INSTRUCTION MANUAL
Power, SWR & METER

This model is SWR & POWER Meter with Directional Coupler installed and its character is to measure the wide frequency range precisely by very easy operation. For SWR measurement, it uses Directional Coupler, comparing the power supplied to and reflected from antenna and the independent SWR indicates the measurement. For power measurement, the power meter indicates the travelling wave power detected by Directional Coupler and its frequency range is determined by the figure of Variable Resistor which is for sensitivity adjustment. This model is a through line power meter in its construction, so RF amount is not directly detected from co-ax line. Accordingly, there is very little loss connecting it between transmitter and antenna circuit and QSO is available as it is connected. "On the air" lamp is lighted in accordance with transmitting power while QSO.

SPECIFICATIONS:

Measuring Method	: Directional Coupler
Maximum Handling Power	: 1 KW
SWR Indication	: 1:1 – 3:1
Frequency Range	: 3.5 – 150 MHz
Circuit ~~Impedance~~	: 50 ohm
Measuring Accuracy	: RF Power ±20%
Connector	: SO-239
Meter Sensitivity	: SWR Meter 100μA F.S.D. POWER Meter 100μA F.S.D.
Accessories	: Connector cable for illumination lamp. Magic fastener x 2, pcs.
Dimensions	: 150(W) x 70(H) x 65(D) mm
Weight	: 400 g.

OPERATIONS:

CONNECTION

1. Turn off the output power of transmitter. Disconnect the co-ax cable which leads to antenna from transmitter.
2. Connect the antenna terminal of transmitter and the "XMTR" connecter of this model with 50 ohm co-ax cable. This co-ax cable is preferably short, and should be less than 1 meter long.
3. Connect the co-ax cable which leads to the antenna to the "ANT" connector of this model. When any antenna tuner is set between transmitter and antenna, connect this model between transmitter and antenna tuner. In this case, any type of feeder is acceptable between antenna tuner and antenna.
4. By connecting with 12V (AC/DC) power source using included connector cable, illumination lamp for meter scale is bright.

SWR MEASUREMENT

1. Turn transmitter on, under the condition that this model is correctly connected.
2. POWER Meter and SWR Meter swing at the same time. Adjust the center knob so that the left side POWER Meter indicates "100/50". This position is "SET". You can now read SWR figure on the right side SWR Meter directly.
3. The indication of SWR Meter shows the ratio of the travelling wave power from transmitter and the reflected wave power from antenna circuit, so the higher indication of SWR Meter, the larger reflected wave power. The reflected wave power is not delivered to antenna and it is more preferable that its power is less. If SWR Meter indicates less than 1.3, the condition is good. The table below shows the ratio of the travelling wave power and the reflected wave power against the SWR figure.

SWR	W(REF)/W(FOR)%	SWR	W(REF)W/(FOR)%
1.1	0.227	1.5	4.00
1.2	0.827	2.0	11.1
1.3	1.71	2.5	18.4
1.4	2.78	3.0	25.0

4. In case of Antenna tuner is set between this model and antenna, adjust Antenna Coupler to make SWR figure as small as possible.
5. The relation between this minimum input power and frequency range in order to mesure SWR by this model is as follows.

Frequency (MHz)	The Minimum Input Power (watts)
3.5	20
7	7.5
14	4
21–28	2
50–150	1

RF POWER MEASUREMENT

1. To protect the meter movement, rotate the knob to fully counter clockwise.
2. This power meter is quite stable against load impedance, however best accuracy is obtained with an accurate 50 ohm load and SWR should be as close as 1:1.
3. The sensitivity of the directional coupler of this model depend on the frequencies, and therefore set the knob to the position listed below in accordance with the frequency of the transmitter and read the power directly on the meter (Full Scale 100W/50W at 50 MHz & 10W/5W at 144 MHz).

Frequency	100W	50W	10W	50W
3.5 MHz	4.7	6.0		
7	2.7	3.5		
14	1.8	2.2		
21	1.7	2.0		
28	1.5	1.8		
50			2.0	2.2
144			1.4	1.6

4. a) **The Power Meter (10W Full Scale)**

In accordance with the above list, set the knob to be the power meter of 100W full scale and turn on the power of below 10W.

If the meter indicate the power of 7W at the above condition, rotate the knob to indicate the power of 70W and this condition is to be the power meter of 10W full scale.

b) The Power Meter (1KW Full Scale)

In accordance with the above list, set the knob to be the power meter of 100W full scale and turn on the power of below 100W.

If the meter indicate the power of 50W at the above condition, rotate the knob to indicate the power of 5W and this condition is to be power meter of 1KW full scale.

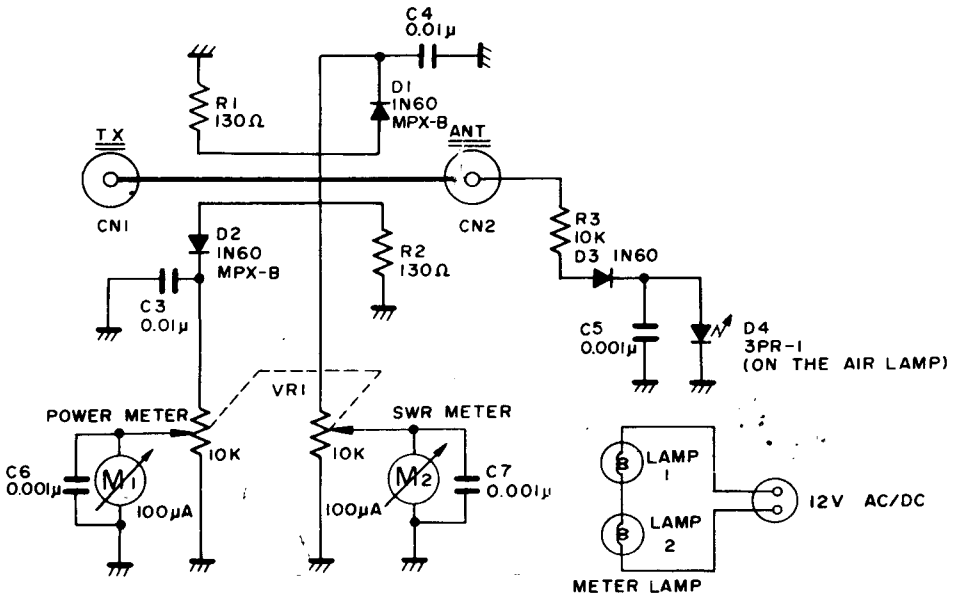
The power meter of this model is scaled for 50W & 100W, and therefore multiply 1/10 for 10W full scale and 10 times for 1KW full scale.

CAUTION

1. Never disconnect the connector of this model leading to antenna when transmitter is on. This model may be burned and spoiled.
2. Sometimes abnormal voltage is found at a certain place of the feeder when transmitter and antenna circuit are mismatching. Do not connect this model in such a case. The safety limit of this model from the view point of transmitting power and SWR figure is shown in the table below. Cut off the output power of transmitter immediately and do not use this model when the shown figure is exceeded.

Transmitter Power	SWR
1 KW	1.1
500 W	1.5
300 W	3.0

SCHEMATIC DIAGRAM



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