

Keysight 478A Option H72

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Introduction

The Keysight 478A Option H72 Coaxial Thermistor Mount is similar to the standard 478A with one exception, it is designed to measure microwave power from 1 μ W to 10 mW over a frequency range of 1 MHz to 1 GHz.

The lower frequency is accomplished by the design of the RF Input connector (00478-62004) and Thermistor Assembly that utilize a 0.1 μ F cap for reference designators C1 and C2.

Specifications

Modify the 478A Operating and Service Manual (00478-90021) - Table 1, following specification **Table 1-1** as follows:

Table 1-1 Electrical specifications

Parameter	Specification	Condition
Frequency range	1 MHz to 1 GHz	-
Impedance		-
VSWR _{max}	1.1	1 MHz to 100 MHz
	1.2	100 MHz to 1 GHz
Operating Resistance	200 $\Omega \pm 1\%$	-
Power range	1 μ W to 10 mW	Cannot use 431 power meter
Max peak power	200 W	-
Max average power	30 mW	-
Max energy per pulse	10 W/ μ s	pulse rep rate \geq 1 kHz
	5 W/ μ s	pulse rep rate < 1 kHz
RF connector	Type-N (m)	-
Bridge connector	Mates with cable supplied with 432 type power meters.	-
The 478A Option H72 cannot be used with the 431 Power Meters.		

All other specifications in the 478A Operating and Service Manual - Table 1 apply, except where 431 use is referenced in the standard manual.

Mount Calibration

Table 1-2 Electrical specifications (mount calibration)

Parameter	Specification	Condition
Effective efficiency	> 95% (typically 98%)	1 MHz to 1GHz
Impedance	> 95%	1 MHz to 1 GHz

Mount calibration data

The calibration factors are essentially the same (within 1%) as the effective efficiency for 478A Option H72, over the 1 to 1000 MHz frequency range. Both vary less than the measurement uncertainties that apply to any calibration data and typically remain between 98% and 100%. Therefore, the CALIBRATION SWITCH on the 432A Power Meter may be set to 99% for most measurements made with the 478A Option H72 Thermistor Mounts. Below 1 MHz - the calibration factor typically falls off as indicated in **Figure 1-1**.

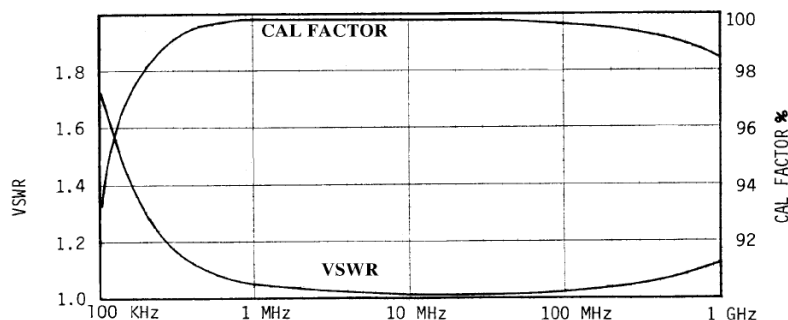


Figure 1-1 Typical VSWR and calibration factor versus frequency

Operation

For more information on the operation, please refer to the 478A Operating and Service Manual (00478-90021). Operation of the 478A Option H72 is the same as the standard 478A, with the following exceptions:

All references to the 431 power meters are to be ignored. The 431 design type power meters cannot be used with the 478A Option H72. In general, only those power meters employing bridges that transmit DC signals to and from the mount (432 design type) are suitable for use with the 478A Option H72. Therefore, paragraphs 16, 26 through 30, 43, 44, 50, 52 and 53 as well as Figures 4 and 5 in the 478A Operating and Service Manual do not apply.

Zero set

It is not necessary to terminate the mount if it is disconnected from the RF source when zeroing. Refer to the 432A Operating and Service Manual - Chapter 3 for the proper zeroing procedure.

Operating principles

Downward extension of the frequency range to 1 MHz of a 478A Thermistor Mount is accomplished in the Option H72 by changing the value of C1 and C2 to 0.1 μF , as shown in **Figure 1-2**. Utilization of these physically larger 0.1 μF capacitors requires modified connector and thermistor assemblies. The part numbers assigned to these special assemblies are indicated in **Table 1-4** and **Figure 1-3**.

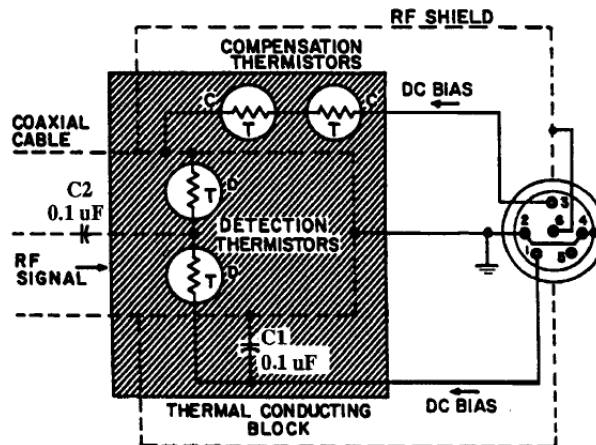


Figure 1-2 Thermistor mount connected to a 432 power meter

Testing

As the 478A Option H72 units are specified only up to 1000 MHz with effective efficiency and calibration factor varying little over the operating frequency range, the following checks (made with the 478A Option H72 connected to an operating 432A) will generally ensure that the 478A Option H72 is operating properly:

- 1 Verify the VSWR/Return Loss from 1 MHz to 1 GHz using a swept frequency network analyzer or equivalent. A quick fixed frequency check at 1 MHz will only ensure that blocking capacitor (C2) is intact. Verify the following specifications in Table 3-1, “Typical VSWR Characteristics.”
- 2 CAL FACTOR: Carefully zero and set the 432A range switch to 1 mW range on the 478A Option H72. Connect the 478A Option H72 to a precision 1 mW, 50 MHz power reference such as the 435A/B or 436A power meters or the 435A Option K05 dual power reference. With the CAL FACTOR switch set to 100%, the 432A should read between 0.95 and 1.02 mW (includes allowance for meter and power reference errors).

Table 1-3 Typical VSWR characteristics

Parameter	Specification	Condition
VSWR _{max}	1.1	1 MHz to 100 MHz
	1.2	100 MHz to 1 GHz

Maintenance

Follow all the precautions for 478A Option H72, as with the standard 478A, as outlined in the Operating and Service Manual (00478-90021).

The standard 478A Thermistor Mount's, THERMISTOR MATCH and REPAIR procedures (00478-90021) generally apply to the 478A Option H72.

Replaceable Parts

Make the following changes to the 478A Operating and Service Manual (00478-90021) - Table 3, "Replaceable Parts." When ordering a replacement RF connector or Thermistor Assembly, refer to **Table 1-4** and **Figure 1-3**.

Table 1-4 Replaceable Parts

Description	Keysight part number	Quantity
RF Connector Assembly	00478-62004	1
Thermistor Assembly	00478-62007	1

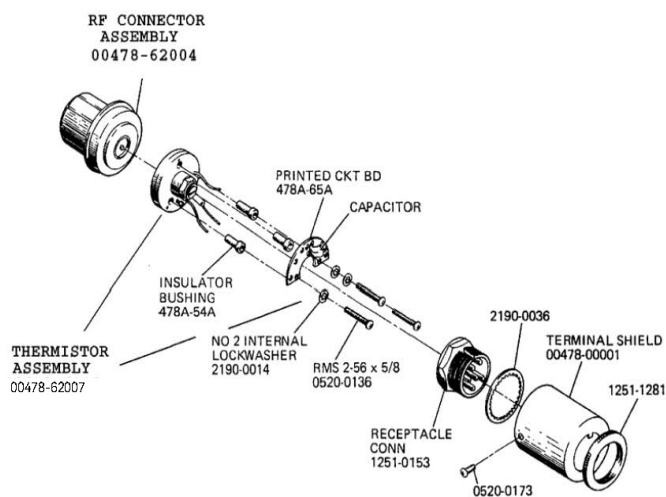


Figure 1-3 478A Option H72 Thermistor Mount Assembly

NOTE: Special options are build to order - long lead times may be encountered when ordering replacement parts.

Safety and Regulatory Information

Introduction

Review this product and related documentation to familiarize yourself with safety markings and instructions before you operate the instrument. This product has been designed and tested in accordance with international standards.

Applying power

Verify that the product is configured to match the available main power source, before applying power. If this product is to be powered by autotransformer, make sure the common terminal is connected to the neutral (grounded) side of the ac power supply.

Shipping instructions

User need to call the Keysight Technologies Instrument Support Center to initiate service before retuning your instrument to a service office. Always transport or ship the instrument using the original packaging (if possible), or use a comparable packaging. Attach a complete description of the failure symptoms.

To contact Keysight for sales and technical support, refer to Keysight worldwide website at: www.keysight.com/find/assist.



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Edition 2, July 26, 2018

Printed in Malaysia



00478-90031

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