TABLE 1

Freq. MHz \ Coaxial		RG-8/U	RG-11/U	RG-17/U	RG-59/U	RG-58/U
Line Loss in dB 100ft.	3.5	0.30	0.37	0.14	0.65	0.70
	7	0.44	0.54	0.19	0.90	1.00
	14	0.64	0.75	0.26	1.30	1.50
	21	0.82	0.97	0.33	1.60	1.70
	28	0.95	1.10	0.40	1.80	2.30
	50	1.35	1.55	0.54	2.50	3.30
	144	2.40	2.60	0.90	4.10	5.70

LINE LOSS IN dB. WHEN PERFECTLY MATCHED

TABLE 2

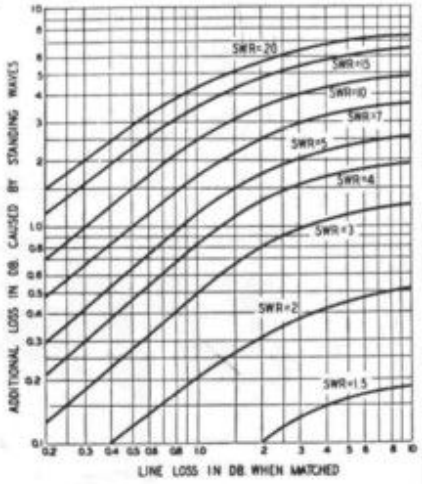
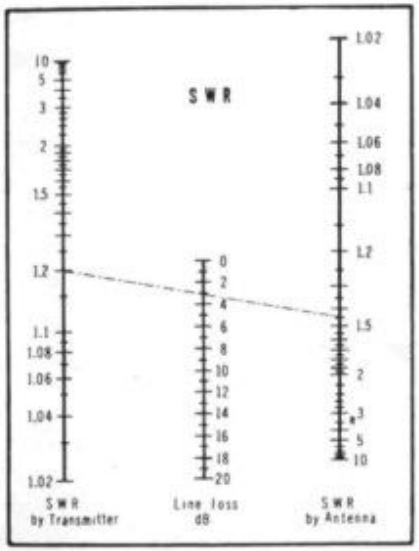


TABLE 3



Note:

Printed in Japan

SWR & POWER METER

MODEL SWR-200

INSTRUCTIONS

The SWR-200 is an easy-to-operate and high sensitive standing-wave ratio and power meter for practical use by radio amateurs. It is designed for measuring the forward and reflected power of standing waves caused between a transmitter and an antenna and also monitoring the impedance-matching of an antenna to a transmission line. The two meters balanced mechanically and electrically, one for the forward power and the other for the reflected one, read the standing-wave ratio directly without a switch. The tube type directional coupler for reducing inductive and capacitive reactances to a minimum is useful in the VHF range. The push button switch for selecting the impedance of 75Ω or 52Ω is useful in mobile radio stations as well as fixed radio ones.

OSKER BLOCK ELECTRONIC ENG. CO., LTD.
TOKYO, JAPAN

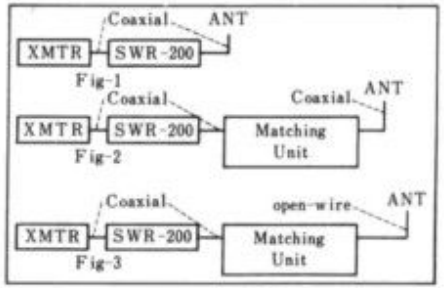
Specification

SWR Meter	POWER Meter
Type : Directional Coupler Ratios : 1 : 1 to 1 : 10 & ∞ Frequency Ranges : 3MHz to 200MHz Impedance : 75Ω or 52Ω Full Scale Minimum Power : 100W at 3.5MHz 50W at 7MHz 15W at 14MHz 5W at 21/28MHz 1W at 50/144MHz	Type : Through Line Power Ranges : 0-200W, 0-2kW at 3.5/7MHz 0-20W, 0-200W, 0-2kW at 14/21/28MHz 0-2W, 0-20W, 0-200W at 50/144MHz Accuracy : ±15% at SWR 1 Safety Rating : 2kW at SWR 1.1−1 750W at SWR 1.5−1 200W at SWR 3.0−1
Meters Sensitivity : 90uA D.C. Connectors : UHF Type(SO−239) Measurement : 76m/m high×110m/m deep×220m/m wide (3" high×4−3/8" deep×8−5/8" wide) Weight : 1,250gs. (2.8lbs.) net	

Construction

Generally speaking, there are three types of the antenna feed system as follows :

1) Direct Feed System
   A transmitter is connected direct to an antenna by a coaxial cable.
2) Impedance Matching System No. 1
   A matching unit is placed between a transmitter and an antenna, and these three are connected by coaxial cables, respectively.
3) Impedance Matching System No. 2
   A matching unit is placed between a transmitter and an antenna, and these three are connected by a coaxial cable and an open-wire line, respectively.



Although this model may theoretically be connected to the connecting point of an antenna and a coaxial cable, it can practically not be done so, as the point is usually too high in the air. Now following are construction practices :

1) Place this model by a transmitter and connect the transmitter terminal of this model to the transmitter by a coaxial cable. Then, extend another coaxial cable from the antenna terminal of this model to an antenna. See Figure 1.
2) Place this model between a transmitter and a matching unit and connect the antenna terminal of this model to the matching unit by a coaxial cable. See Figure 2.
3) Place this model between a transmitter and a matching unit or a TVI filter and connect the antenna terminal of this model to the matching unit or the TVI filter by an open-wire line. See Figure 3.

Operation

Select the impedance of an antenna by the push button switch and adjust the central knob to 0 before operating a transmitter, or the SWR meter will overload. Then, adjust the pointer of the POWER meter to the full scale of it by turning the central knob, and the standing-wave ratio will read directly. Reduce it to a minimum by adjusting an antenna and a matching unit. When the standing-wave ratio is 1, the impedance-matching must be perfect. It can practically be perfect even if the standing-wave ratio is lower than 1.5. The lower scale on the SWR meter reads the reflected power by the percentage. When the standing-wave ratio is 3, the reflected power is 25%, and the forward one is 75%. The standing-wave ratio by the transmitter is lower than that by the antenna. This is equal to a line loss. When a line is extended in the VHF range, it is necessary to know the standing-wave ratio after correcting the line loss. To know the standing-wave ratio by the antenna, find the line loss in Table 1. It depends on the kinds, lengths and frequencies of a line to be used. When a line of 50MHz, RG-8/U and 100 ft. long is used, for example, the line loss will be 1.35dB. This is a line loss at the standing-wave ratio of 1. As the higher standing-wave ratio causes an additional line loss, find it in Table 2. The ordinates give the additional line loss in dB. for the line loss shown on the abscissas, when perfectly matched. These line losses make a total line loss. When the standing-wave ratio is 2, for example, the additional line loss is about 0.24dB., and the total line loss is 1.59dB. When the standing-wave ratio is lower than 1.5, do not see Table 2. In Table 3, find the standing-wave ratio by the antenna at the intersecting point of a straight line extended from the left and middle ordinates to the right one. The correct standing-wave ratio must be higher than that by the transmitter. This means that too fine lines and imperfect matching cause waste consumption of power.

When operating the POWER meter, adjust the central knob to the frequency and power shown in the attached power table. The table of 75Ω is different from that of 52Ω, and the dial number varies with the frequency, even if the same power is used. The POWER meter has a scale on which all the ranges can be read directly. It is a through line type volt meter that does not consume power. It can be used as a monitor of power, while amateur radio stations are in operation. When measuring power without connecting the transmitter to the antenna, attach a dummy load. The higher the standing-wave ratio is, the greater the error of the POWER meter is. When the impedance-matching is imperfect, there will be a very high frequency voltage at some points on the line. To such points, do not connect this model. When using this model in the ranges of 27MHz and 150MHz, see the power table of 28MHz and 144MHz, respectively.

SWR-200 POWER TABLE 52 OHMS LINE

Range / Freq. MHz	0~2W	0~20W	0~200W	0~2kW
3.5	—	—	82	60
7	—	—	71	33
14	—	81	44	15
21	—	71	31	14
28(27)	—	63	23	13
50	74	43	15	—
144(150)	59	20	13	—

KEEP TO SET LEVEL DIAL at SWR 1—1.5

OSKER

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ELECTRONIC ENG., CO.

No 28190

SWR-200 POWER TABLE 75 OHMS LINE

Range / Freq. MHz	0~2W	0~20W	0~200W	0~2kW
3.5	—	—	85	66
7	—	—	76	42
14	—	85	52	17
21	—	76	37	14.5
28(27)	—	69	26	13.5
50	79	51	17	—
144(150)	60	20	13	—

KEEP TO SET LEVEL DIAL at SWR 1—1.5

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TEST O K m.o.