

SPINNER

1.35 mm - E Connector



The Robust Precision Interface
for DC to 90 GHz

HIGH FREQUENCY PERFORMANCE WORLDWIDE
www.spinner-group.com



The SPINNER Group

For more than 70 years, the SPINNER Group has been setting new standards worldwide in high-frequency technology. Based in Munich with production facilities in Germany, Hungary and China, SPINNER currently has over 1,000 employees. Our international network of subsidiaries and distributors supports customers in over 40 countries.



TEST & MEASUREMENT



COMMUNICATION



BROADCAST



SATCOM/SPACE



WIND ENERGY



INDUSTRY



SUBSEA/OFFSHORE

RF Measurement

Today no development, production, testing or quality assurance department that deals with RF signals on coaxial lines can afford to dispense with up-to-date measurement equipment. Particularly with vector network analyzers, it is essential for them to use high-precision connectors, terminations and adapters.

The same statement applies to calibration kits and mechanical accessories such as gauges for checking mating face dimensions or torque wrenches for tightening coupling nuts. In all of these cases, SPINNER has established new, extremely high standards of precision that most users would not want to be without.

Precise measured values are especially important when transmitting high power levels. Other major applications

include extensive testing of mobile communications systems such as GSM, UMTS or LTE and wireless data transmission, e. g. via WiMAX, WLAN or RFID.

SPINNER supplies coaxial measurement equipment of outstanding electrical and mechanical quality for use at frequencies from 1 kHz to 110 GHz.

Coaxial & Waveguide Measurement Devices

Coaxial & waveguide measurement devices made by SPINNER are needed in:

VNA Measurement

- Calibration and Verification Standards
- Air Lines
- Rotary Joints
- Articulated Lines
- Adapters
- Connector Gauges

Millimeter Wave Measurement

- Ruggedized Test Port Adapters
- 1.35 mm Connector "E Connector"
- mmWave Waveguide-to-Coax-Adapters
- EasyLaunch PCB Connectors
- EasySnake Flexible Dielectric Waveguides

PIM Measurement and Test Automation

- EasyDock Push-Pull Adapters
- Low PIM Switches
- Low PIM Test Cables
- Low PIM Rotary Joints
- Low PIM Loads
- Low PIM Passive Intermodulation Standards



The New Precision Coaxial Connector Between 1.85 and 1.00 mm

1.35 mm E Connector.
The Best High-Precision Connector for E-Band Applications



As the market for millimeter wave sensors for self-driving vehicles expands, the demand for proper RF connections in testing environments is also growing.

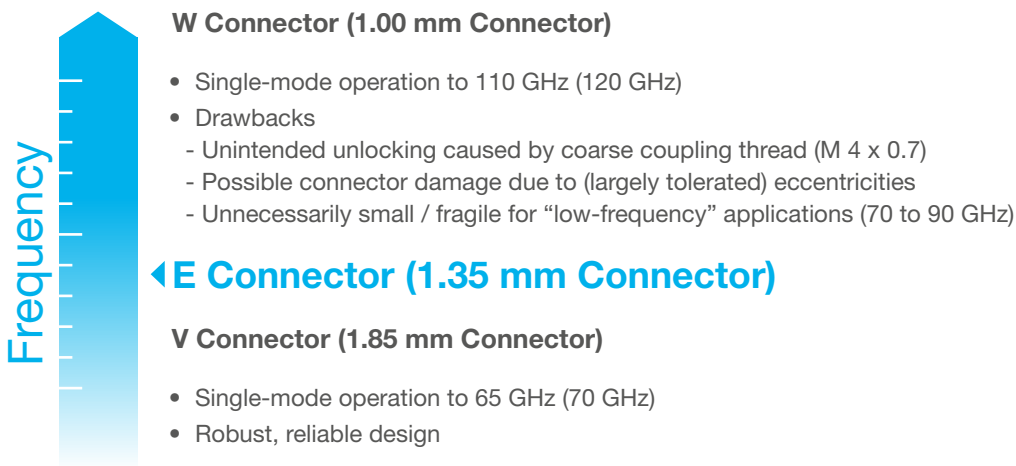
Reliable coaxial interface connections are crucial for achieving good RF performance, especially in E-band applications. A common frustration in RF laboratories is unwanted unlocking of the 1.00 mm coaxial thread performing time-consuming calibrations. This spawned the idea of a 1.35 mm connector the “E Connector” with a precise metric thread like the 1.85 mm connector plus an integrated time-saving push-pull capability.

The E Connector is ideal for making high-performance RF measurements in the E-band without being held up by fragile 1.00 mm coaxial connectors or wasting time reas-

sembling WR 10 waveguides. SPINNER designed the new 1.35 mm E Connector to close the gap between the 1.85 mm and 1.00 mm coaxial connectors.

The 1.35 mm E Connector interface has been accepted for IEEE precision connector standard P287. A manufacturer-independent supply of the new 1.35 mm E Connector is therefore ensured.

Why the E Connector?



Design Goals

- **Frequency range DC to 90 GHz (92 GHz), E-band**
- **Highly robust**
 - Minimum service life of 3000 cycles
 - Locked by a threaded coupling nut that adequately prevents unintended opening
- **„Thru-male“ capability**, i.e. pin diameter must coincide with the inner conductor of the standard 0.047-inch semi-rigid cable (MIL-DTL-17/151; largest cable covering the E-band; $H_{1,1}$ -cutoff at 109 GHz)
- **Push-pull coupling as an option**
- **Precision interface with**
 - Accurate alignment with outer conductor
 - Well-defined reference plane
 - Maximized return loss
 - High connector repeatability (min. 45 dB)
 - Suitable for precision S-parameter testing
 - Similar design to 1.85 mm connector

Special Design Features

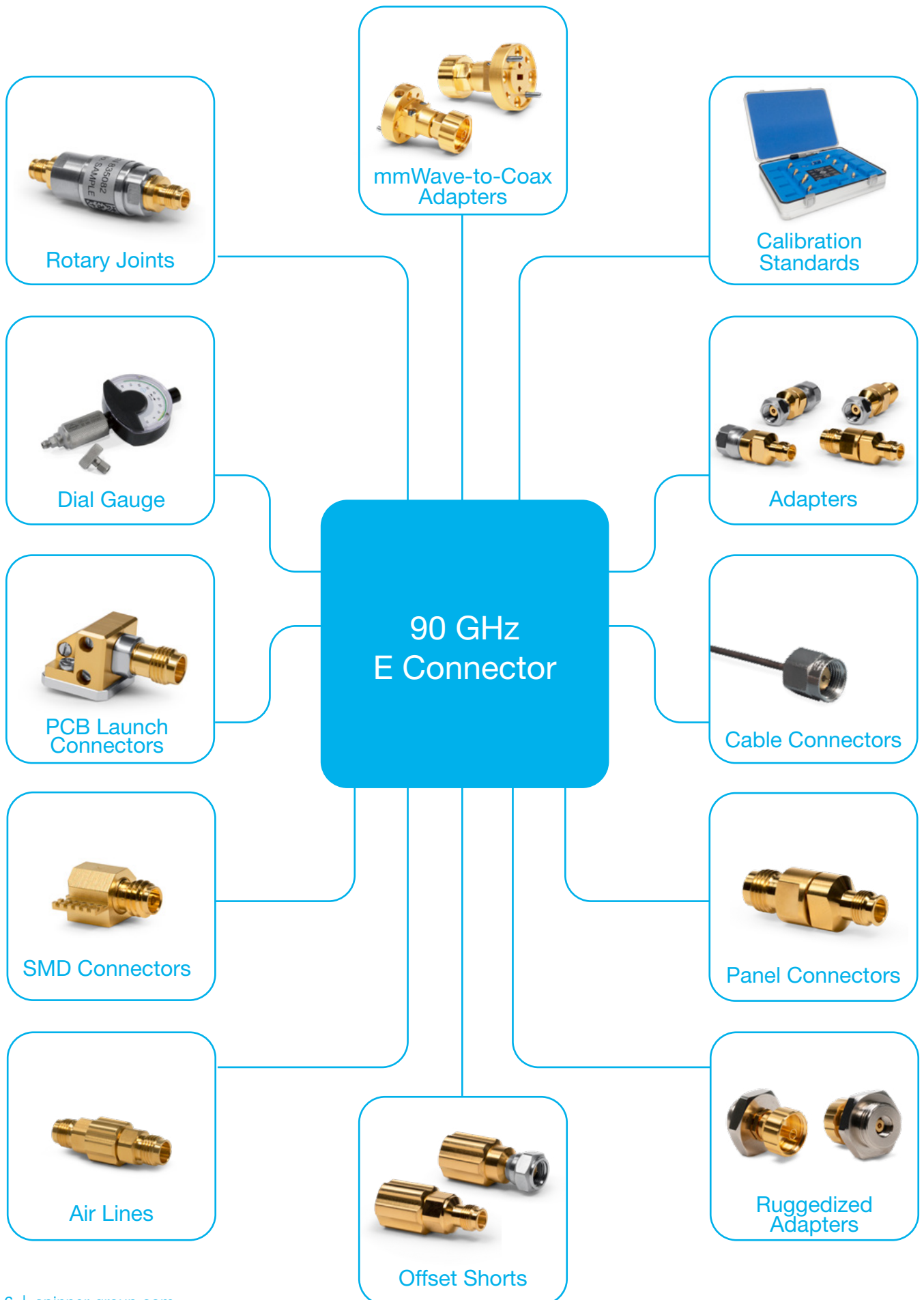
- Only precision connector that ensures a pin gap in mated condition
=> **Prevents near field effects from impairing connector repeatability**
- Only precision connector that applies a common reference to all eccentricity tolerances
=> **Prevents tolerance chains**
- Only precision connector for higher frequencies with a provision for push-pull locking
=> **Enables time and cost savings**
- Pin diameter equals center conductor of 0.047-inch semi-rigid cable and other standard cables
=> **Enables high-quality low-budget jumper cables with captive connector**
- Same wrench as most precision connectors (3.5 mm, 2.92 mm, 2.40 mm, 1.85 mm)
=> **Convenience**

Comparison of Connector Systems

Technical Data	1.85 mm	1.35 mm	1.00 mm
Upper operating frequency	65 (70) GHz	90 (92) GHz	110 (120) GHz
Cut-off frequency	72 GHz	99 GHz	133 GHz
Outer conductor diameter	1.85 mm	1.35 mm	1.00 mm
Inner conductor diameter	0.8036 mm	0.586 mm	0.434 mm
Pin diameter	511 µm	290 µm	250 µm
Thread	M 7 x 0.75	M 5.5 x 0.5	M 4 x 0.7
Coupling torque	0.9 N m (IEEE)	0.9 N m	0.45 N m (IEEE)
Flat wrench size	8 mm	8 (7) mm	6 mm
Optional push-pull locking	No	Yes	No
Connections	5000 (IEEE)	> 3000	3000 (IEEE)
Interface			

- ✔ Optimized for frequently used bands
- ✔ Allows „thru-male“ design with multiple cables
- ✔ Thread and coupling torque prevents unintended opening

Creating a Suitable Environment



Available Products

Description	BN
High-precision calibration kit	BN 534936
Precision adapter 1.35 mm male to 1.00 mm male	BN 534917R000
Precision adapter 1.35 mm male to 1.00 mm female	BN 534918R000
Precision adapter 1.35 mm female to 1.00 mm male	BN 534919R000
Precision adapter 1.35 mm female to 1.00 mm female	BN 534920R000
Precision adapter 1.85 mm male to 1.35 mm male	BN 534921R000
Precision adapter 1.85 mm male to 1.35 mm female	BN 534922R000
Precision adapter 1.85 mm female to 1.35 mm male	BN 534923R000
Precision adapter 1.85 mm female to 1.35 mm female	BN 534924R000
Precision adapter waveguide WR 10 to 1.35 mm female	BN 533124
Precision adapter waveguide WR 12 to 1.35 mm female	BN 533126
Precision adapter waveguide WR 15 to 1.35 mm female	BN 533128
Precision adapter waveguide WR 10 to 1.35 mm male	BN 533134
Precision adapter waveguide WR 12 to 1.35 mm male	BN 533135
Precision adapter waveguide WR 15 to 1.35 mm male	BN 533136
Precision adapter waveguide WR 10 to 1.35 mm female ruggedized	BN 533151
Precision adapter waveguide WR 12 to 1.35 mm female ruggedized	BN 533152
Precision adapter waveguide WR 15 to 1.35 mm female ruggedized	BN 533153
Rotary joint 1.35 mm female	BN 835082
Rotary joint 1.35 mm female with 3-hole flange	BN 8350BQ
Cable connector 1.35 mm for 0.047 inch semi-rigid cable (MIL-DTL-17/151)	BN 534942
PCB launch connector 1.35 mm female	BN 533416
Precision adapter 1.35 mm female ruggedized – 1.00 mm male ruggedized	BN 534974
Precision adapter 1.35 mm female – 1.00 mm female ruggedized	BN 534975
Dial gauge 1.35 mm male	BN 534940
Dial gauge 1.35 mm female	BN 534941
Precision offset short male, 5.0 mm	BN 534925R000
Precision offset short female, 5.0 mm	BN 534926R000
Precision air line, beaded, male-female, 16.3 mm	BN 533696C1630
Precision air line, beaded, male-female, 17.8 mm	BN 533696C1780
Precision air line, beaded, female-female, 16.3 mm	BN 533697C1630
Precision air line, beaded, female-female, 17.8 mm	BN 533697C1780
Panel connector 1.35 mm female-female D-hole	BN 534990
Panel connector WR 12 to 1.35 mm female	BN 533159
Torque Wrench 8 mm, 90 N cm +/- 9	BN 238741



HIGH FREQUENCY PERFORMANCE WORLDWIDE

SPINNER designs and builds cutting-edge radio frequency systems, setting performance and longevity standards for others to follow. The company's track record of innovation dates back to 1946, and many of today's mainstream products are rooted in SPINNER inventions.

Industry leaders continue to count on SPINNER's engineering excellence to drive down their costs of service and ownership with premium-quality, off-the-shelf products and custom solutions. Headquartered in Munich, Germany, the global frontrunner in RF components remains the first choice in simple-yet-smart RF solutions.

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