

Calibration Kit Overview

The Agilent 85036B and 85036E type-N calibration kits are used to calibrate Agilent network analyzers up to 3 GHz for measurements of components with 75 Ω type-N connectors.

Kit Contents

The 85036B calibration kit contains the following:

- one male and one female 75 Ω type-N open termination
- one male and one female 75 Ω type-N short termination
- one male and one female 75 Ω type-N load
- three 75 Ω type-N to 75 Ω type-N adapters

Refer to [Table 6-1](#) and [Figure 6-1](#) for a complete list of kit contents and their associated part numbers.

The 85036E calibration kit contains the following:

- one male combination open/short termination
- one male 75 Ω type-N load

Refer to [Table 6-2](#) and [Figure 6-2](#) for a complete list of kit contents and their associated part numbers.

Broadband Loads

The broadband loads are instrument-grade, 75 Ω terminations that have been optimized for performance up to 3 GHz. The rugged internal structure provides for highly repeatable connections. A distributed resistive element on sapphire provides excellent stability and return loss.

Opens and Shorts

The opens and shorts are built from parts that are machined to the current state-of-the-art precision machining.

The short's inner conductors have a one-piece construction, common with the shorting plane. This construction provides for extremely repeatable connections.

The female open has a separate-piece inner conductor that is made from a low-dielectric-constant plastic to minimize compensation values.

Both the opens and shorts are constructed so that the pin depth can be controlled very tightly, thereby minimizing phase errors. Some of the opens and shorts have offsets. The lengths of these offsets are designed so that the difference in phase of their reflection coefficients is approximately 180 degrees at all frequencies.

Adapters

Like the other devices in the kit, the adapters are built to very tight tolerances to provide good broadband performance. The adapters utilize a dual-beaded connector structure to ensure stable, repeatable connections. The beads are designed to minimize return loss and are separated far enough so that interaction between the beads is minimized.

The adapters are designed so that their nominal electrical lengths are the same, which allows them to be used in calibration procedures for non-insertable devices.

Calibration Definitions

The calibration kit must be selected and the calibration definitions for the devices in the kit installed in the network analyzer prior to performing a calibration. Refer to your network analyzer user's guide for instructions on selecting the calibration kit and performing a calibration.

The calibration definitions can be:

- resident within the analyzer
- entered from the front panel

Installation of the Calibration Definitions

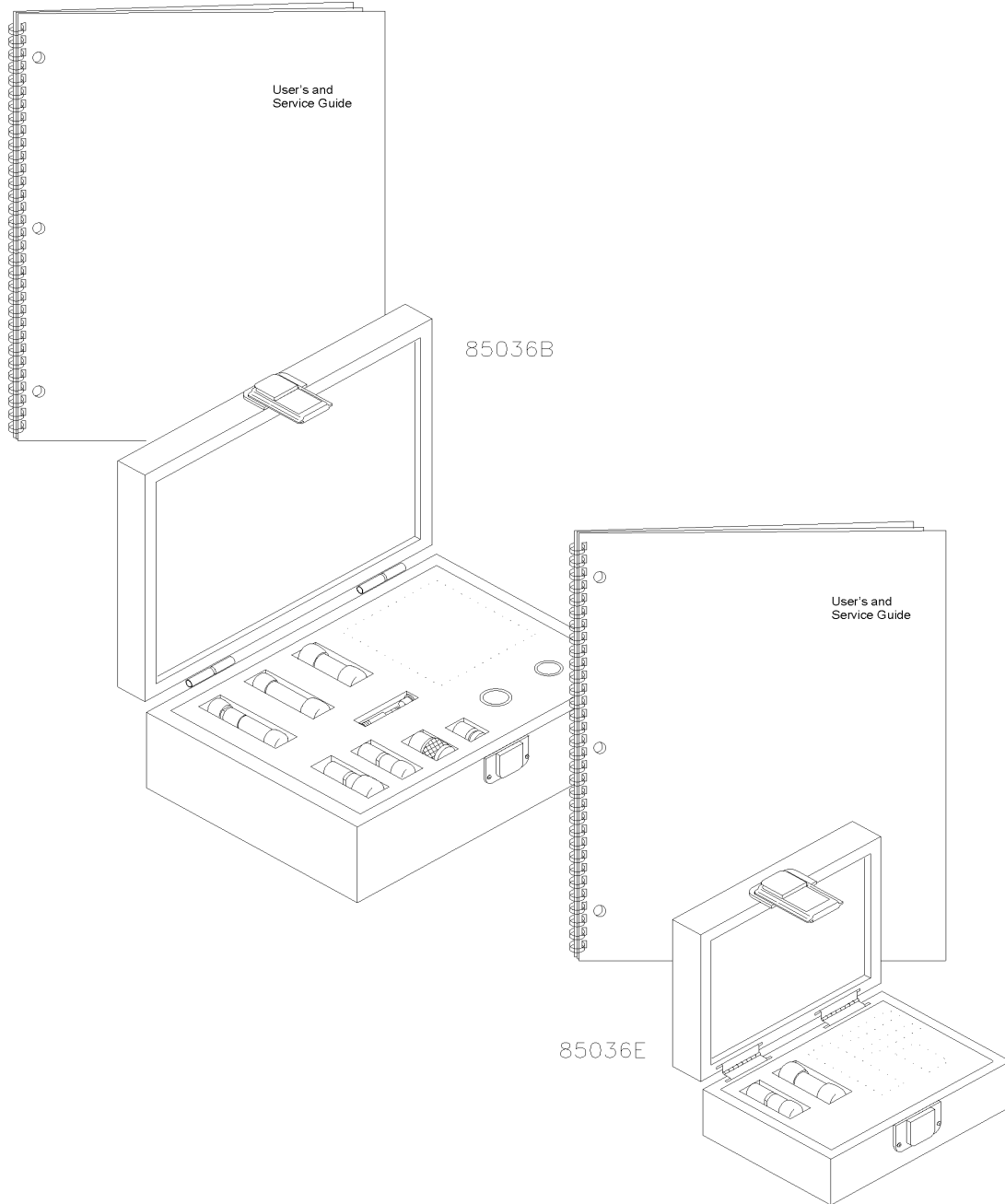
The calibration definitions for the kit may be permanently installed in the internal memory or hard disk of the network analyzer.

If the calibration definitions for the kit are not permanently installed in the network analyzer, they must be manually entered. Refer to your network analyzer user's guide for instructions.

Equipment Required but Not Supplied

Gages, torque and open-end wrenches, ESD protective devices, and various connector cleaning supplies are *not* included in the calibration kit but are required to ensure successful operation of the calibration kit. Refer to [Table 6-3 on page 6-5](#) for ordering information

Figure 1-1 Calibration Kit Contents



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2 Specifications

Environmental Requirements

Table 2-1 Environmental Requirements

Parameter	Limits
Operating temperature ^a	+18 °C to +28 °C (+64 °F to +82 °F)
Error-corrected temperature range ^b	±1 °C of measurement calibration temperature
Storage temperature	-40 °C to +75 °C (-40 °F to +167 °F)
Altitude	
Operation	< 4,500 meters (≈15,000 feet)
Storage	< 15,000 meters (≈50,000 feet)
Relative humidity	Always non-condensing
Operation	0 to 80% (26 °C maximum dry bulb)
Storage	0 to 95%

- a. The temperature range over which the calibration standards maintain conformance to their specifications.
- b. The allowable network analyzer ambient temperature drift during measurement calibration and during measurements when the network analyzer error correction is turned on. Also, the range over which the network analyzer maintains its specified performance while correction is turned on.

Temperature—What to Watch Out For

Changes in temperature can affect electrical characteristics. Therefore, the operating temperature is a critical factor in performance. During a measurement calibration, the temperature of the calibration devices must be stable and within the range specified in [Table 2-1](#).

IMPORTANT Avoid unnecessary handling of the devices during calibration because your fingers are a heat source.

Mechanical Specifications

The mechanical specifications in [Table 2-2](#) apply to the devices in the 85036B and the 85036E 75 Ω type-N calibration kits.

Table 2-2 Mechanical Specifications

Device	Specification
Type-N Male Open	Inside diameter of outer conductor: 6.985 to 7.010
Type-N Male Short	Inside diameter of outer conductor: 7 ± 0.015 mm Distance from reference plane to shorting plane: 5.29 ± 0.013 mm

Supplemental Mechanical Characteristics

Supplemental characteristics are values which are typically met by a majority of the calibration kit devices tested at Agilent. These supplemental characteristics are intended to provide information useful in calibration kit applications by giving typical, but non-warranted performance parameters. [Table 2-3](#) lists the typical characteristics of the devices in this kit.

Table 2-3 Mechanical Characteristics

Device	Characteristic
Type-N Male Short	Diameter of male pin: 0.897 ± 0.013 mm
All Type-N Male Connectors	Pin depth: 0.207 to 0.210 inch
All Type-N Female Connectors	Pin depth: 0.204 to 0.207 inch

Electrical Specifications

The electrical specifications in [Table 2-4](#) apply to the devices in your calibration kit when connected with an Agilent precision interface.

Table 2-4 Electrical Specifications

Device	Specification	Frequency (GHz)
Loads ^a	Return loss ≥ 46 dB ($\rho \leq 0.00501$)	DC to ≤ 2
	Return loss ≥ 40 dB ($\rho \leq 0.01000$)	> 2 to ≤ 3

a. 23° +5 °C; typical resistance change: ± 300 ppm/°C

Certification

Agilent Technologies certifies that this product met its published specifications at the time of shipment from the factory. Agilent further certifies that its calibration measurements are traceable to the United States National Institute of Standards and Technology (NIST) to the extent allowed by the institute's calibration facility, and to the calibration facilities of other International Standards Organization members. See [“How Agilent Verifies the Devices in This Kit” on page 4-2](#) for more information.