



**TV LOW POWER
ANTENNA
INSTRUCTION MANUAL**

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Warnings:

The purchaser is responsible for determining if the support structure, pole, tower or mast will safely handle the antenna system.

For reliable, moisture free operation, maintain 5 psig of dry air or dry nitrogen to the antenna system at all times. Failure to keep the transmission line and antenna pressurized with dry air or nitrogen may allow moisture into the system can cause arcing and physical destruction of the coaxial system. The damage degrades the performance and eventually failure of the antenna. Failure or reduced performance of the antenna due to moisture in the system is not manufacture warranted.

This antenna system, when energized by a RF transmitter, will present a high intensity R.F. field. Care must be adhered not to touch the antenna system when energized. Personnel should not be in the aperture of the antenna while the antenna system is energized. All maintenance or repairs should be done with the primary voltage to the transmitter disconnected and all transmitter remote controls disabled.

Return Policy

When returning any material to the factory, be sure to call your sales representative or customer service support and obtain a material return authorization (MRA) number first. Use this number in all correspondence. Material may be refused and sent back at customer expense without a MRA.

Factory Tests

The antenna has been completely assembled and tested at the factory. Each antenna system has been tuned to the required frequency.

Each antenna section is internally matched and requires no tuning after installation. The total input VSWR of the antenna is measured on a tuning rack and is tuned to be 1.1:1 or better within the specified TV channel.

Each section is pressure tested to 15 psig at assembly.

Antenna Description

Dielectrics TLP Antenna is comprised of one or more eight-layer antenna section(s). Each section has vertical rows of horizontally or circularly polarized slots and directors mounted along the cylinder. The antenna sections are made of aluminum outers and copper inners along with stainless steel hardware and slot covers. These antennas are designed to be corrosion resistant and maintenance free. Adjustments and/or tuning are not necessary.

Uncrating

Prior to opening any crate(s) or removing strapping from skids, inspect for shipping damage. Notify the *carrier* immediately of any observed damage to the crate.

Note: TLP-8: The antenna single section is shipped under pressure and should remain so until installation.

TLP-16,-24,-32: The two, three, or four antenna sections and feed lines are shipped under pressure and should remain so until installation.

Open each crate and verify contents against packing list. If any parts are missing notify Dielectric Communications immediately. Inspect contents for possible shipping damage.

Note: If any parts are found damaged, *promptly notify the carrier*. Shipping crates may be used to return damaged parts.

Antenna Sections

Antenna sections are crated individually fully assembled, with hardware and O-rings.

Transmission Line, Power Divider & Feed Lines

Transmission lines may be crated with one or more sections per box. Feed lines are coiled in a separate crate.

Power dividers and feed lines (TLP-16,-24,-32) were match marked so that the antenna system will perform as tuned by the factory.

Where applicable, elbows and transmission line(s) for an elbow complex may be matched marked.

Note: Discoloration on transmission line exterior surface is normal and was caused by handling and exposure to the elements during tuning.

Mounts

Mounts may be crated on a pallet or in a box. Verify quantities and check for damage prior to removal.

Assembly/Installation

Notes:

1. Input section-Power Divider:

There is a transmission line (Input) section that is bolted onto the power divider. Do not remove the inner conductor from the outer of the input feed line. This inner conductor is usually slugged during the tuning process of the antenna. If the inner conductor is moved, it will affect the performance of the antenna.

2. O-ring Installation:

All flange joints are provided with black “Buna” O-ring seals. Ensure that all seal grooves are free of debris. Apply a light coat of the provided non-melting silicon dielectric lubricant (Dow Corning no. 4 compound) to the O-rings at time of assembly. The lubricant will aid in holding the O-ring in the seal groove. Always be sure the lubricant is applied very lightly. If applied too freely, so it does not get onto contact surfaces.

Also to prevent arcing and air leaks, ensure not to pinch an O-ring between the flange contact surfaces.

Sufficient quantities of O-rings and silicon dielectric lubricant are supplied.

3. Inner Conductor Connections:

While assembling and installing the antenna, care must be exercised when inserting the inner conductor connector (i.e. bullet) into a mating coaxial inner conductor. While engaging, the connector should be aligned perfectly with the mating inner conductor to prevent damage to connector.

4. Section Sequence Numbers (TLP-16,-24,-32):

If the antenna has more than one section note that the sections are not the same. The antenna sections are numbered in sequence from bottom to top, (i.e. number one is located in the bottom position). **Each section, elbow, feed line section and power divider output port are match marked.** Assembly by the number sequence ensures that the antenna system will be assembled as tuned by the factory. Reference the Installation Drawing.

5. Hardware:

Feed line hardware supplied is stainless steel. Mounting hardware may be either stainless steel or galvanized steel. Sufficient quantities are included.

Cautions

- ◆ Never climb on the antenna directors or antenna supports.
- ◆ Do not use any gas stop on the antenna. The antenna is internally pressure sealed and should be kept under pressure at all times after installation.
- ◆ Before and during installation, the antenna and feed lines should always be sealed against rain or moisture condensation.
- ◆ Do not alter the length of any feed line from the power divider to the antenna section(s).
- ◆ Connect feed lines only to their assigned (match marked) antenna sections.
- ◆ Never bend the 7/8" feed lines tighter than a ten (10) inch radius.
- ◆ Never bend the 1 5/8" feed lines tighter than a twenty (20) inch radius.
- ◆ Spacing between antenna sections should be set as specified.
- ◆ Antenna sections are not the same, do not interchange the sections from their designated order.

A. TLP-8 Assembly and Orientation

1. Assemble mounts. (Reference Universal Mount drawing in the information folder)
2. Locate and install antenna to supporting structure per Installation Drawing.

Note: If an azimuth pattern optimization and custom mounts were purchased then see the Installation Drawing for orientation with tower.

3. Remove the gas cap from the input section and connect the transmission line.

B. TLP-16, -24 & -32 Assembly and Orientation

1. Assemble mounts. (Reference Universal Mount drawing in the information folder)

For reference locate and mark the center of radiation on the tower.

2. Raise the top antenna section (i.e., highest number) and locate from the center of radiation (Reference Installation Drawing).
3. Fasten mounts to tower and orient antenna per Installation Drawing.

Note: If an azimuth pattern optimization and custom mounts were purchased then see the Installation Drawing for orientation with tower.

4. Repeat for the remaining section(s).
5. Clamp the saddle mount to the power divider and mount on the tower central to the antenna array.
6. Release the pressure and remove the gas cap from the section and the corresponding cap on the power divider. Then connect the feed line matched marked for that section.

Note: To ensure antenna performance the correct feed line must be connected to the correct section and power divider output port. Observe the match marking on sections, feed lines and power divider.

7. Repeat step 5 until all the feed lines are installed.
8. Remove the gas cap from the input section of the power divider and connect the transmission line.
9. After the feed lines have been connected, fasten the rest of the line within the supporting structure to eliminate damage. Use the “wrap-lock” clamps to fasten the lines to the tower legs, diagonals, and horizontals or support mast.

C. Leak Testing

After the antenna is installed and all transmission lines are connected, check the system for leaks.

1. Pressure the system using dry nitrogen or air from a compressor-dehydrator.

CAUTION

Using an air supply other than specified for transmission line, may contaminate the transmission line system.

Note: Make sure a good quality gauge is used which read accurately in the 1-20 psig (140 KPa) range, do not depend on the cylinder regulator gauge.

2. Pressurize the system to 6 psig.
3. Close the shutoff valve.
4. Give the system approximately one half hour to stabilize, and then record the pressure and the temperature.
5. Wait twenty-four hours, and then read the pressure and the temperature again. Use the following formula to obtain a corrected pressure for comparison:

$$PC=(PR+14.7)(T1+460)/(T2+460)-14.7$$

PC=corrected final pressure, psig
 PR=final pressure as read, psig
 T1=beginning temperature, degrees F
 T2=final temperature, degrees F

Note: A rule of thumb is that the final pressure should not be less than half the initial pressure after twenty-four hours.

6. If the system loses pressure at an unacceptably high rate, re-pressurize.
7. Leave the gas/air supply on and find the leak(s) using a “leak detector” or bubble soap.

Should it be necessary to identify a leak, use non-ammonia based leak detection soap, such as *Snoop*, by Swagelok. If unavailable use a simple mixture of dish detergent and water. Ammonia and ammonia-based chemicals are extremely incompatible with brass and brass is one of the main components in transmission line and antenna systems. Ammonia makes the brass more susceptible to stress-corrosion cracking.

8. Correct any leaks that are found.
9. Repeat steps 2 thru 5.

D. Purging System

The transmission line and the antenna system should be purged prior to applying power.

1. Purge by pressurizing the antenna array to about 10 psi (70 kPa) with compressed dehydrated air or cylinder nitrogen
2. Loosen the connection between the transmission line and input section to power divider just enough to allow an air leak.
3. Purge using table below.

Note: Usually allow three volume changes of dry gas/air for a system. See table below for approximate volumes inside various coax sizes.

VOLUME OF COAX PER
1000 FEET OF LENGTH

| Diameter | Volume |
|----------|-------------|
| 1-5/8” | 13 cu. ft. |
| 3-1/8” | 50 cu. ft. |
| 4-1/16” | 90 cu. ft. |
| 6-1/8” | 200 cu. ft. |

One full nitrogen cylinder, size K, contains about 240 cubic feet of gas.

For systems pressurized via dehydrator compressor the time required will depend on pressure maintained and dehydrator compressor capacity.

4. Tighten the connection and check for leaks when purging has been completed.

E. Pressurized System

After system purge, reduce the supply pressure to about approximately 5 psig (35 KPa). After the pressure has stabilized, regularly note the cylinder pressure or dehydrator compressor running time as an indicator of large leaks. Pressure observation is especially important immediately after installation or any subsequent opening and re-assembly.

F. Pre-Operation Inspection

Before powering the system perform the following inspection;

1. Antenna system has been installed per the installation drawing(s).
2. The system is gas tight and purged.
3. If an antenna checkout was ordered, a Dielectric Representative will give approval to apply power.

Operation

To start up apply transmitter signal. *Do not* exceed the rated power rating for the antenna.

For best performance and reliability from the Dielectric antenna follow the “Maintenance” section of this manual.

Maintenance

Inspection:

The transmission line and antenna system should be inspected once a year, as a matter of routine maintenance. The inspection can be made in conjunction with maintenance on the tower and servicing of obstruction lighting. This requires the service of a qualified TV tower maintenance crew.

Check transmission lines for breaks, loose or missing hardware, chafing and so forth. The transmission line itself should be visually checked for signs of changed alignment, undue stressing and loose coupling clamps and hardware.

Inspect the antenna mounting hardware for tightness.

Observe the dry nitrogen gas/dehydrated-compressor air usage as an indication for system leaks.

Note: Whenever the system has been open for repair purge with dry nitrogen gas or dehydrated-compressor air as described in section E of the Installation instructions. Never operate the system under power until all moisture has been purged. Otherwise permanent damage may occur to the entire system, including the transmitter and transmission line.

ILLUSTRATIONS

Installation Drawing (See Information Folder)

Universal Mount Drawing (See Information Folder)

Optional Ice shield drawing (See Information Folder)

Torque Specification

REVISIONS

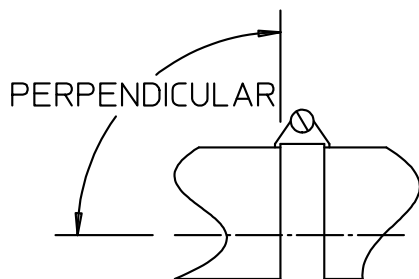
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|-----|-------------|------|----------|
| SYM | DESCRIPTION | DATE | APPROVED |
|-----|-------------|------|----------|

HARDWARE TORQUE SPECIFICATIONS

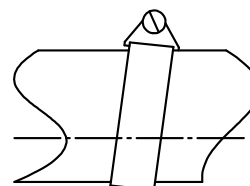
| HARDWARE DESCRIPTION | RECOMMENDED TORQUE | |
|----------------------|------------------------|------------------------|
| | MATERIAL 18-8 SST. | MATERIAL CS. GRADE 5 |
| 1/4-20 | 70 IN/LB | 96 IN/LB |
| 5/16-18 | 130 IN/LB | 204 IN/LB |
| 3/8-16 | 210 IN/LB | 360 IN/LB = 30 FT/LB |
| 1/2-13 | 480 IN/LB = 40FT/LB | 900 IN/LB = 75 FT/LB |
| 5/8-11 | 1080 IN/LB = 90 FT/LB | 1800 IN/LB = 150 FT/LB |
| 3/4-10 | 1440 IN/LB = 120 FT/LB | 260 FT/LB |
| 1-8 | 285 FT/LB | 640 FT/LB |
| 1 1/8-7 | 413 FT/LB | 800 FT/LB |
| 1 1/4-7 | 523 FT/LB | 1120 FT/LB |
| 1 3/8-6 | 688 FT/LB | 1460 FT/LB |
| 1 1/2-6 | 888 FT/LB | 1940 FT/LB |
| HOSE CLAMPS | 40 - 50 IN/LB | - |

NOTE:

HOSE CLAMPS MUST BE ORIENTED PERPENDICULAR TO THE AXIS OF THE OBJECT ON WHICH THEY ARE TO BE MOUNTED.
(HOSE CLAMP BAND, FLAT ON THE OBJECT SURFACE)




GOOD



NOT GOOD

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|---|--------------------------|--|-------|-----------|
| DIMENSIONAL TOLERANCES (UNLESS OTHERWISE NOTED) 4 PLACE DIMENSIONS ± .0005 3 PLACE DIMENSIONS ± .005 2 PLACE DIMENSIONS ± .02 ANGULAR DIMENSIONS ± 0°-30' REFERENCE DIMENSIONS ARE NOT FOR MANUFACTURING OR INSPECTION USE WORKMANSHIP STDS DWG. No. D78691 | PART NO: |  Dielectric A Unit of SPX Corporation | | |
| | MATERIAL: | TITLE | | |
| DATE STAMP 6-Oct-1999 11:18:53 A88212 | FINISH: | DIELECTRIC TORQUE SPECIFICATIONS | | |
| DATE: 9-30-99 DR. BY: M. DAVISON CHKD BY: LDW ENG/MFG APPVL: CNP | CODE IDENT. NO. 08441 | A | 88212 | REV: - |