

# Precision AutoCal<sup>®</sup> 36585-Series Automatic VNA Calibrator

## Reference Manual



**36585K Precision AutoCal, 70 kHz to 40 GHz, 2-port**

**36585V Precision AutoCal, 70 kHz to 70 GHz, 2-port**

**Anritsu**

## **WARRANTY**

The ANRITSU product(s) listed on the title page is (are) warranted against defects in materials and workmanship for one year from the date of shipment.

ANRITSU's obligation covers repairing or replacing products which prove to be defective during the warranty period. Buyers shall prepay transportation charges for equipment returned to ANRITSU for warranty repairs. Obligation is limited to the original purchaser. ANRITSU is not liable for consequential damages.

## **LIMITATION OF WARRANTY**

The foregoing warranty does not apply to ANRITSU connectors that have failed due to normal wear. Also, the warranty does not apply to defects resulting from improper or inadequate maintenance by the Buyer, unauthorized modification or misuse, or operation outside of the environmental specifications of the product. No other warranty is expressed or implied, and the remedies provided herein are the Buyer's sole and exclusive remedies.

## **TRADEMARK ACKNOWLEDGEMENTS**

AutoCal is a registered trademarks of ANRITSU Company.

## **NOTICE**

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## **NOTICE**

This document is not an operation manual for the 36585 Series AutoCal. Please refer to the host VNA that this AutoCal is intended to be used with, for such information. The 36585 Series AutoCal is compatible with the MS4640x Series VNAs from Anritsu. It is not compatible with the original 360, 37xxx Series, or MS462xx Series VNAs.

For technical specifications, please refer to the MS4640x VNA Technical Data Sheet, part number 11410-00432, available at [www.us.anritsu.com](http://www.us.anritsu.com).

# DECLARATION OF CONFORMITY

**Manufacturer's Name:** ANRITSU COMPANY

**Manufacturer's Address:** Microwave Measurements Division  
490 Jarvis Drive  
Morgan Hill, CA 95037-2809  
USA

declares that the product specified below:

**Product Name:** Precision AutoCal 36585-Series Automatic VNA Calibrator

**Model Number:** 3658X Series

conforms to the requirement of:

EMC Directive: 2004/108/EC  
Low Voltage Directive: 2006/95/EC

## **Electromagnetic Compatibility: EN61326:2006**

Emissions: EN55011: 2007 Group 1 Class A

Immunity:	EN 61000-4-2:1995 +A1:1998 +A2:2001	4kV CD, 8kV AD
	EN 61000-4-3:2006 +A1:2008	3V/m
	EN 61000-4-4:2004	0.5kV SL, 1kV PL
	EN 61000-4-5:2006	0.5kV L-L, 1kV L-E
	EN 61000-4-6: 2007	3V
	EN 61000-4-11: 2004	100% @ 20msec

## **Electrical Safety Requirement:**

Product Safety: EN 61010-1:2001

Morgan Hill, CA

  
Eric McLean, Corporate Quality Director

*27 Jan 2009*  
Date

European Contact: For Anritsu product EMC & LVD information, contact Anritsu LTD, Rutherford Close, Stevenage Herts, SG1 2EF UK, (FAX 44-1438-740202)



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This chapter provides precautionary instructions for the use of precision connectors and cleaning instructions.	



# Chapter 1 — AutoCal Calibration Kits

## 1-1 SCOPE

This manual provides description and maintenance instructions for models 36585K (70 kHz to 40 GHz) and 36585V (70 kHz to 70 GHz) 2-Port AutoCal Calibration Kits.

- The calibration kits are described in this chapter.
- Maintenance instructions applicable to all the kits are provided in Chapter 2.
- Part numbers and connector options are shown in Table 1.
- Use of the calibration kits and calibration procedures are documented in the VNA Operation Manual and Programming Guide.

## 1-2 INTRODUCTION

This chapter provides illustrations and contents for models 36585K and 36585V Calibration Kits.

## 1-3 PURPOSE

The calibration kits contain all of the precision components and tools required to calibrate an Anritsu Vector Network Analyzer System for a 12-term error-corrected measurement.

AutoCal has been characterized by Anritsu and the characterization file is included for use by the host VNA. It is valid for 1 year from time of shipment.

**The characterization cycle for the 36585-Series AutoCal is 12 months** assuming proper use and care of the module and its connectors.

AutoCal can be characterized using the MS4640x Series VNA, following the instructions in the VNA Operation Manual, however Anritsu can only guarantee meeting its published specifications with Anritsu characterized AutoCals.

## 1-4 CONTENTS

Contents of the calibrations kits are listed on the following pages.

**Table 1.** 2-Port Precision AutoCal Models

Frequency Range	Connectors Type	Part Number
70 kHz to 40 GHz	K (male) to K (male)	36585K-2M
	K (female) to K (female)	36585K-2F
	K (male) to K (female)	36585K-2MF
70 kHz to 70 GHz	V (male) to V (male)	36585V-2M
	V (female) to V (female)	36585V-2F
	V (male) to K (female)	36585V-2MF

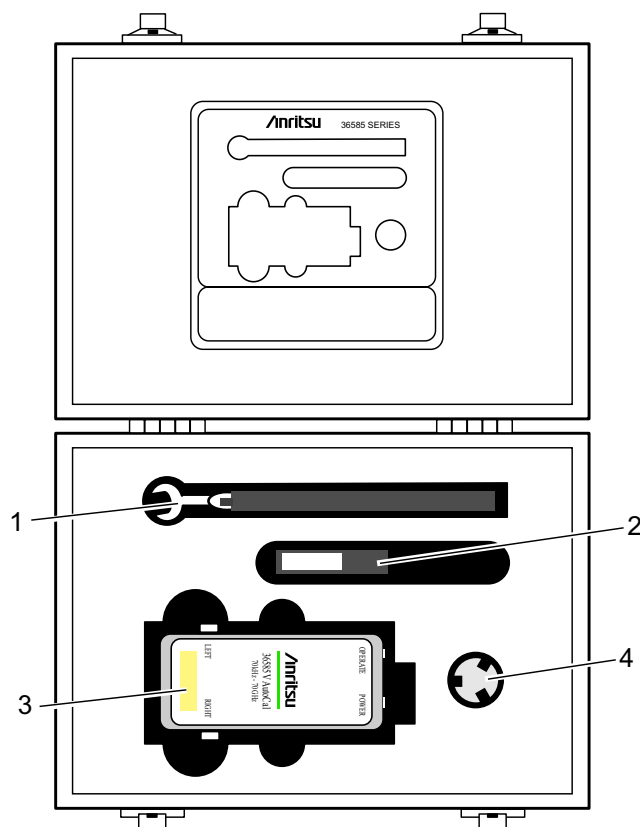
## Model 3658K, 36585V Calibration Kit

The kits (Figure 1-1) includes the following items:

- (1) 01-201 torque wrench, 8mm, 0.9 N-m
- (2) Characterization data on a USB memory device
- (3) 36585 precision AutoCal
- (4) 01-204 universal wrench for K and V connectors

Additional included items not shown in Figure 1-1:

- 40-168-R 12V power supply
- 806-69 serial cable
- Line power cord



**Figure 1-1.** Model 36585K, 36585V Calibration Kit Components



# Chapter 2 — Maintenance Instructions

## 2-1 INTRODUCTION

This chapter provides instructions and discussion on the care and use of precision connectors.

## 2-2 PRECAUTIONS FOR USING CONNECTORS

The following are precautionary notes related to the use of connectors. For specific information on setting pin depths on sliding terminations, refer to the Vector Network Analyzer Operation Manual.

### Pin Depth

Before mating, measure the pin depth (Figure 2-1) of the device that will mate with the RF component, using an ANRITSU Pin Depth Gauge or equivalent (Figure 2-2). Based on RF components returned for repair, destructive pin depth of mating connectors is the major cause of failure in the field. When an RF component is mated with a connector having a destructive pin depth, damage will likely occur to the RF component connector. (A destructive pin depth has a center pin that is too long in respect to the connector's reference plane.)

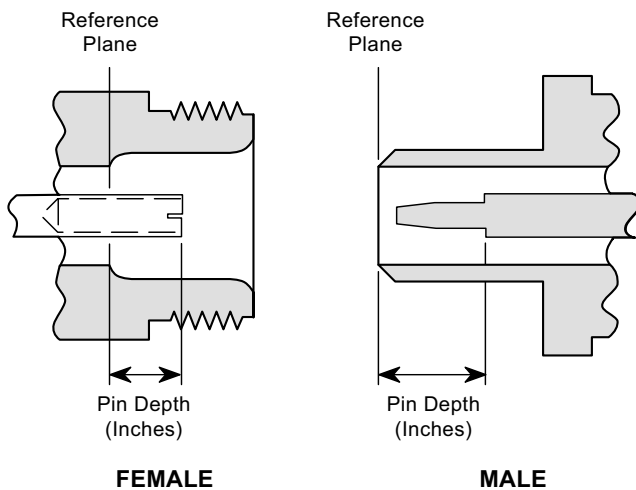


Figure 2-1. N Connector Pin Depth

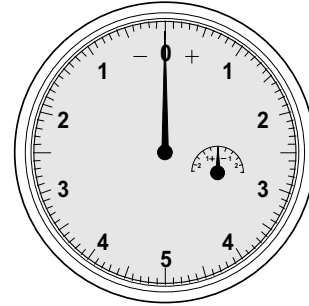


Figure 2-2. Pin Depth Gauge

### Tolerance

The center pin of RF component connectors has a precision tolerance measured in mils (1/1000 inch). Connectors on test devices that mate with RF components may not be precision types and may not have the proper depth. They must be measured before mating to ensure suitability. When gauging pin depth, if the test device connector measures out of tolerance (Table 2-1) in the “+” region of the gauge (Figure 2-1), the center pin is too long. Mating under this condition will likely damage the termination connector. On the other hand, if the test device connector measures out of tolerance in the “-” region, the center pin is too short. While this will not cause any damage, it will result in a poor connection and a consequent degradation in performance.

Table 1. Pin Depth Tolerances

Port/Connector Type	Pin Depth (Inches)	ANRITSU Gauge Setting
GPC 7	+0.000 -0.003	Same as pin depth
N Male	207 -0.000 +0.003	207 -0.000 +0.003
N Female		
WSMA Male	-0.0025	Same as pin depth
WSMA Male	-0.0035	
K Male	+0.000	Same as pin depth
K Female	-0.003	
V Male		Same as pin depth
V Female		

## Over Torquing Connectors

Over torquing connectors is destructive; it may damage the connector center pin. Finger-tight is usually sufficient, especially on Type N connectors. *Never* use pliers to tighten connectors.

## Teflon Tuning Washers

The center conductor on most RF components contains a small teflon tuning washer located near the point of mating (interface). This washer compensates for minor impedance discontinuities at the interface. The washer's location is critical to the RF component's performance. *Do not disturb it.*

## Mechanical Shock

RF components are designed to withstand years of normal bench handling. However, do not drop or otherwise treat them roughly. They are laboratory-quality devices, and like other such devices, they require careful handling.

## 2-3 CLEANING INSTRUCTIONS

Connector interfaces — especially the outer conductors on the GPC 7 and SMA connectors — should be kept clean and free of dirt and other debris.

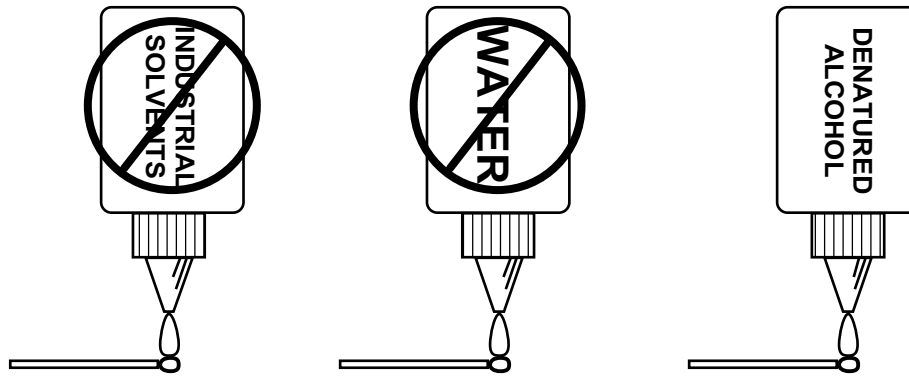
Denatured alcohol is the recommended applicator. Figure 3-3 on the following page illustrates information about cleaning male and female connectors.

### Note

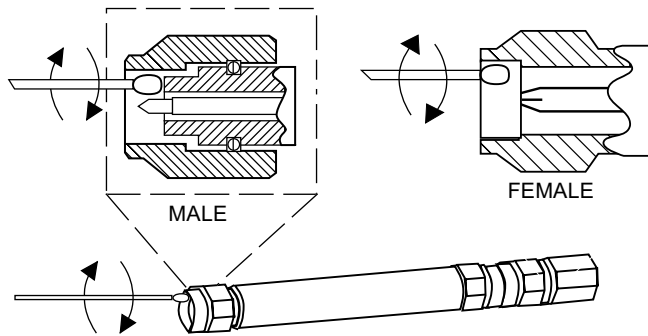
Most cotton swabs are too large to fit into the ends of the smaller connector types. In these cases it is necessary to peel off most of the cotton and then twist the remaining cotton tight. Be sure that the remaining cotton does not get stuck in the connector.

The following are some important tips on cleaning connectors:

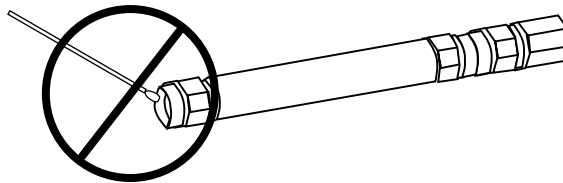
- Use only denatured alcohol as a solvent.
- Always use an appropriate size of cotton swab.
- Gently move the cotton swab around the center conductor.
- Never put lateral pressure on the connector's center pin.
- Verify that no cotton or other foreign material remains in the connector after cleaning.
- Only dampen the cotton swab. Do NOT saturate it.
- Compressed air can be used to remove foreign particles and to dry the connector.
- Verify that the center pin has not been bent or damaged.



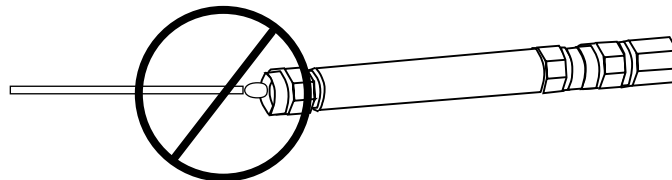
Do NOT use Industrial Solvents or Water on connector. Use only Denatured Alcohol. Dampen only, DO NOT saturate.



Use only denatured alcohol and the proper size of cotton swab. Gently rotate the swab around the center pin being careful not to stress or bend the pin or you will damage the connector.



Do NOT put cotton swabs in at an angle, or you will damage the connectors.



Do NOT use too large of cotton swab, or you will damage the connectors.

**Figure 2-3.** Cleaning Connectors

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