

## OPERATION AND MAINTENANCE MANUAL FOR PRECISION ADAPTERS

### 1. INTRODUCTION

This manual describes the K220, 34, and 35 Series precision adapters. The manual provides specifications, performance verification instructions, and a list of precautions the user should observe when using a precision adapter.

### 2. DESCRIPTION

The standard 34 series 50-ohm adapters provide a low-SWR connection between type N and GPC-7 connectors, between WSMA (SMA compatible) and GPC-7 connectors, and between the K Connector® and V Connector®. All 34 series adapters are tested to ensure optimum performance over their full frequency range.

The ruggedized 34R Series 50-ohm adapters provide a rugged and rigid connection between the Rugged K Female or V Female output on ANRITSU signal sources and the respective K or type N input port on SWR Autotesters. These adapters have an outside diameter almost equal to that of a type N connector, which adds mechanical strength to the sweep generator connection.

The 35 series adapters provide a transition from waveguide to coax via the K Connector and V Connector.

The K220 and 34V precision in-series adapters provide accurate measurements with K and V connectors, respectively.

### 3. SPECIFICATIONS

Table 1 provides adapter specifications.

® K Connector and V Connector are registered trademarks of the ANRITSU Company.

### 4. PURPOSE

The Series 34 adapters consist of moderate and high return loss models. The moderate return loss models (34NN50A, 34NFNF50, 34SFSF50, 34R Series) adapt mating connectors to the input port on an SWR Autotester or the male test ports and male detectors for through-line calibration. The 34NN50A, 34RKN50, and 34RKRK50 adapters make possible a direct connection between an SWR Autotester or bridge and the RF output port on different models of 68XXXB and 69XXXA signal sources. This eliminates the need for often lossy RF cabling.

The high return loss models (34AN50, 34ANF50, 34AS50, and 34ASF50) provide for changing the test port connector on an SWR Autotester or bridge from GPC-7 to type N, NF, or WSMA—or vice versa. Using any adapter to change the test port connector on an SWR Autotester or bridge lowers its directivity and degrades the test port match. However, a precision adapter causes less of a change. For example: If a precision adapter having a 36 dB return loss is used with an SWR Autotester or bridge having a 40 dB directivity and a 19 dB test port match, the effective measurement directivity lowers to 32 dB; the test port match degrades to 17 dB. On the other hand, if a non-precision adapter having a 24 dB return loss is used in the same situation, the effective directivity lowers to 22 dB, while the test port match degrades to 15 dB.

### 5. PRECAUTIONS

The ANRITSU precision adapters are high-quality, precision laboratory devices and should receive the same care and respect afforded such devices. Complying with the following precautionary notes will guarantee longer component life and less equipment downtime due to connector failure. Also, such compliance will ensure that adapter failures are not due to misuse or abuse—two failure modes not covered under the ANRITSU warranty.

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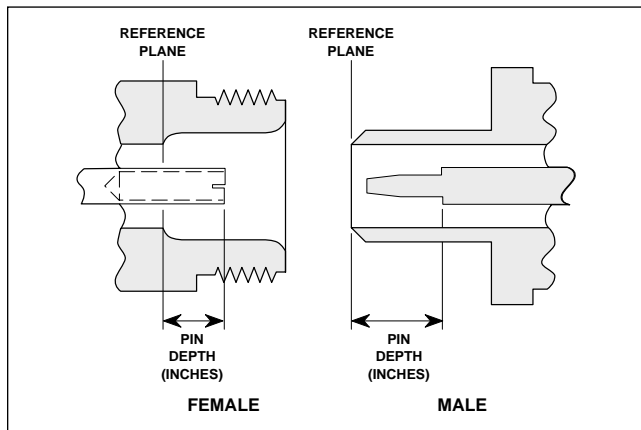
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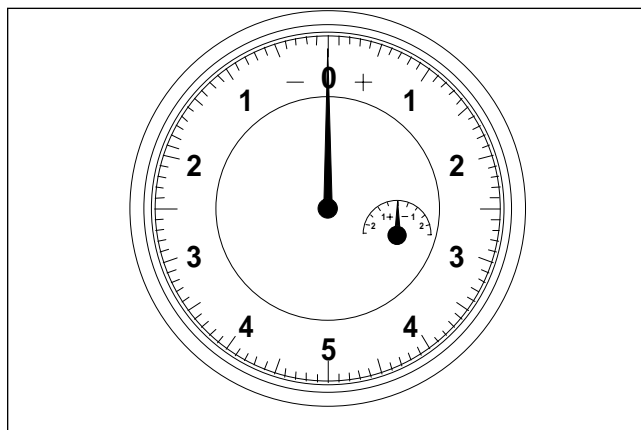
**Table 1. Specifications for Adapters**

Model	Frequency Range (GHz)	Impedance (Ohms)	Connectors	SWR
34NN75B	DC to 3	75	N Male to N Male	1.1
34NFN75			N Female to N Female	
34AN50	DC to 18	50	GPC-7 to N Male	1.02
34ANF50			GPC-7 to N Female	
34AS50	DC to 18	50	GPC-7 to WSMA Male	1.033
34ASF50			GPC-7 to WSMA Female	
34NN50A	DC to 18	50	N Male to N Male	1.1
34NFN50			N Female to N Female	
34NK50	DC to 18	50	N Male to K Male	1.12
34NKF50			N Male to K Female	
34NFK50			N Female to K Male	
34NFKF50			N Female to K Female	
34SFSF50	DC to 26.5	50	WSMA Female to WSMA Female	1.11 to 18 GHz 1.18 to 26.5 GHz
34RSN50	DC to 18	50	RS Male to N Male	1.40
34RKNF50			RK Male to N Female	
34RVNF50			RV Male to N Female	
34RKRK50	DC to 40	50	RK Male to RK Male	2.00
34RVRK50			RV Male to RK Male	
34RVRV50	DC to 60	50	RV Male to RV Male	2.30
K220B	DC to 40	50	K Male to K Male	1.12
K222B			K Female to K Female	
K224B			K Female to K Male	
34VK50	DC to 40	50	V Male to K Male	1.3
34VFK50			V Male to K Female	
34VFK50	DC to 40	50	V Female to K Male	
34VFKF50			V Female to K Female	
34VV50	DC to 60	50	V Male to V Male	1.5
34VVF50			V Female to V Female	
34VVF50			V Male to V Female	
35WRD180K	18 to 40	50	WRD180 to K Male	1.25
35WRD180KF			WRD180 to K Female	
35WR42K	18 to 26.5	50	WR42 to K Male	
35WR42KF			WR42 to K Female	
35WR28K	26.5 to 40	50	WR28 to K Male	
35WR28KF			WR28 to K Female	
35WR22K	33 to 50	50	WR22 to K Male	1.30
35WR22KF			WR22 to K Female	
35WR22V	33 to 50	50	WR22 to V Male	1.30
35WR22VF			WR22 to V Female	
35WR19K	40 to 50 Usable to 54	50	WR19 to K Male	1.30
35WR19KF			WR19 to K Female	
35WR19V	40 to 60	50	WR19 to V Male	1.30
35WR19VF			WRX19 to V Female	
35WR15V	50 to 65	50	WR15 to V Male	1.38
35WR15VF			WR15 to V Female	

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



**Figure 1.** N Connector Pin Depth Definition



**Figure 2.** Pin Depth Gauge

The center pin of adapter connectors has a precision tolerance measured in mils (1/1000 inch). Connectors on test devices that mate with adapters 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 adapter connector indicates out of tolerance (Tables 2, 3, and 4) in the “+” region of the gauge (Figure 2), the center pin is too long. *Mating under this condition will likely damage the adapter connector.* On the other hand, if the test device connector indicates 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 2.** Adapter Pin-Depth

Port/ Conn. Type	Pin Depth (MILS)	Gauge Reading
GPC-7	+0.000 -0.003	Same As Pin Depth
N Male	0.207 -0.000 +0.003	
N Female	0.207 +0.000 -0.003	
WSMA Male	-0.0025 -0.0035	
WSMA Female	-0.0000 -0.0010	
K Male, Female	+0.000 -0.003	
35WR15V/VF 35WR19V/VF 35WR22V/VF	-0.0002 -0.002	

**Table 3.** 34 Series Adapter Pin-Depth

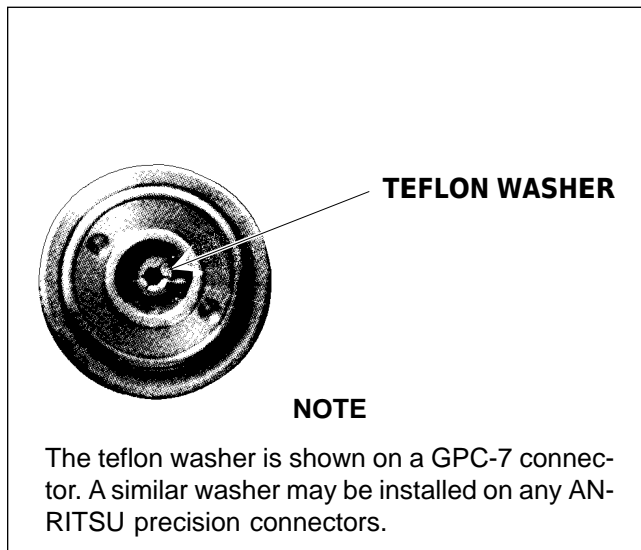
Adapter	V Connector	K Connector
34VK50	-0.0005 -0.003	-0.0005 -0.005
34VKF50	-0.0005 -0.003	-0.0005 -0.005
34VFK50	-0.0005 -0.003	-0.0005 -0.005
34VFKF50	-0.0005 -0.003	-0.0005 -0.005

**Table 4.** K220 Series Adapter Pin-Depth

Adapter	Input	Output
K220, K222	0.000 to -0.0035	0.000 to -0.0035
K224	K 0.000 to -0.0035	KF 0.000 to -0.003

**b. Avoid 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. Should it be necessary to use a wrench to tighten SMA or WSMA connectors, use a torque wrench that breaks at 8 inch-pounds. As a general rule, *never use pliers to tighten connectors.*

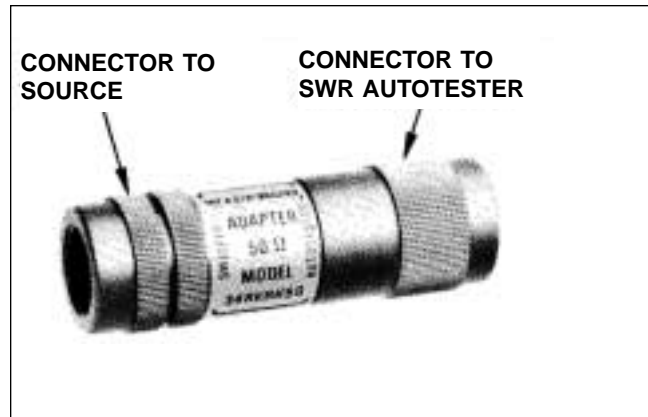
**c. Do Not Disturb Teflon Tuning Washers On Connector Center Pins.** The center conductor on some adapter connectors contains a small teflon tuning washer located near the point of mating (interface) (Figure 3). This washer provides for precise impedance matches at the interface. The washer's location is critical to the adapter's performance. *Do not disturb it.*



**Figure 3.** Tuning Washer on GPC-7 Connector

**d. Avoid Mechanical Shock.** Adapters are designed to withstand years of normal bench handling. Do not drop or otherwise treat them roughly. They are laboratory-quality devices, and like other such devices, they require careful handling.

**e. Keep Adapter Connectors Clean.** The precise geometry that makes the adapter's high performance possible can be disturbed by dirt and other contamination adhering to connector interfaces. When not in use, keep the adapter connectors covered. Refer to paragraph 8 for cleaning instructions.



**Figure 4.** Model 34RKRK Adapter

## 6. OPERATION

The operation of the K220, K230, 34 and 35 Series adapters is obvious, except for the 34RKRK50. For this model, to enable this adapter's coupling ring to be tightened at the SWR Autotester's RF INPUT port, connect the end with the two knurled rings (Figure 4) to the sweep generator. If the adapter ends are connected otherwise, the SWR Autotester, rather than the adapter coupling ring, will have to be turned to effect a good connection.

## 7. PIN DEPTH MEASUREMENTS.

Gauging sets for measuring adapters are available from ANRITSU via special order. Instructions for gauging the adapter connectors are provided with the gauging set.

## 8. MAINTENANCE

ANRITSU recommends that no maintenance other than cleaning be attempted by the customer. The adapter should be returned to ANRITSU for repair and/or service when needed.

### CAUTION

Do not disturb the teflon washer on the center conductor (refer to paragraph 5.c).

Clean the connector interfaces with clean cotton swab dampened with alcohol.