

# Precision TNC VNA Calibration Kits

DATA SHEET / 2Z-080

Models:

2950CK40 – Fixed Load Kit

2950CK41 – Fixed Load Kit Plus Adapters

2950CK20 – Sliding Load Kit

2950CK21 – Sliding Load Kit Plus Adapters



# Precision TNC VNA Calibration Kits

MODELS 2950CK40/41 AND  
2950CK20/21

## Features

- > Precision TNC Connectors
- > DC to 18 GHz
- > High Performance
- > Keysight, Rohde & Schwarz and Anritsu VNAs Supported

## Calibration Methods Supported

- > 2950CK40 & 2950CK41 – Fixed Load SOLT (DC–18.0 GHz)
- > 2950CK20 & 2950CK21 – Sliding/ Fixed Load SOLT (DC–18.0 GHz)

## The Importance of VNA Calibration

Imperfections exist in even the finest test equipment. If un-corrected these systematic imperfections cause the equipment to yield less accurate measurements. The basis of network analyzer error correction is referred to as “calibration” of which multiple methods exist.

## Calibration Methods

SOLT calibration, which uses Short, Open and Load standards, requires precise models of the standards’ electrical performance. Fixed load SOLT uses fixed terminations and is adequate for measuring devices with mid-range reflection coefficients. The lowest return loss is limited by the reflection coefficient of the fixed load standard (typically better than 20 dB return loss\*).

The sliding load SOLT kit can accurately measure lower reflection coefficients due to the improved termination performance provided by the sliding load (typically better than 30 dB return loss).

2950CK40/41/20/21 kits are configured for use in performing one-port SOL (Short-Open-Load) response calibrations (a method used for measuring VSWR/ Return Loss), and full two-port SOLT (Short-Open-Load-Thru) calibration (for performing forward and reverse transmission and reflections measurement).

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## Recommended Accessories

### A012G TNC/BNC Connector Gage Kit:

Contains a metrology-grade “push-on” “universal” type, dial indicator style gage for measuring the contact pin and dielectric interface locations of MIL-STD, IEC and commercial TNC connectors. \*This provides an easy and accurate way to measure these critical linear interface dimensions.

### 2698G1 9/16-inch Torque Wrench — 12.0 Inch lbs:

For proper torquing of TNCA and MP6 connections. Factory preset to 12.0 inch lbs to ensure the precise torque needed for optimum repeatability. Employs a “break” design that makes it impossible to over-torque your connections. These torque wrenches are provided with 2950CK20/21 and are highly recommended for use with 2950CK40/41 kits.

*Note: Maury Precision TNC connectors will support a torque range between 12 and 24 inch lbs.*

A012G



2698G1



## Maury Precision TNC VNA Calibration Kits

Maury precision TNC VNA calibration kits include each of the calibration standards and tools shown in the tables at the right. The 2950CK40/20 kits do not include adapters; the 2950CK41/21 kits include one each of the in-series adapters shown. Other in-series and between-series adapters are sold separately.

### 2950CK40



### 2950CK41



### Components Included in 2950CK40/41

| QUANTITY | DESCRIPTION  | MODEL |
|----------|--|-------|
| 1        | Precision TNC female fixed short circuit             | 2946A |
| 1        | Precision TNC male fixed short circuit               | 2947A |
| 1        | Precision TNC female open circuit                    | 2948A |
| 1        | Precision TNC male open circuit                      | 2948B |
| 1        | Precision TNC female fixed termination               | 2931A |
| 1        | Precision TNC male fixed termination                 | 2931B |
| 1*       | Precision TNC female to Precision TNC female adapter | 2921A |
| 1*       | Precision TNC male to Precision TNC male adapter     | 2921B |
| 1*       | Precision TNC female to Precision TNC male adapter   | 2921C |
| 1        | Foam-lined wood instrument case                      | —     |

\* These adapters are provided in the 2950CK41 kits, but are not included in the 2950CK40 kits.

### 2950CK20



### 2950CK21



### Components Included in 2950CK20/21 Kits

| QUANTITY | DESCRIPTION  | MODEL  |
|----------|--|--------|
| 1        | Precision TNC female fixed short circuit             | 2946A  |
| 1        | Precision TNC male fixed short circuit               | 2947A  |
| 1        | Precision TNC female open circuit                    | 2948A  |
| 1        | Precision TNC male open circuit                      | 2948B  |
| 1        | Precision TNC female fixed termination               | 2931A  |
| 1        | AFTNC male fixed termination                         | 2931B  |
| 1*       | Precision TNC female to Precision TNC female adapter | 2921A  |
| 1*       | Precision TNC male to Precision TNC male adapter     | 2921B  |
| 1*       | Precision TNC female to Precision TNC male adapter   | 2921C  |
| 1        | Precision TNC female sliding termination             | 2935A  |
| 1        | Precision TNC male sliding termination               | 2935B  |
| 1        | 9/16-inch torque wrench — 12 in. lbs.                | 2698G1 |
| 1        | 7/16-inch open end wrench                            | 8770Z7 |
| 1        | Foam-lined wood instrument case                      | —      |

\* These adapters are provided in the 2950CK21 kits, but are not included in the 2950CK20 kits.

## COMPONENT SPECIFICATIONS



### Sliding Terminations – Models 2935A & 2935B

Frequency Range -- 2.0 to 18.0 GHz  
 Maximum VSWR of Terminating Element -- 1.05  
 Air Line Accuracy -- 56 dB min return loss (equivalent return loss of air line impedance)  
 Nominal Impedance -- 50 ohm  
 Power Handling -- 5.0 watt CW, 1.0 kW peak  
 Travel -- Greater than 1/2 wavelength at 2.0 GHz



### Fixed Short – Models 2946A & 2947A

Frequency Range -- DC to 18.0 GHz  
 Minimum Reflection Coefficient -- 0.98  
 Phase Accuracy --  $\pm 2.0$  degrees  
 Nominal Impedance -- 50 ohm



### Precision TNC Adapters – Models 2921A, 2921B & 2921C

Frequency Range -- DC to 18.0 GHz  
**Maximum VSWR:**  
 DC to 4.0 GHz --  $\leq 1.04$   
 4.0 to 8.0 GHz --  $\leq 1.08$   
 8.0 to 18.0 GHz --  $\leq 1.12$   
 Nominal Impedance -- 50 ohm

*(Note: These adapters are included in the 2950CK41/21 kits, but are not included in the 2950CK40/20 kits.)*



### Fixed Terminations – Models 2931A & 2931B

Frequency Range -- DC — 18.0 GHz  
**Maximum VSWR:**  
 DC — 4.0 GHz -- 1.04  
 4.0 — 12.0 GHz -- 1.08  
 12.0 — 18.0 GHz -- 1.10  
 Nominal Impedance -- 50 ohm  
 Power Handling -- 1.0 watt CW 1.0 kW peak



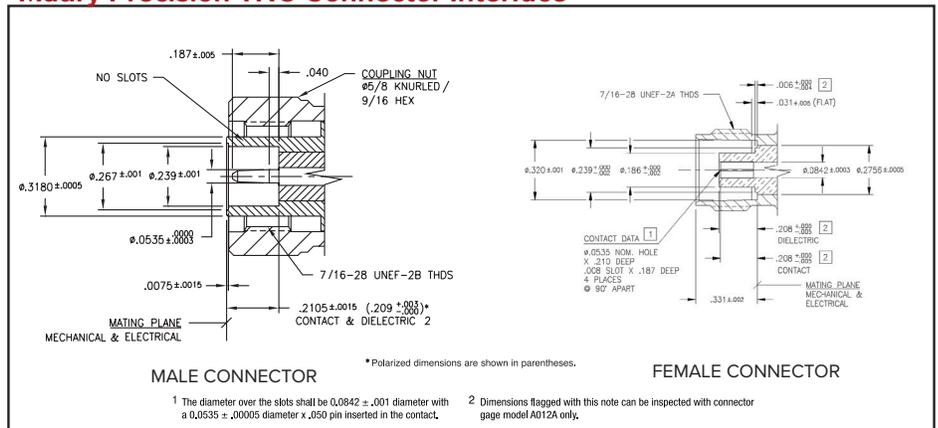
### Open Circuits – Models 2948A & 2948B

Frequency Range -- DC to 18.0 GHz  
 Minimum Reflection Coefficient -- 0.98  
 Phase Accuracy --  $\pm 2.0$  degrees  
 Nominal Impedance -- 50 ohm

## Connector Description

The precision TNC connectors on the components in this kit are precision stainless steel connectors that mate with most commercially available TNC connectors, and especially with those conforming to MIL-STD-348B. They are low VSWR connectors rated from DC to 18.0 GHz.

## Maury Precision TNC Connector Interface



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