



OPERATING MANUAL

Attenuator & Pulse Limiter

PAT20M

REVISION LEVEL 2.8
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GENERAL INFORMATION

The information contained herein, are provided in connection with the usage of AFJ PAT20M pulse limiter only.

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All efforts have been made to ensure the accuracy of the contents of this document. However, the supplier can assume no liability whatsoever for any errors in this manual or their consequences, direct and/or indirect.

USE

The EMI receiver input attenuator, the preamplifier, the pre-selector or input mixer can be destroyed in EUT testing due to a very high spectral density/pulse energy. For high voltages as occur e.g. in LISNs or absorbing clamp measurement, we strongly recommend to make use of the external Pulse Limiter – Attenuator PAT20M with every kind of EMI Receiver. PAT20M also offers 20dB of attenuation to prevent the mixer input saturation and shall be directly connected to the test receiver input.

WARRANTY

Systems, options and accessories thereof, manufactured and shipped under the AFJ Instruments brand name, are warranted to be free from manufacturing defects for a period of twelve (12) months from the date of shipment.

AFJ Instruments certifies that all products are tested and inspected to comply with the published specifications originating from the company. Calibration procedure includes Calculation of uncertainty using ISO model and Traceability.

- Warranty is provided “Ex-Works”: therefore, AFJ Instruments will be responsible of the amendment of failures arising from ascertained manufacturing defects only.
- Warranty will not be applicable in case of mishandling, unauthorized opening of the case, improper use, and unauthorized repairs. In such cases, the warranty will be terminated.
- A repair under warranty will not extend the original term of validity of the warranty itself.
- All products or parts thereof, to be subject to a warranty operation, shall be shipped to the appropriate AFJ Instruments Warranty Centre, at Customer's charge.

If a delivery back to the supplier is necessary we recommend keeping the original transport case. In such case, refer to the following Return Procedure.

Return Procedure

To return the item to AFJ Instruments, use the following procedure:

- Briefly describe the problem in writing (Service Requested form). Include the serial number of the item being returned;
- Package the unit carefully (Damages due to transport are not covered from any guarantee);
- Before return the system back to AFJ, wait for RMA number (Returned Material Authorization).

WORKING CONDITIONS

The allowed temperature range during use of the device is -10°C to $+45^{\circ}\text{C}$. In cases of storage or transport this range may exceed by -20°C to $+70^{\circ}\text{C}$.

Working relative humidity shall be 30% to 75%, atmospheric pressure shall be 86kPa to 106kPa (860 to 1060mba). System is not influenced by direct solar radiation.

Use a clean, dry non abrasive cloth for external cleaning of the pulse limiter. Do not use any solvent, thinner, turpentine, acid, acetone or similar to avoid damage to external surfaces.

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1: Description

The PAT20M pulse limiter (fig.1) protects EMI receiver precision input circuit against high-energy interference pulses. The pulse limiter does not cause any change of the measured signal and loss in sensitivity of measuring receiver. These attenuators support pulses of up to 1Ws.

When the test receivers are connected to artificial mains networks, high-energy transients of up to 100mWs may occur particularly when DUTs are switched on or off or during phase switching. The pulse limiter can be directly connected to the input of every kind of EMI Receivers/Spectrum analyzers.



Fig.1: PAT20M pulse limiter

2: Characteristics

The PAT20M pulse limiter consists of a 20dB attenuator and limiter diodes with low-pass compensation. The operative frequency range is $f=9\text{kHz}\div 30\text{MHz}$ and the limiter acts as Low pass filter up to $f=100\text{MHz}$.

Characteristic

Insertion loss		20dB $\pm 0.3\text{dB}$
Frequency range		$f=9\text{kHz}-30\text{MHz}$
Low pass filter up to		$f=100\text{MHz}$
VSWR with 50Ω termination	Input	<1.05
	Output	<1.15
Power-handling capacity (continuous operation)		1W
Pulse energy-handling capacity		1Ws (500 μs)

General data

Nominal Temperature range		0°C to +45°C
Storage temperature range		-20°C to +70°C
RF connectors	Input	N or BNC female
	Output	N or BNC male
Dimensions		96 x 28 x 23mm
Weight		70g

3: Use

The EMI receiver input attenuator, the preamplifier, the pre-selector or input mixer can be destroyed in EUT testing due to a very high spectral density/pulse energy. For high voltages as occur e.g. in LISNs or absorbing clamp measurement, the external Pulse Limiter – Attenuator **PAT20M** is strongly recommended with every kind of EMI Receiver.

The PAT20M has been designed to fit between the LISN and the measuring instrument to protect the instrument from mains transients interface. The LISN itself will attenuate most of the transients on the mains supply – the real problem is the connection and disconnection of the EUT, which can cause up to 400V transients to appear at the RF outputs. The pulse limiter can be directly connected to the input of every kind of EMI Receivers/Spectrum analyzers (fig.2).



Fig. 2: AFJ FFT3000 Receiver and PAT20M

Warning

- Before connecting Pulse Limiter to relevant EMI test instrument, ensure that an uninterruptible safety earth ground is provided from the main power source to the test receiver protective heart connection.
- To avoid hazardous electrical shock, prior to energizing either unit or prior pulse limiter connection, verify that a common ground exist between EMI test receiver and equipment under test.