



Coaxial Dynamics

88950-A Series



98950-A Series



INSTRUCTION MANUAL

Specifications And Leading Particulars

The **88950** and **98950** series Wattmeter is designed to work with any Coaxial Dynamics line section and the appropriate elements to accurately indicate the power in coaxial transmission lines. They are used to indicate power from 100mW to 100kW.

They are all equipped with an easily read 4 ½” mirror backed triple scale meter.

88950 Series

Models With 5/10/25 Scales

Model 88952-A

High power 30uA meter in case for use with external single socket line sections.

Model 88954-A

High power 30uA meter in case with a FWD/RFL switch for use with external dual socket line sections.

Models with 15/30/60 Scales

Model 88958-A

High power 30uA meter in case for use with external single socket line sections.

Model 88959-A

High power 30uA meter in case with a FWD/RFL switch for use with external dual socket line sections.



Specifications And Leading Particulars (cont.)

98950 Series

Models With 5/10/25 Scales

Model 98952-A

High power 30uA meter in case for use with external single socket line sections.

Model 98954-A

High power 30uA meter in case with a FWD/RFL switch for use with external dual socket line sections.

Models with 15/30/60 Scales

Model 98958-A

High power 30uA meter in case for use with external single socket line sections.

Model 98959-A

High power 30uA meter in case with a FWD/RFL switch for use with external dual socket line sections.



General Description

1. Purpose and Application

The **88950** series of Wattmeters are designed to measure power flow and match, when used with the appropriate line sections and elements. They are designed for use with CW, FM, AM, and analog TV systems. They are not for use with digital or pulsed applications. They normally are supplied with a 10' cable, but can be supplied with cables up to 200' without any loss of accuracy.

The **98950** series of Wattmeters are designed to measure power flow and match, when used with the appropriate line sections and elements. They are designed for use with complex waveforms such as CDMA, DAB, DTV, IBOC as well as CW, FM, AM, and analog TV systems. They normally are supplied with 10' cables, but can be supplied with cables up to 200' without any loss of accuracy.

2. Description

The **88950** series of Wattmeters includes a case with carrying strap, a shock-mounted mirror backed triple scale meter and cable(s) to attach to the line section. The case has four rubber feet on the base.

The **98950** series of Wattmeters includes a case with carrying strap, a shock-mounted mirror backed triple scale meter and cables to attach to the line section and the element and a plug in wall power supply. The case has four rubber feet on the base. On the rear cover are SMA connectors used to supply DC power to the element via a length of shielded cable equipped with SMA connectors.

General Description (cont.)

3. Theory of Operation

The operation of the **88950/98950** series Wattmeters is based on the traveling wave concept of RF transmission. As RF is applied to a transmission line, there is a forward wave traveling from the transmitter to the load, and a reflected wave traveling from the load to the transmitter. The closer the load is matched to the transmission line the smaller the reflected wave will be. To determine the RF power dissipated in the load, it is necessary to determine the RF power of the forward wave and the RF power of the reflected wave. The difference between the two will be the power absorbed by the load.

The interference between the forward and reflected waves produces a standing wave in the system. In the standing wave concept, VSWR (voltage standing wave ratio) is a widely used tool. There is a simple relation between forward power, reflected power and VSWR.

Let W_f represent forward power.

W_r represent reflected power.

Then

$$\text{VSWR} = \frac{1 + \sqrt{\frac{W_r}{W_f}}}{1 - \sqrt{\frac{W_r}{W_f}}}$$

General Description (cont.)

For example: 1% reflected power is about 1.2:1 VSWR and 10% is about 2.0:1 VSWR.

It can be seen that the VSWR is an index of the magnitude of the mismatch between the source and the load.

The charts supplied can convert W_f and W_r to VSWR.

When the line section and element are inserted in the transmission line the element is both capacitively and inductively coupled to the main line. Voltages proportional to the RF voltage and current in the main line are induced in the element circuitry. The coupling is so adjusted that the induced voltages add in the sensitive direction and cancel in the opposite direction. These voltages are rectified and the resulting DC current is applied to the meter, which is calibrated to represent the power in the main transmission line.

In the **98950** series the RF voltages from the element are fed to some additional circuitry to provide the correct measurements of the complex waveforms.

Operation

1. General Procedure

To make readings with the Wattmeter, it is necessary to select and install a plug-in detector element of the proper power and frequency range, connect the cables to the line section in the transmission line and read the meter with the element in the forward and reverse direction. Subtraction of the reflected power from the forward power provides the power dissipated in the load. To determine VSWR, first determine the forward and reflected power and either use the formula or the charts provided.

Maintenance

Maintenance of the **88950/98950** series of Wattmeters normally is limited to cleaning. The amount of cleaning necessary will depend on the environment the Wattmeter is operated in. Keeping an element in the socket of the line section will provide an effective seal against dust and dirt. When necessary, clean the element seat in the line section with a cotton swab. Pay particular attention to the bottom rim of the element seat and the body of the element. If necessary, the spring finger of the DC contact may be adjusted to make contact with the contact on the element.

CAUTION: *When making adjustments in the line section use extreme caution. The high RF voltages present in the line section can cause serious injury or death.*

Replacement Parts

Common Parts to **88950/98950** series:

Meter 5/10/25 scale	88950-A
Meter 15/30/60 scale	88959-A
Cable with DC connector:	
10'	88901
25'	88902
50'	88903
100'	88904
200'	88905

For **98950** series only:

DC cable with SMA connectors:

25'	88927
50'	88928
100'	88929
200'	88930

Wall Plug-in Power supply

120 VAC/60 HZ	9725
230 VAC/50 HZ	9726

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Network of Distributors
or Coaxial Dynamics for
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Our Products**

RF

**Loads
Meters
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