Operation and Maintenance Manual

Precision Adapters

K220, 34, and 35 Series Precision Adapters

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Precision Adapters

Introduction

The manual provides descriptions, specifications, performance verification instructions, and connector care the user should observe when using the K220, 34, and 35 Series precision adapters.

Description

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.

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.

34 Series Adapter

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. Figure 1-1 shows an example of a 34NMDVFNF50 adapter. All 34 series adapters are tested to ensure optimum performance over their full frequency range.

Figure 1-1. Model 34NMDVFNF50 Adapter

The ruggedized 34R Series 50-ohm adapters provide a 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. Figure 1-2 shows an example of a 34RKRK50 adapter. These adapters have an outside diameter almost equal to that of a type N connector, which adds mechanical strength to the sweep generator connection.

Figure 1-2. Model 34RKRK50 Adapter

35 Series Adapter

The 35 series adapters provide a transition from waveguide to coax via the K Connector and V Connector. Figure 1-3 shows and example of a 35WRR22V Adapter. The K220 and 34V precision in-series adapters provide accurate measurements with K and V connectors.

Figure 1-3. Model 35WRR22V Adapter

Specifications

Table 1 provides performance specifications for the K220, 34, and 35 Series precision adapters.

Table 1. Performance Specifications for K220, 34, and 35 Series precision adapters

All Models: Max. Input Power: 0.5 watts (+27 dBm)
Characteristic Impedance is 50 Ohms

Model	Frequency Range (GHz)	Impedance (Ohms)	Test Port Connector	SWR
K220B	DC to 40	50	K Male to K Male	1.12
K222B			K Female to K Female	
K224B			K Female to K Male	
K220B	DC to 40	50	K Male to K Male	1.12
K222B			K Female to K Female	
K224B			K Female to K Male	
34NMDVFNF50	DC to 18 GHz	50	V Female to N Female	1.12
34NN75B	DC to 3	75	N Male to N Male	1.10
34NFNF75			N Female to N Female	

Table 1. Performance Specifications for K220, 34, and 35 Series precision adapters

All Models: Max. Input Power: 0.5 watts (+27 dBm)
Characteristic Impedance is 50 Ohms

Model	Frequency Range (GHz)	Impedance (Ohms)	Test Port Connector	SWR
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	1.10
34NFNF50			N Male to N Female	
34NK50	DC to 18	50	N Male to K Male	1.12
34NKF50			N Male to Female	
34NFK50			N Female to N 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	1.4
34RKNF50			RK Male to N Female	
34RKNF50			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
34VK50	DC to 40	50	V Male to K Male	1.3
34VFK50			V Male to K Female	
34VFK50			V Female to K Male	
34VFKF50			V Female to K Female	
34VV50	DC to 60	50	V Male to V Male	1.5
34VFVF50			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		WR42 to K Male	
35WR42KF			WR42 to K Female	
35WR28K	26.5 to 40		WR22 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	1.3
35WR19VF			WRX19 to V Female	
35WR15V	50 to 65	50	WR15 to V Male	1.38
35WR15VF			WR15 to V Female	

Connector Care

Anritsu terminations are high-quality, precision laboratory instruments and should receive the same care afforded other such instruments. 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 termination failures are not due to misuse or abuse, two failure modes not covered under the Anritsu warranty.

Pin Depth

Before mating, measure the pin depth Figure 1-4 of the device that will mate with the adapter, using an Anritsu Pin Depth Gauge Figure 1-5 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.)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 can damage the adapter connector. 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.

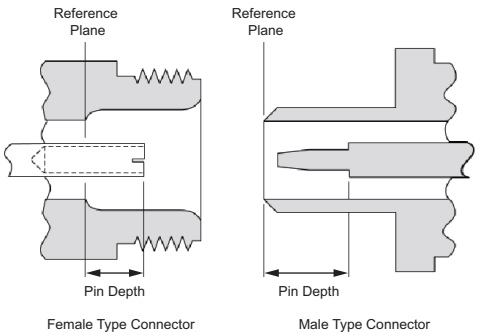

Figure 1-4. Pin Depth

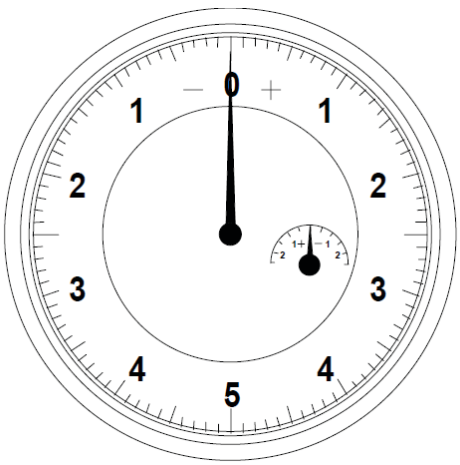

Figure 1-5. Pin Depth Gauge

The center pin of termination connectors have a precision pin depth tolerance as shown in Table 2, Table 3 and Table 4. Connectors on test devices that mate with terminations 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 in the "+" region of the gauge the center pin is too long. Mating under this condition will likely damage the termination connector. 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 2. Adapter Pin-Depth

Port / Conn. Type	Pin Depth (Inch)	
GPC-7		0.000 –0.003
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		0.000 –0.003
K Female		
V Male		0.000 –0.002
V Female		
W1 Male		0.0000 –0.0012
W1 Female		
35WR15V/VF		–0.0002 –0.002
35WR19V/VF		
35WR22V/VF		

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. K220m 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

Torquing Connectors

Over torquing connectors is destructive and may damage the connector center pin. See Table 5 for torque recommendations.

Table 5. Torque Wrench Recommendations

Conn. Type	Torque Wrench Model #	Torque Spec (in-lbs)	Open End Wrench Model #
GPC-7	01-200	12	NA
N			
SMA / 3.5 mm	01-201	8	01-204
K (2.92 mm)			
V (1.85 mm)			
W1 (1 mm)	01-504	4	01-505

Tuning Washers

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

Avoid Mechanical Shock

Adapters are designed to withstand years of normal bench handling. They are laboratory-quality devices and require careful handling.

Keep Termination 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.

Connector Cleaning

Over time the outer conductor mating interface will build-up a layer of dirt and metal chips that can severely degrade the connector's electrical and mechanical performance. The build-up also tends to increase the coupling torque which can damage the mating interface. The cleaning of connectors is essential for maintaining good electrical performance. The connectors should be checked for cleanliness before making any measurements or calibration. The cleaning procedure is listed below:

Required Items

1. Low pressure compressed air (solvent free)
2. Lint-free cotton swabs
3. Isopropyl alcohol
4. Microscope

Cleaning Procedure

1. Remove loose particles on the mating surfaces and threads etc. using low-pressure compressed air.
2. The threads of the connector should be cleaned with a cotton swab. When the connector threads are clean, the connections can be hand-tightened to within a half a turn of the proper torque.
3. Clean mating plane surfaces using alcohol on thin head type cotton swabs. Use only enough Isopropyl alcohol to clean the surface. Use the least possible pressure to avoid damaging connector surfaces.

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.

Anritsu

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