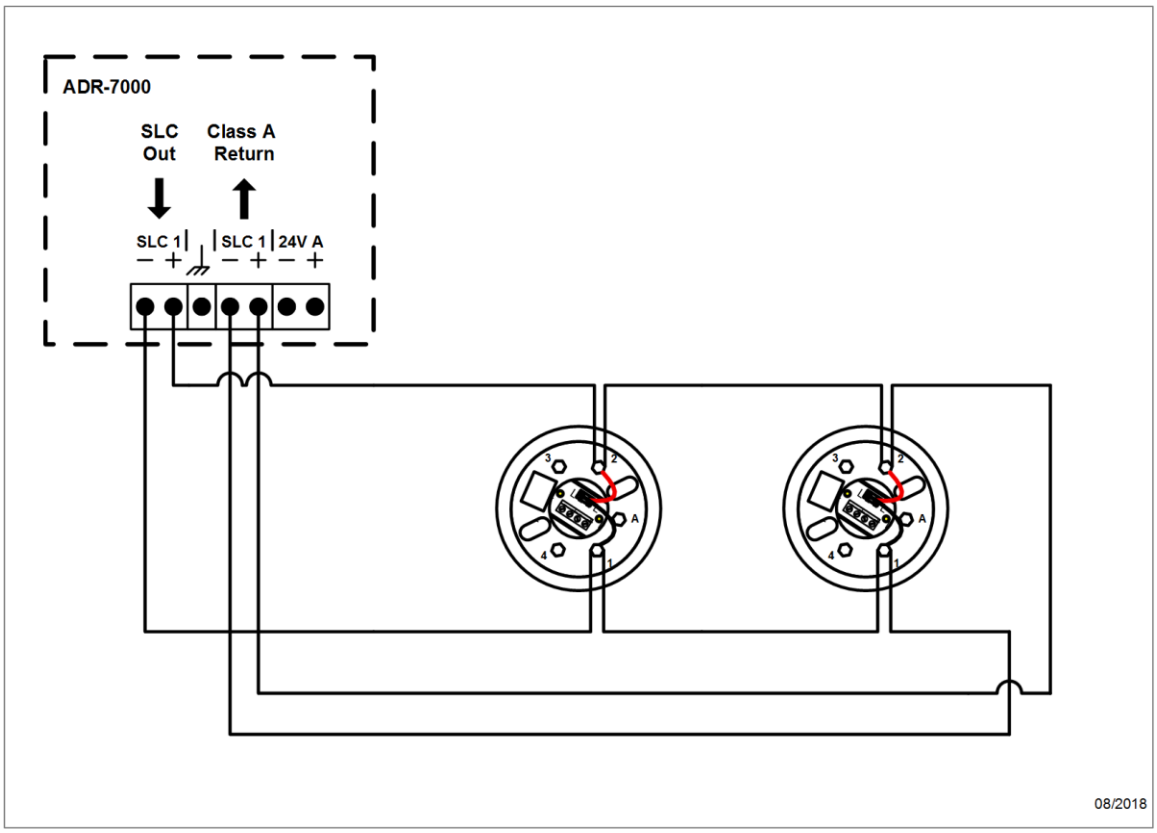


Figure 8 ADR-7000 Class A connection

4.3 Post-Installation Tests

Test that the system still works when there is a short or open circuit on the SLC Loop.

5 Specification

SLC is supervised and power limited by the control panel.

Ground fault supervision is performed by the control panel.

Please refer to the ADR-7000 manual, P/N ADR-7000Enxxx (xxx is a number that corresponds to the document revision), for detailed information.

5.1 LI-3000

Module PCB Dimension (W / H)..... 65 / 65 mm
Operating Temperature Range ..... 0°C – +49°C
Relative Humidity Range ..... 10% – 93% non-condensing
Supervised, power limited
Operating Voltage (supplied via SLC Line) ..... 21V, modulated
LI-3000 Current Consumption..... 0.5 mA (normal status)
4.0 mA (during short or open)

5.2 LI-3000E

Module PCB Dimension (W / H)..... 25 / 75 mm
Operating Temperature Range ..... 0°C – +49°C
Relative Humidity Range ..... 10% – 93% non-condensing
Supervised, power limited
Operating Voltage (supplied via SLC Line) ..... 21V, modulated
LI-3000E Current Consumption ..... 0.5 mA (normal status)
4.0 mA (during short or open)

All values are nominal. Specifications are subject to change without prior notice

6 Certification

Telefire's LI-3000 Line Isolation Module has the following approvals:

- UL 864 listed
- SI 1220 approved