



**TFU-TYPE SIDE MOUNTED
PYLON ANTENNAS
INSTRUCTION MANUAL**

Dielectric LLC
22 Tower Road
Raymond, ME 04071
Phone: 800.341.9678

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WARNINGS

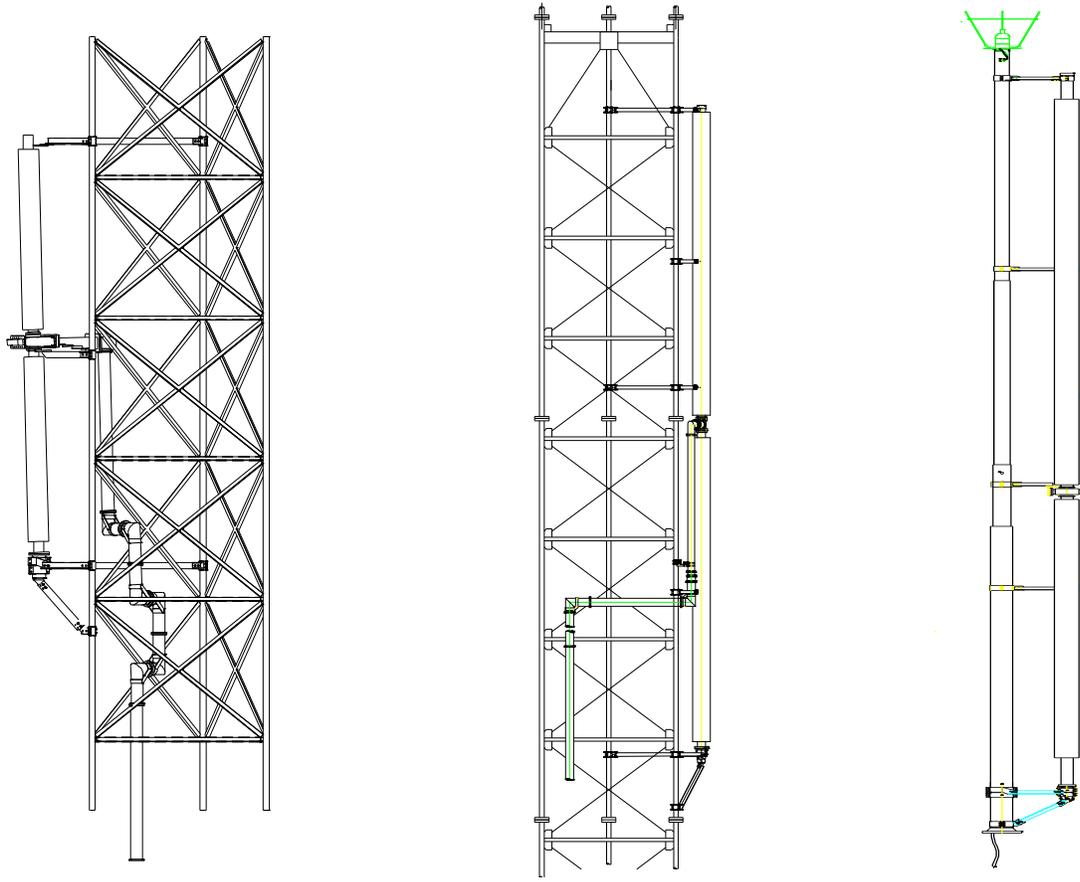
FAILURE TO COMPLY WITH THESE INSTRUCTIONS MAY RESULT IN A SERIOUS ACCIDENT.

- NEVER CLIMB OR WORK ON THE ANTENNA WHILE RF POWER IS BEING FED TO IT. WHEN WORKING ON THE ANTENNA ARRANGEMENTS SHOULD BE MADE WHICH WILL GUARANTEE THAT RF POWER WILL NOT BE APPLIED WITHOUT SPECIFIC INSTRUCTIONS FROM PERSONNEL ON THE TOWER.
- THE ANTENNA IS A COMPLEX ELECTRICAL DEVICE THAT HAS BEEN BUILT IN ACCORDANCE WITH STRICT TOLERANCES AND QUALITY CONTROL. PLEASE HANDLE IT WITH CARE.
- CAUTION: Under no conditions should the spoke short bolts or the spoke short locking plate bolts to be loosened! Do not paint the bottom of the base flange at the tee contact surface!
- PLEASE HEED ALL WARNING LABELS ATTACHED TO THE ANTENNA.

Introduction

Many issues need to be considered during the planning, purchase and installation of a new Dielectric TFU UHF television antenna. The purpose of this book is to assist the station with the final phase of their project; the delivery, inspection, assembly, and installation of their antenna. The general features of the Dielectric type TFU UHF Pylon television side mounted antennas are discussed herein as well as proper installation, handling, and storage procedures. It is essential for the customer and their representatives to become familiar with this information.

Each TFU antenna is designed to meet the requirements of a particular installation therefore exact dimensions are not provided in this book. Drawings containing dimensional specifications and other pertinent data are furnished with the antenna. These drawings should be referred to during assembly, erection and testing. Please contact Dielectric if questions arise.



Waveguide Input Antenna
Side Mounted On Tower
1(a)

Coax Input Antenna
Side Mounted On Tower
1(b)

Pole Mounted Antenna
Mounted On Tower Top
1(c)

Figure 1
Antenna Configurations

DESCRIPTION

General

Dielectric side mounted UHF Pylon Television Antennas (TFU) consist of slotted aluminum pipes with diameters and wall thickness of proper size to provide the specified electrical and mechanical requirements. These antennas are supplied in one of three basic forms. Figure 1 (a) shows a typical waveguide input antenna installation, Figure 1 (b) a typical coax input antenna and Figure 1 (c) shows an antenna side mounted on a pole for tower top installation. Slot

arrangements on each form vary widely as to number of slot layers and number of slots per layer depending on the type of radiation pattern desired.

Dielectric may or may not supply mounting brackets. Order must indicate mounting brackets, otherwise none will be supplied.

The gas stops on all configurations is located at the input of the tee allowing for pressurization up to the antenna.

Equipment for Installation

Dielectric side mounted TFU Antennas, as supplied, require minimal assembly at the tower site.

Standard mechanics tools will be required for any field assembly of the antenna. Special tools will be supplied if they are required. The assembly prior to lifting may include re-assembly of the antenna halves (see page 8). Antennas equipped with a radome may have some of the radome panels removed for shipping. These will need to be re-installed either prior to, or after, erecting the antenna.

The structural bolts, nuts and lockwashers required to connect the support pole to the tower top are supplied with the antenna.

Delivery and Storage

The side mounted TFU antennas are typically shipped on shipping deck saddles or blocks on a flat bed trailer. In Figure 2 a typical pole mounted antenna is shown ready for delivery. The antenna and trestles are strapped to the bed of the trailer while spare parts and other accessories are packed in cartons and shipped with the antenna. One of the boxes contains a shipping list and information to be used during installation of the antenna. The shipping trestles are not returnable and can be used for temporary storage of the antenna.

To store the antenna a space on level ground large enough to accommodate the antenna should be prepared. No parts of the antenna should be in contact with the ground during storage. The antenna should be protected, kept clean and dry.



Figure 2
Antenna Loaded on a Truck

Inspection

On arrival, the antenna should be inspected and checked for any damage resulting from shipping or handling. Examine the contents of all cartons. Check that the number of items agrees with the quantities shown on the bill of lading and shipping list. After checking, replace all parts in their respective cartons until ready for use. Be careful not to lose or destroy any identifying tags attached to the various parts or items. Parts removed to facilitate the shipping are located in the cartons and can be installed prior to or after installation. If any parts for which spares are not supplied are found to be damaged or missing advise Dielectric.

ANTENNA UNLOADING AND ASSEMBLY

Appropriate equipment should be used to safely unload and handle the antenna, components and cartons. For weight of the antenna refer to the stamped nameplate at the antenna base or the antenna's mechanical specification sheet.

As shown on Figure 3, each antenna has lifting lugs for handling and installation. The antenna has one main lug used for lifting the antenna to the tower top and two horizontal handling lugs. Care must be exercised when removing the antenna from the trailer to avoid crushing any parts such as vertical dipoles, radomes, trim strips or slot covers.

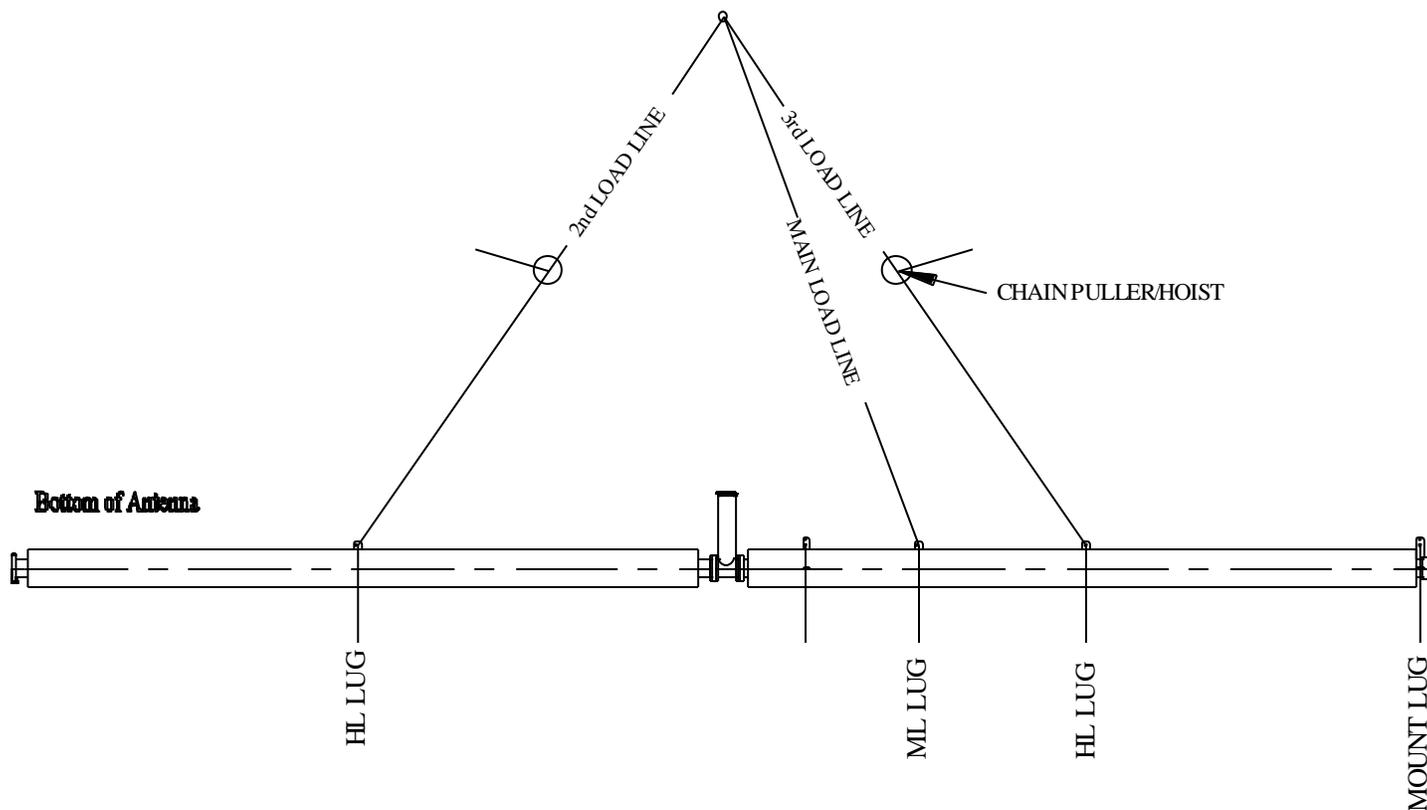


Figure 3
Unloading Detail

ML = Main Lifting Lug
HL = Horizontal Lifting Lug

Assembly

Assembly of Center Fed Tee Antenna

These instructions apply only to antennas shipped in two sections; they also should be used for reference if antenna must be taken apart in the field. Refer to the following two figures for details.

1. Extreme care should be exercised when handling each section to avoid damage to the flange mating surfaces, inner conductor connectors, radome and related components. The antenna is a complex electrical device that has been built in accordance with strict tolerances and quality control. Please handle it with care.

2. Remove the two sections of the antenna from the truck and position them end-to-end horizontally, keeping them as straight and leveled as possible; use blocks and saddles as necessary.

Orient the two sections by aligning the match-marks on the flanges. Looking from the top of the antenna, down towards the base, the match mark on the top section should be kept slightly

counter-clockwise from its matching mark on the TEE until step 4. Gently remove the shipping protection materials from the antenna sections.

3. Reach up into the bottom of the top section. Gently pull the top section inner conductor out until it comes to a stop. It may be necessary to remove the top weather cap of the top section and push the inner as it may move with considerable resistance; its travel is limited by a stop located inside the top of the antenna. Temporarily place the large aluminum spacer around the extended inner conductor. Align the connector of the top section with the inner conductor of the tee; push the two together until the female tube rests against the shoulder of the male connector. Lock the joint by tightening the three set-screws that are visible on the outside of the female portion of the connector. Use a 3/16 inch Allen® wrench.

4. Gently slide the outer conductors of the two sections together, holding the aluminum spacer against one of the flanges. As the sections come together, be careful to maintain alignment between the antenna section and the tee; if they are not directly in line, the tee inner may be damaged. Align the entire match mark; the tube of the top section must be aligned with the top section swivel flange, rotate the swivel flange as necessary. Avoid rotating the top section tube counter-clockwise as viewed looking down from the top section. All components must be aligned for the antenna to be correct. A scribe line in the middle of the match mark should be used for the final alignment. Refer to the similar markings between the Tee and the bottom section. Install the mounting lug and all the flange hardware checking that the appropriate lengths are used in the appropriate places. Tighten hardware to the torque listed on Dielectric specification A88212 in Appendix 3.

5. Once assembled on the ground, the antenna may be lifted as one unit to its position on the tower by following the lifting instructions detailed later .

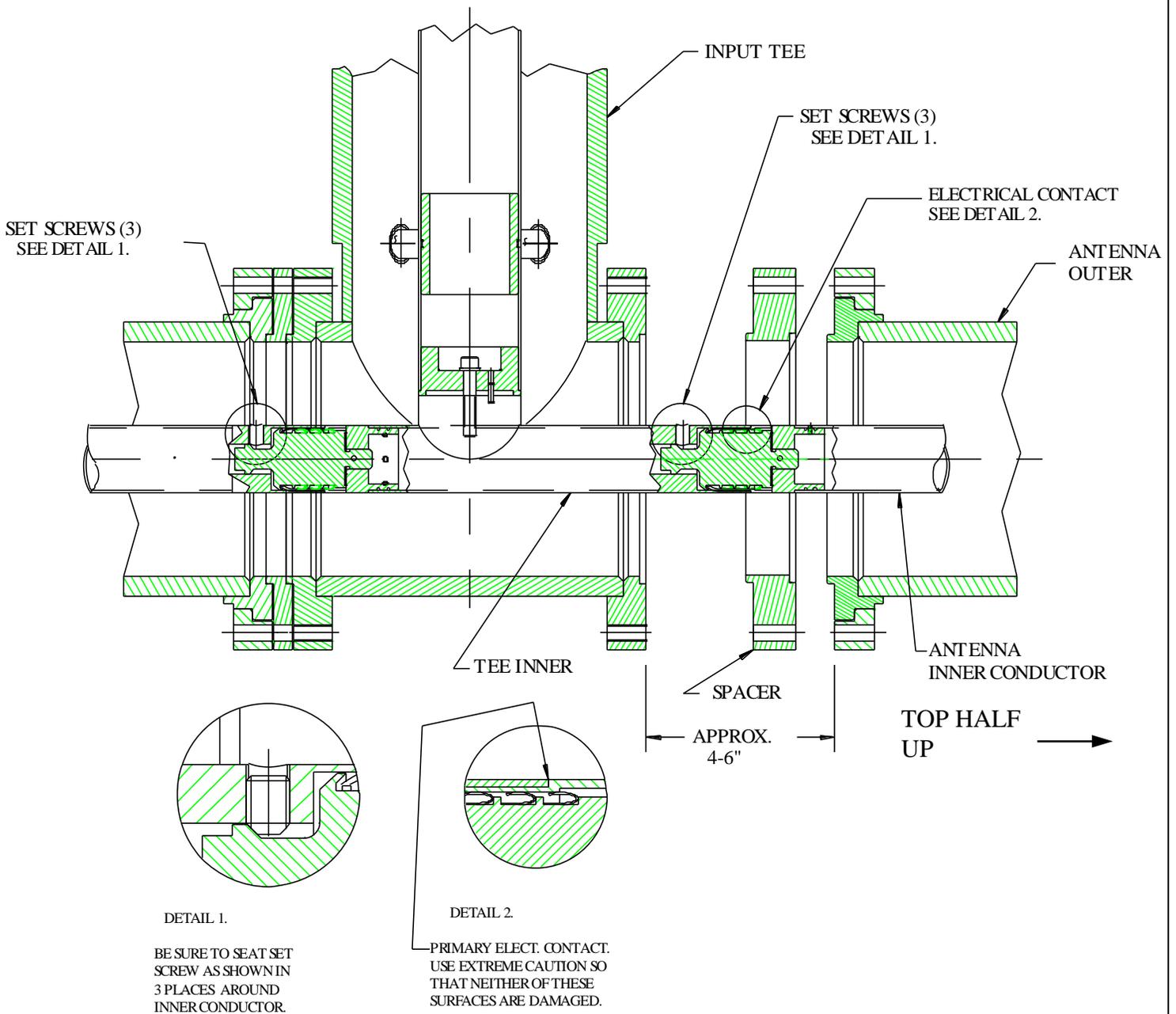
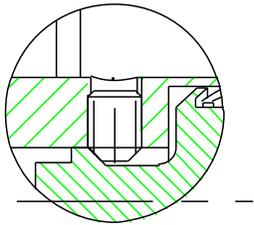
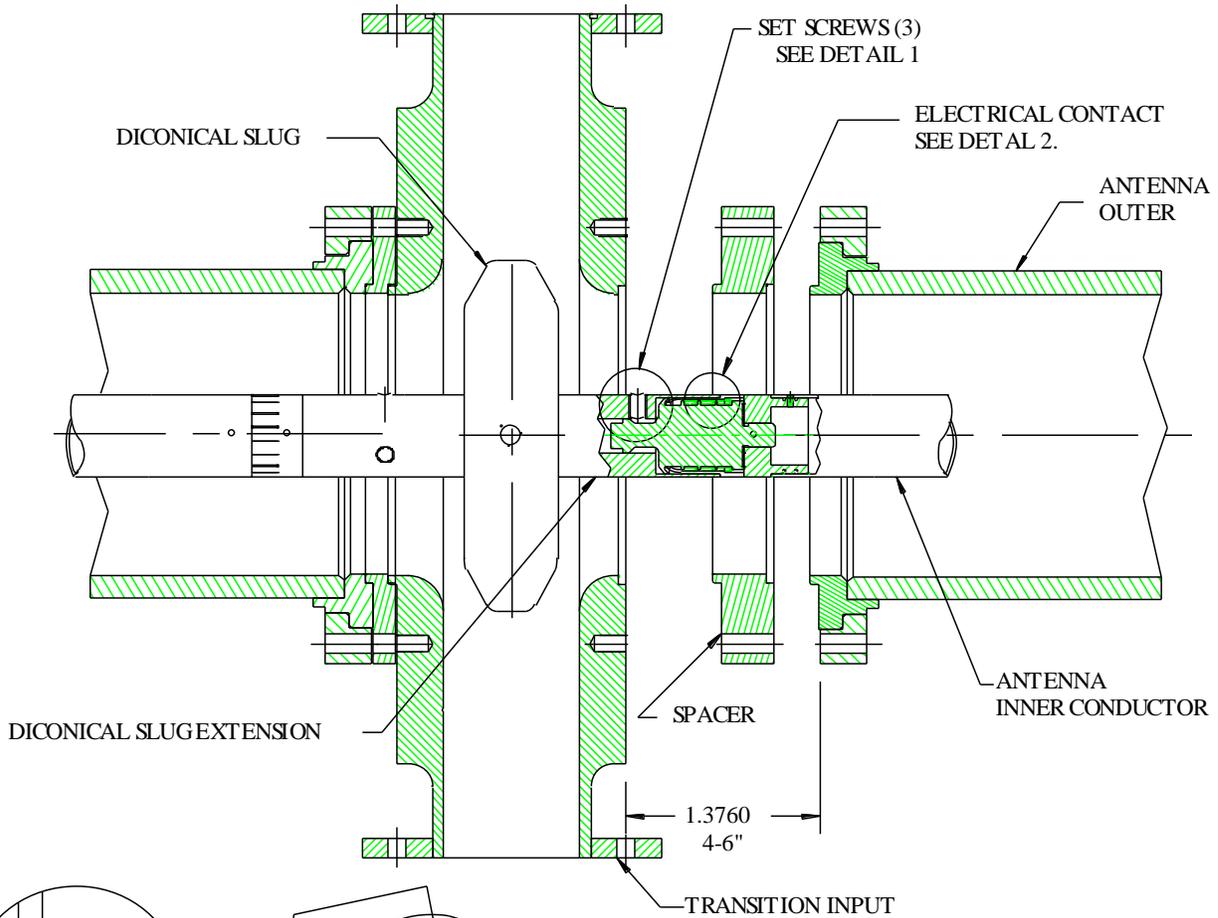
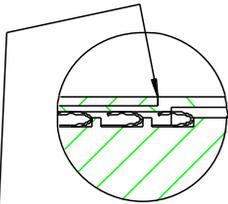


Figure 4
Coax Input Tee



DETAIL 1.

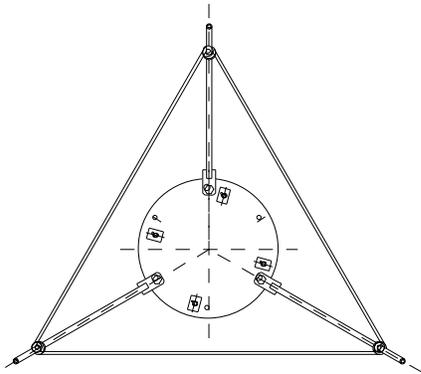
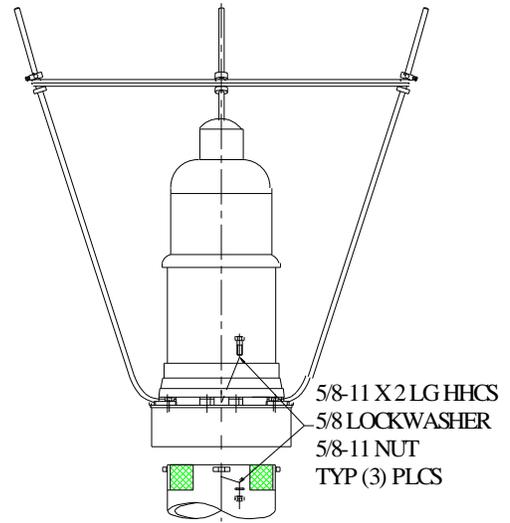
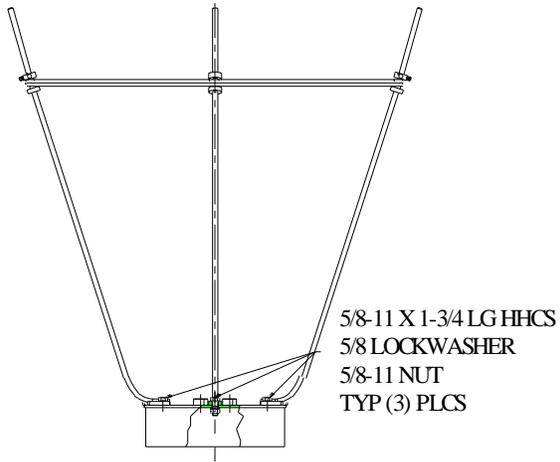
BE SURE TO SEAT SET SCREW AS SHOWN IN 3 PLACES AROUND INNER CONDUCTOR.



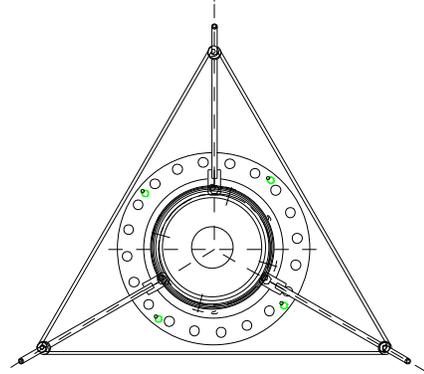
DETAIL 2.

PRIMARY ELECT. CONTACT. USE EXTREME CAUTION SO THAT NEITHER OF THESE SURFACES ARE DAMAGED.

Figure 5
Waveguide Input Tee



(a)
LIGHTNING
ARRESTER ASSEMBLY



(b)
LIGHTNING
ARRESTER ASSEMBLY
TO POLE

Figure 6
Lightning Protector Assembly
For Support Pole Assemblies Only

Lightning Protector Assembly and Mounting. (if a support pole is used)

For poles 9-5/8 inch diameter and greater, a top cap cover with six equally spaced clearance holes for 5/8 inch diameter bolts and three threaded holes for mounting the beacon light is supplied. Use an alternate three of the clearance holes to mount the vertical lightning rods using the 1-3/4 inch long bolts, nuts and lock washers as shown in Figure 6. Install the sleeve assemblies and tie rods and check all bolts for tightness.

For poles 8-5/8 inch diameter and less the top cap cover will have threaded holes for mounting the vertical supports and the beacon. Three 5/8 inch diameter bolt clearance holes are also provided to mount the assembly to the lug on the pole. Use bolts and lock washers to attach the vertical supports then install the sleeve assemblies and tie rods and check all bolts for tightness.

Attach the lightning protector assembly to the three lugs at the top of the pole using 2 inch long, 5/8 inch diameter bolts, lock washers and nuts.

Pole Step Installation. (if a support pole is used)

Pole steps may have been removed for shipping purposes. There are two common sizes of galvanized steel pole steps used by Dielectric. These are $\phi 1-1/8$ and $\phi 5/8$ inch. In rare cases when extra length is required a $\phi 1-3/8$ in size may be used. The pole steps thread directly into the pole and are locked into place with a jam nut. The jam nut is supplied on the pole step. Refer to other pole steps as a guide for proper installation.

Fin Installation

Pattern shaping fins are common on many directional antennas. Not all antennas have fins. Fins may be removed for shipping purposes. Refer to the adjacent fins already installed on the pole for their correct location and orientation. Dielectric pattern shapers are typically made up of two pieces; a 1/2 inch thick base, and a 1/8 inch thick fin. The fin and base are supplied fully assembled. The assembly is attached to the pole using the 1/4-20 SCHS supplied. It is important to verify that the pattern shaper is seated properly. A 3/16 inch Allen® wrench will necessary for assembly. Refer to Dielectric Torque Specifications A88212 for proper assembly torque, in Appendix 3.

Dipole Installation

Dipoles are surface mounted electrical elements used to customize the polarity of the antenna signal. These are often referred to as “Z” dipoles as a portion of the element parallel to the surface of the pole usually has a z shape. Dipoles are located over the slots. Please refer to the other dipoles attached to the pole surface as a guide for proper installation. The dipole is attached to the pole surface with two #10-32 SHCS. These should be torqued to 50 inch-lbs. The hardware is provided with the dipole.

Radome Installation:

Layers of radome panels and radome studs may have been removed for shipping purposes. A 9/16 and 7/16 inch wrench will be required for assembly. Radome studs are fastened to the antenna pole with 3/8-16 threaded rod protruding from the stud. The removed radome studs are labeled and shipped together. The radome studs should be started by hand and then tightened to a snug tight condition with a strap wrench. Caution, over tightening can cause damage to the

stud or the antenna pole. The length of the radome studs may vary around the circumference of the pole. Refer to the adjacent antenna studs as a reference for the proper locations.

Radome panels are formed as half cylinders from lightweight .094 inch thick Lexan®. Along one vertical edge of a panel there are slotted clearance holes and along the opposite edge there are ¼-20 cinch nuts. Cinch nuts are preinstalled threaded inserts. In each panel there are cut outs for pole steps and for attachment to the radome studs. The layers of panels are installed in two halves. It is usually best to install one panel at a time. Refer to the panels that have already been installed as guide. Be sure that any missing pole steps and Lexan® pole step sealing washers have been installed before installing the panel. The circumferential location of the vertical seams can be located by looking at the adjacent panels. Each panel shingles (1.75 inch) up under the layer above and (1.75inch) over the panel below to produce a weather tight seal. Attach the panel to the radome stud using the ¼-20 bolt with lock washer and Lexan® washer provided. The halves are fastened together along the vertical seam using the ¼-20 bolt, lock washer, and Lexan® washer provided.

FINAL PRE-INSTALLATION PROCEDURES

Top Mounted Obstruction Light (Beacon or Strobe, If a support pole is used)

Orient the beacon/strobe light housing such that the hinge will be on the side opposite the pole steps. This will make servicing the light more convenient. Use the bolts provided to attach the light housing to the tapped holes in the top cover of the pole. Trim excess cable prior to connecting the light. **Lights should be installed and the wiring checked before raising the antenna.**

On flashing red obstruction light systems (red beacon), the power cable is factory installed in the support pole. Typical installations consist of the cable passing through a cord grip and into the support pole. The cable must then pass through a hole in the center of the tower top.

On high intensity flashing white obstruction light systems (strobe), the power cable is **not** provided by Dielectric. Most strobe manufacturers cables will pass through the factory-installed fittings/conduit on the support pole. This cable must be less than 3/4 inch in diameter. Again, typical installations consist of the cable passing through a cord grip and into the support pole. The cable must then pass through a hole in the center of the tower top.

On dual lighting systems two cables can be supplied. Exact requirements of the lighting system must be communicated to Dielectric at the time of order to assure that the support pole is supplied with the necessary components. Some systems require a single cable, while others require two.

Inspection of Antenna Components

Check the tower top plate to be sure that it has been properly oriented and has the proper drilling for attachment of the support pole base flange.

Check that the proper tower top mounting bolts, hard washers and nuts are on hand.

Verify proper orientation of the antenna on directional antenna installations. The orientation is critical with respect to the tower top (pole mounted antenna) or to tower legs (side mounted). Prior to lifting the antenna, refer to antenna orientation sketch in the shipping documents. This document in combination with the supplied installation drawing should clarify all questions regarding antenna orientation. If there are any questions contact Dielectric.

All radomes should be inspected for cracks incurred from tower site handling and alignment. Make sure all mounting hardware is installed and tight on any radome panels removed for shipping.

In the event that there is a problem with any of the above please contact Dielectric.

ANTENNA INSTALLATION

General

- No additional weight should be attached to the antenna during lifting without prior written approval from Dielectric.
- Be sure that the bolts attaching the antenna halves to the input tee are tightened per Dielectric Specification A88212.
- Do not support the weight of the antenna by a single Horizontal Lifting Lug.
- Only qualified crews should attempt to lift and erect the antenna.
- Lifting method shown is suggested to minimize bending of the antenna. Alternate rigging may achieve desired results. Contact Dielectric if there is a question on the proper lifting method.
- This document is not a substitute for experienced and properly trained rigging crews. If rigging or installation methods are in question, Dielectric must be notified.

Lifting Antenna

Rig the antenna as shown in Figure 3. Lift the antenna, maintaining a horizontal attitude. Slowly relax the line that supports the bottom half from the chain puller/hoist. This line will support the antenna until it has reached an angle of approximately 60 degrees (See Figure 7). After the load has been relaxed from the top and bottom support line, the antenna is ready to be raised to its mounting spot on the tower.

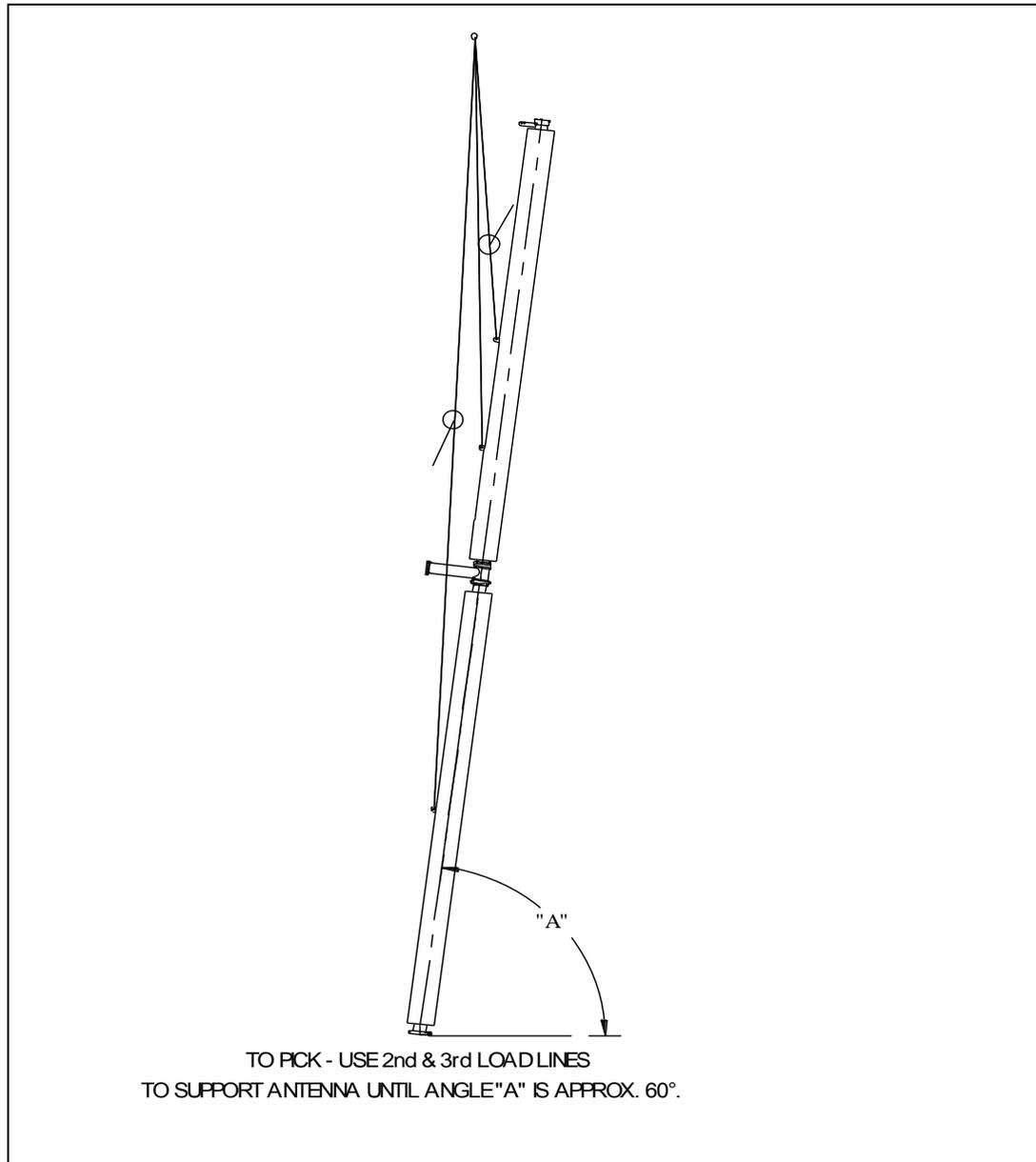


Figure 7

Top Mounted Support Pole

Place the base flange of the support at the desired orientation and install the mounting bolts, hard washers and nuts. Recheck antenna orientation prior to lowering the gin pole. Lower the gin pole below the antenna aperture for antenna system tests.

Bolt installation and tightening procedures are based on AISC's (American Institute of Steel Construction), *Specification for Structural Joints Using ASTM A325 or A490 Bolts*. Summary of the "Turn of the Nut" method is on drawing number A-89251 in Appendix 2. Other acceptable methods are available in AISC's specification.

After the tower is de-rigged, the guy wires tensioned and the tower plumbed, recheck the plumbness of the antenna and make corrections using shims provided with the antenna. Follow the antenna plumbing specifications on drawing number A-78014 in Appendix 1.

The antenna system should be closed and pressurized as soon as possible after installation to prevent moisture from entering the system. The system should be purged a few times to expel any moist air trapped inside.

Side Mounted Antenna - Dielectric Supplied Mounts

Refer to the assembly or installation drawing for details regarding placement of components. Dielectric recommends organizing the components from the shipping container(s) in a manner to match the drawing.

- Follow General Instructions for antenna handling.
- All hardware must be tightened in accordance with Dielectric Specification A88212.

Side Mounted Antenna - Mounts Supplied by Others

Refer to your antenna mount manufacturers details for details regarding placement of components.

- Follow General Instructions for antenna handling.
- Hardware at the antenna and mount interfaces must be tightened in accordance with Dielectric Specification A88212.

FINAL TEST

Dielectric personnel or a Dielectric representative will test the antenna and the antenna system. The representative will verify that the system meets specifications and review this data with the customer. Power should not be applied to the system until after review of the test data and acceptance by Dielectric and the customer. It is recommended that power be applied gradually to avoid damage in case a potential fault has not been identified during tests.

MAINTENNANCE

The antenna and transmission lines do not require any periodic maintenance; however they **should be inspected annually**. Inspection should include visual inspection of the slot covers or radomes. The hardware should be checked for looseness. In an area of extreme weather conditions the antenna and transmission line should be inspected more often. It is a good practice to inspect the system soon after extreme weather conditions.

If the antenna has to be repainted do not paint the slot covers or radome.

Replacement parts for Dielectric TFU Antennas may be purchased through your Dielectric Sales representative.

ADDRESS:

Dielectric

22 Tower Road
Raymond, ME 04071
(207) 655-8100
(800) 341-9678
Fax: (207) 655-8173
www.Dielectric.com

APPENDIX 1

Plumbness Specification

REVISIONS		
SYM	DESCRIPTION	DATE
	- REDRAWN ON CAD MAC	01/11

SPECIFICATION FOR PLUMBNESS OF ERECTED ANTENNA

- A. Consult customer to determine if mechanical tilt is required.
- B. At erection the antenna should be checked for plumbness under no-sun and no-wind conditions.
- C. Readings are to be taken from two locations 90° apart.
- D. The antenna must be plumbed so that the top is within 1.0" of vertical (with no mechanical tilt). Shims should be placed at the base of antenna between the tower top and the antenna base flange.

Do not place any shims between mating flanges of the sections of multiple-section antennas.
- E. Triangular stainless steel shims are provided in four thickness (.016", .025", .050", and .125") Select combinations of shims to fit snugly between the tower top plate and the antenna base flange.
- F. Install shims of appropriate thickness at every space between flange bolts that is .016" and larger. This is most important, as damaging bending stresses could be induced in the base flange if it is insufficiently supported.
- G. When mechanical tilt is required calculate antenna top offset from vertical as (ant. length) X sin(tilt).

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APPENDIX 2

REVISIONS		
SYM	DESCRIPTION	DATE
	REDRAWN ON CAD NEW DRAWING NUMBER ASSIGNED SEE VOID FILE A8000403	MAC 01/14

INSTALLATION OF ANTENNA MOUNTING BOLTS.

1 - Antenna mounting bolts & studs shall be tightened to provide, when all fasteners in the joint are tight, at least the minimum bolt tension show in the table below.

BOLT SIZE (IN.)	MINIMUM BOLT TENSION (LB.)
1 1/8	56,500
1 1/4	71,700
1 3/8	85,500
1 1/2	104,000

2 - The turn of the nut method is to be used to provide the above tension. There shall first be enough bolts brought to a "snug tight" condition to insure that the parts of the joint are properly compacted, i.e., brought into full contact with each other. Snug tight shall be defined as the full effort of a man using an ordinary spud wrench. Following the initial step, bolts shall be placed in any remaining holes in the connection & brought to snug tightness. Then a chalk mark is to be made to reference the bolt head positions on the flange or tower top. All bolts in the joint shall then be tightened additionally by 1/2 turn or more. Be sure to check the chalk marks to insure that all bolts have been properly tightened. (See note #1)

Note#1 - Final 1/2 turn can be achieved by extending spud wrench length using a long piece of pipe or by pounding on the end of the wrench handle.

Note#2 - Lubricate galvanized bolt threads with one of the following: 1.- Never-Seeze 2.- Oil or 3.- Grease.

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APPENDIX 3

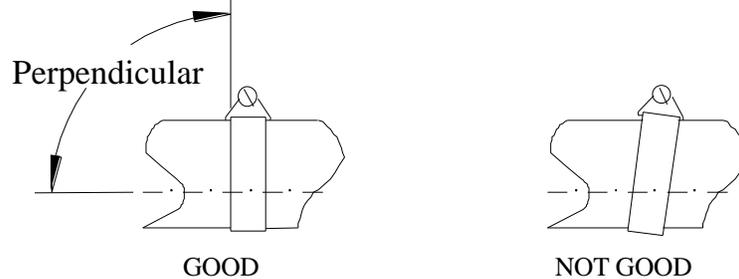
Hose Clamp and Stainless Steel Bolt Installation Specification

REVISIONS			
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)



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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:	 A Unit of SPX Corporation DIELECTRIC TORQUE SPECIFICATIONS		
	MATERIAL:			
DATE STAMP 6-Oct-1999 11:18:53 A88212	FINISH:			
	DATE: 9-30-99 DR. BY: M. DAVISON CHKD BY: LDW ENG/MFG APPVL: CNP	CODE IDENT. NO. 08441	A	88212
				REV: -