

MODEL T400/T200 REPEATER HOUSING LIST 1 AND LIST 2 INSTALLATION/MAINTENANCE

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1. GENERAL

This practice provides installation and maintenance information for the ADTRAN Repeater Housing, part number 1150043, List 1 and List 2. Figure 1 shows a view of the Repeater Housing mounted on a pole.

Features

Basic features of the LRH II-30AT, part number 1150043L1, include:

- Four slots for T400 or T200 circuits
- 40-foot stub with air core cable
- Local or remote pressurization
- Houses line-powered HDSL HRE, HTU-R, FNID, BRIDLE-R, or Total Reach TRI-R circuit technologies



Figure 1. ADTRAN Repeater Housing

Basic features of the LRH II-30FT, part number 1150043L2, include:

- Four slots for T400 or T200 circuits
- 40-foot stub with gel-filled core cable
- Local pressurization
- Houses line-powered HDSL HRE, HTU-R, FNID, BRIDLE-R, or Total Reach TRI-R circuit technologies

The Repeater Housing is a sealed, pressurized apparatus case designed to house one to four line-powered T400 or T200 circuit packs, depending on the model used. The housing may be mounted on a pole, in a vault, on a pedestal, or in a manhole.

All models include tamper-resistant features, replaceable surge arrestor Gas Tubes, externally accessible order wire terminals, lockable clamp, 6 AWG ground cable, 40-foot cable stubs, mounting bracket, quick-reference housing wiring labels, and detailed connection information for the various circuit technologies. The housing is available with air-core or gel-filled cable, depending on the model.

A Test Access Card is shipped with each Housing to assist with installing and troubleshooting T400 and T200 circuits. Refer to the Test Access Card I/M Practice (61244065L1-5) for more details.

Revision History

This practice has been revised to include a one-page circuit technology wiring chart, update the replacement parts list, reflect a change in the gas tube insertion/extract tool, and update the Warranty and Customer Service section information.

2. INSTALLATION

CAUTION

Never install telephone wiring during a lightning storm.

After unpacking the unit, immediately inspect it for possible shipping damage. If damage is discovered, file a claim immediately with the carrier, then contact ADTRAN Customer Service.

The Repeater Housing consists of a mounting bracket, a base, a circuit pack support structure, a support case cover, a clamp, an O-ring, and a dome. The mounting bracket is shipped attached to the Repeater Housing. A stainless steel locking clamp secures the bottom of the dome to the base of the housing using an O-ring to form an air-tight seal. A tamper-resistant screw with a captured cup washer is provided to attach to the clamp for additional security. Figure 2 shows the parts of the housing.

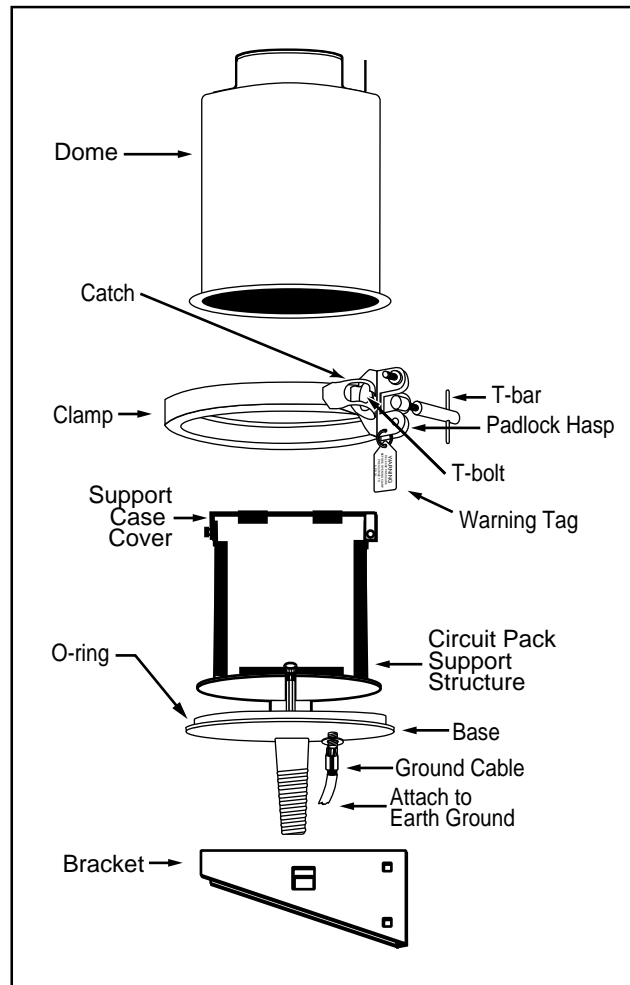


Figure 2. Repeater Housing Assembly

The locations of the security box, valves, order wires, and the ground cable are illustrated in Figure 3.

WARNING

ALWAYS RELEASE PRESSURE BEFORE LOOSENING THE CLAMP AND REMOVING THE DOME.

If the housing is opened without releasing pressure first, the sudden release of the dome under pressure could cause personal injury.

To release pressure for the List 1 air-filled housing, hand-tighten the needle valve clockwise to ensure that it is closed, and depress the fill valve.

To release pressure for the List 2 gel-filled housing, depress the fill valve.

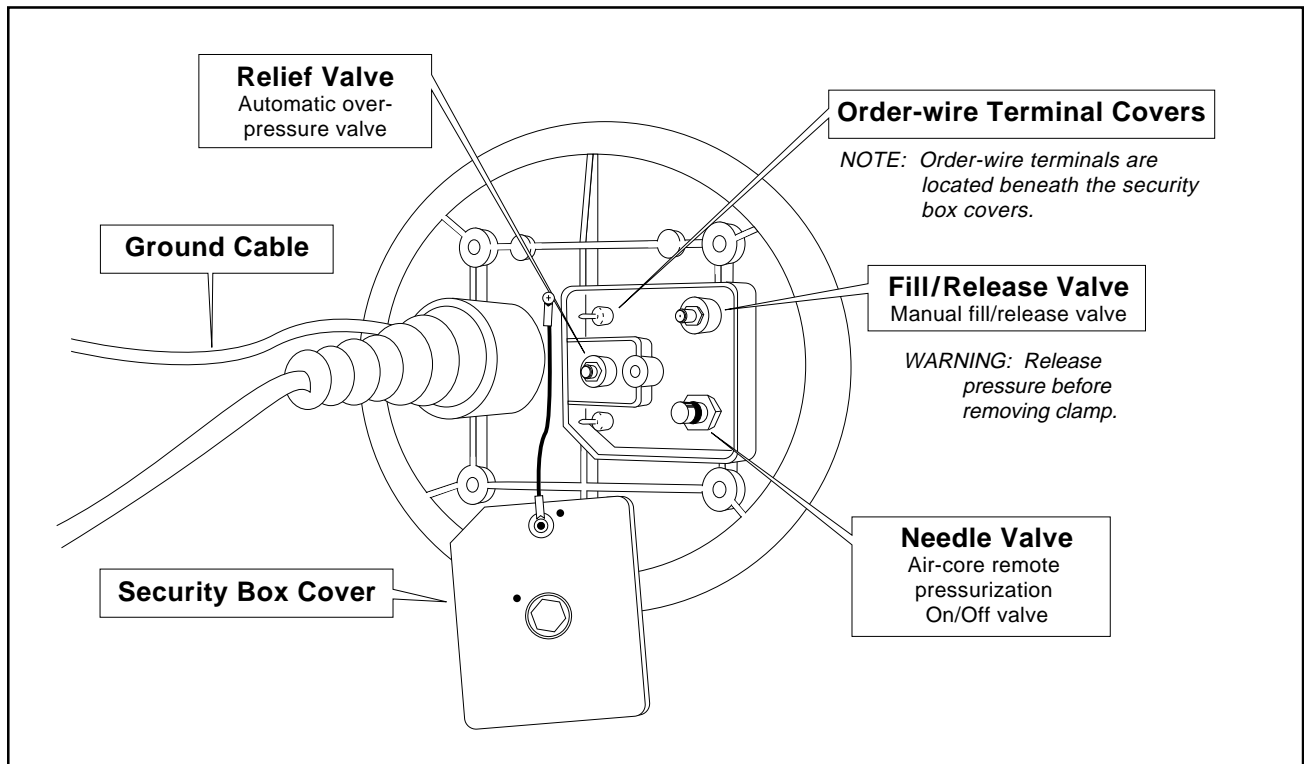


Figure 3. Location of Security Box, Valves, Order Wires, and Ground Cable on Base Bottom

Follow these steps to install the housing.

A. Install Mounting Bracket

NOTE

The Repeater Housing is designed to be mounted vertically, with the cable stub down.

- (1) Clearances between the Repeater Housing and adjacent structures must be observed for access during maintenance. Refer to Figure 4 for the clearances required for removing the housing cover and the tilting internal case support.
- (2) Verify that the proposed cable route does not exceed the 40-foot stub cable length.
- (3) The mounting bracket contains holes for mounting the unit to a pole, in a vault, or in a manhole. A guide for mounting bracket holes is illustrated in Figure 5. Select the location for mounting the unit and fasten the mounting bracket appropriately.

B. Splice Wires

- (1) Connect the wiring in the cable stub based on the appropriate matching repeater technology and housing wiring. Refer to Table A for deployment restrictions, and to Table B for circuit technology wiring information.

**Table A.
Repeater Housing Capacity Specifications**

| ADTRAN Circuit Technology | Mechanical Size | Quantity per Housing |
|---------------------------------|---------------------------------|-------------------------|
| HDSL HRE | T400 or T200 ¹ | 4 |
| HDSL HTU-R | T400 or T200 ¹ | 2 |
| HDSL FNID | T400 or T200 ¹ | 3 |
| ISDN TRI-R | T200 | 4 |
| ISDN BRIDLE-R | T400 | 4 |

¹ Capacity verification pending Thermal Load tests

NOTE

Some slot pairs inside the housing may not be used, depending on the specific circuit technology wiring.

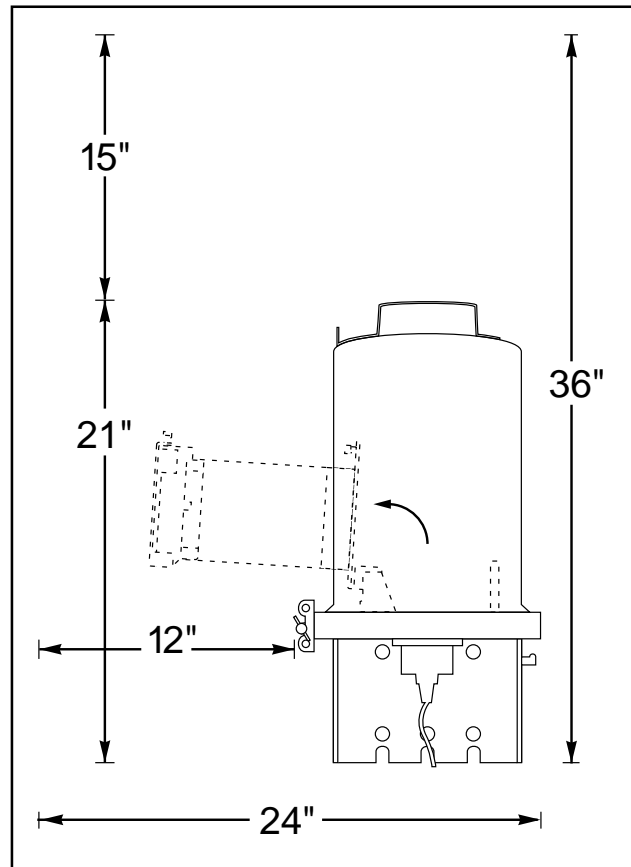


Figure 4. Mounting Clearances

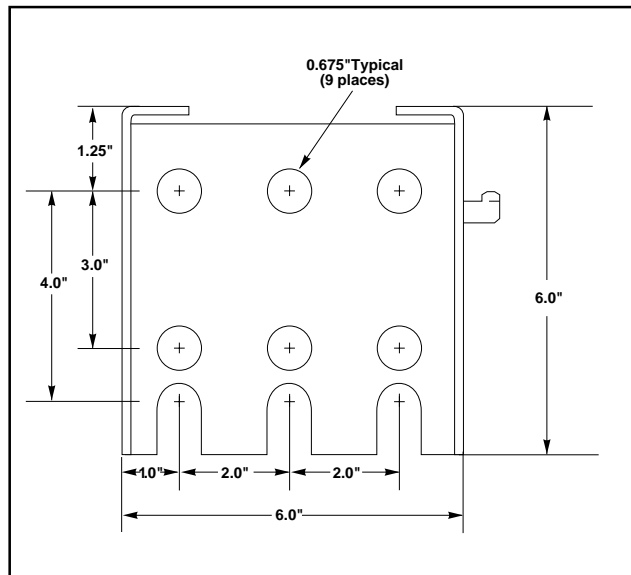


Figure 5. Guide for Mounting Bracket Holes

- (2) If installing an air-pressurized model (List 1) and using remote pressurization, an air-tight splice enclosure must be installed.
- (3) Connect the ground cable to an appropriate ground. Surge arrestors work only when the ground cable is connected.

Table B. Circuit Technology Wiring Chart

| Circuit Pack | Cable Wire Color for Loop 1 and Loop 2 Housing | HDSL HRE | HDSL HTU-R | HDSL FNID | ISDN TRI-R | ISDN BRIDLE-R |
|--------------|--|------------------|-----------------|---------------|----------------|-----------------|
| CP1, 5 - 15 | Blue | Customer, Loop 1 | To Customer | To Customer | NC | Customer |
| 7 - 13 | Orange | Network, Loop 1 | Network, Loop 1 | Network | NC | Network, Loop 1 |
| 41 - 47 | Orange | Network, Loop 2 | Network, Loop 2 | NC | Network | Network, Loop 2 |
| 49 - 55 | Green | Customer, Loop 2 | From Customer | From Customer | Customer - NTI | NC |
| CP2, 5 - 15 | Green | Customer, Loop 1 | To Customer | To Customer | NC | Customer |
| 7 - 13 | Brown | Network, Loop 1 | Network, Loop 1 | Network | NC | Network, Loop 1 |
| 41 - 47 | Brown | Network, Loop 2 | Network, Loop 2 | NC | Network | Network, Loop 2 |
| 49 - 55 | Slate | Customer, Loop 2 | From Customer | From Customer | Customer - NTI | NC |
| CP3, 5 - 15 | Blue | Customer, Loop 1 | To Customer | To Customer | NC | Customer |
| 7 - 13 | Blue | Network, Loop 1 | Network, Loop 1 | Network | NC | Network, Loop 1 |
| 41 - 47 | Orange | Network, Loop 2 | Network, Loop 2 | NC | Network | Network, Loop 2 |
| 49 - 55 | Blue | Customer, Loop 2 | From Customer | From Customer | Customer - NTI | NC |
| CP4, 5 - 15 | Green | Customer, Loop 1 | To Customer | To Customer | NC | Customer |
| 7 - 13 | Yellow | Network, Loop 1 | Network, Loop 1 | Network | NC | Network, Loop 1 |
| 41 - 47 | Brown | Network, Loop 2 | Network, Loop 2 | NC | Network | Network, Loop 2 |
| 49 - 55 | Slate | Customer, Loop 2 | From Customer | From Customer | Customer - NTI | NC |
| Order Wires | Slate | | | | | |
| Spare Pair | Green | | | | | |
| | Yellow | | | | | |

Notes:

- 1 CP# refers to the Connector Number inside the Housing.
- 2 NC = Not Connected
- 3 Pin 11 of each Card Edge Connector is GROUND.
- *4 Heat dissipation from the circuit packs AND the collection of heat from solar loading must be considered to avoid overheating conditions inside the Environmental Housings. Refer to the I/M Practice for guidelines on installation.
- *5 Capacity constraints possible pending thermal load tests.

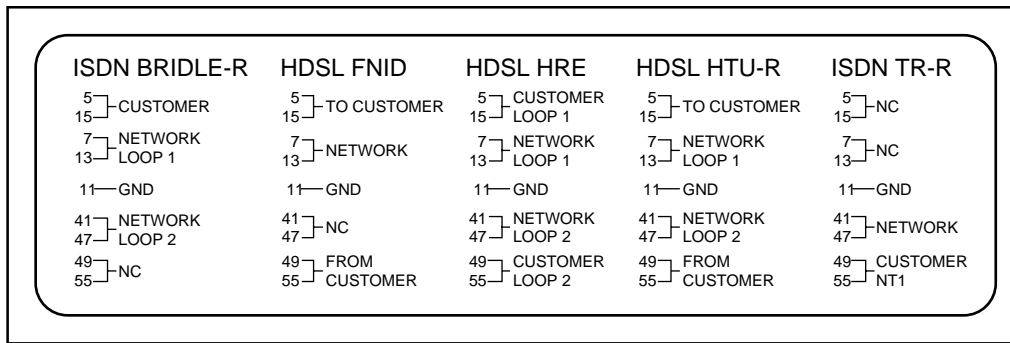


Figure 6. Circuit Pack Connections

C. Release Pressure in Housing

WARNING

This housing is shipped pressurized to prevent moisture accumulation during shipment and storage.

- (1) Remove the security box cover located on the bottom of the housing base using a nut driver to loosen the 7/16-inch bolt.
- (2) For List 1 (air-core) only: Verify that the needle valve is closed by hand-tightening clockwise. DO NOT OVERTIGHTEN. See Figure 3.
- (3) Remove fill valve cap.
- (4) On both models: Fully depress the needle in the fill valve for at least 30 seconds to ensure pressure release.

D. Remove the Clamp and Housing Cover

- (1) Wipe any debris from the dome and clamp before removing locking clamp.
- (2) Remove the tamper-resistant security bolt using a 7/16-inch nut driver.
- (3) Turn the T-bar counter-clockwise, releasing the end of T-bolt from the catch.
- (4) Remove the clamp.
- (5) Hang the clamp over mounting bracket behind base. See Figure 7.
- (6) Remove the dome from the housing base.
- (7) Hang the dome on the bracket using the dome hook.

E. Install Circuit Packs

- (1) The label on the support case cover provides a quick reference to color coding, slot number locations, and the direction the T400 card MUST be installed. See Figure 8. (Circuit pack #1 and circuit pack #2 MUST be installed in the opposite direction from circuit pack #3 and circuit pack #4, resulting in a back-to-back placement of circuit pack #2 and circuit pack #3.)

A Slot Location Label is placed around the housing card-edge connectors showing the proper orientation of the circuit packs.

Labels affixed inside the repeater housings provide wiring connection information for each type of repeater.

The Test Access Card, shipped with each Housing, may be used to assist with installing and troubleshooting T400 and T200 circuits and removed for future use. Refer to the Test Access Card I/M Practice (61244065L1-5) for more details.

Refer to Table A for Repeater Housing Capacity Specifications. Heat dissipation from the circuit packs AND the collection of heat from solar loading must be considered to avoid overheating conditions inside the Environmental Housings.

- (2) Open the support case cover by pulling the spring-loaded plunger.
- (3) Remove the shipping supports from the card guides.

CAUTION

Handle the circuit packs ONLY by the front panel handle. Sharp pins are exposed on both the front and back sides of the circuit pack so care must be taken during installation and maintenance of the circuit packs.

- (4) Insert each circuit pack (aligning the goldfingers on each circuit pack with the connector inside the circuit pack support structure) in a slot that is wired.
- (5) Close the support case cover.
- (6) Verify that the spring-loaded plunger snaps into place.

F. Place the Dome on the Base

- (1) Verify that the O-ring is properly placed around the base and is free of debris before replacing the dome.



Figure 7. Hang Clamp over the Bracket

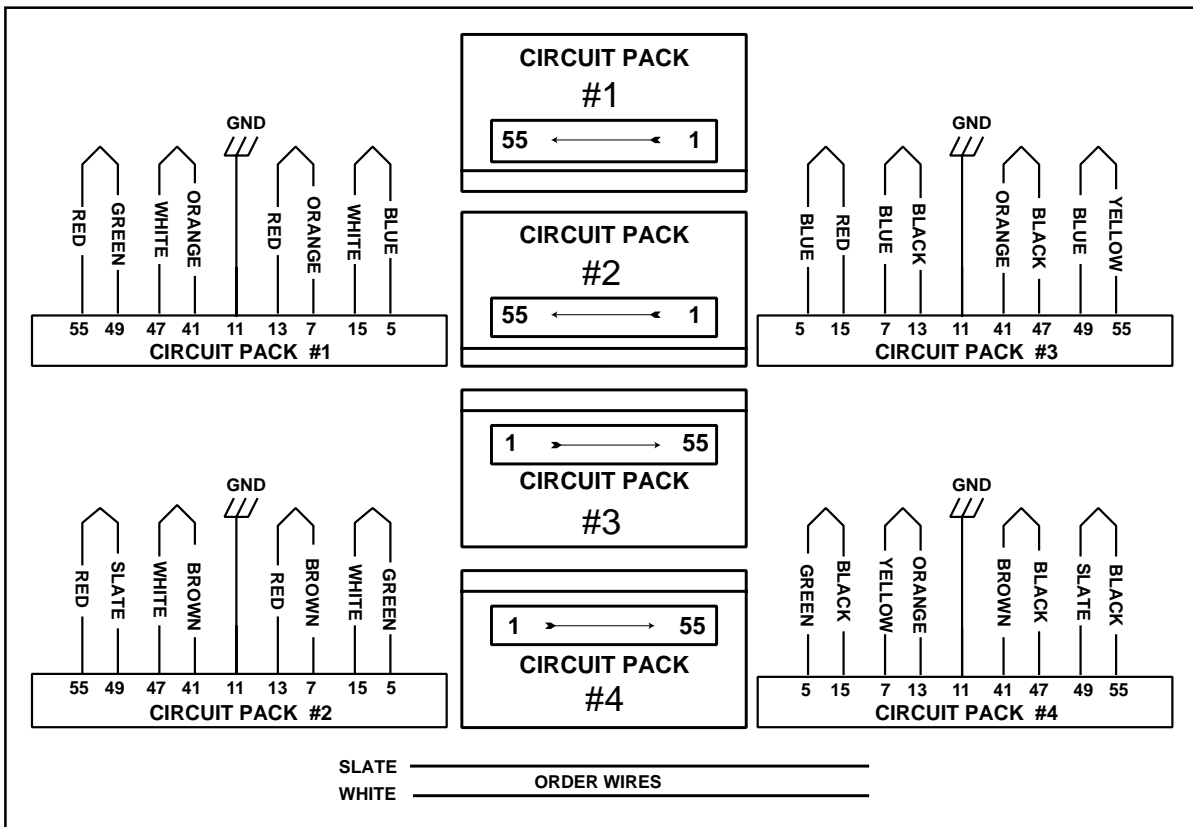


Figure 8. Support Case Cover Label

- (2) Place the dome on the base.
- (3) To ensure the air-tight seal provided by the O-ring, ADTRAN recommends that when opening the housing for other maintenance, the O-ring be replaced if it has not been replaced in the last three months.

G. Place the Clamp over the Dome and Base

- (1) When properly positioned, the dome should seat evenly around the base, and the warning tag should hang from a hole on the bottom of the clamp.
- (2) Put the T-bolt inside the catch. Hand-tighten the T-bar clockwise until the clamp is secure.
- (3) Secure the tamper-resistant security screw, if necessary. Tighten to 10 in-lbs.
- (4) Install a customer-supplied lock on the bottom of the clamp, if desired.

H. Pressurize the Repeater Housing

- (1) ADTRAN recommends pressurizing the housings with nitrogen.
- (2) To locally pressurize the Repeater Housing, connect a portable tank to the fill valve.
- (3) To remotely pressurize the Repeater Housing (through the cable), turn the needle valve *On* (turning counter-clockwise) by hand. (Only the air housing, List 1, may be pressurized remotely.)
- (4) Pressurize to approximately 9 P.S.I.G.
- (5) Check for pressure leaks using a soapy-water solution.
- (6) Repeat instructions C through H (except for instruction E) if a leak is detected around the clamp area.

CAUTION

Always verify that the security box cover and order-wire terminal covers are in place after installing or maintaining housings; see Figure 3. If a manhole becomes flooded with the security box and order-wire terminal covers off, the order-wire terminals may short circuit.

I. Replace Security Box Cover

- (1) Verify that the attached security box gasket, the two air -passage holes on the cover, and the security box are free of debris before replacing the security box cover. See Figure 3.
- (2) Replace the security-box cover by matching the notched corner of the cover and the box.
- (3) Tighten the security-box cover bolt using a 7/16-inch nut driver. Tighten from 20 to 30 in-lbs. **DO NOT OVERTIGHTEN.**

3. MAINTENANCE

The Repeater Housing contains surge arrestors which may be replaced in the field, if needed. See the subsection entitled “**Replacement of Surge Arrestors**” for instructions on replacing surge arrestors. To ensure the air-tight seal provided by the O-ring, ADTRAN recommends that when opening the housing for other maintenance, the O-ring be replaced if it has not been replaced in the last three months.

For quick reference to proper tightening, see Table C.

Table C. Quick Reference for Proper Tightening

| Part | Torque |
|---------------------------------------|--------------------------|
| Tamper-Resistant Security Screw | 10 in-lbs. |
| Security Box Cover Bolt | 20-30 in-lbs. |
| Mounting Bracket Bolts | 30-40 in-lbs. |
| Ground Stud | 20-30 in-lbs. |
| Clamp T-Bar | hand-tighten only |

The dome and clamp may be replaced in the field if they become damaged. See Table D for part numbers.

Table D. Replacement Parts

| Description | Part Number |
|--------------------------------------|-------------|
| Dome w/o handle | 3294.064@ |
| Dome with handle | 3294.132@ |
| Clamp | 3293.010@ |
| Clamp T-Bar | 3290.0010@ |
| Clamp T-Bolt | 3276.00075@ |
| O-ring | 3273.004 |
| Gas Tube* Surge Arrestor | 3186.001 |
| Gas Tube Insert / Extract Tool | 3269.042 |
| T400 Test Access Card | 1244.065L1 |

*Each Housing contains 16 Gas Tubes

Replacement of Surge Arrestors

NOTE

Electrical shock can occur if modification or surge arrestor replacement is attempted before removing the powering modules.

If lightning is the suspected cause of circuit pack failure, ADTRAN recommends replacing all surge arrestors within the Repeater Housing. Figure 9 shows the surge arrestors on the bottom of the circuit pack support structure.

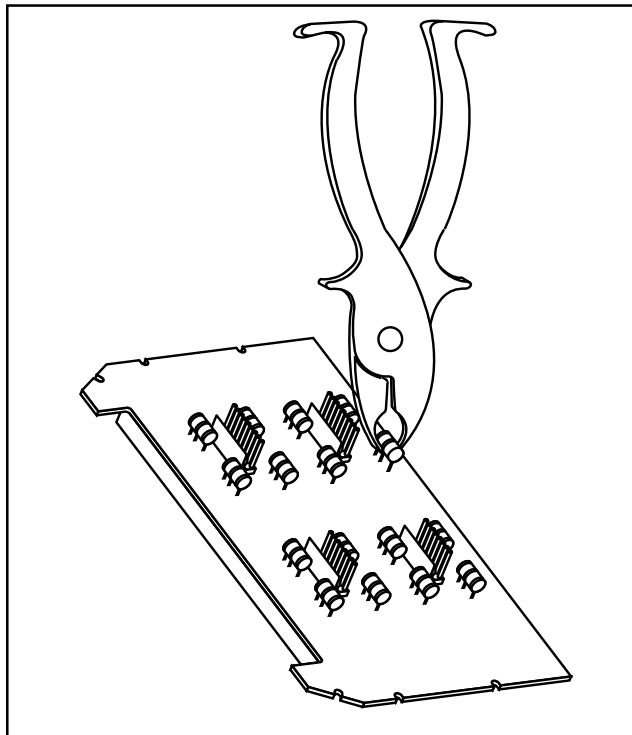


Figure 9. Replacing Surge Arrestors

To Replace Surge Arrestors:

- A. Unseat and tag the appropriate powering modules (located in the central office) before replacing surge arrestors inside the Repeater Housing. This removes power from the wires and pins. The tag should read, "Do not insert. Field work in process."
- B. Release pressure in the Repeater Housing by depressing the needle in the fill valve; see the subsection entitled "**Installation,**" instruction C, and Figure 3.
- C. After cleaning debris from the dome and clamp, remove the clamp and dome; see the subsection entitled "**Installation,**" instruction D.
- D. Release the case support by turning the fastener counter-clockwise and tilt the circuit pack support structure to expose the surge arrestors on the bottom. List 1 and List 2 Repeater Housings contain 16 surge arrestors.
- E. Grasp one surge arrestor and remove it using the Insertion/Extraction Tool; see Figure 9.
- F. Place a replacement surge arrestor in the same position.
- G. Replace the remaining surge arrestors in the same manner.
- H. Close the circuit pack support structure; secure by turning the fastener clockwise.
- I. Reseat the tagged powering modules at the central office.
- J. Perform circuit tests to verify proper circuit operation.
- K. Remove the tags on the powering modules.
- L. Replace the O-ring if it has not been replaced within the last three months.
- M. Reattach the dome and locking clamp then repressurize the Repeater Housing. See the subsection entitled "**Installation,**" instructions F through I.

4. WARRANTY AND CUSTOMER SERVICE

ADTRAN will replace or repair this product within five years from the date of shipment if it does not meet its published specifications or fails while in service (see ADTRAN Equipment Warranty, Repair, and Return Policy and Procedure).

Return Material Authorization (RMA) is required prior to returning equipment to ADTRAN.

For service, RMA requests, or further information, contact one of the following numbers.

ADTRAN Customer Service:

ADTRAN Telco Technical Support . (800) 726-8663
Standard support hours Monday-Friday
7 a.m. - 7 p.m. CST
Emergency support 7 days/week, 24 hours/day
Sales (800) 827-0807
Customer and Product Support (256) 963-8722

Repair and Return Address:

ADTRAN, Inc.
Customer and Product Support (CAPS) Department
901 Explorer Boulevard
Huntsville, Alabama 35806-2807