

NoiseKen

Instruction Manual

HIGH PRECISION
20dB ATTENUATOR

00-00009A

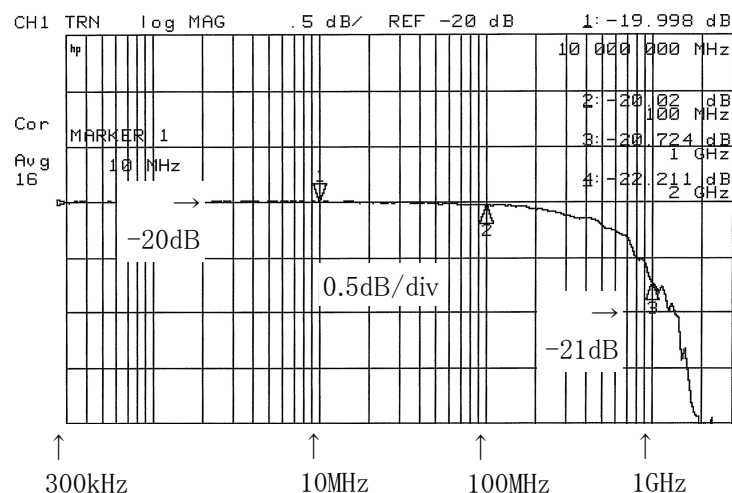
NOISE LABORATORY CO., LTD.

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Attenuation frequency characteristics (Typ)

1. IMPORTANT SAFETY PRECAUTIONS

This attenuator model 00-00009A (hereinafter "the unit") has been developed to observe high voltage pulses. The unit is used in conjunction with a high voltage generator. Thoroughly read beforehand "Important safety precautions" and "Basic safety precautions" for such generator as well as "Basic safety precautions" of this manual.

2. PREFACE

Thank you very much for your purchase of the high precision 20dB Attenuator Model: 00-00009A.

- This operation manual describes the function, operation and safety precautions of 00-00009A.
- Thoroughly read this operation manual before use and keep it as a ready reference.

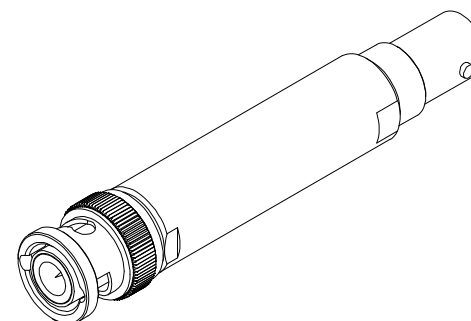
§ Features

1. The performance of the unit is highly precise, input resistance: less than $50\Omega \pm 0.1\%$, input resistance: less than $50\Omega \pm 0.1\%$, DC attenuation: less than $1/10 \pm 0.1\%$, Attenuation ratio: less than $20\text{dB} \pm 0.3\text{dB}$ (Attenuation frequency characteristics: $\sim 100\text{MHz}$).
2. Suitable for attenuation and measurement which require high precision.
3. Adopting a resistor body with low temperature constant which can keep performance even with change of temperature.
4. Pulse peak voltage: 100V.
5. Wide frequency range from DC to 1GHz.

3. BASIC SAFETY PRECAUTIONS

1. Mishandling or careless operation may result in serious injury. 【Precautions for human body, operation, environment and connection】
2. Before connecting this unit to a high voltage pulse generator, turn off the high voltage circuitry beforehand. Otherwise, the operator may receive an electric shock due to the generated high voltage pulses. 【Precautions for human body and connection】
3. Fully insert the coaxial connector and turn it clockwise until a click is heard to make connection securely. 【Precautions for human body and connection】
4. Our company and its distributors/agents shall have no liability for any injury or damage resulting from careless operation of this unit and any resultant damage or loss. 【Precautions for human body, operation, environment and connection】
5. For allowable pulse duration and its repetition frequency, follow the maximum values given in Section "Specifications". If the specified tolerance is exceeded, this unit may be broken and the operator may receive an electric shock. 【Precautions for human body and connection】
6. Since the attenuation ratio of the unit is 10:1, be careful of withstanding input voltage of a measurement instrument, such as an oscilloscope. If the input voltage exceeds it, put one more 20dB attenuator between the unit and the measurement instrument. 【Precautions for operation】

4. MAIN UNIT



High precision 20dB Attenuator..... 1 piece

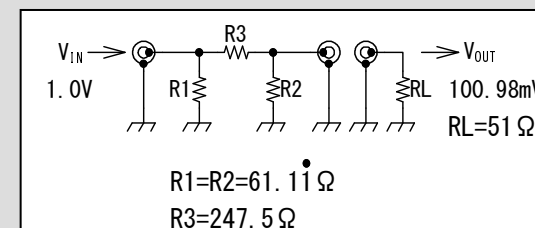
5. OPERATION

1. Preparation of equipment to be measured
Prepare equipment to be measured.
Confirm beforehand that the output voltage of the equipment is within the rate voltage of the unit.

In this manual, the input side of the unit is distinguished with the output side for the convenience of explanation, but the unit can be used without caring direction. Injecting voltage to the output side and measuring at the input side is also available.
2. Connection between equipment to be measured and the unit
 - Connect the unit to the equipment to be measured. The attenuation is 1/10 (When non-reflective 50Ω terminator is connected).
 - A 50Ω coaxial cable as short as possible is recommendable for connection. If the 50Ω coaxial cable is longer, the transmission loss becomes bigger to spoil high precision.
3. Connection between measurement equipment and the unit
 - Connect the other side of the unit to measurement equipment, such as an oscilloscope.
 - A 50Ω coaxial cable as short as possible is recommendable for connection.
4. Setup of measurement equipment
 - The 50Ω termination is necessary in the measurement equipment, such as an oscilloscope. Since the impedance of the coaxial cable is around 50Ω , the non-reflective 50Ω termination is necessary.

Notice

- Be careful of withstanding input voltage of a measurement instrument, such as an oscilloscope. If the input voltage exceeds it, put one more 20dB attenuator between the unit and the measurement instrument.
- Is the input impedance of the measurement equipment 50Ω ?
Since the output impedance of the unit is 50Ω , make the input impedance of the measurement equipment 50Ω also. In case of high input impedance (e.g. $1\text{M}\Omega$) measurement equipment, insert a non-reflective 50Ω terminator into the input part of the measurement equipment.
- The input resistance and attenuation of the unit are influenced by the accuracy of the non-reflective 50Ω terminator of the measurement instrument. Increase in the attenuation in 51.0Ω connection is about $+0.98\%$ based on the time when 50.0Ω is connected.



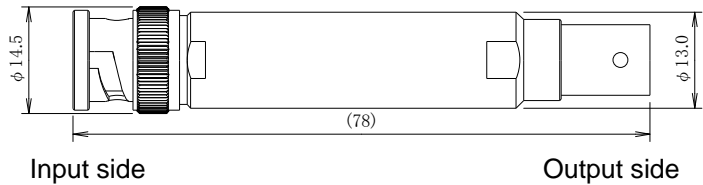
6. SPECIFICATIONS

CategoryHigh precision 20dB Attenuator
Model number 00-00009A

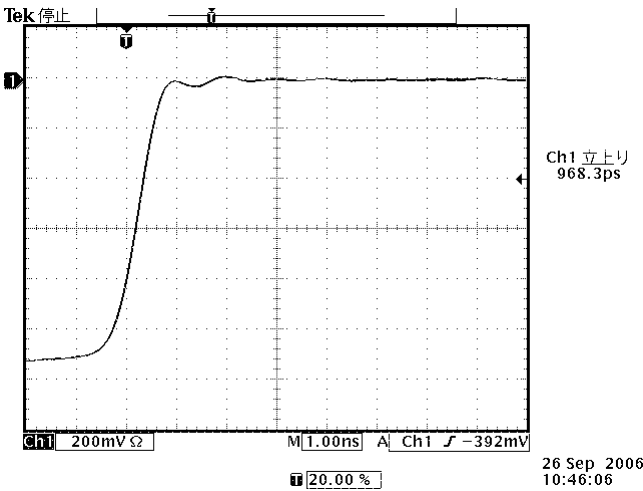
Items	Specifications
Attenuation	DC~1GHz-----20dB (Tolerance : 19.7dB~23.0dB※) DC~100MHz-----20dB (Tolerance : 19.7dB~20.3dB※) ※At DC <1/10 ±0.1%
Input resistance	<50 Ω ±0.1% (50 Ω termination at output side)
Output resistance	<50 Ω ±0.1% (50 Ω termination at input side)
VSWR	<2.0 (~1GHz 50 Ω termination) <1.2 (~100MHz 50 Ω termination)
Power	1W <25℃
Pulse peak voltage	100V at 1μs
Shape	Input side: BNC-P(male) Output side: BNC-J(female)
Weight	Approx. 50g

Note:
Use the unit with the following conditions.
Power: Less than the rated power
Voltage: Less than the pulse peak voltage
The unit can be used irrespective of input or output side.

【Appearance】



【Step response】



Generator=PG506A(Tektronix) tr ≤ 1ns

7. WARRANTY

Servicing terms

The following terms are applicable to servicing by Noise Laboratory Co., Ltd., (hereafter referred to as the Company) provided to maintain the intended performance of its products.

1. Scope

The following terms shall apply only to products made by the Company.

2. Technical servicing fee

In the event of a failure of a product within the warranty period (see warranty section), the Company will repair a product without charge. After the warranty expires, repairs will be billed at a nominal cost.

3. Ownership of defective parts

Any defective part exchanged under the Company's servicing belongs to it.

4. Limited liability

In the event that damages resulting from servicing by the Company are intentional or caused by negligence, the Company will pay the cost but at the purchase value of the relevant product maximum. But, notwithstanding the foregoing, the Company shall not be responsible for any incidental or consequential damages of any nature, including without limitation thereof loss of would-be profit or compensation demanded from a third party

5. Refusal to offer servicing

The company may not accept a repair order in the following cases:

- More than 5 years have passed since the product discontinued
- More than 8 years have passed after delivery
- Required component for servicing already discontinued and no alternative is available.
- Product changed, repaired or remodeled without obtaining a prior permission from the Company.
- Product severely damaged to the extent it has lost its original form

Limited warranty

Noise Laboratory Co., Ltd. (hereafter referred to as the Company) warrants its products to be free from defects in materials and workmanship under normal use and service for a period of one year from date of delivery. In the event of failure of a product covered by this warranty, the Company will repair the product or may, at its option, replace it in lieu of repair without charge.

Notwithstanding the foregoing, the Company shall not be responsible for any incidental or consequential damages of any nature, including without limitation thereof loss of would-be profit or compensation demanded from a third party. This warranty is valid only in Japan.

1. Scope

This warranty shall only apply to products made by the Company.

2. Period

One year from date of delivery. The warranty may be valid in 6 months after servicing if the same failure on the same component has repeated.

3. Exclusions

The followings are exclusions from this warranty:

- ◇ Consumable parts (including HV relay)
- ◇ Failure caused by misuse, neglect, accident or abnormal conditions of operation
- ◇ Failure caused by remodeling on the user side without prior permission from the Company
- ◇ Failure caused by servicing by unauthorized personnel by the Company
- ◇ Failure due to force majeure including but not limited to, acts of God, fire, war, riot, rebellion and others
- ◇ Failure due to shock or drop in or after transit
- ◇ Failure due to operation in environment being out of ambient specifications.
- ◇ A unit shipped to overseas.

8. MAINTENANCE

1. When repair, maintenance or internal adjustment is required, it should be performed only by our company's authorized service engineer.
2. Maintenance to be performed by the customer is limited to the outside cleaning and functional check.
3. For products with fuses, unplug before check or fuse replacement.
4. When cleaning products, turn off the power switch and unplug them beforehand.
5. When the body gets dirty, soak a cloth in water or detergent, squeeze the cloth and gently wipe off it.

9. SERVICE SUPPORT CONTACT

- If you find a phenomenon, which may be judged as a trouble, please inform our maintenance or sales division of the model name of your machine and serial number together with the detail of such phenomenon.
- When you return the product, fill in a repair request form with the detail of the trouble, symptom, model name, serial number and your request. Put the whole equipment in the original package or pack it in a type of package suitable for transit and send to our company.

For repair and other services, contact:

International Dept.
Noise Laboratory Co., Ltd.
1-4-4 Chiyoda, Chuo-ku, Sagami-hara, Kanagawa
252-0237, Japan
Tel: +81 (0)42-712-2051 Fax: +81 (0)42-712-2050

----- Cut line -----

10. APPLICATION FORM

We apply for buying INSTRUCTION MANUAL.

Model: 00-00009A

Serial Number:

Applicant's address:

Company name:

Section:

Name of person in charge:

Tel:

Fax:

Cut off this page "APPLICATION FORM FOR BUYING INSTRUCTION MANUAL" from this booklet and keep it for future use with care.

When an INSTRUCTION MANUAL is required, fill out the above Application Form and mail or fax it to NOISE LABORATORY CO., LTD. or our sales agent.