6970 RF Power Meter

The world's most portable RF and Microwave Power Meter, designed for accurate power measurements in the field

- ***Hand-held for portability***
- ***Battery powered for field use***
- ***Wide frequency range:***
  30 kHz to 46 GHz
- ***Analog bargraph***
- ***Excellent accuracy traceable to National Standards***
- ***Power levels from -70 dBm (100 pW) to +44 dBm (25 W)***
- ***Internal power reference***
- ***Audible Pass/Fail limits alarm***
- ***Rugged case***
- ***Four digit display***

The 6970 RF Power Meter provides precision microwave power measurements in a hand portable battery-powered package. A wide range of user features, including duty cycle, relative power measurements and limit checking make the 6970 Power Meter highly versatile. The same wide range of power sensors used with the IFR 6960 Power Meters and the 6200B series Microwave Test Set are used by the 6970.

Field and Bench Use

The 6970 is designed for both field and bench use. For the installation and maintenance engineer the instrument replaces large and expensive meters with no loss of measurement performance. Rechargeable batteries mean that there is no need for an AC supply; this greatly eases measurements at remote sites such as an antenna tower.

Additional benefits of the 6970 are lower cost and portability. An optional soft carrying pouch with both belt loop and shoulder strap enable the 6970 to be easily carried in field environments

For bench operation the instrument takes up little bench space and it can be powered from the AC adapter.

Battery operation is ideal for field operation

High Accuracy

The 6900 series power sensors all have an excellent return loss specification to minimise mismatch errors in power measurements. Correction for power sensor frequency response and high power non-linearity is also provided by entry of calibration factor and linearity factor values into the 6970.

All the power sensors are individually calibrated and supplied with a calibration data chart.

The auto ZERO function reduces offset errors on each of the 6970 ranges. This increases measurement accuracy at low power levels and improves the measurement sensitivity.

Built-In Power Reference

The built-in power reference provides an accurate 0 dBm (1 mW) 50 MHz calibration signal. Power sensors can be calibrated against this reference for improved measurement accuracy and traceability.

The power reference is automatically switched on during a CAL procedure or it can be enabled at any time to provide a traceable 0 dBm signal for verification.

Operation

The instrument front panel consists of a keyboard and a four digit LCD with annunciators. Power levels are clearly displayed on a digital readout with an analog bargraph to facilitate peaking and nulling. Power levels may either be displayed in logarithmic units such as dBm or dBV or in Watts.

To save battery life, the unit powers down six minutes after the last key press. 6970 will operate for 7 hours from a full battery charge. When the instrument powers down the last operator set-up is stored and this will be the state the 6970 assumes when it is next switched on.

Upper and lower power limits can be set. An audio and visual alarm alerts the user of a measurement that is out of limits. This is useful to set a power to a pre-determined level as well as for monitor-ing purposes.

The 6970 is fully auto-ranging but manual range hold is also possible. Manual range selection is used when measuring modulated or unstable signals. The display indicates either AUTO or MAN as appropriate and will also provide information of over/under-range conditions.

Wide Range of Power Sensors

The 6970 uses the same rugged IFR power sensors that have been developed for the 6960 Power Meter and 6200B series Microwave Test Set. A wide range of 17 sensors is available covering the frequencies from 30 kHz to 46 GHz. Power level measured depends on sensor type, sensors cover from -70 dBm (0.1 nW) to +44 dBm (25 W).

To cater for the different frequency ranges connector types include N type, PC 3.5 mm, 2.92 mm and N type (75 W).

Specification

Frequency Range

30 kHz to 46 GHz
Depending on sensor used

Power Range

-70 dBm (0.1 nW) to +44 dBm (25 W)
Depending on sensor used

Power Sensors Supported

6910 series (-30 dBm to +20 dBm)
6920 series (-70 dBm to -20 dBm)
6930 series (-15 dBm to +35 dBm)
6930 series opt 2 (-5 dBm to +44 dBm)

Instrumentation Accuracy Including Carryover

±1% range 0, 1, 2
±5% range 3

Power Accuracy

After calibration using 0 dBm power reference: ±0.2 dB
Measuring a signal in the centre of the power sensor dynamic range, from a source with return loss better than 14 dB

DISPLAY

Resolution

4 digits for positive readings
3 digits for negative readings

Units

dBm, nW, mW, mW, W, mV, V, dBV

Annunciators

Analog bargraph, Battery low indicator, Indication of auto-ranging or manual range, Upper and lower limits

CORRECTION

Linearity Factor

Ability to enter in range 0.01 to 15 with 0.01 resolution
Defaults to standard setting

Calibration Factor

Ability to enter in range 0.01% to 200%
Resolution: 0.01 to 99.99%
0.1 100% and above

Auto-Calibration

Ability to calibrate against a 0 dBm (1 mW), 50 MHz power reference

Auto-Zero

Removes DC offset from gain stages and power sensor

Set

<400 nW (6910 series)
<100 pW (6920)
<200 pW (6923/6924)
<12 mW (6930 series)

Drift

When measured over one hour at constant temperature
±10 nW (6910 series)
±100 pW (6920 series)
±300 nW (6930 series)

NOISE

Averaged over 5 s
±100 nW (6910 series)
±100 pW (6920 series)
±3 mW (6930 series)

FACILITIES

Averaging

Selected automatically
Audio limit

Produces audible tones when the measured power is above or below programmed limits

Batteries

3 rechargeable NiCd AA size
Operating time
>7 hours from full charge when new

Operating Time

>7 hours from full charge when new

Time to Recharge

<14 hour

Power Consumption

250 mW

DC Input Requirement

9 V to 21 V, 120 mA via a 2.1 mm power connector

GENERAL

Operating Temperature Range

0 to +55°C

Storage Temperature Range

-40 to +55°C

Storage Humidity Range

Up to 85% RH at +40°C

Storage Altitude Range

Up to 4600 m (15000 ft)

DIMENSIONS AND WEIGHT

Height	Width	Depth	Weight
50 mm	88 mm	190 mm	550 g
1.9 in	3.5 in	7.5 in	

ELECTROMAGNETIC COMPATIBILITY

Conforms with the protection requirements of the EEC Council Directive 89/336/EEC. Conforms with the limits specified in the following standards:
IEC/EN61326-1 : 1997, RF Emission Class B, Immunity Table 1, Performance Criteria B

SAFETY

Conforms with the requirements of EEC Council Directive 73/23/EEC and Standard IEC/EN 61010-1 : 1993
Complies with IEC 348, HD 401 for class 3 portable equipment and is for use in a pollution degree 2 environment. The instrument is designed to operate from an installation category 1 supply.

POWER REFERENCE

Frequency

50 MHz ±0.05 MHz

Power level

0 dBm (1 mW)

Uncertainty

±0.7% traceable to National Standards

Accuracy

±1.2% worst case for one year

Output Connector

N (female), 50Ω. Adapters are supplied with 75 Ω, 3.5 mm and 2.92 mm power sensors.

Versions and Accessories

When ordering please quote the full ordering number information.

Ordering Numbers

Versions

6970	RF Power Meter with built-in power reference 6970 RF Power Meter must be used with one of the AC Adapters listed below. One Adapter must therefore be ordered with each instrument
54441/016	AC Adapter - UK Style
54441/017	AC Adapter - European Style
54441/018	AC Adapter - USA Style

Supplied with

43138/663	1.5 m Power Sensor Cable
46882/182	Operating Manual
46882/183	Summary Card
23421/641	2.1 mm Power Connector Plug

Accessories

54112/159	Carrying Pouch
54311/171	DC Supply Lead
46882/207	Service Manual
54417/002	Waveguide 22 to 2.92 mm Transformer

POWER SENSORS - STANDARD

56910/900	10 MHz to 20 GHz (-30 dBm to +20 dBm) Type N.
56911/900	10 MHz to 20 GHz (-30 dBm to +20 dBm) APC 7.
56912/900	30 kHz to 4.2 GHz (-30 dBm to +20 dBm) Type N.
56913/900	10 MHz to 26.5 GHz (-30 dBm to +20 dBm) MPC 3.5.
56914/001	10 MHz to 40 GHz (-30 dBm to +20 dBm) 2.92 mm.
56914/002	10 MHz to 40 GHz (-30 dBm to +20 dBm) 2.92 mm plus waveguide 22 coax transition and calibration table.
56914/003	10 MHz to 46 GHz (-30 dBm to +20 dBm) 2.92 mm.
56919/900	75 Ω 30 kHz to 3 GHz (-30 dBm to +20 dBm) Type N

POWER SENSORS - LOW POWER

56920/900	10 MHz to 20 GHz (-70 dBm to -20 dBm) Type N.
56923/900	10 MHz to 26.5 GHz (-65 dBm to -20 dBm) MPC 3.5
56924/001	10 MHz to 40 GHz (-65 dBm to -20 dBm) 2.92 mm.
56924/002	10 MHz to 40 GHz (-65 dBm to -20 dBm) 2.92 mm plus waveguide 22 coax transition and calibration table
56924/003	10 MHz to 46 GHz. (-65 dBm to -20 dBm) 2.92 mm.

POWER SENSORS - HIGH POWER

56930/900	10 MHz to 18 GHz (-15 dBm to +35 dBm) Type N.
56932/900	30 kHz to 4.2 GHz (-15 dBm to +35 dBm) Type N.
56934/001	10 MHz to 40 GHz (-15 dBm to +30 dBm) 2.92 mm
56934/002	10 MHz to 40 GHz (-15 dBm to +30 dBm) 2.92 mm plus waveguide 22 coax transition and calibration table
56934/003	10 MHz to 46 GHz (-15 dBm to +30 dBm) 2.92 mm
56930/002	10 MHz to 18 GHz (-5 dBm to +44 dBm) Type N
56932/002	30 kHz to 4.2 GHz (-5 dBm to +44 dBm) Type N

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Part No. 46891/066
Issue 3
08/2001