Broadcast Equipment

Instructions

Type BFC-B Series Circularly Polarized FM Antenna

Communications Systems Division Front and Cooper Streets Camden, New Jersey, U.S.A., 08102
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TECHNICAL DATA

Electrical Specifications

Frequency Range	Factory tuned to any channel in the 88 to 108 MHz band
Polarization	Circular, clockwise
Power Gain (over dipole)	
Horizontal Polarization	Approximately equal to half the number of sections stacked (See Table 1)
Vertical Polarization	Approximately equal to half the number of sections stacked (See Table 1)
Azimuthal Pattern	
Horizontal Polarization	Circularity ± 1.0 dB in free space
Vertical Polarization	Circularity ± 1.0 dB in free space
VSWR at input (without field trimming)	
Top Mounting	1.2:1 or better
Side Mounting	1.5:1 or better
VSWR at input (with field trimming)	
Top or Side Mounting	1.1:1 or better can be achieved over entire 200 kHz channel
Input Connection	3 1/8 in., 50 ohm EIA flange (unless otherwise specified)
Power Input Rating	See Table 1
Deicer	3 volts @ 250 A (per section)

Mechanical Specifications

Windload Rating	50 psf for flat surfaces: 33 psf for cylindrical surfaces (based on extreme velocity of 110 mph.) (See Table 1 for specific antenna windloads.)
Section Dimensions	
Height	20 in (cm)
Diameter	20.7 in (cm)
Feed Point	
BFC-1B through BFC-7B	Approximately 13 ft. below bottom radiator
BFC-8B through BFC-16B	Center-fed Feed point approximately 15 ft. below center

TECHNICAL DATA (Cont.)

Approximate Weight (lbs)*

Type	Less Deicers	With Deicers	With Radome
BFC-1B	76	136	118
BFC-2B	137	257	221
BFC-3B	198	378	334
BFC-4B	259	499	427
BFC-5B	320	620	530
BFC-6B	381	741	633
BFC-7B	442	862	736
BFC-8B	513	993	849
BFC-10B	635	1235	1055
BFC-12B	757	1477	1261
BFC-14B	879	1719	1467
BFC-16B	1001	1961	1673

*Weight includes BFC Elements, Feed System to Input and Mounting Brackets (13 in. to 18. in. extension).

EQUIPMENT SUPPLIED

Type BFC Circularly Polarized FM Antenna with standard support brackets for mounting on conventional towers (specify tower type or furnish tower drawings).

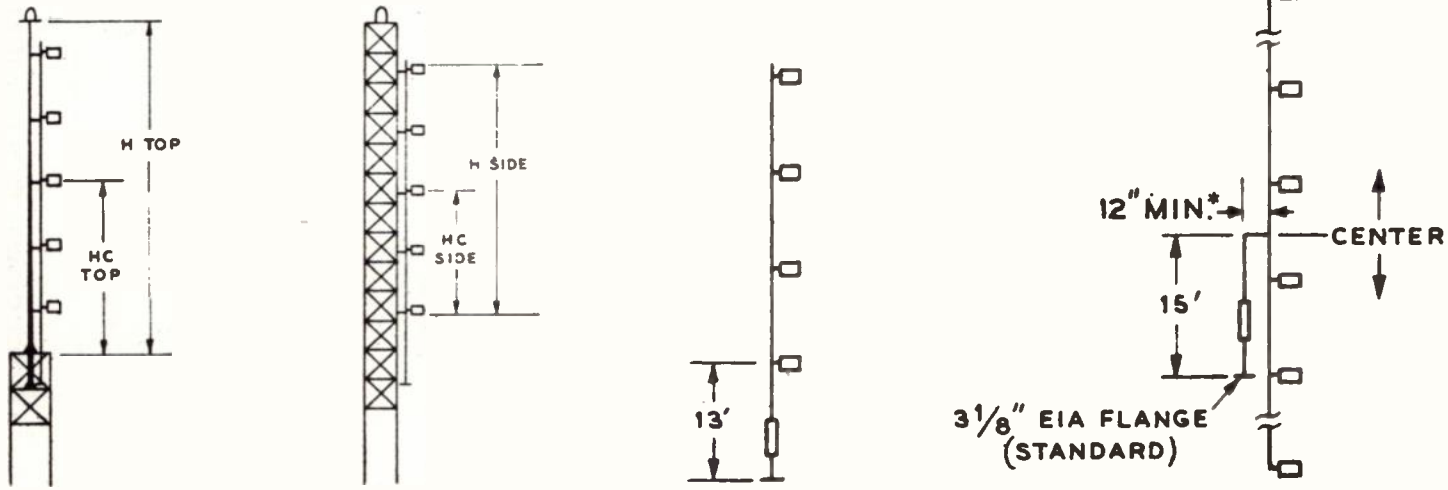
Order by stock number as follows:

	Less Deicers	With Deicers	With Radome
BFC-1B, single section FM antenna	ES-561921-A	ES-561921-B	ES-561921-C
BFC-2B, two-section FM antenna	ES-561922-A	ES-561922-B	ES-561922-C
BFC-3B, three-section FM antenna	ES-561923-A	ES-561923-B	ES-561923-C
BFC-4B, four-section FM antenna	ES-561924-A	ES-561924-B	ES-561924-C
BFC-5B, five-section FM antenna	ES-561925-A	ES-561925-B	ES-561925-C
BFC-6B, six-section FM antenna	ES-561926-A	ES-561926-B	ES-561926-C
BFC-7B, seven-section FM antenna	ES-561927-A	ES-561927-B	ES-561927-C
BFC-8B, eight-section FM antenna	ES-561928-A	ES-561928-B	ES-561928-C
BFC-10B, ten-section FM antenna	ES-561929-A	ES-561929-B	ES-561929-C
BFC-12B, twelve-section FM antenna	ES-561930-A	ES-561930-B	ES-561930-C
BFC-14B, fourteen-section FM antenna	ES-561931-A	ES-561931-B	ES-561931-C
BFC-16B, sixteen-section FM antenna	ES-561932-A	ES-561932-B	ES-561932-C

ACCESSORY EQUIPMENT

Automatic Sleet Melter Control Unit	MI-27369
BAF-15A Iso-couper (1 5/8 in. line) 10 kW	MI-561573
BAF-16A Iso-coupler (3 1/8 in. line) 40 kW	MI-561574

(See Table on opposite page)



Pole Mounting | Side Mounting | End Feed 1-7 Sections | Center Feed 8-16 Sections

Figure 1– Mounting Dimensions and Feed Line Locations

TABLE 1. SPECIFICATIONS

ELECTRICAL DATA												MECHANICAL DATA							
RCA Type	Gain[5]						Power Rating[2]					Dimension in Feet					Windload at 50/33 PSF		
	Horizontal Polarization			Vertical Polarization			Field Intensity[1]	With Radomes		Without Radomes		Freq.[3] MHz	Hc Top	Hc Side	H Top	H Side	Less De-Icers	With De-Icers	With Radomes
	Power	dB	Field	Power	dB	Field		kW	dBk	kW	dBk								
BFC-1B	0.46	−3.37	0.678	0.46	−3.37	0.678	93.2	10.0	10.0	4.0	6.02	88	5.0	0.8	8.0	1.7	178	198	332
												98	5.0	0.8	8.0	1.7	178	198	332
												108	5.0	0.8	8.0	1.7	178	198	332
BFC-2B	1.0	0	1.0	1.0	0	1.0	137.5	20.0	13.01	8.0	9.03	88	10.6	6.4	19.2	12.8	337	377	645
												98	10.0	5.8	19.2	11.7	327	367	635
												108	9.5	5.4	18.0	10.8	319	359	627
BFC-3B	1.5	1.76	1.23	1.5	1.76	1.23	168.4	30.0	14.77	12.0	10.79	88	16.2	11.9	30.4	23.9	495	555	957
												98	15.0	10.9	28.9	21.8	475	535	937
												108	14.1	9.9	27.5	19.9	459	519	921
BFC-4B	2.1	3.22	1.45	2.1	3.22	1.45	199.2	40.0	16.02	16.0	12.04	88	21.7	17.6	41.5	35.2	653	723	1269
												98	20.0	15.9	38.4	31.8	623	703	1239
												108	18.6	14.5	36.8	29.0	599	679	1215
BFC-5B	2.7	4.31	1.64	2.7	4.31	1.64	225.2	40.0	16.02	20.0	13.01	88	27.3	23.2	52.7	46.4	810	911	1581
												98	25.0	20.9	49.4	41.8	791	871	1541
												108	23.2	19.0	46.1	38.1	763	839	1510
BFC-6B	3.2	5.05	1.79	3.2	5.05	1.79	246.0	40.0	16.02	24.0	13.80	88	32.9	28.8	63.9	57.6	970	1090	1874
												98	30.0	25.4	59.3	50.9	920	1040	1824
												108	27.7	23.6	54.9	47.2	882	1000	1784
BFC-7B	3.8	5.80	1.95	3.8	5.80	1.95	268.0	40.0	16.02	28.0	14.47	88	38.5	34.3	75.0	68.7	1128	1268	2183
												98	35.1	30.9	68.7	61.9	1068	1208	2123
												108	32.3	28.1	64.2	56.3	1020	1160	2075
BFC-8B	4.3	6.34	2.07	4.3	6.34	2.07	285.2	40.0	16.02	32.0	15.05	88	44.0	40.0	86.2	80.0	1308	1468	2514
												98	40.1	35.9	78.9	71.9	1238	1398	2454
												108	36.8	32.7	73.2	65.4	1182	1342	2390
BFC-10B	5.5	7.40	2.35	5.5	7.40	2.35	322.4	40.0	16.02	40.0	16.02	88	55.2	51.1	108.6	102.2	1625	1875	3165
												98	50.1	46.0	98.6	92.0	1535	1735	3075
												108	45.9	41.8	91.2	83.7	1483	1663	3003
BFC-12B	6.6	8.20	2.57	6.6	8.20	2.57	353.2	40.0	16.02	40.0	16.02	88	66.4	62.3	131.0	124.7	1942	2182	3790
												98	60.1	56.0	119.8	112.1	1832	2072	3680
												108	55.0	51.0	109.6	101.9	1744	1984	3592
BFC-14B	7.8	8.92	2.79	7.8	8.92	2.79	383.9	40.0	16.02	40.0	16.02	88		73.5		147.0	2258	2538	4414
												98	4	66.1	4	132.2	2128	2408	4284
												108		60.0		120.1	2088	2304	4244
BFC-16B	8.9	9.49	2.98	8.9	9.49	2.98	410.2	40.0	16.02	40.0	16.02	88		84.7		169.4	2575	2895	5039
												98	4	76.1	4	152.3	2425	2745	4889
												108		69.1		138.3	2206	2625	4669

[1] Effective free space field intensity at one mile in mV/m for one kilowatt antenna input power for either equivalent horizontally polarized component or equivalent vertically polarized component.
[2] Based on a 40° C. ambient. Multiply values by 0.8 for 50° C. ambient. BFC-5B and larger antennas with higher power input ratings can be made available on application.
[3] Interpolate for in-between frequencies.
[4] Pole mounting not recommended for BFC-14B and BFC-16B Antennas.
[5] ERP for each polarization is equal to gain per polarization times total input power.

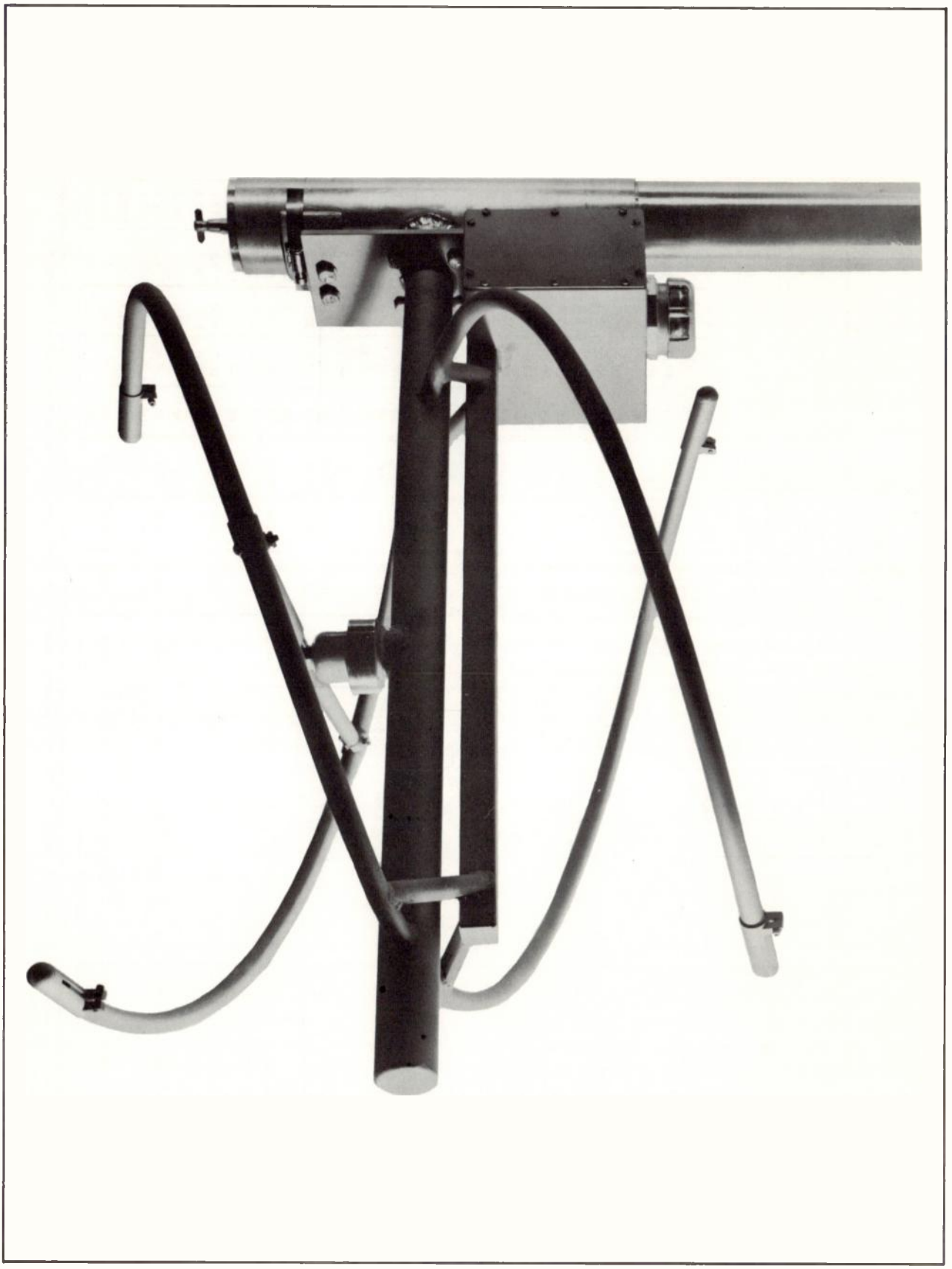


Figure 2—BFC FM Antenna Element

APPLICATION

The RCA BFC Series of Circularly Polarized FM Antennas is designed for use in monaural, stereo and multiplex FM broadcast service. These antennas have a low standing wave ratio over a 200 kHz channel, which provides optimum conditions for stereo or multiplex operation.

The BFC Antenna radiates a circularly polarized wave intended to improve reception in FM automobile radios employing vertical whip antennas and in home receivers with built-in or "line cord" antennas. The BFC Antenna has an advantage over those using separate radiators for each polarization, consisting of lower windload and weight, reduced complexity, and simpler installation.

The antenna features sectional construction and therefore can be supplied with as many sections as are required for a given application. The antennas are designated BFC-1B, BFC-2B, BFC-3B, etc., depending on the number of stacked sections required. Since it provides circular polarization the power gain in either the horizontally polarized plane or the vertically polarized plane is approximately equal to the number of sections divided by two (the number of equivalent planes of polarization). Thus, in comparison with antennas using only horizontal polarization the transmitter power can be doubled without exceeding the licensed horizontal effective radiated power since the additional power is radiated in other planes of polarization. An external power splitter is not required.

The mechanical simplicity and low weight of the BFC Antenna permits quick and easy installation on the side of an existing tower, or pole mounting on top of towers or buildings. The antenna is designed for rugged service in all types of weather conditions, and will withstand wind velocities up to 110 miles per hour. Radiating elements are made of durable stainless steel that eliminates electrolysis and corrosion when bolted to the copper feed system. Mounting brackets for standard or conventional installations are supplied with antennas at no extra cost. Custom brackets can be supplied at extra cost for special or unusual types of installations. The antenna can be supplied with standard poles using a guide flange and pole socket mounts. Antennas are available with deicers or radomes, either of which is strongly recommended for most areas, especially where icing and sleet conditions are common. The MI-27369 Automatic Sleet Melter Control is an accessory and is recommended when automatic control of the deicers is desired.

DESCRIPTION

Each section of the RCA Type BFC Circularly Polarized FM Antenna consists essentially of two helical radiators in intersecting planes attached to a supporting frame and a section of 3 1/8-inch transmission line. Sections are interconnected by appropriate lengths of transmission line. The antenna input is provided with a 50-ohm EIA flange for connection to the transmission line from the transmitter. Adaptors are available for other transmission line types and sizes. Standard antennas have power gains of approximately 0.5 to 8.0, depending on the number of sections. An adjustable transformer section is provided near the input fitting. In standard and multiplexing operations, a voltage standing wave ratio of 1.1 to 1 can be achieved with a minimum of field trimming. All BFC Antennas are supplied factory tuned to any channel in the frequency range of 88 to 108 megahertz.

The free space azimuthal radiation pattern of the BFC Antenna is circular ± 1.0 dB for both the horizontal and vertical polarizations. The deviation from a circular pattern when mounted on a pole, or side mounted on a tower, depends primarily on the type and size of the supporting structure. It also depends on the frequency of operation and whether the antenna is mounted on a corner or a face. Additional factors are the proximity of the radiators to tower members and the quantity of other items in the tower. If the antenna is mounted on a guyed structure, it should be located so that the distance from the nearest guy which passes through the aperture to the nearest radiator is at least 20 feet. Where this is not possible the guys in the immediate area of the antenna should be broken by insulators every 3½ feet for a distance of at least 14 feet. In addition, each guy in the vicinity of the antenna should be insulated at the point where it connects to the tower.

With radomes on the radiators, power handling of the BFC Antenna is 10 kW for a single section antenna, and up to 40 kW for a 12 section antenna. Antennas with higher power handling capability can be obtained on special order. Without radomes the rating is 4.0 kW per bay.

Mechanically, each section consists of two helical radiators in intersecting planes mounted on a short horizontal section of 1 5/8-inch transmission line fitted with an insulated central feed point and supported from the 3-1/8-inch feed system. Only one coaxial transmission line feeds all elements of the antenna, and the individual radiating elements are identical mechanically and electrically. From this line the radiators are shunt fed by modified sections of RCA 3 1/8-inch rigid coaxial transmission line, which also provides mechanical support. The BFC-1B through BFC-7B Antennas terminate mechanically in a pressurized top cap with bleed valve and a bottom input flange for connection to the desired type of transmission line. The BFC-8B through BFC-16B Antennas are center fed through a matching tee and the bottom and top radiators terminate mechanically in pressurized caps.

Each element may be equipped with internally mounted heating units (deicers). In areas where icing conditions can occur, even though very rarely, it is strongly recommended that either deicing equipment or radomes be ordered. Deicers and radomes are installed at the factory and should be ordered with the antennas. Deicers cannot be added to existing radiators. If radomes are applied after the original installation, a re-adjustment of the variable transformers may be necessary to regain the optimum VSWR match.

INSTALLATION

UNPACKING

As soon as received the material should be checked against the packing list and examined for shipping damage so that any necessary claims may be immediately filed with the shipping company. All packing material should be removed. Be careful to preserve the installation instructions enclosed. Handling of the radiators with bare hands or oily gloves should be avoided. Oil or grease on the radiators will nullify the effects of the surface finish. (If accidentally contacted, the soiled part may be cleaned with Chlorothene, white gasoline, or any completely volatile solvent.) Care exercised at this time will insure best operation during rain and fog.

WARNING

NEVER CLIMB OR WORK ON THE ANTENNA WHILE RF POWER IS BEING FED TO IT. FAILURE TO COMPLY MAY RESULT IN A SERIOUS (POSSIBLY FATAL) ACCIDENT.

Installing the Feed Line to the Antenna

The feed line sections should be laid out side by side, and the mounting brackets attached, in accordance with the installation drawing shipped with the antenna. The mounting flanges for the radiator bays are covered with special caps to prevent entrance of water or dirt during shipment and installation. Do not remove these caps until the feed line has been installed and the radiators are ready for mounting. The entire feed line should be hoisted into position on the tower or mast and anchored in place without the radiators, as described in the following paragraphs.

The top and bottom feed line sections are different from the center ones, as can be seen from the installation drawing. Ordinarily there is no particular order of installation for the center sections, which are all identical. In special antennas where the sections must be installed in a particular order, they are numbered and the numbers are called for on the installation drawing.

Whether all the mounting brackets are identical will depend on whether the diameter of the mast or tower leg is uniform or tapered, since the mast end of the brackets is contoured to fit the supporting element. The feedline end of the bracket is curved to fit the *heavy* wall section of line on which the radiators are mounted. Two hose clamps are provided to mount the feed line to each bracket and two heavier special clamps or clamp castings secure the bracket to the mast or tower leg. Thus, behind each radiator there is one bracket, two mast clamps or casting clamps and two feed line clamps. Occasionally a bracket must be displaced to clear a

tower leg flange, gusset, etc. This will be shown on the installation drawing. The installation drawing also provides other necessary information, such as distance from tower top to top bay, location of special transmission line elbows, and location of the deicer harness.

Hoist the top most feed line section to a vertical position with enough clearance from the ground to allow the next section to be added. The feed line joints are supplied with the O-ring in place, coated with silicone grease for ease in joining, and covered with masking tape to exclude dirt. The flanges are brought together, the lower section rotated to align the axes of the radiator mounts, and a Marman V clamp drawn around them to secure the joint. Any rotational alignment errors remaining in the feed line section can be removed after mounting on the tower.

The entire feed line, less the transformer, is assembled in this manner in a vertical position and hoisted into place as one unit. The deicer harness may be mounted to the feed line at this time, or after the feed line is installed, making sure the harness cable is taped to the feed line at close intervals.

If wind conditions are such that the entire feed line cannot be raised as one unit, each section may be hoisted into place separately with mounting brackets attached, and the joints made up as the sections go into place.

Mounting the Radiators

The radiators should not be installed until the feed line is completely mounted. The ease with which the bays can be mounted makes this entirely feasible.

An inner conductor connector must be inserted into the rear of the radiator.

The bays are raised one at a time to their positions, the feedline sealing plastic protectors removed, the O-ring set in place with silicone grease or gasket cement. Secure the radiator bays to the line sections with 4 hexagon bolts and lock washers, and the hose clamp around the saddle (curved section). Care should be exercised in making this joint to see that the O-ring is not pinched.

Make sure that none of the radiators are mounted upside down (with end seal pointing down) as this would make the radiation out of phase with respect to the other radiators.

The sealing caps should be preserved, since, should the radiator become damaged in service, it may be removed, the mounting joint sealed again with a cap, and the antenna operated without the damaged radiator, while the latter is returned for repair. Removal of one bay of a multibay antenna causes a small increase in the VSWR, but usually not enough to cause operating difficulties. See *Maintenance* section.

Impedance Trimming

An adjustable transformer (see figure 3) is provided to compensate for changes in the input impedance due to the presence of the mounting structure. The antenna has been factory adjusted for an impedance match with the transformer in mid-position setting, when mounted on a six inch diameter uniform mast, with a spacing of approximately seven inches from center of feedline to center of mast.

For an optimum impedance match after the antenna is installed it is usually necessary to adjust the transformer as described in the following paragraphs. Some method of measuring the standing wave ratio is of course necessary, and this may be done with a directional coupler, slotted line, or rf bridge. Although greatest accuracy in measurement would call for the impedance measuring device to be connected to the antenna input flange, convenience and practicability usually dictate that the measuring equipment be located in the transmitter room. Since this latter method gives a measurement of both the antenna and transmission line, it must be known that the line is reasonably "flat" for the measurements to have meaning. For this reason, it is necessary to terminate the transmission line at the antenna input flange, with a good load, and measure the VSWR of the line alone.

The power source for these measurements can either be a signal generator or the transmitter operated at reduced power. Reduced power is necessary as a precaution to safeguard the transmitter and test equipment. Do NOT adjust the transformer with transmitter power on.

To gain access to the adjustment devices (slugs) in the transformer, first remove the gas pressure from the transmission line (a bleeder is provided at the top of the transformer). Then remove the six Allen head screws at the top of the tubular case, and the six similar screws at the lower end. Allow the case to slide down over the line until the slot is exposed. (See figure 4.) Loosen, but do not remove, the hose clamps securing the slugs. A sliding

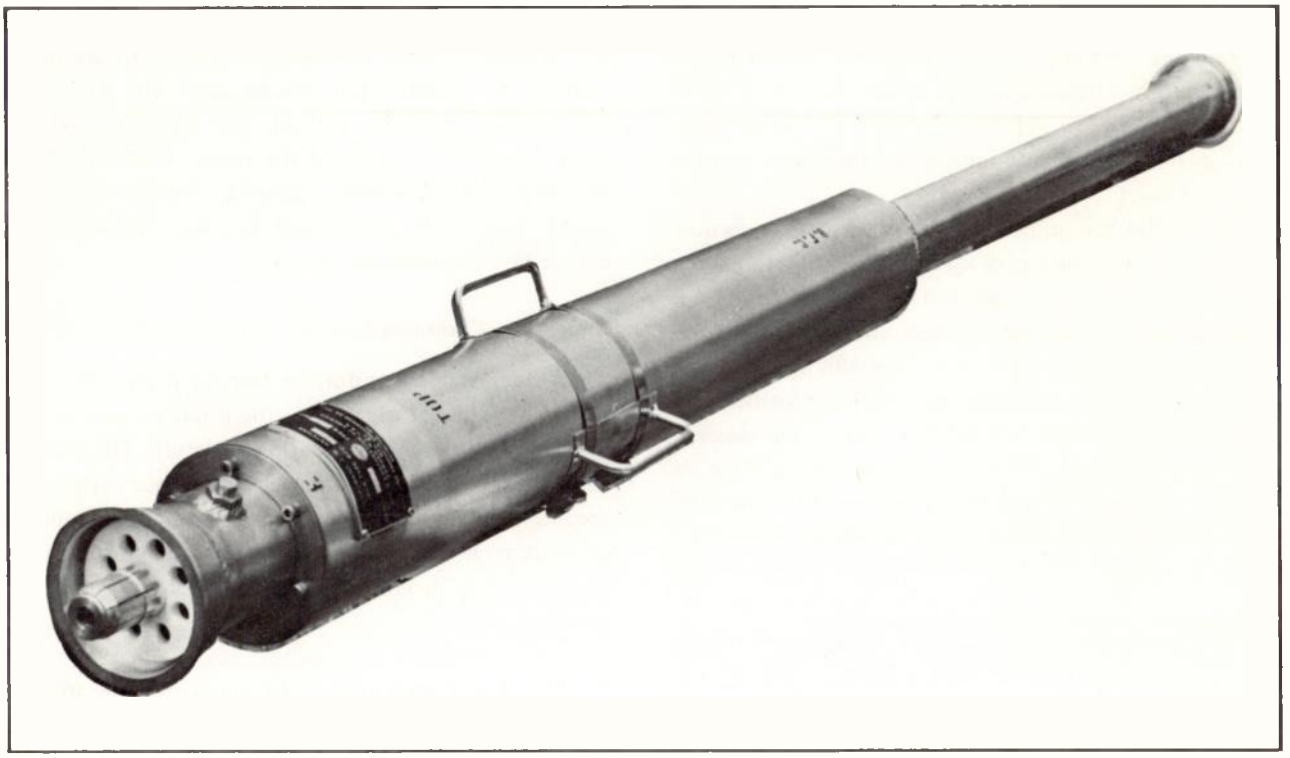


Figure 3—RF Variable Transformer

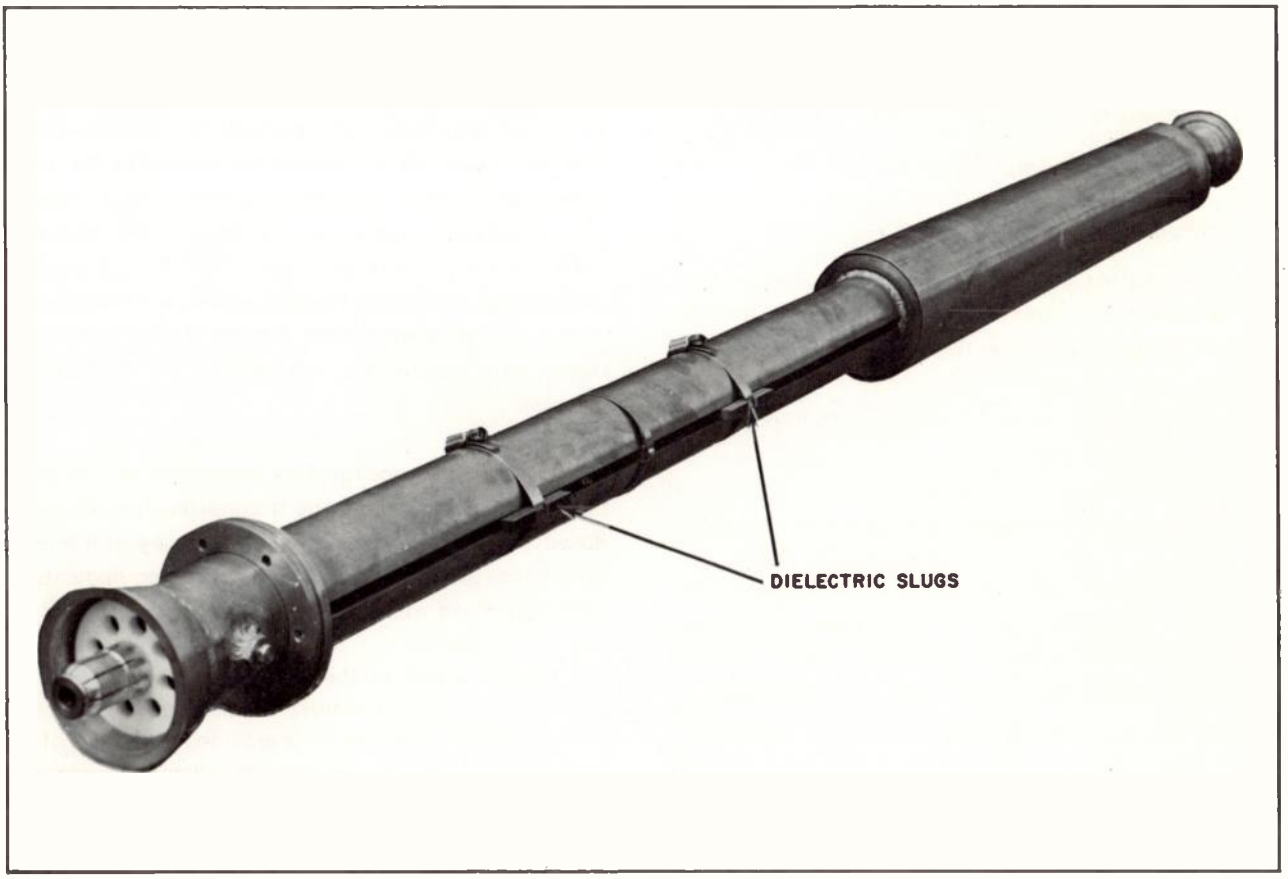


Figure 4—RF Variable Transformer with Weather Cover in Tuning Position

block is provided between the two slugs to maintain the correct slot width, and yet be movable should it be necessary to move the slugs a considerable distance.

To make the adjustment, move one slug about ¼ inch and read the VSWR. If it is reduced, make another move, if not, return the slug to the original position and move the other slug. If a positive result is noted, continue moving in quarter inch increments until no significant change is noted, then go back to the other slug and repeat the process. A perfect match at the input terminal to the transformer can always be obtained by successive moves of the slugs, provided the necessary impedance change is within the range of the transformer. The transformer will match loads varying from a matched condition to a VSWR of 2.6 with a ± 45 degree phase angle. This is a greater range than normally required for side mounted antennas. After correct settings have been obtained the hose clamps should be retightened and the cover returned to closed position.

After the antenna is installed and the transmission line connected, the system should be bled through the gas bleeder plug at the top of the antenna feed line to remove any moist air which may have entered during the tuning procedure.

For those mounting conditions in which the transformer cannot be located in its normal (standard) position, an extra line section will be provided (if previous arrangements are made) containing miter elbows to extend around the obstructions. This section of line has the correct electrical length to suit the transformer and cannot arbitrarily be lengthened or shortened except in steps of one-half wave length.

Antenna Radomes

Antennas intended to be operated with radomes for improved resistance to icing conditions or for increased power rating are normally shipped with the radiators within the radomes. The radiators are mounted to the feed line in the same manner as those without radomes.

In some instances it may be desirable to add radomes to an antenna previously shipped without radomes. It should be noted that radomes cannot be added to antennas designed for deicers.

To install the radomes, first lower the radiators to the ground. Refer to figures 5, 9, 10, 11 and 12, then proceed as follows:

1. Insert the rear support and hose clamp over the end of the horizontal support tube. Do not tighten the clamp.

2. Place the upper half of the radome over the radiator.

3. Fasten the front end of the radome (near the feed point) to the curved support plate using two 1/4—20 x 3/4 in. long bolts, washers and lockwashers in the upper holes only.

4. Fasten the rear support to the radome with four 1/4—20 x 3/4 in. long bolts, washers, lockwashers and nuts.

5. Tighten the hose clamp around the rear support.

6. Fasten the cover plate to the front end of the upper half of the radome using the two lower holes in the radome and the two upper holes in the cover plate with two 1/4—20 x 3/4 in. long bolts, washers and lockwashers.

7. Place the lower half of the radome over the radiator inside the upper half of the radome.

8. Fasten the cover plate to the lower half of the radome using two 1/4—20 x 1 1/4 in. long bolts, washers and lockwashers.

9. Fasten the lower half of the radome to the upper half at six additional points using six 1/4—20 x 1 in. long bolts and washers.

10. Before tightening the bolts, caulk around the support tube and cover plate using the sealant supplied to prevent entry of moisture.

NOTE: Make sure that the drain hole in the bottom of the lower half of the radome is open.

Grounding Kit

A grounding kit is provided for center fed antennas of 10 bays or more to eliminate the formation of standing waves on the outer surface of the input transmission line where it is opposite radiating elements of the antenna. Use of the grounding kit breaks up the resonant conditions causing the standing waves. The ground strap is provided precut or in a roll which will have to be cut to required lengths at the time of installation. Hose clamps are provided to attach the ground strap to the antenna feedline and either hose clamps or flat clamp type castings will be provided to attach the other end of the ground strap to the tower. These ground straps should be spaced at approximately every 30 inches on the feedline to the center feed tee. Any elevator, or power cables, in the immediate region of the radiating bays must be shielded and the shield grounded in the

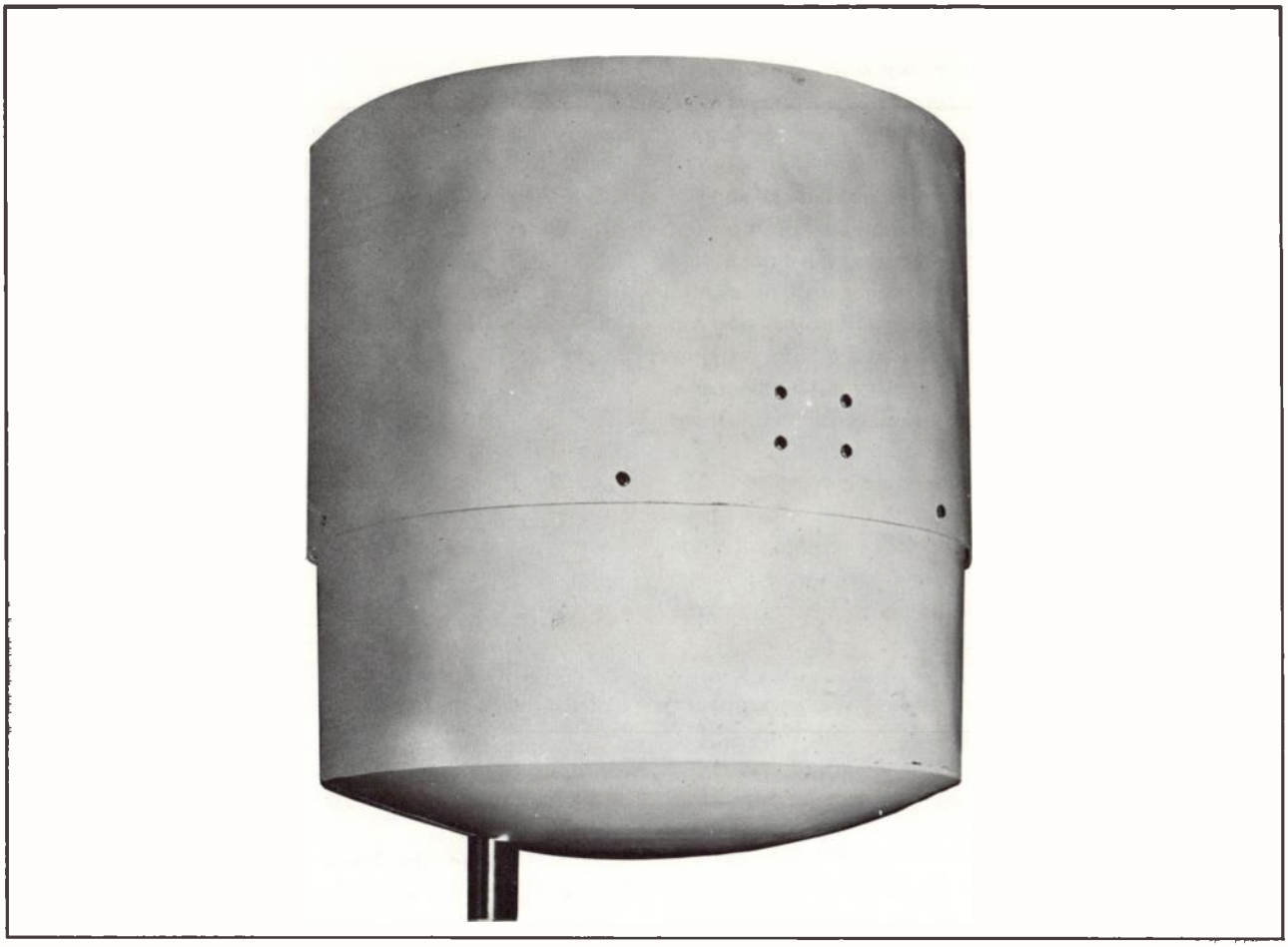


Figure 5—Fiberglass Radome for Individual BFC Antenna Bays

same manner as explained above. These details are further explained in figures 13 and 14.

Deicer System

General

A weather-tight terminal box is mounted on the antenna bracket to receive the deicer cable and connect it to the supply cable on the tower. The system should be connected in accordance with figures 6 and 7.

The minimum recommended deicer cable size for 208 volt and 240 volt single phase power for a given cable length and antenna type is shown in figures 15 and 16.

The rate of ice removal varies greatly with wind velocity, ambient temperature, type of ice, etc.

The heater transformer primary current should be read with a hook-on ammeter when the antenna is installed; the reading should be about 80% of the fuse rating shown in Table 2.

Deicer Transformers

High Voltage (Primary) Section

The deicer transformers are fed through a cable and a series of junction boxes located mid-way between radiator bays. The first junction box is always located between the first and second bays (numbering from the bottom). Each box feeds two transformers which are to be mounted on the tower near the junction box. The next box will be located between bays three and four, etc., with the exception that in case of an odd number of bays the last box will feed only one transformer.

The center fed antenna will be treated in the same manner as an end fed antenna except that the junction boxes are split into two sections.

The cable should be taped to the feed line at close intervals.

Low Voltage (Secondary) Section

The low voltage (secondary) section starts at the

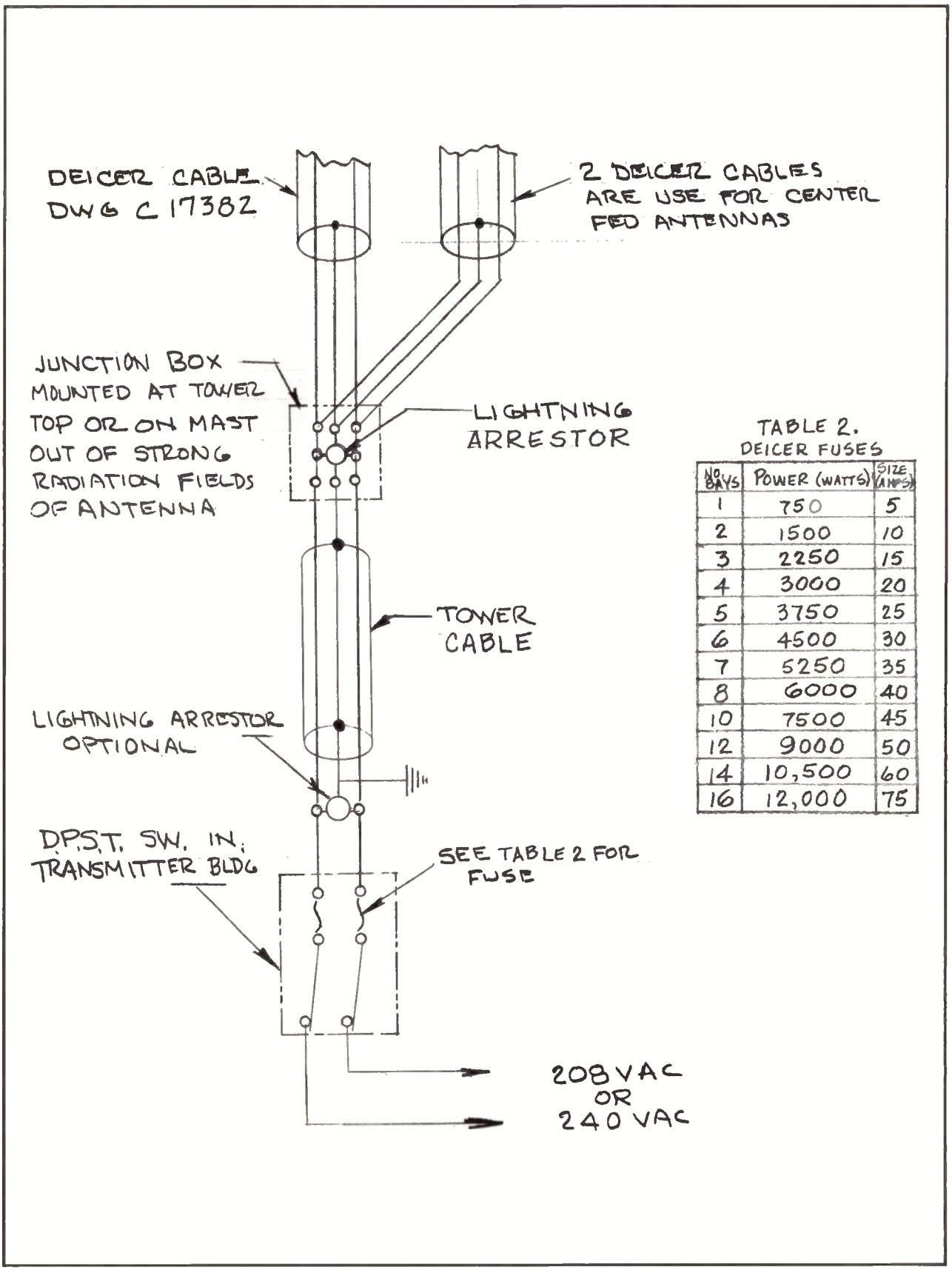


TABLE 2.
DEICER FUSES

NO. ANTS	POWER (WATTS)	SIZE (AMPS)
1	750	5
2	1500	10
3	2250	15
4	3000	20
5	3750	25
6	4500	30
7	5250	35
8	6000	40
10	7500	45
12	9000	50
14	10,500	60
16	12,000	75

Figure 6—Antenna Deicer Wiring Diagram

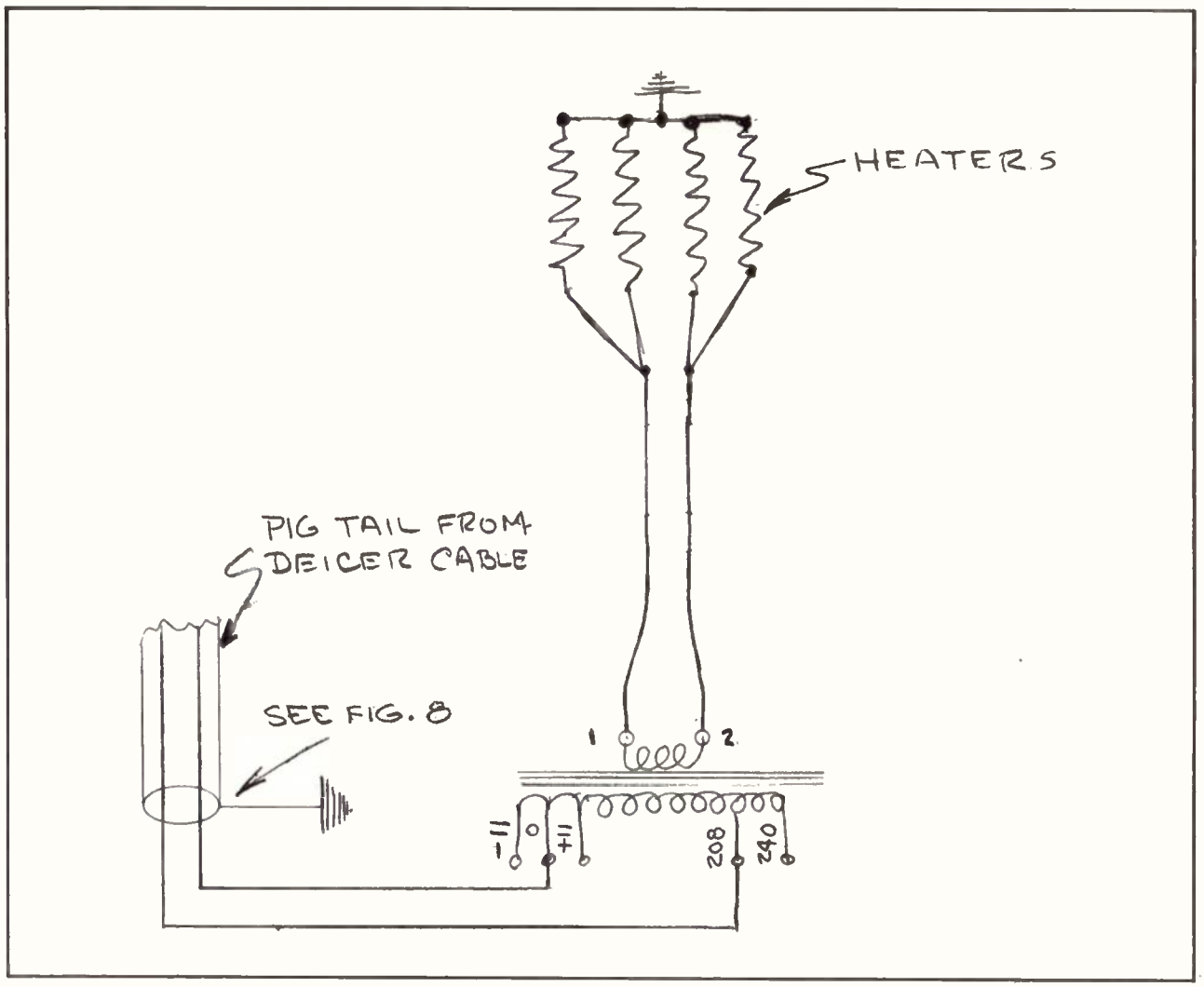


Figure 7—Antenna Deicer Schematic Diagram

transformer located mid-way between bays. Each bay has a separate transformer which supplies approximately 250 amperes at 3 volts. The entrance cable must be looped and connected to the transformer through the weather tight fitting in the *bottom* of the transformer case. Care must be taken to secure the heavy entrance cable to the tower, leaving a minimum of loop exposed to radiation, and also a minimum of weight that either the transformer or junction box on the antenna bay will be subject to due to the cable.

Sleet Melter Control Unit

An Automatic Sleet Melter Control Unit, MI-27369, is available for use with the Deicer. The sensor, placed in the vicinity of the antenna at the tower top, will automatically operate the control circuits for antenna heater elements as ambient weather conditions make necessary, and precludes the possibility of heater operation when temperatures are not within the ice forming range.

It should be noted that proper installation of the Sleet Melter Control Unit requires the installation of two two wire, 110 volt power circuits down the tower, a circuit breaker and an ac magnetic contactor. These items are *not* supplied and should be obtained locally. The Sleet Melter Control Unit instruction book, IB-36267, presents a discussion of the method of installation, and contains reference tables to enable the selection of the proper size contactor.

Iso-Coupler

The Iso-Coupler is used when an FM Antenna is mounted on an insulated AM tower. The outer conductor of the FM antenna transmission line is at ground potential and would ground the AM tower as it passes across the base insulator if mounted directly. The Iso-coupler provides the needed isolation in installations of this type. It is available for installations employing 10 kW and 40 kW FM power and 1 5/8 or 3 1/8 inch transmission line respectively.

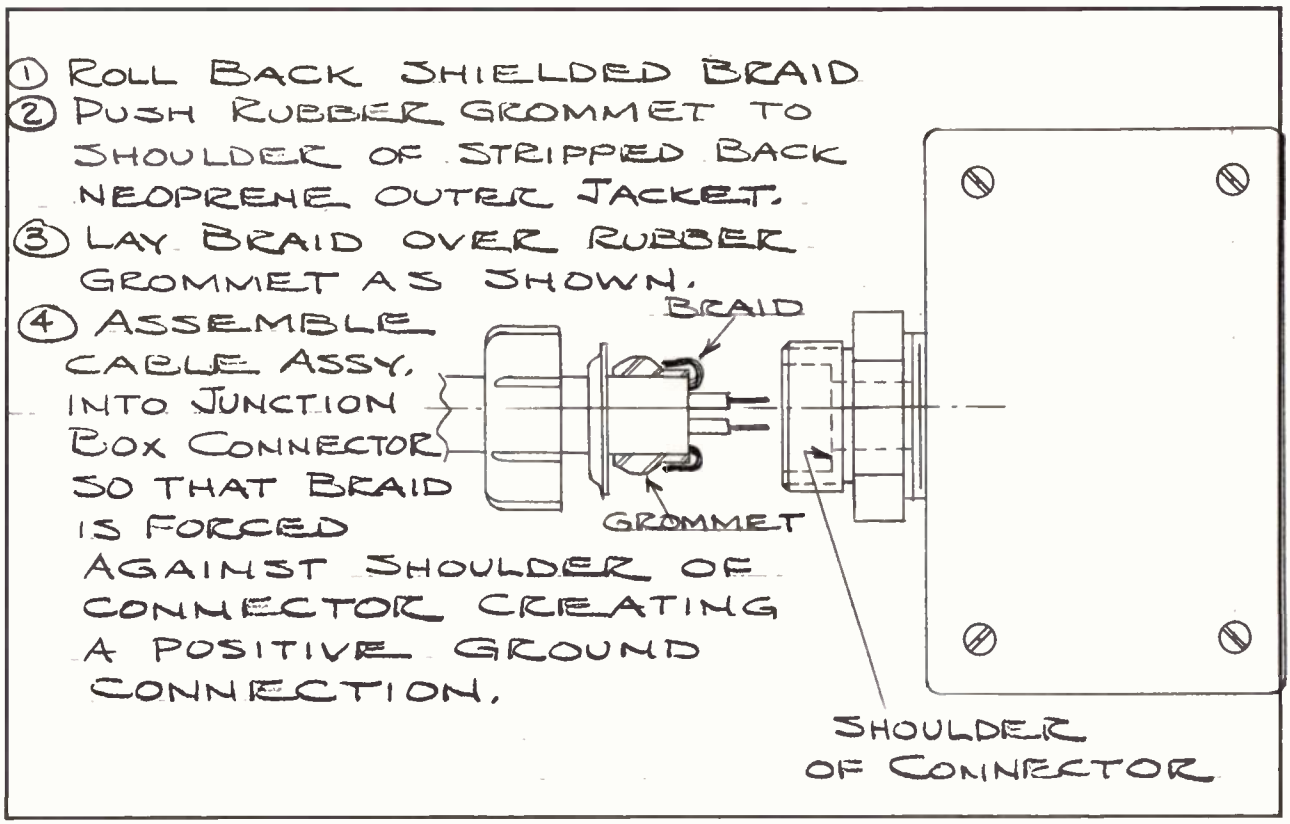


Figure 8—Deicer Cable Preparation

MAINTENANCE

The antenna is shipped with the radiators sand-blasted to prevent water droplets from standing on the radiating surfaces. Oil or grease on the radiators will nullify the effects of the surface finish, and should be removed as mentioned in the section on *Unpacking*. The radiators should never be painted, and they need no surface protection, since they are constructed entirely of stainless steel. It is not necessary to paint the feed line, though no harm will result from so doing.

The antenna should be inspected every six months for looseness in the radiator or feed line mountings, and all hardware tightened.

Should a radiator be damaged by falling ice, entanglement with rigging lines, etc., it may be removed by taking off the four mounting nuts, and sealing the feed line with one of the emergency sealing caps shipped originally with the antenna, using the same or a new O-ring. Operation of the antenna can then continue with a slightly increased VSWR, while the bay is returned to the factory for repair. As an example of the change in input impedance with a bay removed, the removal of a bay from a six bay antenna that has been trimmed to a VSWR of 1.05 or less will cause the VSWR to increase to about 1.2. The gain will, of course, drop to about 83% of its former value.

WARNING

When using a sealing cap, be sure it is the type supplied with the antenna, in which the center is relieved so as not to touch the inner conductor of the feed line.

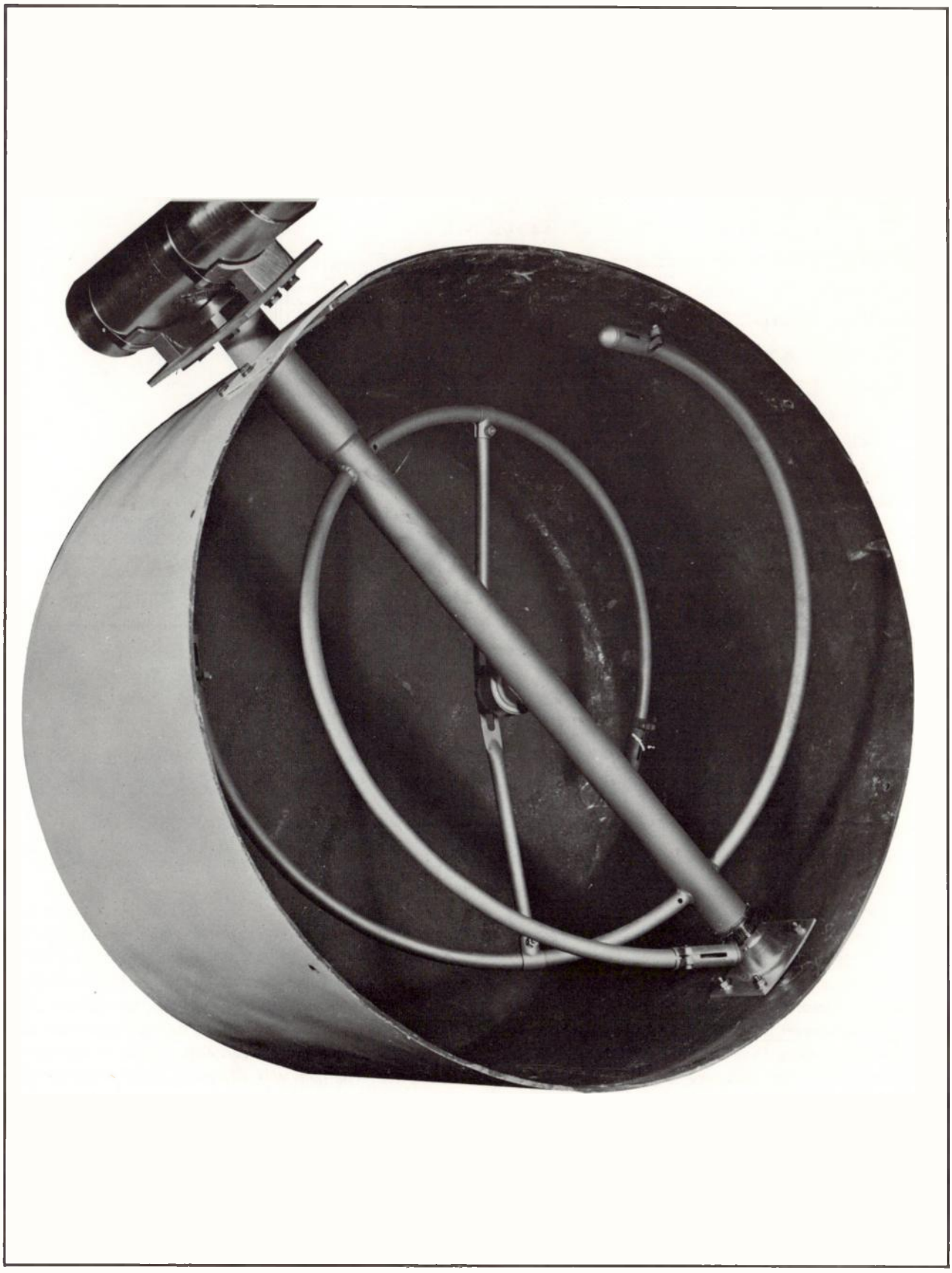


Figure 9—BFC Antenna Element and Radome with Bottom Cover Removed

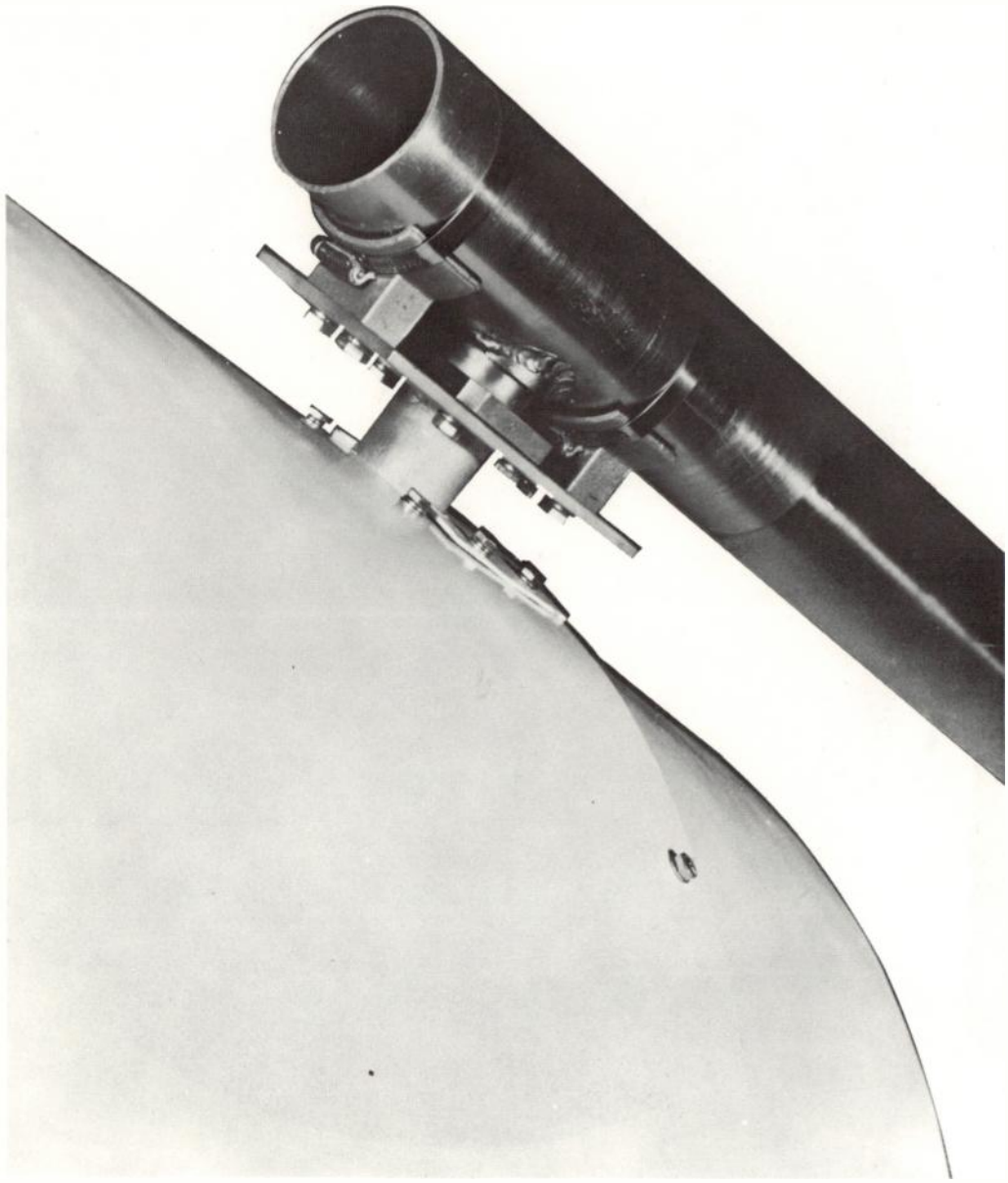


Figure 10—Radome Mounting Bracket

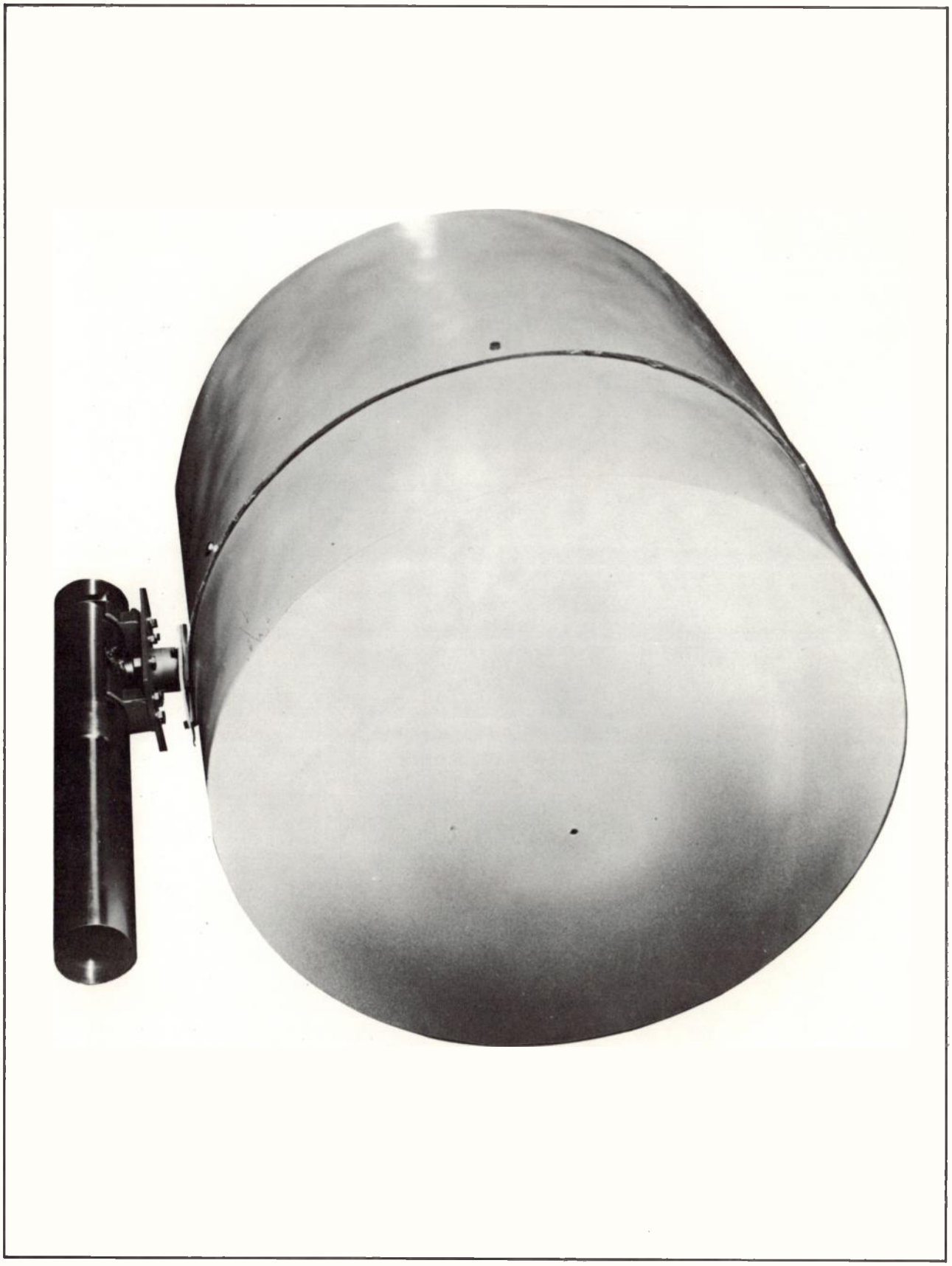


Figure 11—Bottom View of Radome showing Drainhole

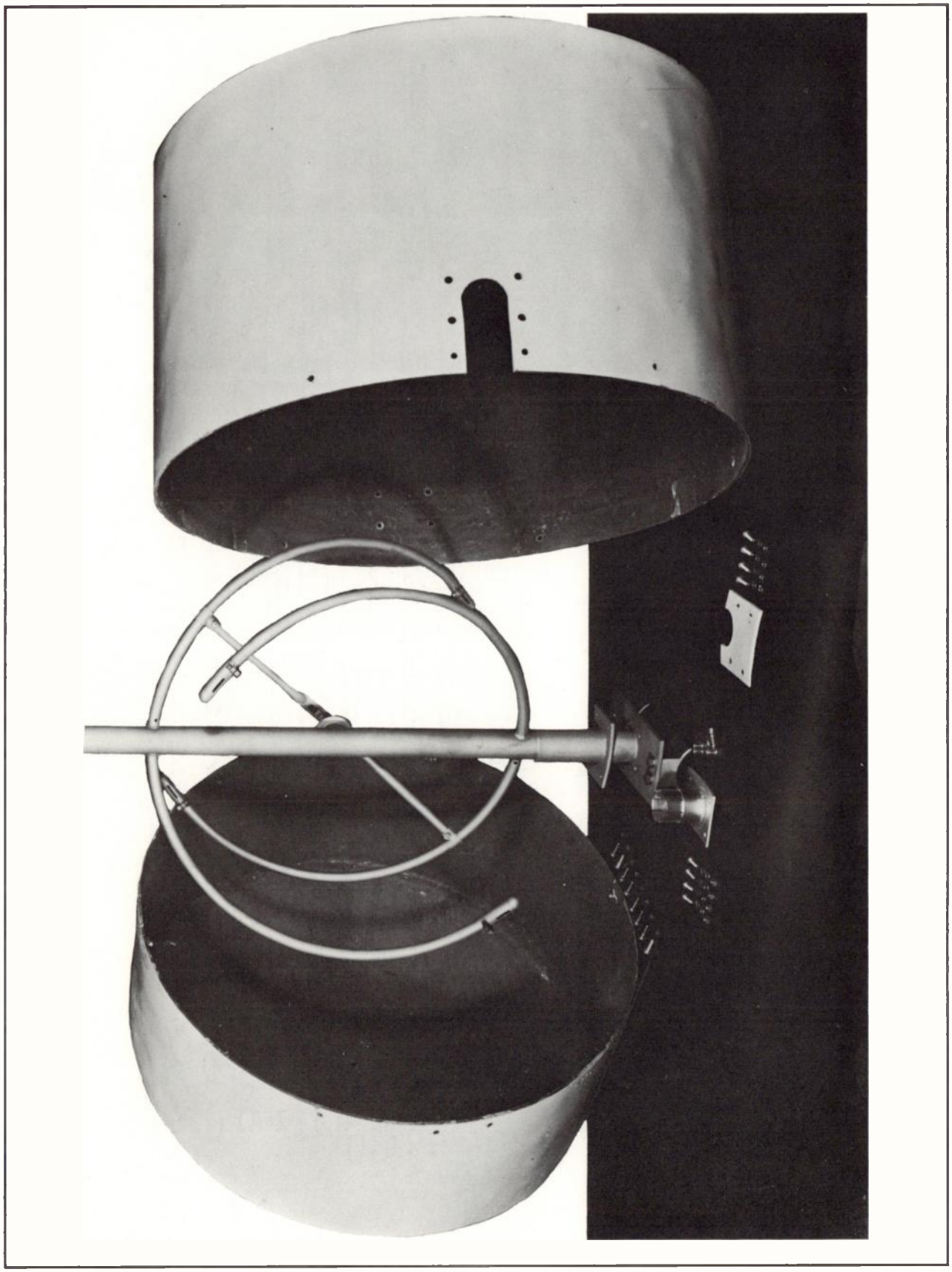
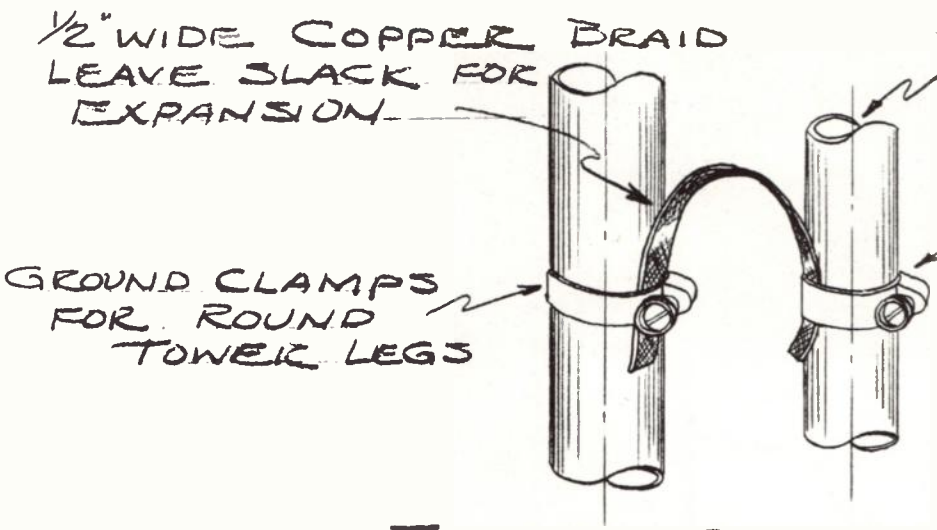


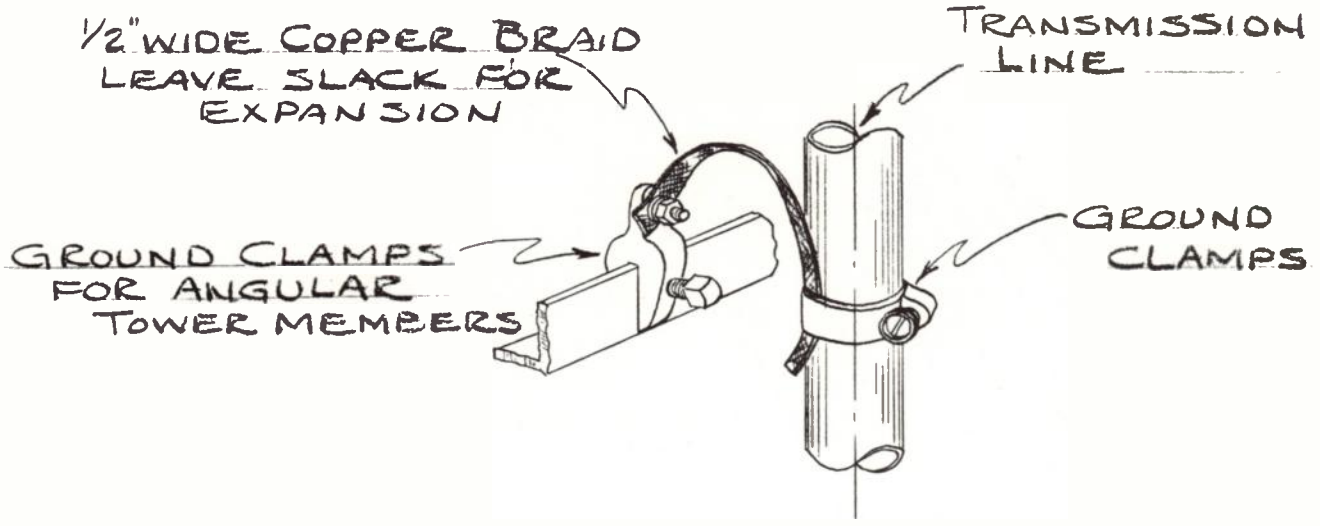
Figure 12—BFC Antenna Element, Radome and Associated Parts



TYPICAL GROUND CONNECTION (10 BAYS OR MORE)

NOTE: TRANSMISSION LINE FEEDING THE CENTER FEED TEE AND RADIATOR BAYS MUST BE GROUNDED TO TOWER AT APPROXIMATELY 30 INCH INTERVALS STARTING AT THE TEE INPUT AND ENDING APPROXIMATELY 6 FT. BELOW BOTTOM BAY. ANY ELEVATOR OR POWER CABLES WITHIN 6 FT. OF TRANSMISSION LINE IN RADIATOR REGION MUST BE SHIELDED AND THE SHIELD GROUNDED TO TOWER EVERY 30".

Figure 13—Grounding Details for Round Tower Legs



TYPICAL GROUND CONNECTION (FOR 10 BAYS OR MORE)

NOTE: TRANSMISSION LINE FEEDING THE CENTER FEED TEE AND RADIATOR BAYS MUST BE GROUNDED TO TOWER AT APPROXIMATELY 30 IN. INTERVALS STARTING AT THE TEE INPUT AND ENDING APPROXIMATELY 6 FT. BELOW BOTTOM BAY. ANY ELEVATOR OR POWER CABLES WITHIN 6 FT. OF TRANSMISSION LINE IN RADIATOR REGION MUST BE SHIELDED AND THE SHIELD GROUNDED TO THE TOWER EVERY 30" APPROXIMATELY.

Figure 14—Grounding Details for Angular Members

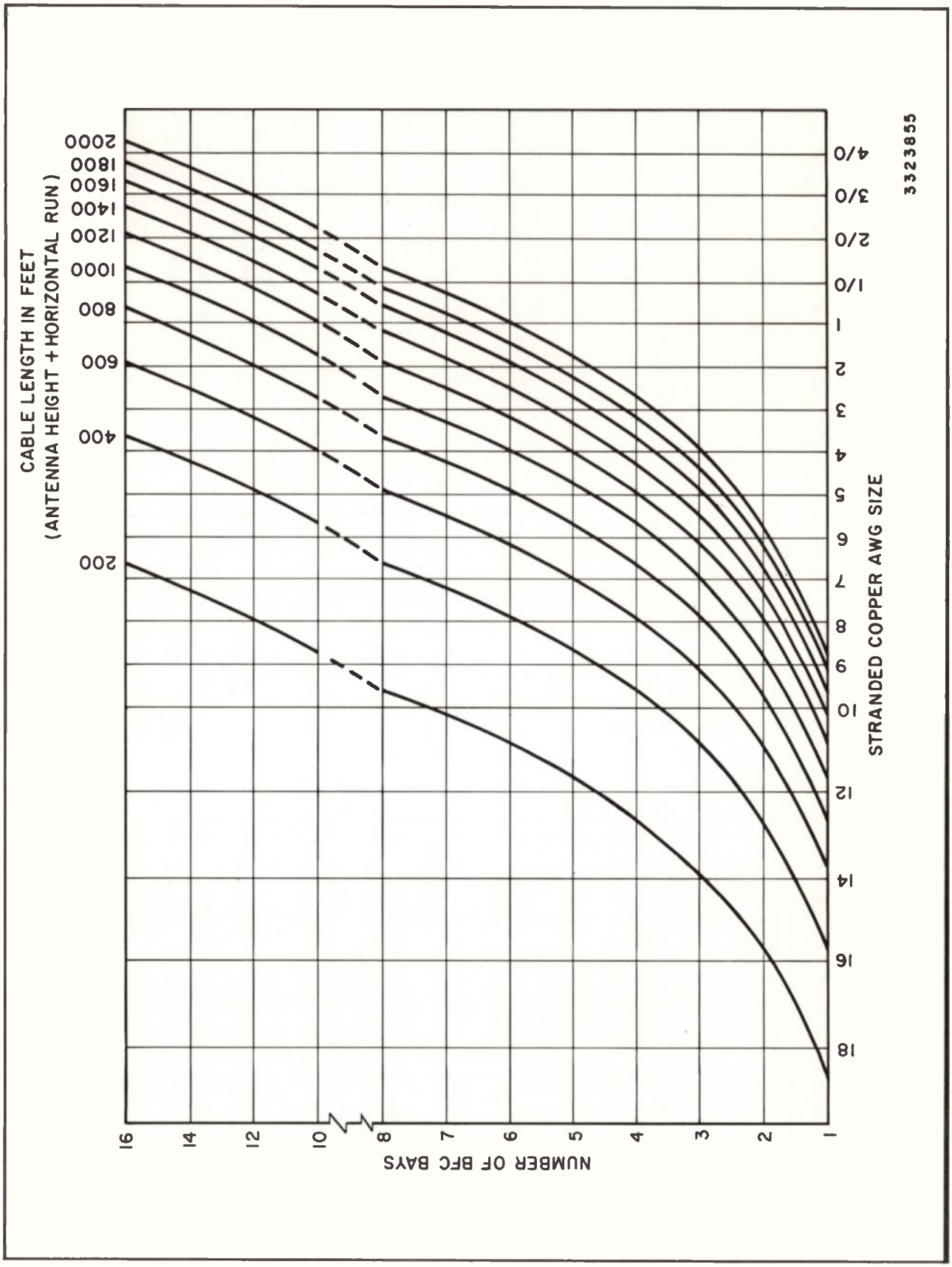


Figure 15—Deicer Cable Size for 208 Volt Power

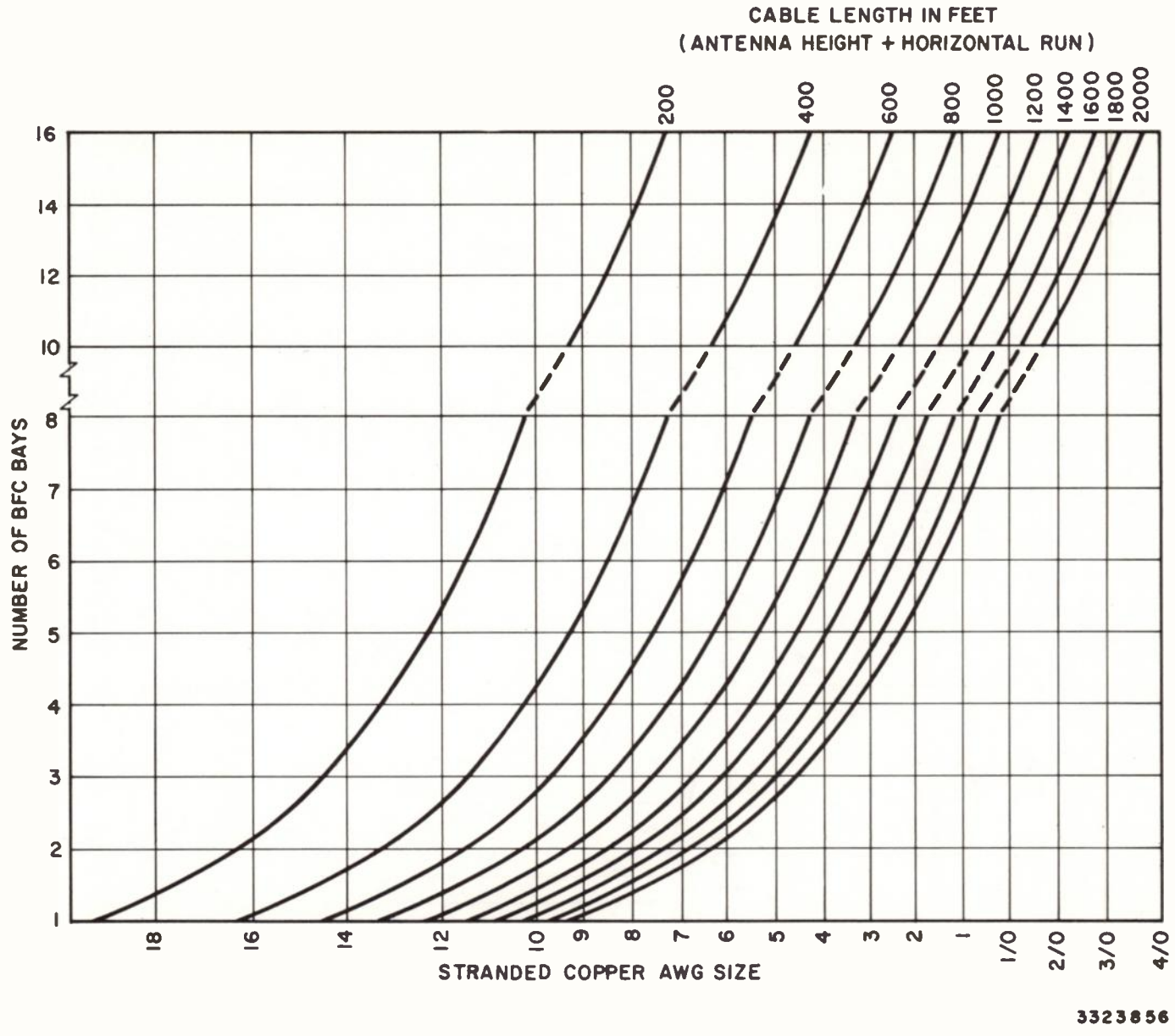


Figure 16—Deicer Cable Size for 240 Volt Power

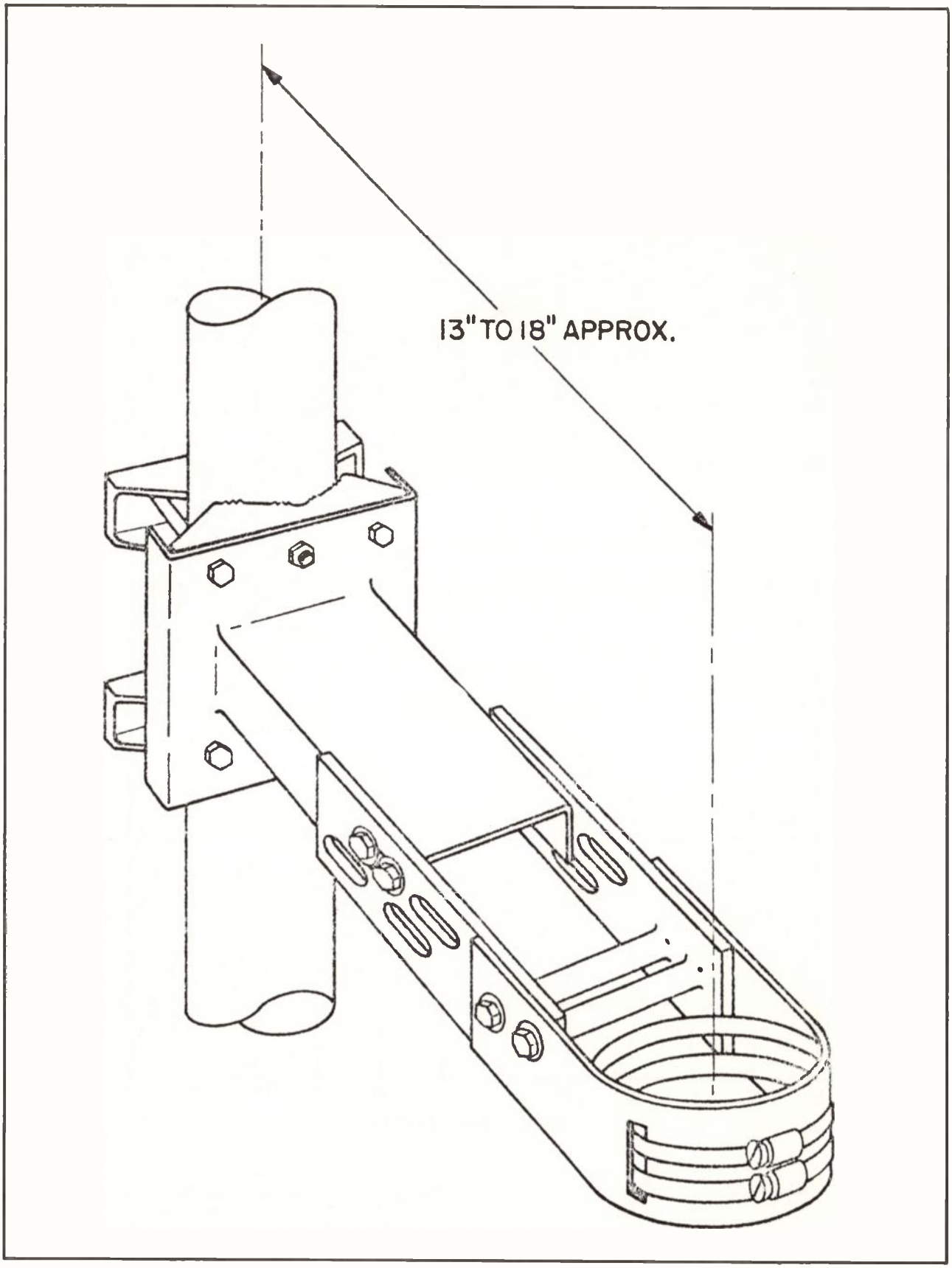


Figure 17—Typical Mounting Bracket for Towers with Leg Diameter of 2 in. to 3 3/4 in.

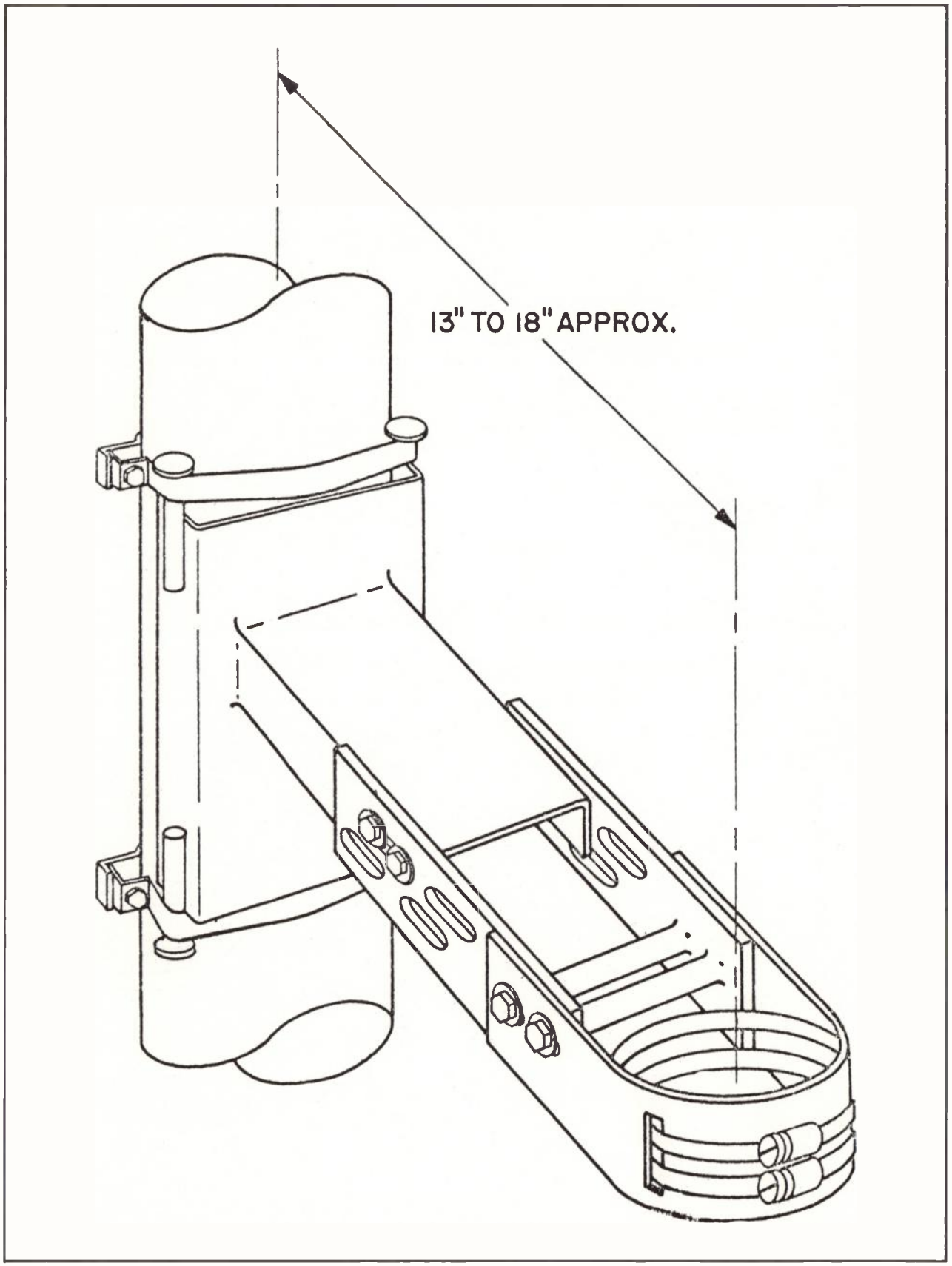


Figure 18—Typical Mounting Bracket for Towers with Leg Diameter of 4 in. to 12 in.

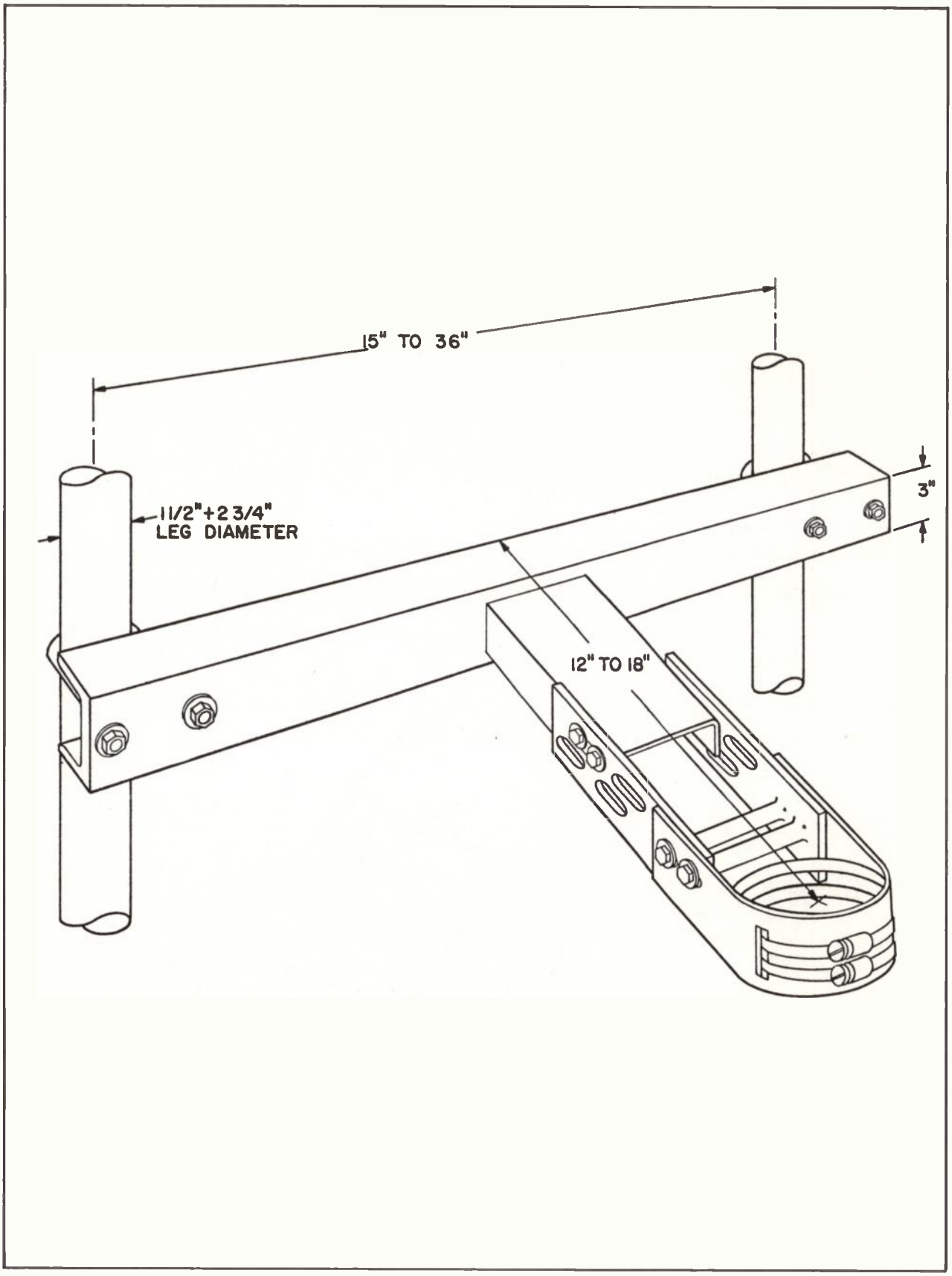
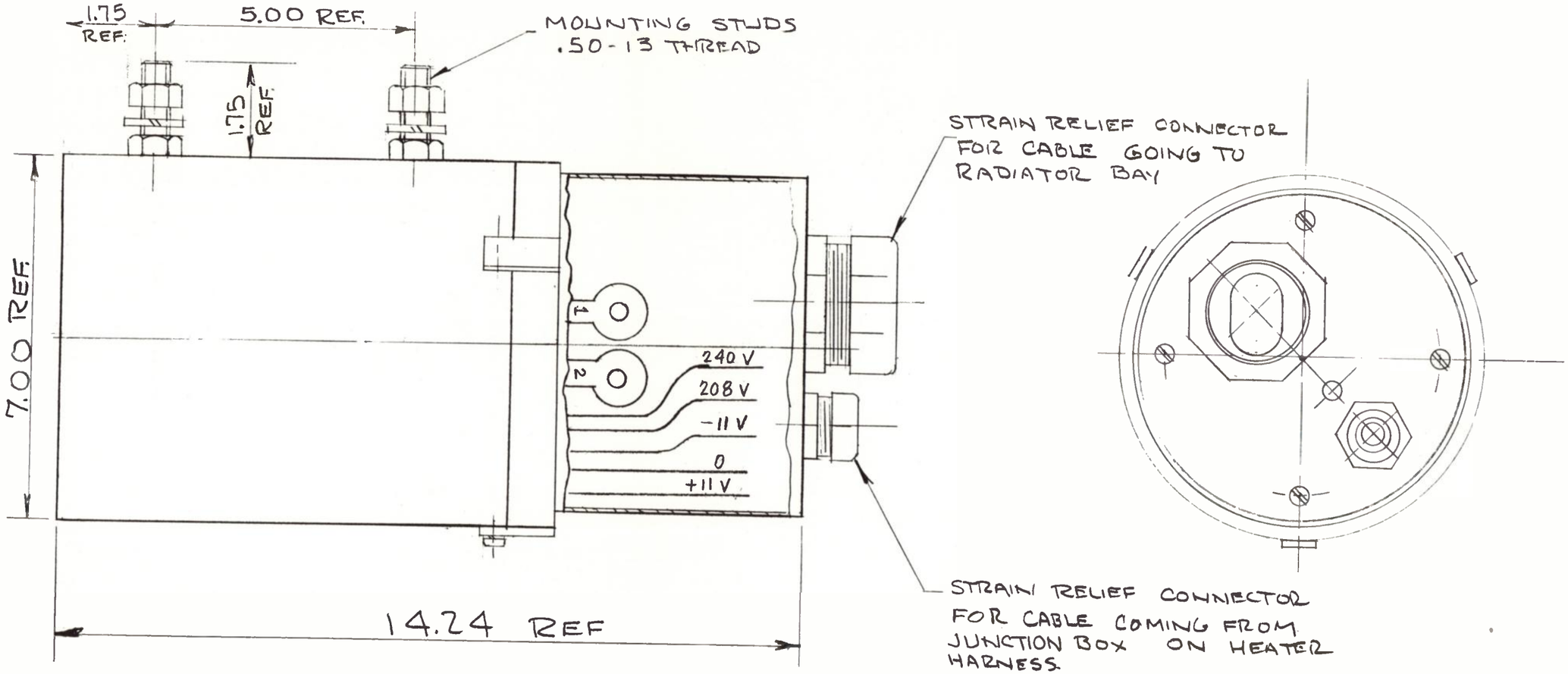


Figure 19—Typical Mounting Bracket for Face Mounting



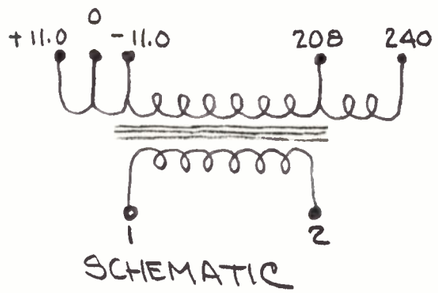


Figure 20—Heater Transformer Outline Drawing

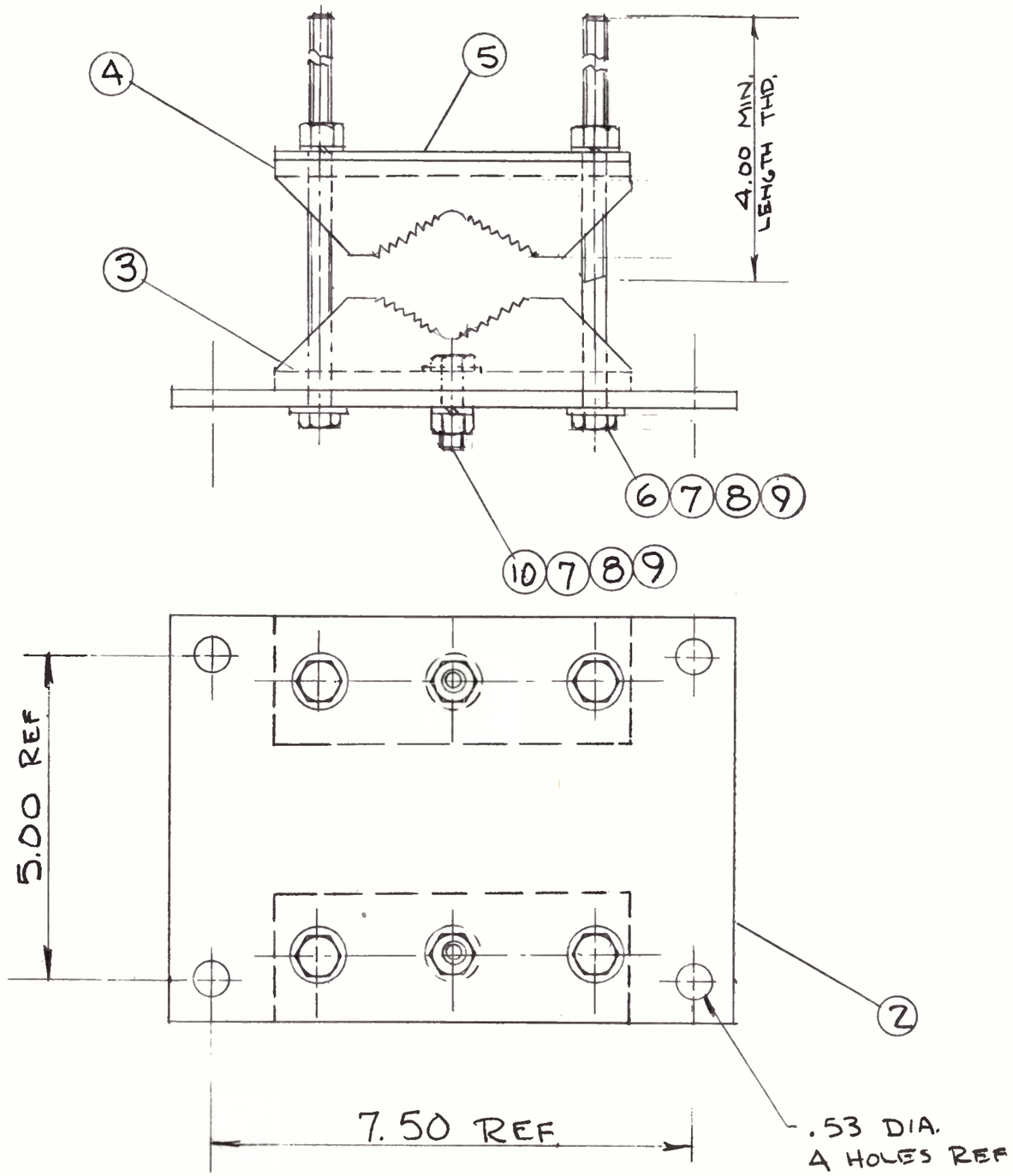


Figure 22—Transformer Mounting Bracket for 2 to 3 3/4 in. Diameter Leg

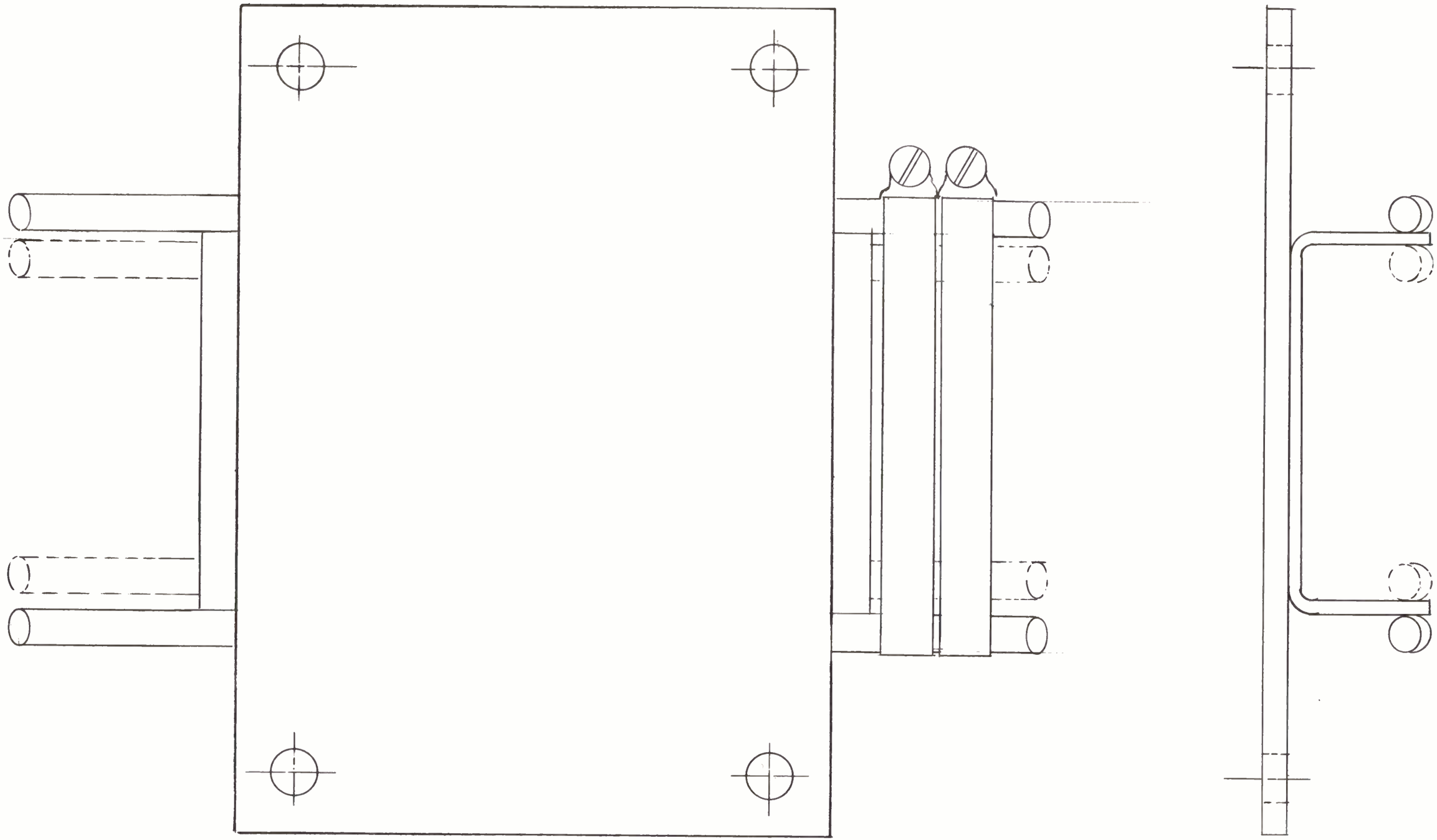
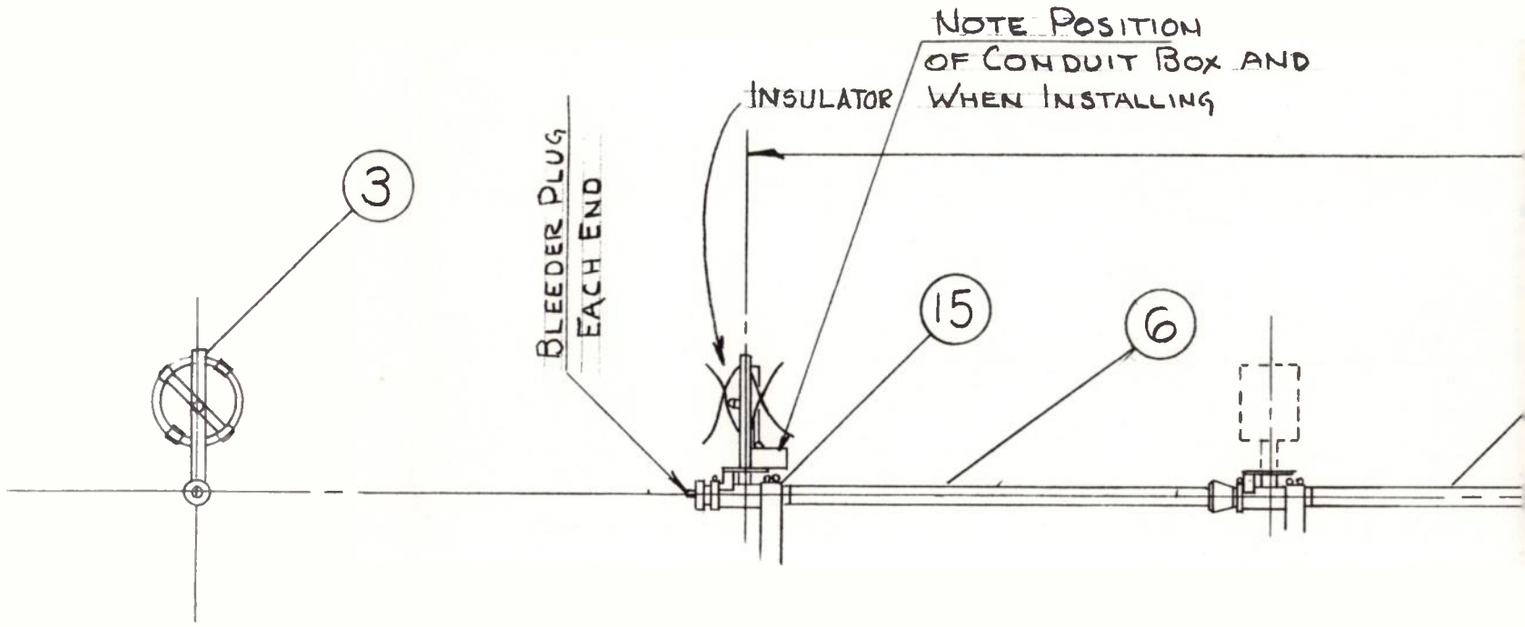
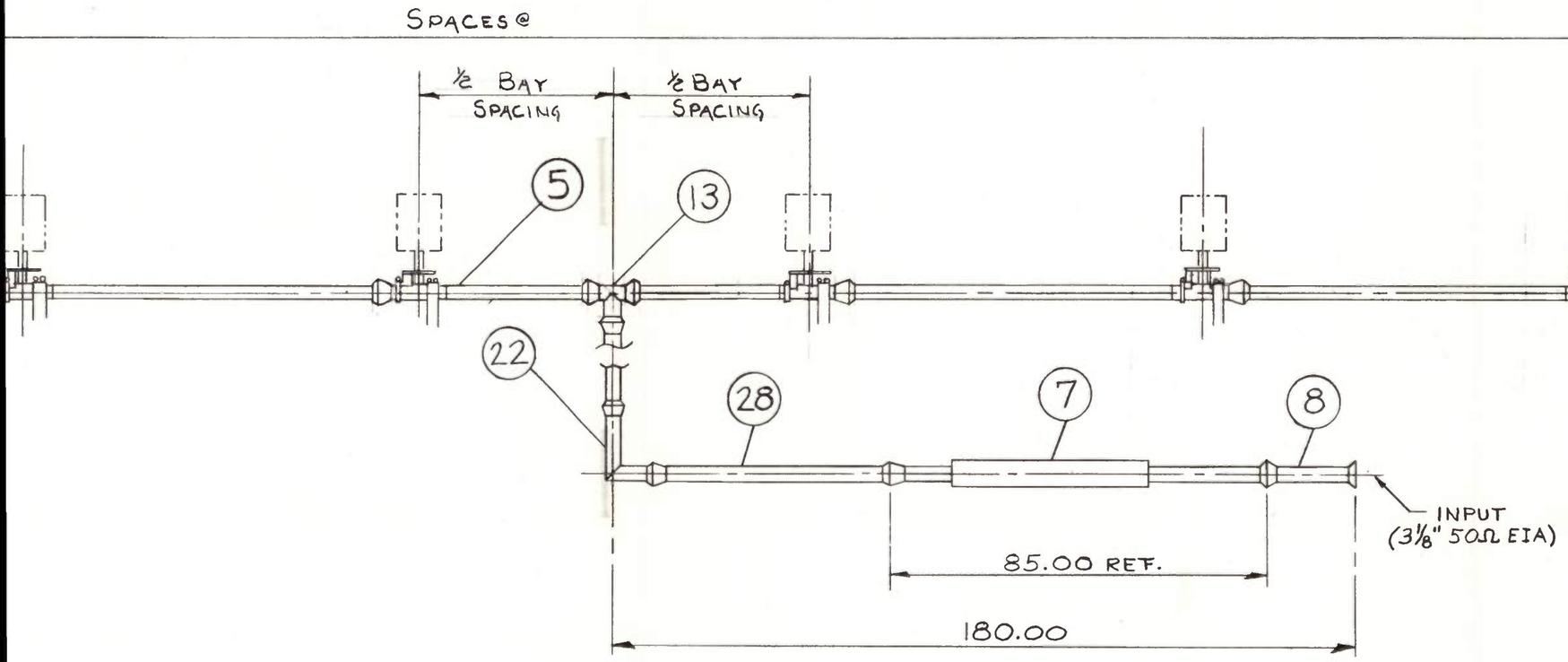


Figure 23—Transformer Mounting Bracket for Leg Diameters 3 3/4 in. and Up

MATERIAL

ITEM	DESCRIPTION
1	Set Instruction Sheets
2	Installation Drawing
3	Radiator Bay Assembly
4	Feedline Section, Center
5	Feedline Section, Input
6	Feedline Section, End
7	Transformer, Adjustable
8	Termination
9	Heater Harness
10	
11	Cap, Sealing
12	Lightning Arrestor
13	Tee
14	Silicone Compound (DC-4) 2 oz Tube
15	Mounting Bracket (For Item 3)
16	Transformer (Heater)
17	Transformer Mount (For Item 16)
18	Grounding Kit
19	Transformer Outline
20	Cable Preparation
21	Wiring Diagram
22	Elbow
23	Mounting Bracket (For Item 7)
24	Straight Section
25	Straight Section
26	
27	Radome

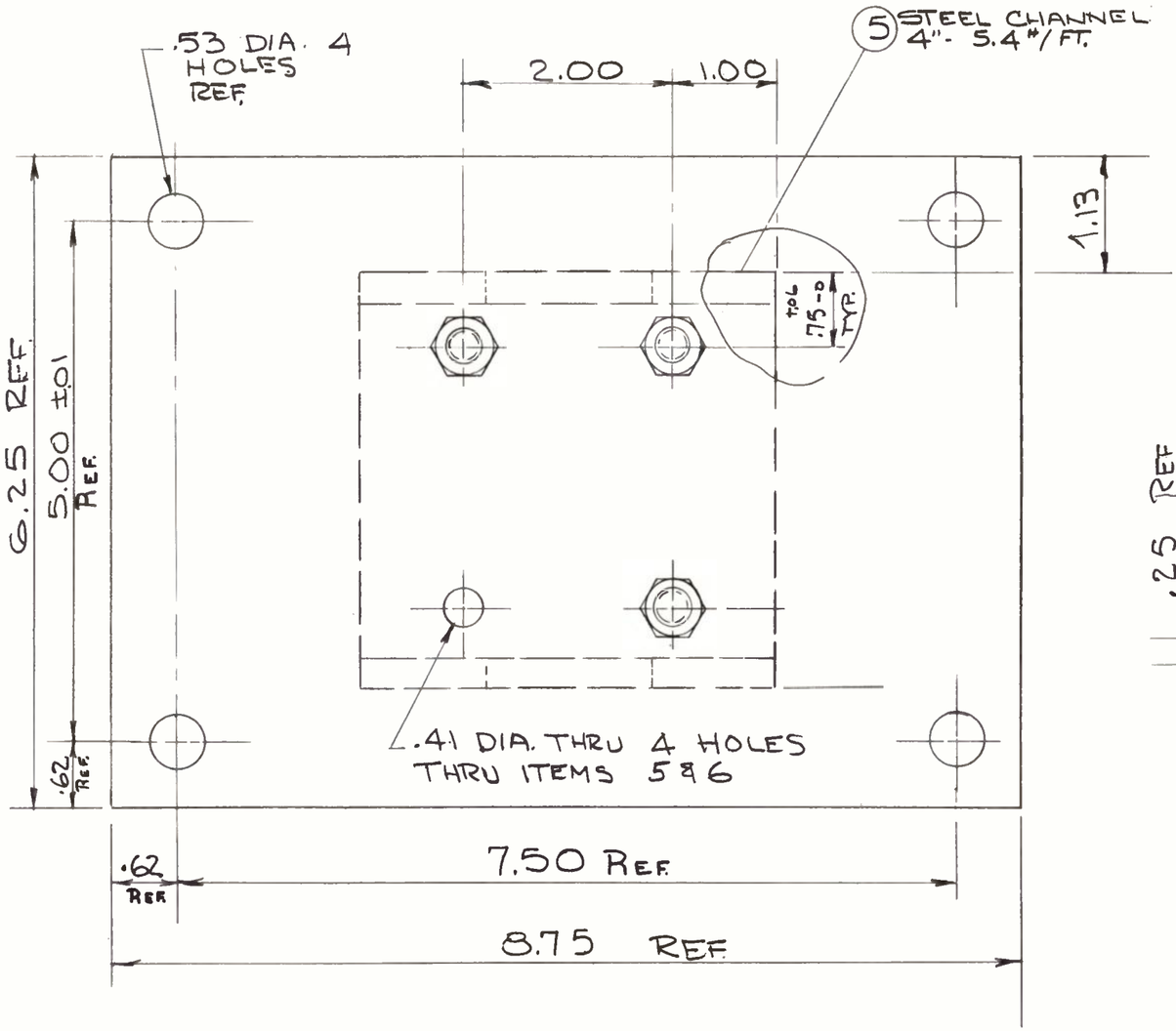




NOTE:

APPLY DOW CORNING COMPOUND TO ALL O-RING SEALS BEFORE ASSEMBLY

Figure 24—BFC Antenna Installation, Center Fed (8 sections or more)



BRACKET MUST MOUNT ON 1.50 DIA. LEG.

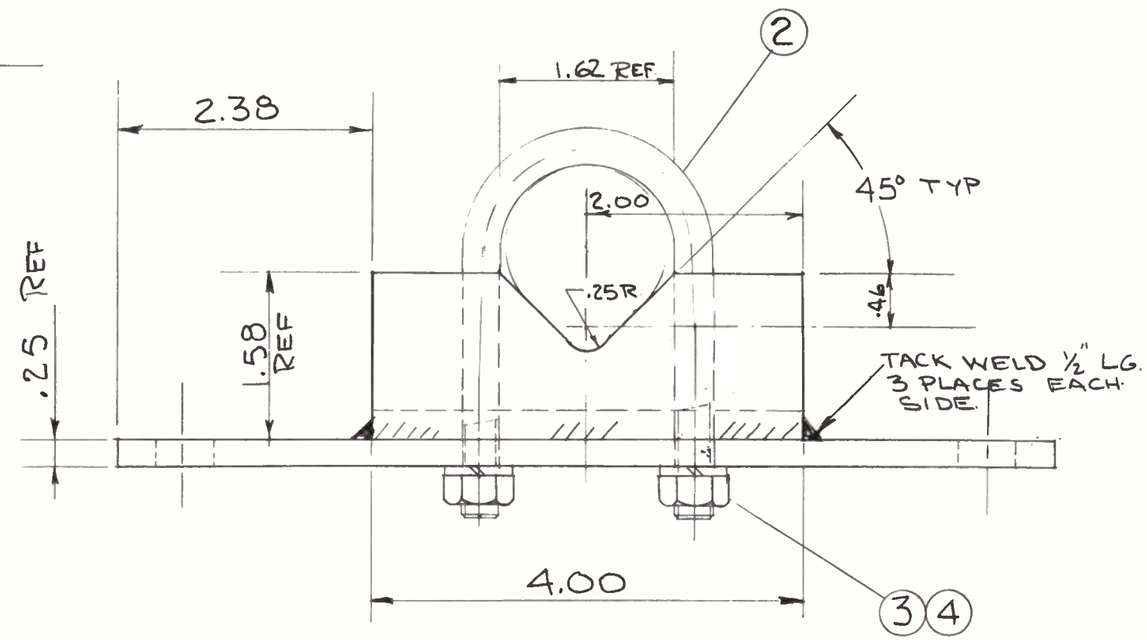
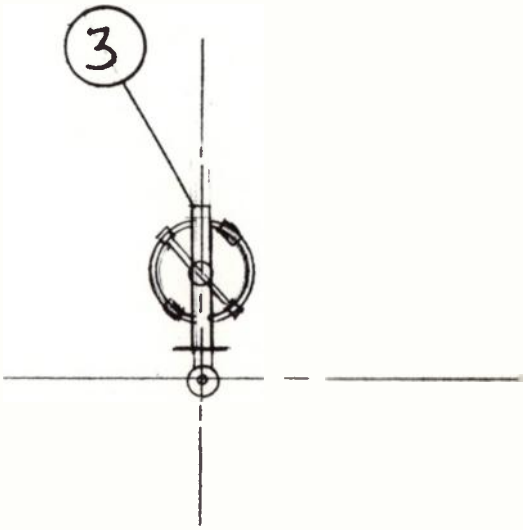
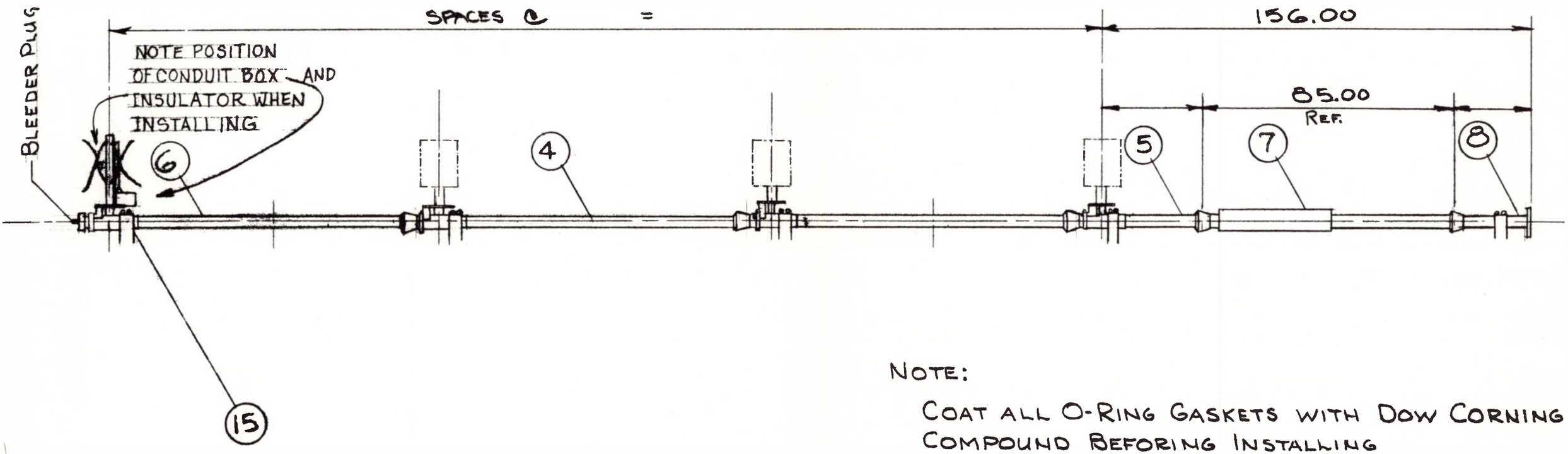


Figure 21—Transformer Mounting Bracket for 1½ in. Diameter Leg

MATERIAL

ITEM	DESCRIPTION
1	Set Instruction Sheets
2	Installation Drawing
3	Radiator Bay Assembly
4	Feedline Section, Center
5	Feedline Section, Input
6	Feedline Section, End
7	Transformer, Adjustable
8	Termination
9	Heater Harness
10	
11	Cap, Sealing
12	Lightning Arrestor
13	Tee
14	Silicone Compound (DC-4) 2 oz Tube
15	Mounting Bracket (For Item 3)
16	Transformer (Heater)
17	Transformer Mount (For Item 16)
18	Grounding Kit
19	Transformer Outline
20	Cable Preparation
21	Wiring Diagram
22	Elbow
23	Mounting Bracket (For Item 7)
24	Straight Section
25	Straight Section
26	
27	Radome





NOTE:

COAT ALL O-RING GASKETS WITH DOW CORNING COMPOUND BEFORING INSTALLING

Figure 25—BFC Antenna Installation, End Fed

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