

Agilent
11636B
APC-3.5 mm
Power Divider
DC to 26.5 GHz

Operating and Service
Manual



Notices

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Safety Notices

CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

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A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

11636B Power Divider

Introduction

From DC to 26.5 GHz, the 11636B provides excellent output power symmetry between the two output ports. Its design provides excellent source match for fault applications using network analyzers. However, it is not recommended for ratio or source leveling applications.

The 11636B provides a symmetrical 6 dB power division. It can also be used as a power combiner: when signals are input at the two output ports, the sum of the two signals appears at the input port.

Specifications

Maximum Input Power: 0.5 W (27 dBm)

Frequency Range: DC to 26.5 GHz

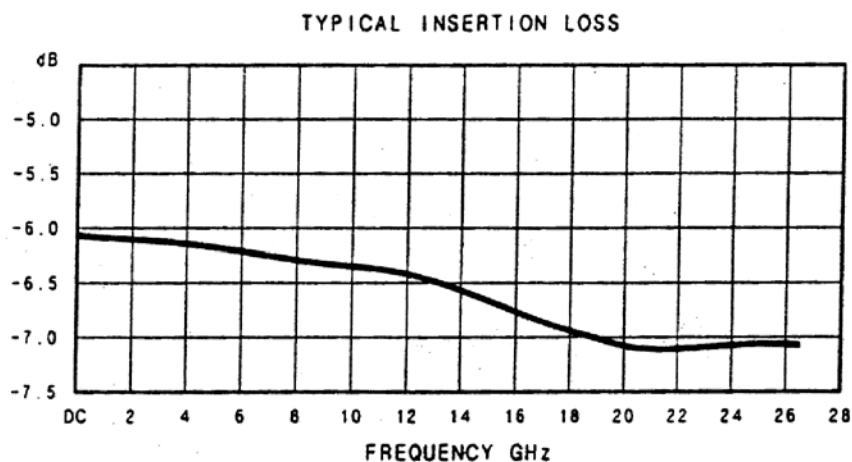
Input/Output SWR:

- DC to 10.0 GHz: ≤ 1.22
- 10.0 GHz to 26.5 GHz: ≤ 1.29

Tracking Between Output Ports:

- DC to 18.0 GHz: < 0.25 dB
- 18.0 to 26.5 GHz: < 0.50 dB

Maximum Insertion Loss: < 7.5 dB (DC to 26.5 GHz)



11636_001_1

Phase Tracking Between Output Arms: < 3 degrees, Typical

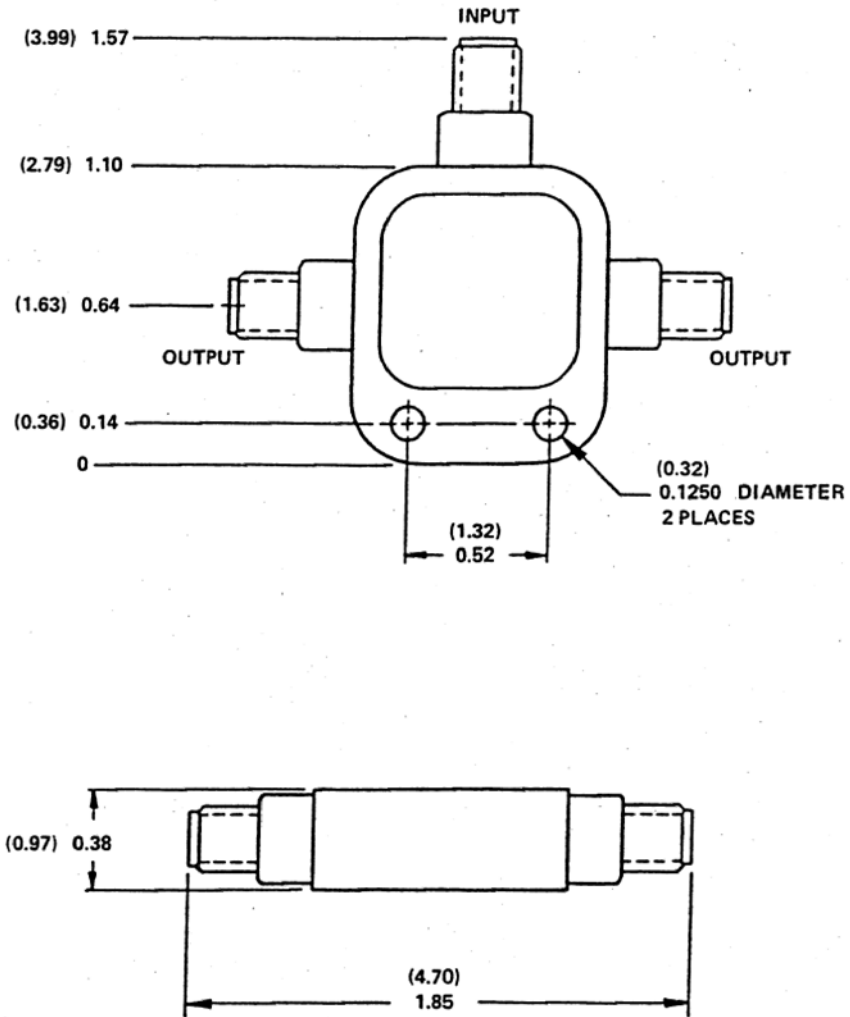
Nominal Insertion Loss: 6.0 dB + 0.04 dB/GHz

Number of Ports: Three

Connectors: 3.5 mm on all ports

Dimensions:

NOTE In the following graphic, dimensions are given in inches (cm) and are maximum unless otherwise specified.



11636_001_2

Mating the 11636B Power Divider with Other Precision 3.5 mm Devices

The 11636B power divider has *precision* 3.5 mm connectors, and is best used with other precision 3.5 mm devices. When mating connectors, observe the following precautions:

- Push them straight together.
- Make sure the male contact pin is precisely aligned with the female.
- Do not overtighten the connectors.
- NEVER rotate either center conductor (by turning the device body).
- Only turn the outer nut of the male connector.
- Torque to 8 in-lb (96 N-cm) for the final connection.

An 8 in-lb torque wrench is available from Agilent. For the part number, refer to “[Equipment and Supplies](#)” on page 5.

Mating the 11636B Power Divider with SMA Devices

CAUTION SMA connectors are not precision devices, and are often out of mechanical tolerances even when new. Out of tolerance SMA connectors will likely ruin a precision 3.5 mm connector on the first mating. Gage SMA connectors before use.

The 11636B power divider has *precision* 3.5 mm connectors. SMA connectors will mate with precision 3.5 mm connectors. However, caution is necessary to prevent accidental damage due to worn or out-of-tolerance SMA connectors. Such connectors can destroy a precision 3.5 mm connector *even on the first connection*. Agilent Technologies recommends that you remember the following important information:

- SMA connectors are not precision mechanical devices.
- They are not designed for repeated connections.
- They are very susceptible to mechanical wear.
- SMA connectors are often out of mechanical tolerances when new.

Before mating an SMA connector (even a new one) to a precision 3.5 mm connector, inspect the SMA connector carefully both visually and mechanically. To measure the mechanical tolerances, use a precision connector gage. A male SMA connector pin which is too long can smash or break the delicate fingers on the precision 3.5 mm female connector, damaging it beyond possibility of repair. Gaging SMA connectors is the most important step in preventing damage to your equipment, and it takes very little time. Gaging instructions and gage part numbers are provided in the *Connector Care for RF and Microwave Coaxial Connectors* document. It can be viewed online by searching for part number 08510-90064 at www.agilent.com.

Use the following precautions when mating SMA and precision 3.5 mm connectors:

- Push them straight together.
- Make sure the male contact pin is precisely aligned with the female.
- Do not overtighten the connectors.
- NEVER rotate either center conductor (by turning the device body).

- Only turn the outer nut of the male connector.
- Torque to 5 in-lb (50 N-cm) for the final connection.

Note that the torque listed above is less than when mating two precision 3.5 mm connectors. A 5 in-lb torque wrench is available from Agilent. For the part number, refer to [“Equipment and Supplies” on page 5](#).

Significant structural and dimensional differences exist between these two type of connectors. Precision 3.5 mm connectors use an air dielectric. Only air exists between the center and outer conductors. The male or female center conductor is supported by a plastic bead, deep within the body of the connector. In SMA connectors, a plastic dielectric supports the entire length of the center conductor. In addition, the diameters of both the inner and outer conductors differ between SMA and precision 3.5 connectors. When an SMA connector is mated with a 3.5 mm connector, the connection will exhibit a discontinuity mismatch (SWR) of 1.10 typical at 20 GHz (return loss = 26.5 dB). SMA and 3.5 mm connectors should be mated only when a high connector mismatch can be tolerated.

Using only precision 3.5 mm connectors will provide superior SWR and insertion loss. It will also extend the life of your power divider (and other test equipment connectors) by reducing mechanical wear.

Refer to [Table on page 6](#) for a list of precision 3.5 mm adapters available from Agilent Technologies. A precision 3.5 mm (m) to precision 3.5 mm (m) adapter, or precision airline, can be used to extend the life of the 11636B connectors.

Operating Environment

The operating environment should be within the following limits:

Temperature	0° to +55°C (+32° to +131°F)
Humidity	Up to 95% relative
Altitude	Up to 4.572 meters (15,000 feet)

Adjustments

The 11636B power divider requires no electrical or mechanical adjustments.

Service

The circuit elements of the 11636B are split into three identical channels. A malfunction will usually occur in only one channel and can be verified by moving the connection to another channel of the divider.

An ohmmeter can be used to check the continuity of the inner conductor connections. The resistance from either output center conductor to the input center conductor should be 33.3 ohms +/- 2 ohms.

There are no replaceable components for the power divider. A worn or damaged power divider must be replaced in whole.

Table 1 Precision 3.5 mm Adapters Available from Agilent Technologies

Description	Part Number
Precision 3.5 mm (m) to type-N (m)	1250-1743
Precision 3.5 mm (m) to type-N (f)	1250-1750
Precision 3.5 mm (f) to type-N (m)	1250-1744
Precision 3.5 mm (f) to type-N (f)	1250-1745
Precision 3.5 mm (m) to Precision 7 mm	1250-1746
Precision 3.5 mm (f) to Precision 7 mm	1250-1747
Precision 3.5 mm (m) to Precision 3.5 mm (m)	85027-60007
Precision 3.5 mm (f) to Precision 3.5 mm (f)	85027-60005
Precision 3.5 mm (m) to Precision 3.5 mm (f)	85027-60006

Equipment and Supplies

The following equipment and supplies are required for the maintenance and use of, but are not supplied with, your 11636B power divider.

Item	Part Number	Recommended Use
3.5 mm gage sets (part of the 85052B calibration kits)	11752-60105 (f) 11752-60106 (m)	Periodic gaging of connectors. Gage <i>every</i> SMA connector before use.
Torque wrench, 5/16", 96 N-cm (8 in-lb) (part of the 85052B calibration kit)	8710-1765	Mating two precision 3.5 mm connectors.
Torque wrench, open-end, 5/16", 60 N-cm (5 in-lb)	8710-1582	Mating a precision 3.5 mm connector to an SMA. connector.
Document: <i>Connector Care for RF and Microwave Coaxial Connectors</i>	08510-90064	Following instructions on using and maintaining coaxial connectors.

Cleaning Connectors

For information on cleaning connectors, refer to the *Connector Care for RF and Microwave Coaxial Connectors* document. It can be viewed online by searching for part number 08510-90064 at www.agilent.com.

Contacting Agilent

Assistance with test and measurement needs and information on finding a local Agilent office are available on the Web at:

www.agilent.com/find/assist

NOTE In any correspondence or telephone conversation, refer to the Agilent product by its model number and full serial number. With this information, the Agilent representative can determine whether your product is still within its warranty period.
