

Chapter 2 Specifications and Characteristics

SPECIFICATIONS TERMINOLOGY

Definitions

The definitions explained here help to clarify the terms used in the remainder of this chapter. These definitions refer to the HP 85062A 3.5 mm Electronic Calibration Kit only and are not necessarily valid definitions for other HP products.

Operating Temperature Range. This is the temperature range over which the calibration standards maintain performance to their specifications.

Accuracy-Enhanced Temperature Range. This is the allowable network analyzer ambient temperature drift during measurement calibration and during measurements when the network analyzer correction is turned on. It is also the range over which the network analyzer maintains its specified performance while correction is turned on. If this temperature range is exceeded, the accuracy-enhanced performance of the network analyzer will be degraded.

Measurement Calibration. This is the calibration performed to determine the corrections necessary for accuracy-enhanced (correction on) measurements.

Connector Pin Depth Values. Refer to Figure 2-1 and Table 2-2. Pin depth is a relative measurement between the center conductor and outer conductor mating surfaces. All references to pin depth in this manual treat positive (+) values as protrusions, and negative (-) values as recessions.

References to Connector Sex

In this manual, adapters, calibration modules, and gage masters are referred to by the sex of their connector. For example, a male adapter has a male connector. A gage is referred to by the sex of the connector that it measures. For example, a male gage *measures* male connectors; a male gage has a female connector.

ENVIRONMENTAL SPECIFICATIONS

Table 2-1 lists the environmental specifications for the modules in the HP 85062 Calibration Kit.

Table 2-1. Environmental Specifications

Specifications	Limits
Operating Temperature Range	+20 to +26 °C (+68 to +79 °F)
Error-Corrected Temperature Range	±1 °C of measurement calibration temperature
Storage Temperature	-40 to +75 °C (-40 to +167 °F)
Barometric Pressure (Altitude) Operation Storage	<4,500 meters (15,000 feet) <15,000 meters (50,000 feet)
Relative Humidity Operation Storage	Non-condensing at all times 0 to 80% (26 °C maximum dry bulb) 0 to 95%
EMI Conducted Susceptibility Radiated Susceptibility Radiated Emissions Magnetic Emissions	CETM 765 EN 50082-1/IEC 801-3 CISPR11 CETM 765

Operating Temperature and Accuracy Enhancement

Temperature of the calibration modules is important because device dimensions (and therefore electrical characteristics) change with temperature. The temperature of the calibration devices and all connectors must be stable before use and within the operating limits shown above.

A measurement calibration of the network analyzer can be made at any temperature within the operating temperature range of the calibration kit. The measurement calibration temperature of the network analyzer must be maintained within the error corrected temperature range of the network analyzer. The error corrected operating temperature range for most HP network analyzers is the initial measurement calibration temperature ±1 °C (±1.8 °F). See the appropriate network analyzer User's Manual.

Measurement calibration, performance verification, and actual device measurements must be made within the error corrected operating temperature range specification of the network analyzer. Part of the error corrected operating temperature range can fall outside of the calibration temperature window. For example, if measurement calibration is performed at +20 °C (+68 °F), verification and measurements must be made between +19 °C (+66.2 °F) and +21 °C (+69.8 °F). Also, if the network analyzer ambient operating temperature drift exceeds the allowable error corrected temperature range, a new measurement calibration must be performed to assure optimum accuracy.

Remember that your fingers are a heat source, so avoid handling the devices unnecessarily during calibration.

Barometric Pressure and Relative Humidity

Barometric pressure and relative humidity also effect device performance. Air exists between the inner and outer conductors of these devices and the dielectric constant of air varies as pressure and humidity change. Refer to Table 2-1 for environmental specifications including barometric pressure.

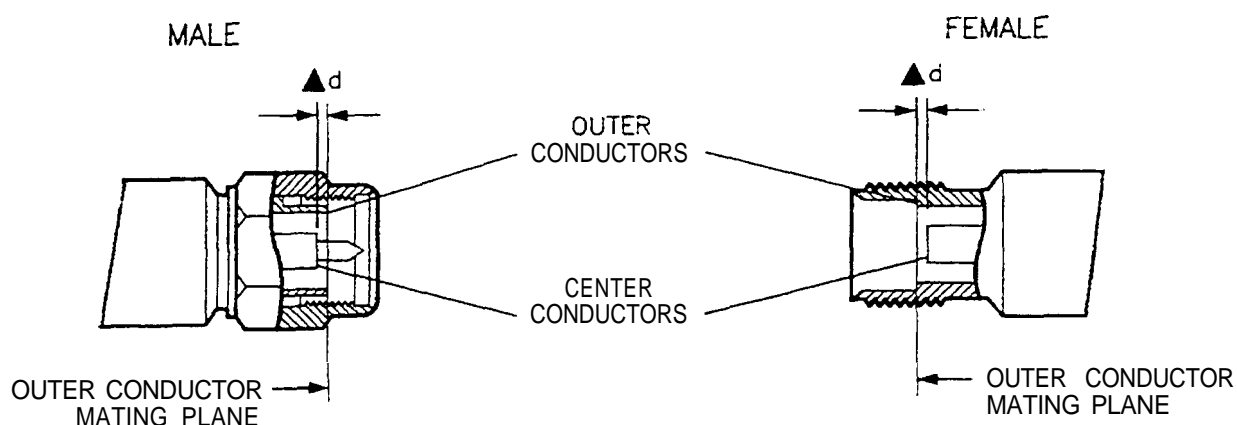
MECHANICAL CHARACTERISTICS

Center Conductor Protrusion and Pin Depth

Mechanical characteristics such as center conductor protrusion and pin depths are not performance specifications. They are, however, important supplemental characteristics related to electrical performance. Hewlett-Packard verifies the mechanical characteristics of the devices in this kit with special gaging processes and electrical testing. This ensures that the device connectors do not exhibit any center conductor protrusion and have proper pin depth when the kit leaves the factory.

Note that center conductor protrusion or recession is referenced to the connector mating surface.

Chapter 4, "Preparation for Use - Gaging and Making Connections", explains how to use gages to determine if the kit devices have maintained their mechanical integrity (refer to Table 2-2 for typical pin depth limits).



Zero pin depth is when $\Delta d = \text{zero}$.

A protruding center conductor is when Δd is a positive (+) value.

A recessed center conductor is when Δd is a negative (-) value.

Figure 2-I. Connector Protrusion and Recession

Table 2-2. 3.5 mm Connector Pin Depth Limits

Device	Typical Pin Depth micrometers (10 ⁻⁴ inches)	Measurement Uncertainty ^a micrometers (10 ⁻⁴ inches)	Observed Pin Depth Limits micrometers (10 ⁻⁴ inches)
3.5 mm Electronic Calibration Module	-25.4 to -50.8 (-10.0 to -20.0)	+1.3 to -1.3 (+0.5 to -0.5)	-24.1 to -52.1 (-9.5 to -20.5)
3.5 mm Adapter	-2.5 to -13.0 (-1.0 to -5.0)	+1.3 to -1.3 (+0.5 to -0.5)	-1.2 to -14.3 (-0.5 to -5.5)

a. Approximately +2 sigma to -2 sigma of gage uncertainty based on studies performed at the factory using analog gages according to recommended procedures.

Connector Torque

Torque all 3.5 mm connectors to 90 N-cm (8 in-lb). Accuracy of the torque wrench supplied in this kit is 90 N-cm ±10% (±9.0 N-cm).

SUPPLEMENTAL CHARACTERISTICS

Table 2-3. Electrical Characteristics

Characteristic	Limit
Frequency Range Standard Option 001	1-26.5 GHz 0.045-2 GHz
Maximum RF Input Power	+20 dBm

Table 2-4. Mechanical Characteristics

Characteristic	Limit
Net Weight Standard Option 001	1,172 grams (2.6 lbs) 1,623 grams (3.6 lbs)
Shipping Weight Standard Option 001	1,893 grams (4.2 lbs) 2,360 grams (5.2 lbs)
Dimensions (length x width x height)	350 x 200 x 67 mm (13.8 x 7.9 x 2.6 inches)