

# A PRECISION TNC CONNECTOR GAGE KIT

With the large number of TNC connector variations on the market and the critical nature of the connector's dimensions to ensure proper mating, a means to check these dimensions accurately has quickly become a necessity. The model A012E connector gage kit, a universal set of tools designed to measure the contact pin and dielectric locations of all commonly used TNC connectors, has fulfilled this requirement.

The A012E kit is supplied with individual gages to measure each of the interface locations shown in [Figure 1](#). Each gage is ready for measurement without requiring part changes or modification. The basic A012E kit is supplied with five indicators and three master set gages, and is designed to measure contact and dielectric locations of today's most commonly used TNC connectors, including MIL-C-87104/2, MIL-STD-348A, MIL-T-81490 and IEC169 (-17 and -26) connectors. An expanded kit (model A012E01) features six dial indicators and four master set gages, which extend the capability to measure 10 TNC connector types that are currently in use. The large number of TNC connector types is a result of various TNC designs used for US military, commercial and European standards.

The gage assemblies are precision dial indicators that are zero set with high accuracy master set gages. These gages measure the actual deviation of the center conductor and dielectric from the outer-conductor mating plane. The A012E push-on connector gage kit can be used easily in both laboratory and field applications. Graduations of 0.0001" provide repeatability of  $\pm 50$  millionths of an inch with an overall accuracy that is four-times better than the measured value for compliance with MIL-STD-45662A and ISO10012-1 requirements. All gage parts and master setting gages are manufactured from stainless steel for long wear and good dimensional stability. In addition, the kit may be used for BNC connector measurement, but the actual measuring dimensions may require interpolation.



**Model A012E**

## Applications

The critical pin and dielectric locations of TNC connectors must be maintained to provide proper electrical performance and mechanical mating integrity. Destructive interference may result when the male and female connectors are mated if the contacts protrude beyond specifications. In addition, an excessive center contact gap will result in high RF reflections. It is recommended that all connectors be measured after assembly to ensure compliance to the applicable specifications (to prevent destructive interference) and electrical performance. In addition, connectors on existing equipment should be measured periodically to detect out-of-tolerance conditions. More than 10 variations in interface dimensions are required to cover all commonly used MIL-STD and IEC connectors. The A012E gage kit is capable of measuring all of these variations.

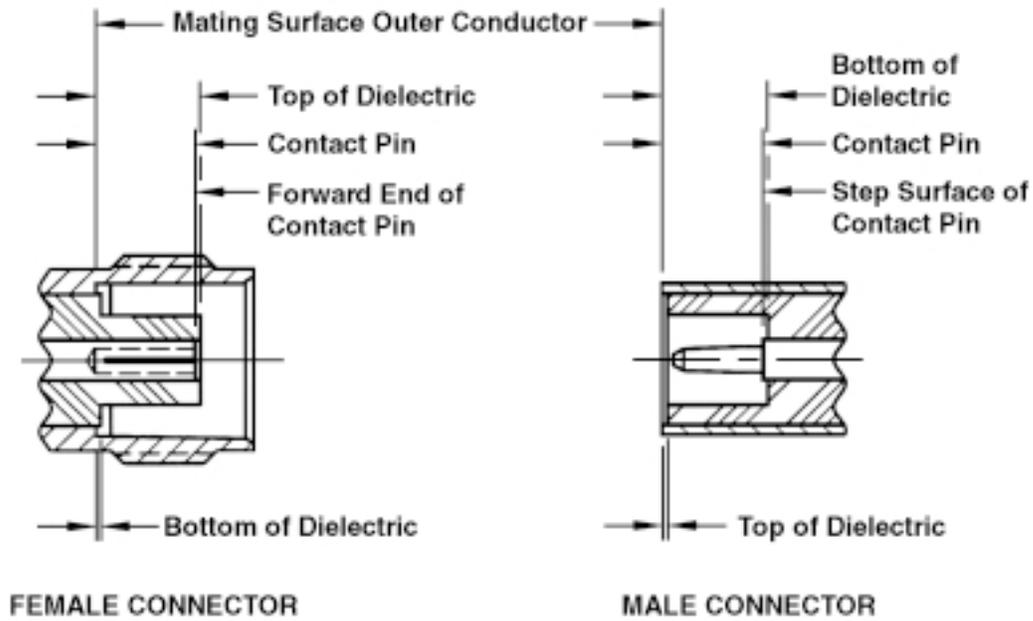


Figure 1: TNC connector critical interface locations

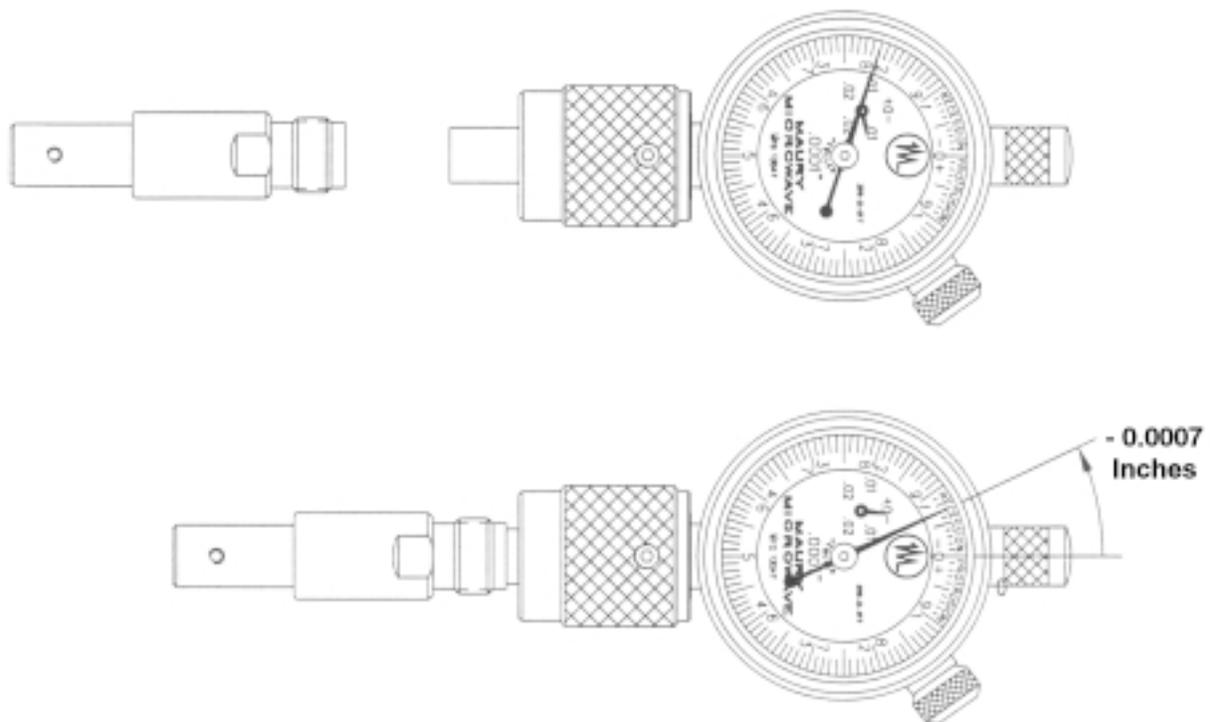


Figure 2: Gaging TNC Connectors



## Operation

The TNC connector generally requires three measurements for each connector to verify the proper location of the contact pin and dielectric. The three interface dimensions (contact pin, top of dielectric and bottom of dielectric) vary with each MIL-STD and IEC specification. The kit is supplied with individual gages for each of these three interface parameters. **Figure 2** shows a gage measurement of the center contact protrusion of a TNC connector. **Table 1** lists the gage kit's performance standards based on factory measurements traceable to the US National Institute of Standards and Technology.

The gage kit should be returned to the manufacturer periodically for calibration to ensure compliance to the specifications. Although the recommended calibration cycle is one year, the actual need may vary depending on usage.

TABLE 1  
Gage Specifications

Specifications	Limits	Comments
Gage resolution (")	0.00002	one-fifth of an increment
Gage calibration accuracy (")	0.00004	—
Gage repeatability <sup>1</sup> (")	0.00005	one-half of an increment
Master accuracy (")	0.00050	—
Total uncertainty <sup>2</sup> worst case (") RSS (")	0.00061 0.00050	add resolution, repeatability gage and master accuracy limits; root sum of the squares

<sup>1</sup> Operator skill has a great impact on repeatability.

<sup>2</sup> Performance standards are in compliance with MIL-STD-45662A and ISO10012-1.

## Conclusion

An easy-to-use kit now is available to measure TNC connector dimensional compliance and ensure proper mating of female and male TNC connectors. With the large number of TNC variants available, this simple procedure may help the user avoid costly mismatches and substandard performance prior to building hardware.

**Maury Microwave Corporation**  
**Ontario, California**

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