

UNIT INSTRUCTIONS

TD-247

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ANTENNA COUPLER 180Y-1

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1.1 GENERAL DESCRIPTION.

Antenna Coupler 180Y-1, figure 1, is a manually operated matching network which matches a 52-ohm transmitter output to a 52-ohm, 1-5/8-inch rigid coaxial antenna feed system exhibiting a vswr (voltage standing-wave ratio) of less than 3:1. The 180Y-1 has a maximum input rating of 10 kilowatts PEP (peak envelope power) or five kilowatts average power.

Antenna Coupler 180Y-1 consists of a variable T-network which is band switched through the frequency range of 2 to 30 megacycles. The 180Y-1 can be adjusted quickly to give a minimum vswr when used with a directional wattmeter. The unit contains four number 10 Rivnuts on each of four sides for mounting purposes. The flanges of the rigid coaxial line fasten to opposite sides of the unit to permit equipment removal without disturbing the coaxial line. Either connector may serve as input or output to the 180Y-1 except for the special case explained in the following note.

NOTE

The 2-2.6L band is used for tuning low impedances (below 25 ohms). In this instance the coupler circuit is an L-network, and the coaxial connector on the right side of the unit must be the power input connector.

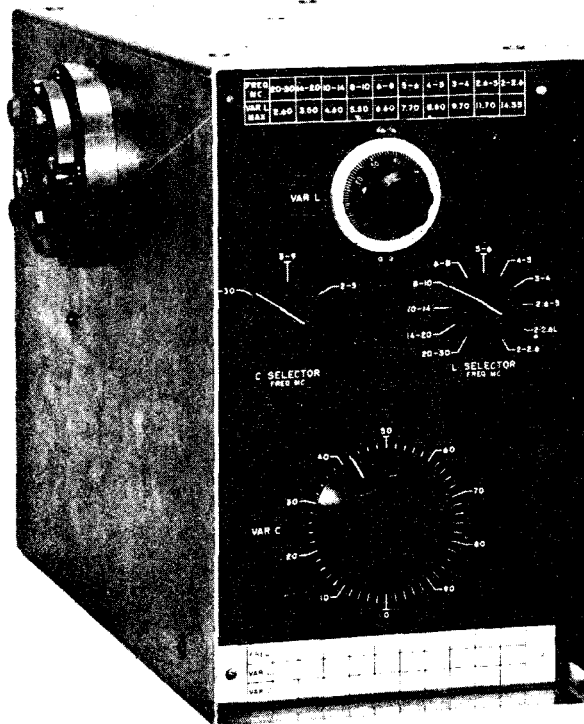


Figure 1. Antenna Coupler 180Y-1

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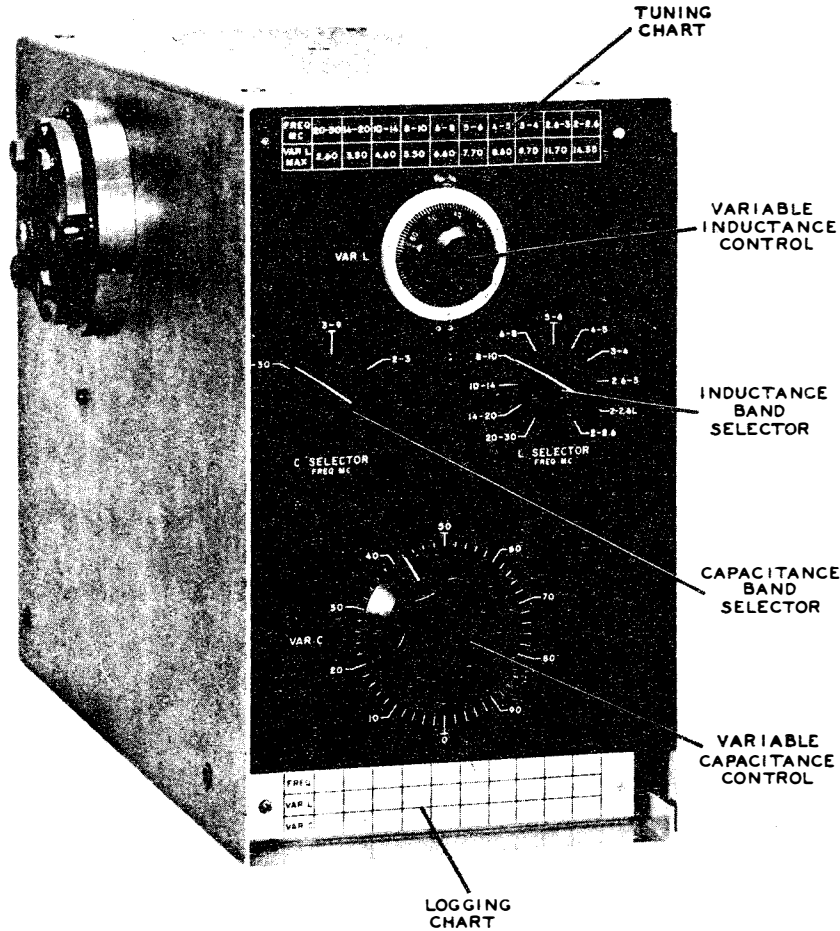


Figure 2. Operating Controls

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1.2 TECHNICAL CHARACTERISTICS.

Frequency range2 to 30 mc.

R-f power input:
 Operate condition . .10 kw PEP maximum; 5 kw average power maximum.

Tune condition1 kw average power maximum.

Maximum tunable swr .3:1.

Input impedance52 ohms.

R-f duty cycleContinuous for 5 kw average power or 10 kw PEP.

Ambient temperature range-20°C to 50°C

Ambient humidity range0 to 95%.

Dimensions 11-5/8 inches high, 7 inches wide, 16-11/16 inches deep.

Weight 23.5 pounds.

2.1 OPERATION.

2.1.1 OPERATING CONTROLS. (See figure 2.)

L SELECTOR Selects one of 11 bands from 2 to 30 mc.

C SELECTOR Selects one of 3 bands from 2 to 30 mc.

VAR L Variable inductance control.

VAR C Variable capacitance control.

2.1.2 OPERATING INSTRUCTIONS.

Connect Antenna Coupler 180Y-1 to input and output coaxial lines (the input line preferably on the right side of the unit). With an external directional wattmeter in the input line, but with no r-f power applied, tune the 180Y-1 in the following manner:

- a. Adjust L SELECTOR and C SELECTOR switches to the band which includes the desired operating frequency.
- b. Adjust VAR C control counterclockwise to zero. Adjust VAR L control to approximately midrange as listed on the tuning chart for the L band selected.
- c. Apply a CW input signal of not more than 1 kilowatt average power. Adjust VAR C control clockwise to give a dip in the r-f wattmeter reflected power reading. Adjust VAR L control to further decrease reflected power reading.
- d. Alternately adjust VAR L and VAR C controls to give a minimum reflected power reading. Apply full power input.

- e. Readjust VAR L and VAR C controls to give minimum reflected power reading (less than 50 watts for five kilowatts average forward power). Check the forward power reading.



Do not reset L SELECTOR or C SELECTOR switches while power is applied to the unit.

3.1 MAINTENANCE.

There are no particular test procedures for Antenna Coupler 180Y-1. After a defective part is replaced, connect the 180Y-1 to a transmitter, and test the unit using the operating procedure.

If a transmitter and the 180Y-1 are operated without a load, arcing between capacitor plates may result. Inspect these plates periodically for defects.

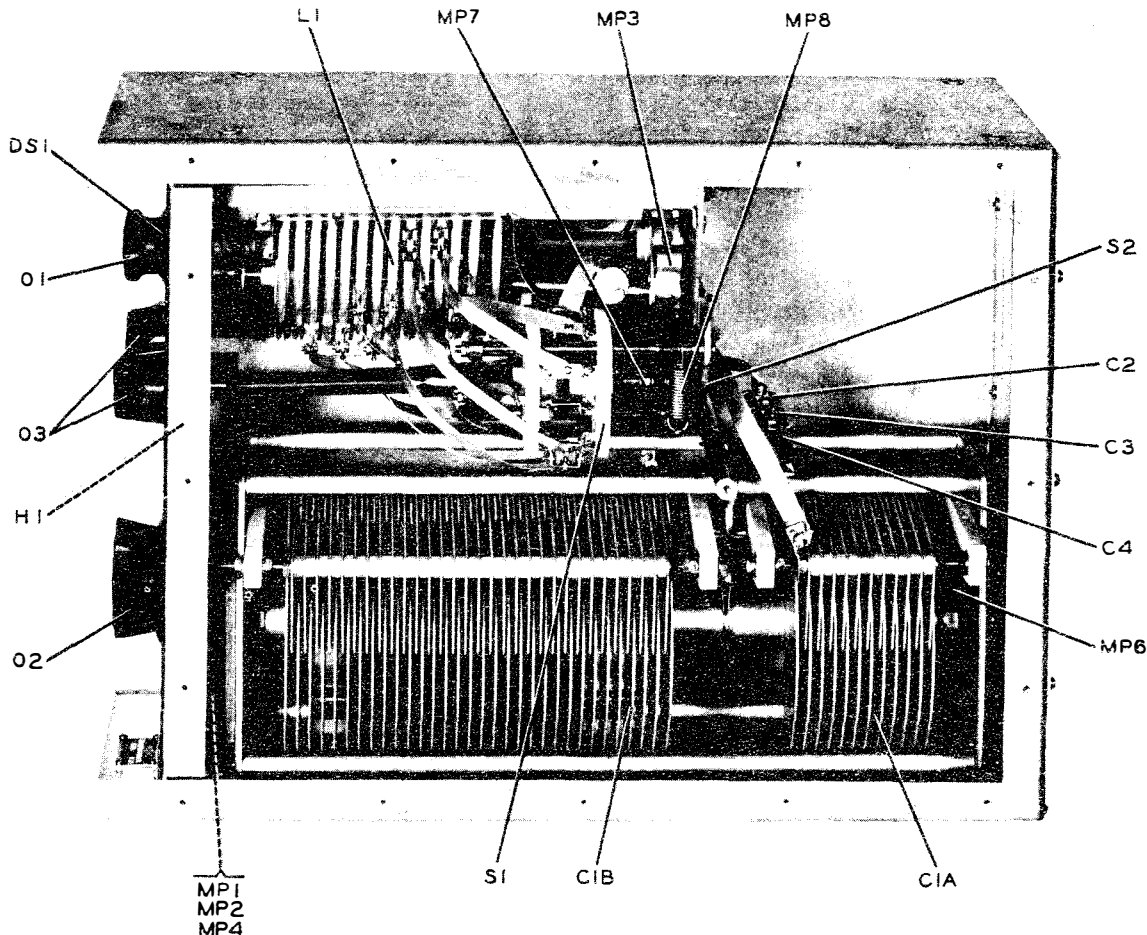


Figure 3. Antenna Coupler 180Y-1, Right Side View, Cover Removed, Parts Location

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PARTS LIST

| ITEM | DESCRIPTION | COLLINS PART NUMBER |
|-------------------------------|---|------------------------|
| ANTENNA COUPLER 180Y-1 | | 522 1493 00 |
| C1 | CAPACITOR, VARIABLE, AIR: dual section, front 58 uuf min 1680 uuf max; back 28 uuf min 580 uuf max; 2500 v dc | 920 0143 00 |
| C2 | CAPACITOR, FIXED, CERAMIC: 100 uuf +10% -750 uuf/uF/°C temp coef; 5000 v dc | 913 0821 00 |
| C3 | CAPACITOR, FIXED, CERAMIC: same as C2 | 913 0821 00 |
| C4 | CAPACITOR, FIXED, CERAMIC: same as C2 | 913 0821 00 |
| DS1 | DIAL, SCALE: 0 to 24 ccw linear inscription range in 380°, incl gear | 542 7425 003 |
| H1 | WASHER, SPRING TENSION: corrosion-resistant 0.006 in. thk by 15/16 in. before forming | 542 7417 002 |
| J1 | JACK ASSEMBLY, ANTENNA COUPLER: 52 ohm impedance assembled w/ contact, electrical, 357 9444 00; sheath, grounding, 304 0146; spring, 340 0814 00; spring, bullet, 545 2895 002; cap, feed-thru, 545 2847 002; fitting, coaxial, 545 2851 002; washer, insulator, 545 2897 002; plate, connector, 545 2853 002; block, antenna mtg, 545 2845 002 | Fab |
| J2 | JACK ASSEMBLY, ANTENNA COUPLER: same as J1 | |
| L1 | COIL, TUNING: seamless copper tubing 3/18 in. od by 0.032 in. wall, precious metal plate, 14-1/3 turns single layer wound, 3-15/32 in. od by 5.933 in. lg | 545 2898 003 |
| MP1 | GEAR, SPUR: CRES, 50 teeth, 20° pressure angle, 0.042 in. w face, diametral pitch 64, standard pitch dia 0.78125 | 542 7416 002 |
| MP2 | GEAR, PRESSED: c/o aluminum 48 tooth gear, 3/8 in. lg by 0.040 in. w face & bronze sleeve bearing 0.46375 in. lg | 542 7440 003 |

| ITEM | DESCRIPTION | COLLINS PART NUMBER |
|------|--|------------------------|
| MP3 | SPRING, PRESSURE: beryllium copper 1-41/64 in. over-all length approx | 545 2829 002 |
| MP4 | GEAR, SPUR: brass, 48 teeth, 20° pressure angle, 0.125 in. w face, diametral pitch 48, std pitch dia 1.000 | 545 2849 002 |
| MP5 | SPRING, BULLET, SHORT: 33 turns, 0.150 in. w by 0.375 in. h; inclis spring, sheath (mod) and inner sheath | 545 6200 002 |
| MP6 | SPRING, CONTACT, SOLDERED: c/o beryllium copper spring 1/2 in. w by 1-5/16 in. lg after forming; & silver rivet 0.250 in. dia by 0.0625 in. h head; 0.090 in. dia by 0.0625 in. lg shank | 545 2893 002 |
| MP7 | BEARING, SHAFT: teflon, flanged, 0.250 in. id by 15/32 in. od by 0.093 in. w overall | 545 2892 002 |
| MP8 | SPRING, BULLET, SHORT: c/o beryllium copper wire 0.0253 in. dia, 33 turns 0.150 in. w by 0.375 in. h and brass bushing 0.046 in. id, 0.070 in. od, 5/18 in. lg | 545 2895 002 |
| O1 | KNOB: fluted, setscrew type, aluminum, black anodize finish, approx 1-1/4 in. dia | 542 7411 002 |
| O2 | KNOB: fluted, setscrew type, black phenolic w/ knurled aluminum insert, 2.078 in. dia approx | 544 0766 004 |
| O3 | KNOB, POINTER: black phenolic w/ knurled aluminum insert; 13/16 in. radius; 29/32 in. h | 544 0781 004 |
| S1 | SWITCH, ROTARY: 2 section, 2 pole, 12 position, 2 moving, 24 fixed contacts | 259 1022 00 |
| S2 | SWITCH, ROTARY: 2 section, 2 pole, 3 position, 2 moving, 12 fixed contacts | 259 1016 00 |

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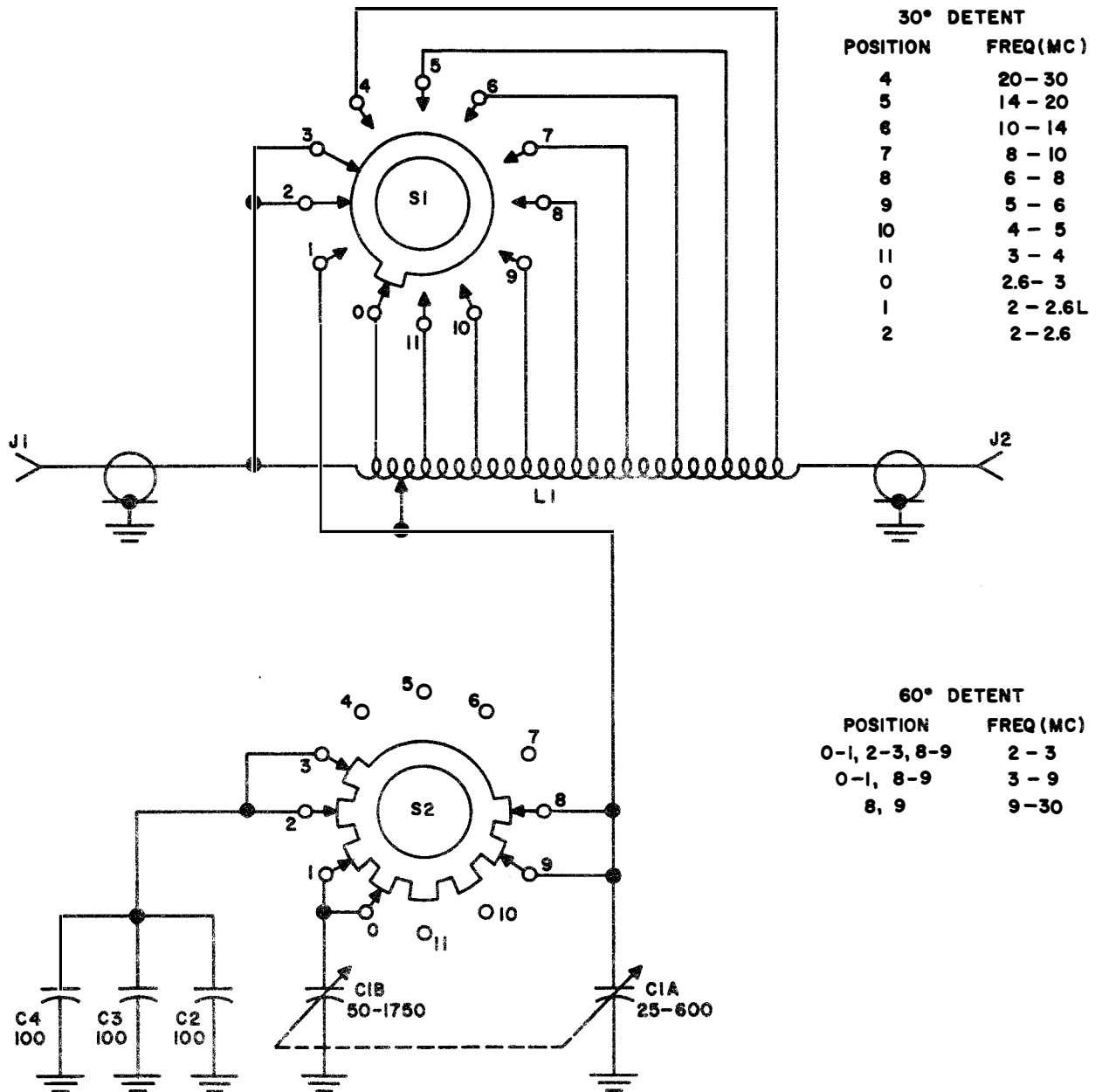


Figure 4. Antenna Coupler 180Y-1, Schematic Diagram

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