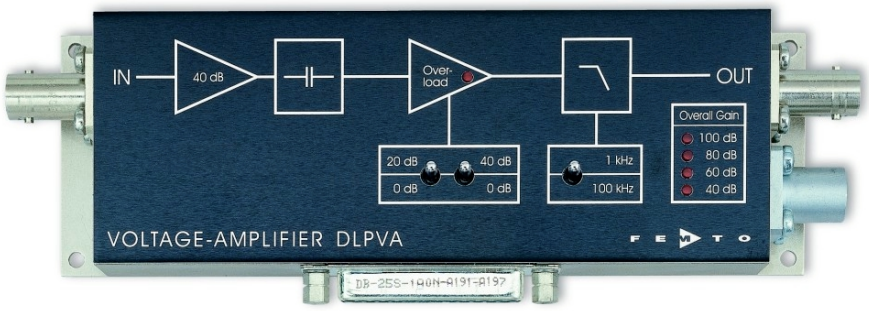
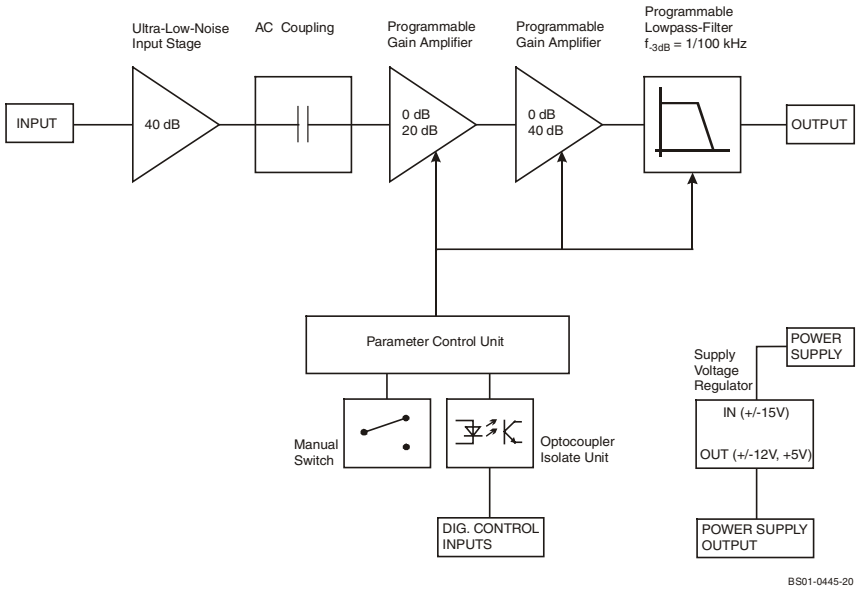
Ultra Low Noise Variable Gain Low Frequency Voltage Amplifier



Features	• **Variable Gain 40 to 100 dB, Switchable in 20 dB Steps** • **Bipolar Input Stage, Recommanded for Low Impedance Sources Smaller than 50 Ω** • **Ultra low Input Voltage Noise: 400 pV/√Hz** • **AC Coupled, Single Ended** • **Bandwidth 1.5 Hz - 100 kHz, Switchable to 1 kHz** • **Local and Remote Control**
Applications	• **Ultra-Low-Noise Laboratory Amplifier** • **Pulsed Thermal EMF Analysis** • **Chopped Thermopiles / Bolometers** • **Industrial Sensors** • **Detector Preamplifier** • **Integrated Measurement Systems**
Block Diagram	

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Specifications

Test Conditions Vs = ±15 V, Ta = 25°C

Gain

Gain Values	40, 60, 80, 100 dB indicated by four LEDs	
Gain Accuracy	± 0.1 %	(between settings)
	± 1 %	(overall)
Gain Flatness	± 0.1 dB	

Frequency Response

Lower Cut-Off Frequency	1.5 Hz
Upper Cut-Off Frequency	100 kHz, switchable to 1 kHz
Upper Cut-Off Frequency Rolloff	12 dB/Oct.

Time Response

Rise / Fall Time (10% - 90%)	3.5 µs (@ BW = 100 kHz) 350 µs (@ BW = 1 kHz)

Input

Input Impedance	1 kΩ

Equivalent Input Voltage Noise

Gain Setting	Noise
100 dB	400 pV/√Hz
80 dB	420 pV/√Hz
60 dB	800 pV/√Hz
40 dB	6 nV/√Hz

Equivalent Input Current Noise	3 pA/√Hz
1/f-Noise Corner	100 Hz
Input Bias Current	30 µA
Maximum Input DC-Offset Voltage for Linear Amplification	± 90 mV

Important Notice: The input must see a source Impedance below 200 Ω to function properly!

Output

Output Impedance	50 Ω (terminate with > 10 kΩ for best performance)
Output Voltage Range for linear Amplification	± 10 V (@ > 10 kΩ load)
Output Current (max.)	± 20 mA
Output Overload Recovery Time	0.5 ms (after 20x overload)

Overload LED

The amplifier features a LED to signalize an overload condition. The Overload LED will turn on if the signal level within the signal path exceeds the linear operating range. In order to ensure the correct operation of the amplifier without signal distortions reduce the gain setting until the Overload LED turns off.

The Overload LED may also turn on when the amplifier is operated with open input or with a high source impedance. For proper operation please use a source impedance of less than 100 Ω or switch to a lower gain setting.

Remote Digital Control

Control Input Voltage Range	Low: - 0.8 ...+ 0.8 V High: + 1.8 ... + 12 V, TTL / CMOS compatible
Control Input Current	0 mA @ 0 V, 1.5 mA @ + 5 V, 4.5 mA @ + 12 V
Overload Output	Non active: + 5 V, max. 1 mA, active: 0.8 V, max. -10 mA

Power Supply

Supply Voltage	± 15 V (± 14.5 V to ± 16 V)
Supply Current	± 55 mA typ. (depends on operating conditions, recommended power supply capability minimum 150 mA)

Case

Weight	0.32 kg (0.7 lbs)
Material	AlMg4.5Mn, nickel-plated

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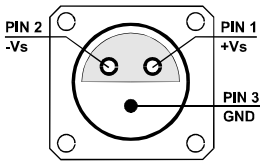
Temperature Range	Storage Temperature	- 40 °C to + 100 °C
	Operating Temperature	0 °C to + 60 °C
Absolute Maximum Ratings	Power Supply Voltage	± 21 V
	Control Input Voltage	+ 16 V / - 5 V
	Signal Input Voltage	± 4 V
	Overvoltage at the signal input can severely degrade the noise performance or destroy the amplifier!	
Connectors	Input	BNC
	Output	BNC
	Power Supply	LEMO series 1S, 3-pin fixed socket Pin 1: + 15V Pin 2: - 15V Pin 3: GND



	Control Port	Sub-D 25-pin, female, qual. class 2 Pin 1: +12 V (stabilized power supply output, max. 100 mA) Pin 2: -12 V (stabilized power supply output, max. 100 mA) Pin 3: AGND (analog ground) Pin 4: +5 V (stabilized power supply output, max. 50 mA) Pin 5: digital output: overload Pin 6: NC Pin 7: NC Pin 8: NC Pin 9: DGND (ground f. digital control Pin 10 - 25) Pin 10: NC Pin 11: digital control input: gain, LSB Pin 12: digital control input: gain, MSB Pin 13: NC Pin 14: digital control input: 100 kHz / 1 kHz Pin 15 - 25: NC

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Remote Control Operation

General

Remote control input bits are opto-isolated and connected by logical OR to local switch setting. For remote control a switch setting, set the corresponding local switch to "0 dB" and "1 kHz" and select the wanted setting via a bit-code at the corresponding digital inputs. Mixed operation, e.g. local gain setting and remote controlled bandwidth setting, is also possible.

Gain Setting

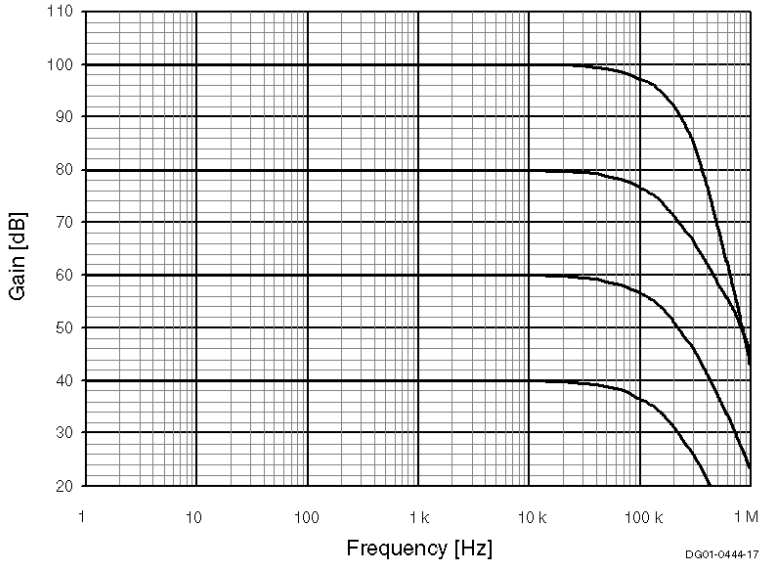
Gain	Pin 11	Pin 12
40 dB	low	low
60 dB	high	low
80 dB	low	high
100 dB	high	high

Bandwidth Setting

Bandwidth	Pin 14
1 kHz	low
100 kHz	high

Typical Performance Characteristics

Frequency Response (Logarithmic)



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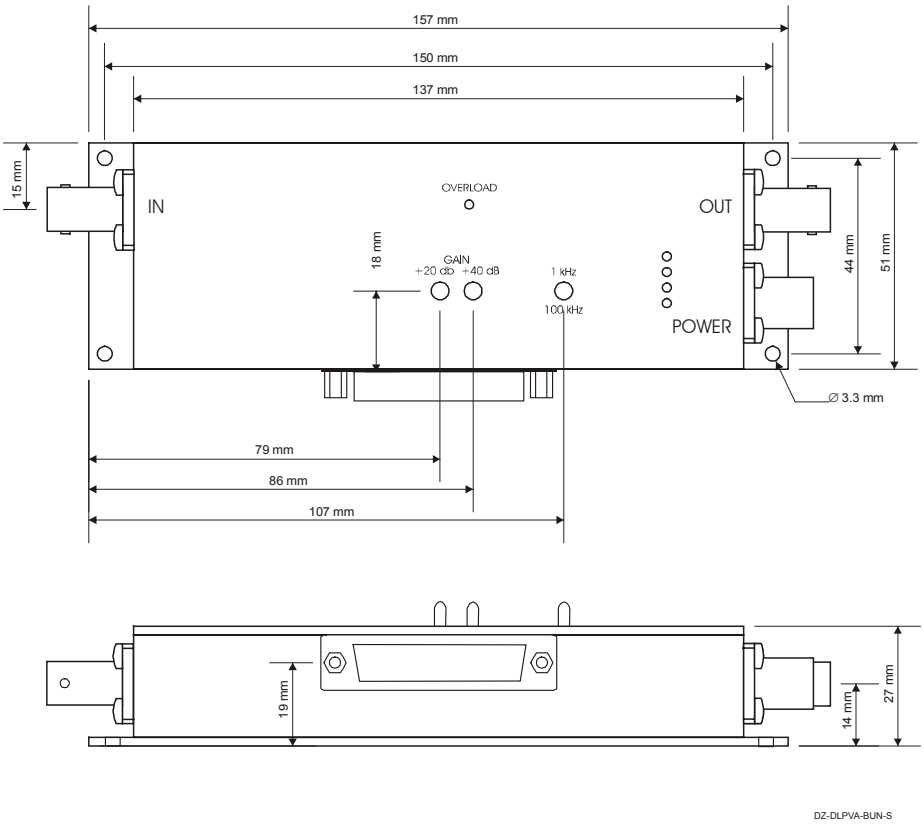
Dimensions



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