85RF II
High Frequency Probe
Instruction Sheet

Introduction
The 85RF II High Frequency Probe (the Probe) transforms a
dc voltmeter into a high frequency (100 kHz to 500 MHz) ac
voltmeter. Conversion from ac to dc is done on a one-to-one
basis and includes a range of 0.25 V rms to 30 V rms. The
Probe’s dc output is calibrated to be equal to the rms value
of a sine wave input.

Safety

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>![ ]</td>
<td>See Instruction Sheet.</td>
</tr>
<tr>
<td>![ ]</td>
<td>Hazardous voltage.</td>
</tr>
<tr>
<td>![ ]</td>
<td>Do not dispose of this product as unsorted municipal waste. Go to Fluke’s website for recycling information.</td>
</tr>
</tbody>
</table>

⚠️⚠️Warning
To prevent possible electrical shock, fire, or personal injury:

- Examine the case before you use the Product. Look for cracks or missing plastic. Carefully look at the insulation around the terminals.
- Limit operation to the specified measurement category, voltage, or amperage ratings.
- Do not touch voltages >30 V ac rms, 42 V ac peak, or 60 V dc.
- Do not use the Product around explosive gas, vapor, or in damp or wet environments.
- Do not use and disable the Product if it is damaged.
- Use the Product only as specified, or the protections supplied by the Product can be compromised.
- Do not exceed the Measurement Category (CAT) rating of the lowest rated individual component of a Product, Probe, or accessory.
- Keep fingers behind the finger guards on the Probes.
- Do not connect directly to mains.
Specifications

AC to DC ratio: 1:1
Ratio accuracy: (at 25 MHz and loaded with 10 MΩ)
   Above 0.5 V: ± 0.5 dB
   Below 0.5 V: ± 1.0 dB
   Add ±0.2 dB in RF fields of 1 V/m to 3 V/m

Frequency response: (Relative to 25 MHz)
   100 kHz to 80 MHz ±0.5 dB
   *80 MHz to 200 MHz ±2.0 dB
   *200 MHz to 300 MHz ±3.5 dB
   *300 MHz to 400 MHz ±4.5 dB
   *400 MHz to 500 MHz ±5.5 dB
   *Refered to high and low inputs at Probe tip.

Extended frequency response:
   Useful for relative measurements from
   20 kHz to 700 MHz.

Response:
   Responds to the peak value of an input and is calibrated
   to read rms value of a sine wave.

Voltage range: 0.25 V rms to 30 V rms
Maximum input voltage: 30 V rms, 200 V dc
Input capacitance: Approximately 9 pF

Temperature range:
   Operating: +10 °C to +35 °C
   Storage: -40 °C to +75 °C
Humidity: <90 % R.H.

Output connector:
   Fits standard 0.75 inch dual banana connectors

Accessory:
   BNC to Probe Adapter, P/N 574756

Pollution degree: 2
Operating altitude: 3000 m
Warranty: 1 year

Voltmeter Compatibility

The 85RF II can be used with a dc voltmeter that has an
input resistance of 10 MΩ, ±10 %. Voltmeters with higher
input resistances are usable if an external shunt is put
across the input terminals. The shunt value is set to
decrease the input resistance to 10 MΩ.
Operation
To operate the 85RF II Probe:

1. Connect the Probe output to a compatible voltmeter with
an applicable shunt (if necessary.) The Probe’s output low
must be connected to voltmeter low.

2. Set a voltage range (1 V dc reading for each 1 V rms
Probe input).

3. Connect the input low (clip lead or tip shield) to earth
ground.

⚠️⚠️Warning
Input low is intended to be connected to earth
ground. To prevent electrical shock, input low
(clip lead or tip shield) must be connected to
potentials of less than 30 V ac, 42 V peak, or
60 V dc.

Frequency Measurements
Frequencies less than 100 MHz
To measure frequencies less than 100 MHz:
1. Ground the 4-inch clip lead supplied with the Probe.
2. Touch the Probe tip to the circuit under test.

Frequencies greater than 100 MHz
To measure frequencies greater than 100 MHz:
1. Ground the 4-inch clip lead supplied with the Probe.
2. Touch the Probe tip to the circuit under test.

Note
Measurements above 100 MHz must be made with
minimum cable lengths and a terminated 50 Ω system.
One inch or less of non-terminated coaxial cable (such as
a BNC adapter and 50 Ω termination) is required for
measurements up to 300 MHz.

Frequencies greater than 300 MHz
To measure frequencies greater than 300 MHz:
1. Ground the 4-inch clip lead supplied with the Probe.
2. Touch the Probe tip to the circuit under test.

Note
Measurements above 300 MHz must have the Probe tip
and tip shield (input high and low) touch the circuit under
test to realize the rated accuracy of the Probe. Lead
lengths less than 1-inch can cause substantial errors.
**Caution**

To prevent Probe damage, the dc component of the input signal (includes transients) must not be more than 200 V dc. Maximum Probe input is 30 V ac rms and 200 V dc. Measurements of an ac signal riding a dc voltage can be made up to 200 V dc. The input capacitor charges to the peak value of ac plus dc. If the dc level is then changed by more than 200 V dc, the transient can possibly damage the Probe. The chance of damage can prevented if the input capacitor is discharged at the end of each measurement. Momentarily touch Probe tip to the ground clip to discharge the capacitor.

**Performance Test/Calibration**

The performance and calibration test is a verification test to make sure that the 85 RF II is functional and correctly calibrated. Use the procedure as an acceptance test and/or calibration procedure (the Probe has one adjustment which is R2). The recommended calibration interval is one year.

*Note*

If the Probe cannot be calibrated to the specifications in this document, the Probe could be damaged and require replacement or repair. Contact Fluke for instructions.

1. Configure the equipment as shown in Figure 2. Use the leveled sine function of the scope output to set the AC Calibrator signal generator for 1 V rms at 25 MHz and the DMM to measure 1 V dc.

![Figure 1. Schematic Diagram](gak001.jpg)
Required Equipment List

The following equipment (or equivalent) is required for testing the performance of the 85RF II:

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Recommended Model</th>
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<tbody>
<tr>
<td>AC Calibrator</td>
<td>Fluke 5520A-SC600</td>
</tr>
<tr>
<td>50-Ohm Feed Thru Termination</td>
<td>JFW Industries P/N 50L-001</td>
</tr>
<tr>
<td>BNC Jack to Banana Plug Adapter</td>
<td>Pomona P/N 1269</td>
</tr>
<tr>
<td>BNC to Probe Adapter</td>
<td>Fluke P/N 574756</td>
</tr>
<tr>
<td>Digital Multimeter, 3-1/2 Digit (DMM)</td>
<td>Fluke 87V</td>
</tr>
<tr>
<td>BNC Jack to Jack Adapter</td>
<td>Pomona 3283</td>
</tr>
</tbody>
</table>

Figure 2. Equipment Configuration for Performance Test

2. The DMM will read between 0.950 V dc and 1.050 V dc. If the Probe is functional but is not in these limits, disassemble the Probe (refer to the “Probe Disassembly” Section in this Instruction Sheet) and adjust R2 for a DMM measurement between 0.990 V dc and 1.010 V dc. Reassemble the Probe.

3. Move the unit in test to the Normal output of the calibrator and decrease the output level to 0.250 V rms and 1 MHz. The DMM will read between 0.223 V dc and 0.280 V dc.

4. Set the AC Calibrator to STDBY, decrease the frequency to 100 kHz and increase the voltage to 30 V ac rms. (Do not increase the voltage to more than 30 V ac.)

5. Set the AC Calibrator switch to OPER. The DMM will read between 28.3 V dc and 31.8 V dc.

6. Move the unit in test back to the scope output and set the level sine to 1 V rms 160 MHz. The DMM will read between 0.9 V dc and 1.12 V dc. Increase the frequency to 450 MHz. The DMM will read between 0.562 V dc and 1.780 V dc.
Probe Disassembly

Use this procedure to access the internal components of the Probe which includes the R2 calibration adjustment.

1. Remove the bend relief screw and move it away from the Probe.
2. Remove the Probe cover. You will see the R2 adjustment.
3. Carefully remove the Probe tip from the front of the Probe with pliers.
4. Remove the ground lead screw from the Probe body.
5. Lift the rear of the printed circuit board up ¼-inch and pull it away from the Probe tip.
6. To reassemble the Probe, do the steps in this procedure backwards (start with step five and end with step one.) Make sure that the gold pin on the front of the printed circuit board aligns correctly in the Probe tip and that the ground-lead nut is aligned with the hole in the Probe body.

How to Clean the Probe

⚠️⚠️Warning

For safe operation and maintenance of the product, remove the input signals before you clean the Product.

Use a soft cloth dampened in a weak solution of detergent and water to clean the 85RF II. Do not use solvents.