

OPERATION AND MAINTENANCE MANUAL FOR FIXED ATTENUATORS



Figure 1. Models 41 and 43 Series Fixed Attenuators

1. INTRODUCTION

This manual describes the Model 41 and 43 Series Fixed Attenuators (Figure 1). It provides specifications and a list of precautions the user should observe when using them.

2. DESCRIPTION

The precision 41 and 43 Series Fixed Attenuators are produced in two series: Gold Line and Silver Line. The Gold Line Series covers dc to 60 GHz, whereas the Silver Line covers dc to 40 GHz. Both series offer models having 3, 6, 10, or 20 dB attenuation from dc to 18, 26.5, 40, or 60 GHz. Specific models are listed in Table 2.

3. SPECIFICATIONS

Table 2 provides fixed attenuator performance specifications. Figures 3 and 4, on page 4, provide outline drawings.

4. PRECAUTIONS

ANRITSU 41 and 43 series fixed attenuators are high-quality, precision laboratory instruments and should receive the same care and respect 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 RF component failures are not due to misuse or abuse—two failure modes not covered under the ANRITSU warranty.

- a. Beware of Destructive Pin Depth on Mating Connectors.* Measure the pin depth of the connector that mates with the RF component, *before* mating. Use an ANRITSU Pin Depth Gauge (Table 1, Figure 2) or equivalent. Based on RF components returned for repair, destructive pin depth on mating connectors is the major cause of failure in the field. When an RF component connector is mated with a connector having a destructive pin depth, damage will likely occur to the RF component connector. (A destructive pin

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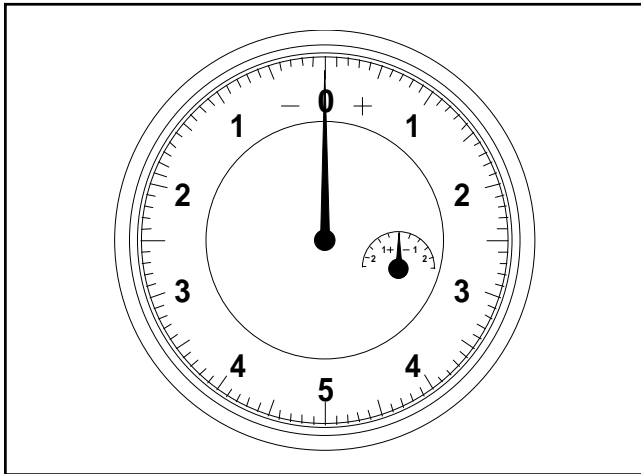


Figure 2. Pin Depth Gauge

Table 1. Available Gauging Sets

Model	Connector Type	Gauging Set Model
41V-X	V	None
41/43KX-X	K	01-162

depth has a center pin that is too long in respect to the connector's reference plane.)

The center pin on an RF component connector has a precision tolerance measured in mils (1/1000 inch), whereas connectors on test devices that mate with RF components may not be precision types. Their pins 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, the center pin is too long. Mating under this condition will likely damage the RF component 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.

The pin depth for all fixed attenuator models ranges from 0.000 to -0.003.

b. Avoid Over Torquing Connectors. Over torquing connectors is destructive; it may damage the mating surface of the outer conductor. This can change the pin depth and may damage the center pin. *Never* use pliers to tighten connectors.

c. Avoid 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, require careful handling. Some fixed attenuators are shipped from the factory in sturdy, wooden boxes containing foam padding. These boxes should be used to store the attenuator when it is not in use.

d. Keep Fixed Attenuator Connectors Clean.

The precise geometry that makes the RF component's high performance possible can be easily disturbed by dirt and other contamination adhering to connector interfaces. When not in use, keep the connectors covered. Refer to paragraph 5 for cleaning instructions.

5. MAINTENANCE

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

The traditional method of cleaning K Connectors with a cotton swab and alcohol can break the male connector pin on the precision connectors. The reason: the cotton swab has a larger diameter than the connector (that is, the area between the coupling nut wall and the center pin.)

We still recommend using a cotton swab; however, you need to trim the swab before cleaning the outer conductor mating service. **TAKE CARE TO NOT BUMP THE CENTER OUTER CONDUCTOR.**

Some precautions to follow when using the fixed attenuators:

Use either the finger saver that has been provided with the attenuator or use a 5 inch-pound torque wrench when connecting to other devices. No other tools are recommended.

Always spin the coupling nut to tighten connections. Spinning the connector body causes premature wear to the connector interface.

Do not disturb the connector center pin. Improper use (see above) of a cotton swab or other such probe to clean the inner connector may cause the center conductor to hinge on its bead and weaken or shear the internal connection.

Table 2. Performance Specifications, 1 of 2

Impedance: 50Ω
Power Rating (average): 2 watt at 20°C;
 1 watt at 85°C
Temperature Coefficient: 0.001 dB/dB/°C
Connectors:
V Connector male and female, compatible
 with 2.4 mm;
K Connector male and female, compatible
 with SMA and APC-3.5

Material: Passivated stainless steel housing
Length: 28.8 mm (1.135 in.) (0.5 (0.020 in.)
Diameter: 8 mm (0.312 in.)
Weight: 8 g (0.28 oz.)
Temperature Range:
Operating: -55°C to +85°C
Nonoperating: -55°C to +125°C
Outline Drawings: Figures 2 and 3 provide
 outline drawings for the 41K/43K Series and 41V
 Series, respectively.

Gold Line Models

Model	Attenuation (dB)	Attenuation Accuracy*				SWR				
		DC-18 GHz	18-26.5 GHz	26.5-40 GHz	40-60 GHz	DC-12 GHz	12-18 GHz	18-26.5 GHz	26.5-40 GHz	40-60 GHz
<i>Frequency Range: DC to 60 GHz</i>										
41V-3	3	±0.5	±0.6	±0.9	±1.20	1.15	1.20	1.30	1.50	1.90
41V-6	6	±0.5	±0.6	±0.9	±1.20	1.15	1.20	1.25	1.40	1.70
41V-10	10	±0.5	±0.6	±0.9	±1.20	1.15	1.20	1.25	1.40	1.70
41V-20	20	±0.5	±0.6	±0.9	±1.20	1.15	1.20	1.25	1.40	1.70
<i>Frequency Range: DC to 40 GHz</i>										
41KC-3	3	±0.4	±0.5	±0.8	-	1.10	1.15	1.23	1.42	-
41KC-6	6	±0.4	±0.5	±0.8	-	1.10	1.15	1.18	1.28	-
41KC-10	10	±0.4	±0.5	±0.8	-	1.10	1.15	1.18	1.28	-
41KC-20	20	±0.4	±0.5	±0.8	-	1.10	1.15	1.18	1.28	-
<i>Frequency Range: DC to 26.5 GHz</i>										
41KB-3	3	±0.4	±0.5	-	-	1.10	1.15	1.23	-	-
41KB-6	6	±0.4	±0.5	-	-	1.10	1.15	1.18	-	-
41KB-10	10	±0.4	±0.5	-	-	1.10	1.15	1.18	-	-
41KB-20	20	±0.4	±0.5	-	-	1.10	1.15	1.18	-	-
<i>Frequency Range: DC to 18 GHz</i>										
41KA-3	3	±0.4	-	-	-	1.10	1.15	-	-	-
41KA-6	6	±0.4	-	-	-	1.10	1.15	-	-	-
41KA-10	10	±0.4	-	-	-	1.10	1.15	-	-	-
41KA-20	20	±0.4	-	-	-	1.10	1.15	-	-	-

Table 1. Performance Specifications, 2 of 2

Silver Line Models										
Model	Attenuation* (dB)	Attenuation Flatness				SWR				
		DC-18 GHz	18-26.5 GHz	26.5-40 GHz	40-60 GHz	DC-12 GHz	12-18 GHz	18-26.5 GHz	26.5-40 GHz	40-60 GHz
<i>Frequency Range: DC to 40 GHz</i>										
43KC-3	3	±0.5	±0.6	±0.9		1.15	1.20	1.30	1.50	
43KC-6	6	±0.5	±0.6	±0.9		1.15	1.20	1.30	1.40	
43KC-10	10	±0.5	±0.6	±0.9		1.15	1.20	1.30	1.40	
43KC-20	20	±0.5	±0.6	±0.9		1.15	1.20	1.30	1.40	
<i>Frequency Range: DC to 26.5 GHz</i>										
43KB-3	3	±0.5	±0.6			1.15	1.20	1.30		
43KB-6	6	±0.5	±0.6			1.15	1.20	1.30		
43KB-10	10	±0.5	±0.6			1.15	1.20	1.30		
43KB-20	20	±0.5	±0.6			1.15	1.20	1.30		

* ±1 dB, dc – 26.5 GHz; ±1.3 dB, >26.5 – 40 GHz; including frequency response and DC offset

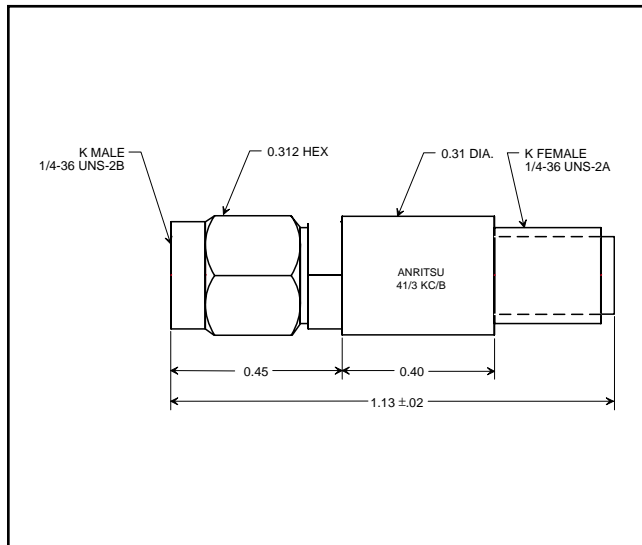


Figure 3. Models 41K-X/43K-X Outline Drawing

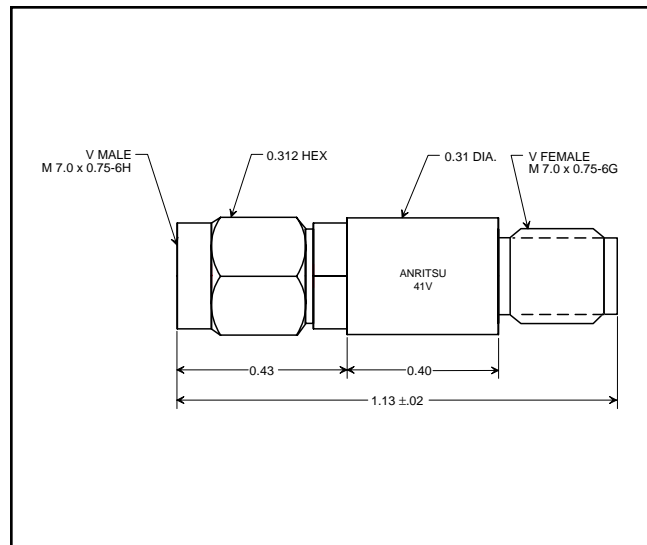


Figure 4. Models 41V-X Outline Drawing