

WH7

WATTMETER

by  **DRAKE**



DRAKE

WH7

WATTMETER
MODEL 1514

**INSTRUCTION
MANUAL**



WH7

SPECIFICATIONS

FREQUENCY COVERAGE:	1.8-30 MHz.
LINE IMPEDANCE:	50 Ohms resistance.
ACCURACY:	Wattmeter accuracy is \pm (5% of reading + 0.2 watts) on 20 watts scale, \pm (5% of reading + 2 watts) on 200 watts scale, and \pm (5% of reading + 20 watts) on 2000 watts scale, throughout the range of 1.8–30 MHz.
VSWR INSERTION:	Insertion of wattmeter in line changes VSWR no more than 1.05:1.
POWER CAPABILITY:	2000 Watts RF continuous duty.
CONTROLS AND JACKS FRONT PANEL: REMOVABLE COUPLER:	Range Selector Switch. Two input and output connectors (SO 239). Three range calibration potentiometers. One .5 to 5 pf piston trimmer null adjustment.
DIMENSIONS MAIN CABINET:	5 $\frac{5}{16}$ " high x 6 $\frac{7}{8}$ " wide, 7" cabinet depth (13.5 cm h, 17.5 cm w, 19 cm d).
REMOVABLE COUPLER:	2 $\frac{1}{2}$ " high, 3 $\frac{3}{8}$ " wide, 2 $\frac{3}{4}$ " deep.
WEIGHT:	2 $\frac{3}{4}$ lbs. (1.25 kG)

WH-7 INSTRUCTION MANUAL



WH7 Wattmeter/Coupler

GENERAL

Description.

The Drake Model WH-7 Wattmeter is a through line wattmeter which accurately measures forward and reverse power. The RF coupler is made removable so that it may be conveniently located at the output of the transmitter.

INSTALLATION

Unpacking.

Carefully remove the unit from the shipping carton, and examine it for evidence of damage. If any damage is discovered, immediately notify the transportation company that delivered the unit. Be sure to keep the shipping carton and packing material, as the transportation company will want to examine them if there is a damage claim. Keep the carton and packing material even if no shipping damage occurs. Having the original carton available makes packing the unit much easier should it ever be necessary, to store it or return it to the factory for service.

NOTE

Fill out the enclosed registration card and return it to the factory immediately to insure registration and validation of warranty.

The WH-7 Wattmeter should be installed between the output of the transmitter (or amplifier) and the antenna. Ordinary PL-259 coax connectors will couple correctly with the SO 239 receptacles on the sensing element. The sensing element is completely removable for station convenience. It can be removed by unscrewing the four machine screws on the bottom of the cabinet that hold it in place. In this manner the sensing element can be installed behind the operating table so that bulky coax need not be brought up. Approximately 3 feet of cable connects the sensing element to the meter allowing a wide range of installation positions.

OPERATION

VSWR Measurements.

VSWR measurements may be made easily and directly with the WH-7. Turn the selector switch to the 'SET' position (full CW) and adjust the 'VSWR SET' control to align the meter pointer with 'SET' at the full scale position on the meter. Turn the selector switch to the 'VSWR' position and read the VSWR directly from the VSWR scale (bottom scale).

Power Measurements.

The WH-7 has three power ranges: 20, 200 and 2000 watts full scale. Always position the selector switch such that the meter will not be driven beyond full scale reading.

There are three different types of power to consider when using a wattmeter: forward, reflected and radiated. The WH-7 reads the sum of the radiated and reflected power or forward power. True radiated power may be determined with the S.W.R. CALCULATOR supplied with the wattmeter. Lay a straight edge across appropriate scales of 'FORWARD' and 'VSWR' and read 'REFLECTED' power on the right hand scale. Radiated power is calculated by subtracting the reflected power from the forward power.



MAINTENANCE

Service.

The WH-7 was designed to keep maintenance to a minimum. Since the WH-7 is basically a passive device, it should provide years of service with proper care. If any problems arise that cannot be solved easily, we suggest that you either return your unit to your dealer, or write directly to the R. L. Drake Service Department describing your problem in detail. Include full information concerning external connections, control settings, type of antenna used, etc. Do not return your equipment to the factory without proper authorization. Address your request for authorization to:

R. L. Drake Company
540 Richard Street
Miamisburg, Ohio 45342
ATTN: Customer Service Department
Telephone: (Area Code 513) 866-3211

Telex No. 288-017

Diode Replacement.

Should either or both of the diode rectifiers malfunction, they should be replaced only with the same type. Diodes with different characteristics may seriously impair the accuracy of the Wattmeter.

ALIGNMENT PROCEDURE

NOTE

The internal coupler adjustments were preset at the factory. Since these controls set the accuracy and null points their adjustment is quite critical. No attempt should be made to disturb the settings unless precision laboratory equipment is available.

The following equipment is necessary for alignment:

- a. A 50 Ohm dummy load with an SWR of no more than 1.05:1 at 14 MHz capable of handling 1 kW.
- b. An accurate RF voltmeter such as the HP410B or Boonton 91CA.
- c. A transmitter with variable output to 1kW at 14.00 MHz. All adjustments are made at 14.00 MHz.
- d. A short piece (3 inches) of 50 Ohm coax such as RG/8U or double male PLR59 connector.
- e. One insulated alignment tool.

Remove the coupler from the Wattmeter and carefully remove the screws and cover from the coupler exposing the printed circuit board.



Null Adjustment.

With the transmitter and dummy load connected to the respective jacks on the coupler and the WH-7 range switch in the VSWR position, apply 1000 watts to the load. If any reflected power is visible, insert the alignment tool through the hole in the side of the coupler and adjust the piston trimmer for minimum reflected power (VSWR Set control turned to extreme CW position). If the load is purely resistive, this will be essentially zero. This correctly adjusts the 50 Ohm reference level and no further adjustments of the piston trimmer will be required.

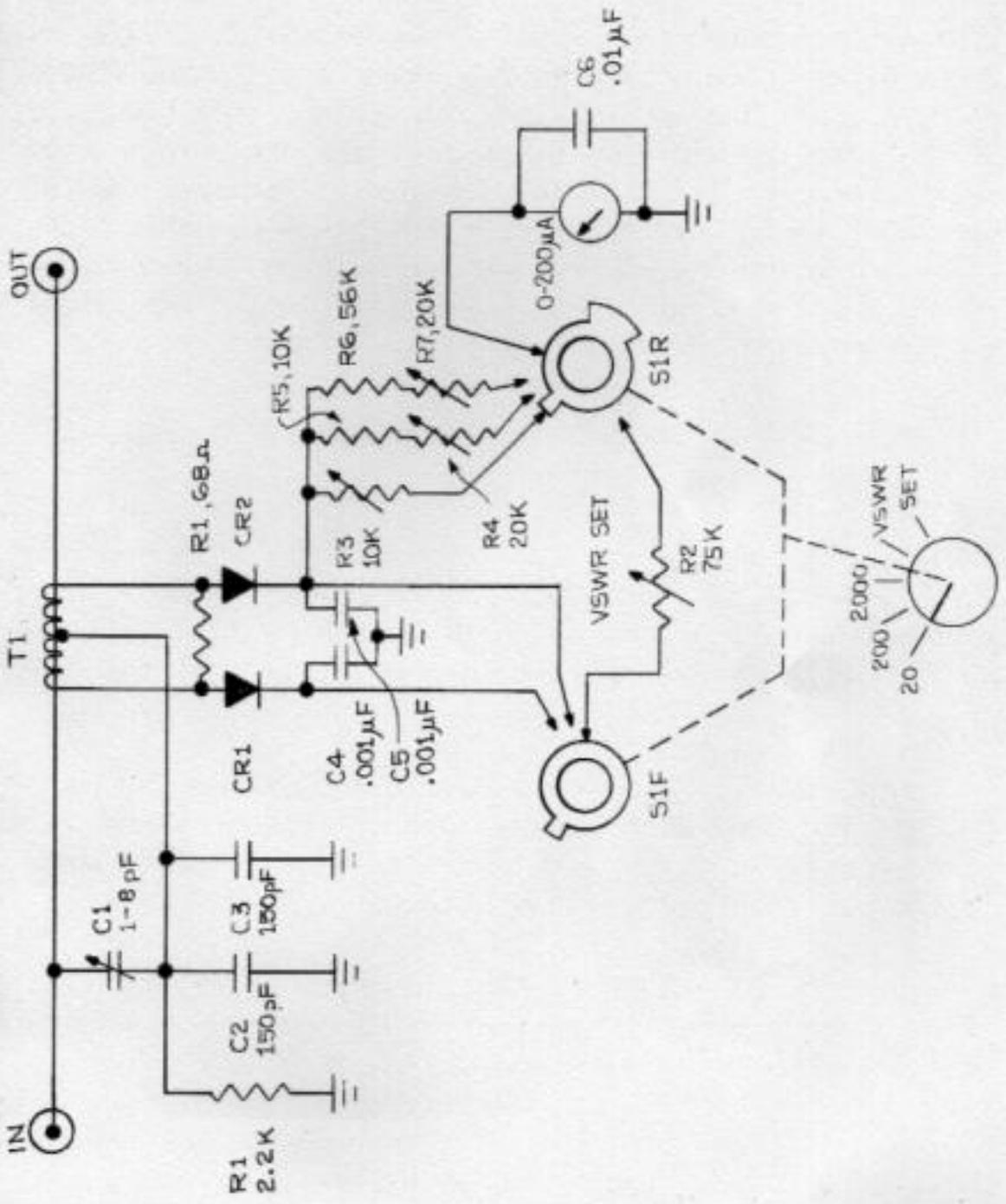
Forward Power Adjustment.

Remove the power from the load, switch the WH-7 range switch to the 20 watt position. Connect the RF voltmeter across the dummy load and apply power until the voltage across the load is exactly 22.36 volts RMS. Adjust the calibration pot (black) until the WH-7 indicates exactly 10 watts.

Remove the power from the load and switch to the 200 watt position. Apply power and increase until the voltage across the dummy load is exactly 70.7 volts RMS. Adjust the middle calibration pot (red) until the WH-7 indicates exactly 100 watts.

Remove the power from the load and switch to the 2000 watt position. Apply power and increase until the voltage across the dummy load is exactly 224 volts RMS. Adjust the end calibration pot (red) until the WH-7 indicates exactly 1000 watts.

Remove the power from the load. The above procedure correctly calibrates the 20, 200, and 2000 watt ranges of the WH-7 and care should be taken not to disturb previous adjustments when calibrating a range.



WH7 Schematic