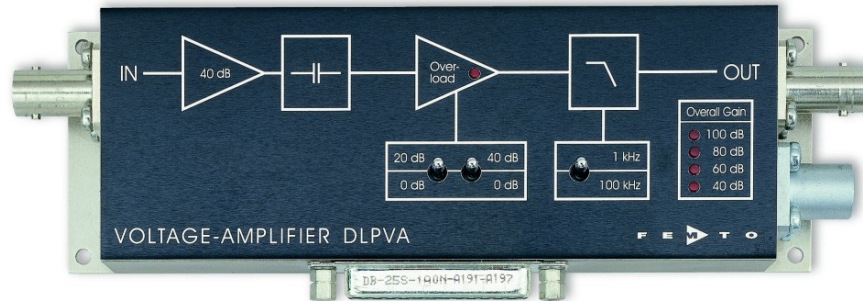
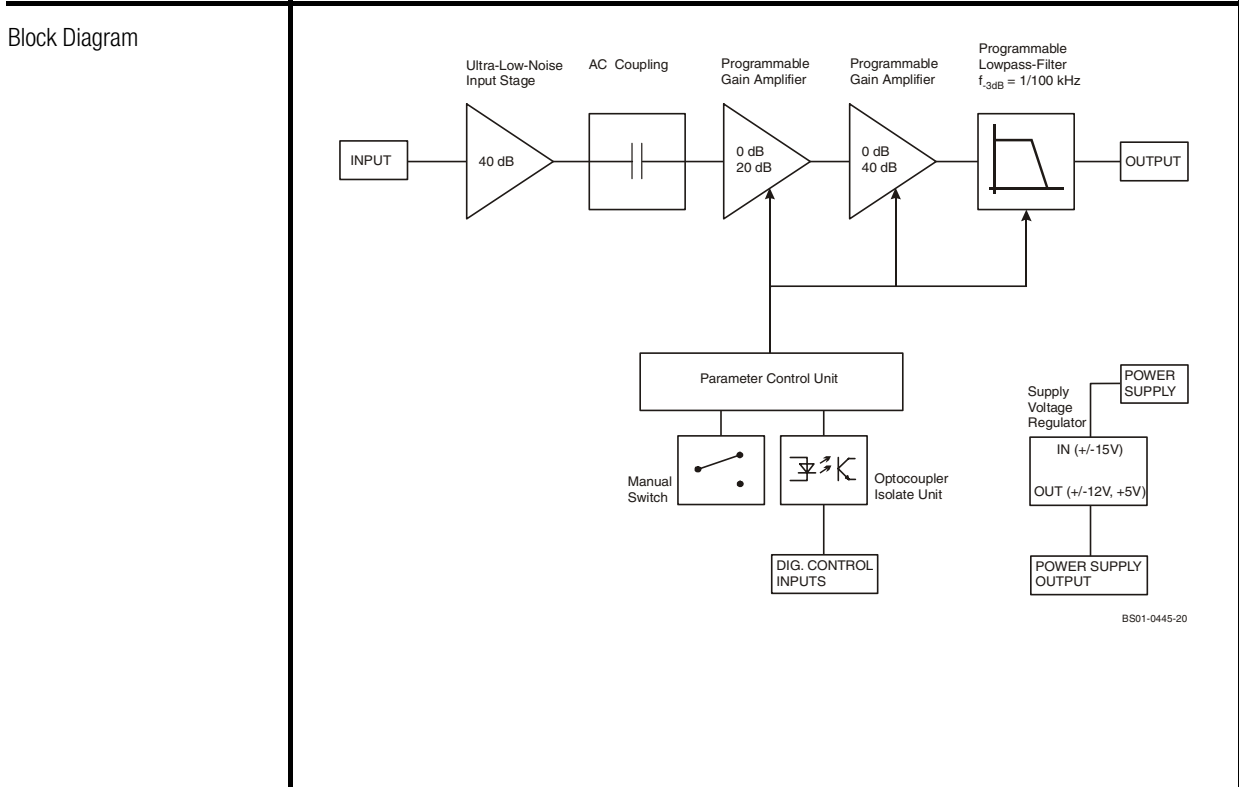


# Ultra Low Noise Variable Gain Low Frequency Voltage Amplifier



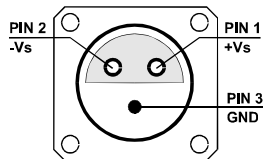
<p>Features</p>	<ul style="list-style-type: none"> <li>• <b>Variable Gain 40 to 100 dB, Switchable in 20 dB Steps</b></li> <li>• <b>Bipolar Input Stage, Recommended for Low Impedance Sources Smaller than 50 Ω</b></li> <li>• <b>Ultra low Input Voltage Noise: 400 pV/√Hz</b></li> <li>• <b>AC Coupled, Single Ended</b></li> <li>• <b>Bandwidth 1.5 Hz - 100 kHz, Switchable to 1 kHz</b></li> <li>• <b>Local and Remote Control</b></li> </ul>
<p>Applications</p>	<ul style="list-style-type: none"> <li>• <b>Ultra-Low-Noise Laboratory Amplifier</b></li> <li>• <b>Pulsed Thermal EMF Analysis</b></li> <li>• <b>Chopped Thermopiles / Bolometers</b></li> <li>• <b>Industrial Sensors</b></li> <li>• <b>Detector Preamplifier</b></li> <li>• <b>Integrated Measurement Systems</b></li> </ul>



## Ultra Low Noise Variable Gain Low Frequency Voltage Amplifier

Specifications	<i>Test Conditions</i>	<i>V<sub>s</sub> = ± 15 V, T<sub>a</sub> = 25°C</i>		
Gain	Gain Values	40, 60, 80, 100 dB indicated by four LEDs		
	Gain Accuracy	± 0.1 %	(between settings)	
		± 1 %	(overall)	
Frequency Response	Gain Flatness	± 0.1 dB		
	Lower Cut-Off Frequency	1.5 Hz		
	Upper Cut-Off Frequency	100 kHz, switchable to 1 kHz		
Time Response	Upper Cut-Off Frequency Rolloff	12 dB/Oct.		
	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	<u>Gain Setting</u>	<u>Noise</u>	
		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		

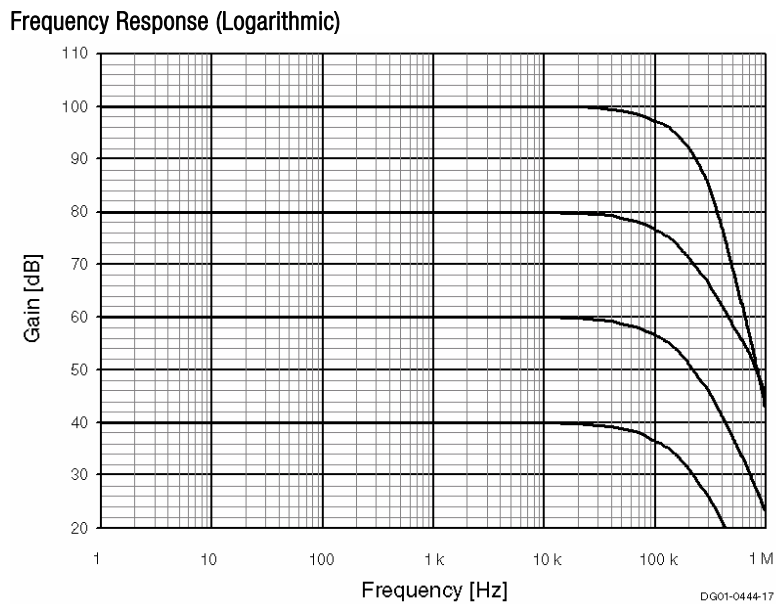
## Ultra Low Noise Variable Gain Low Frequency Voltage Amplifier

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	
	<b>Overvoltage at the signal input can severely degrade the noise performance or destroy the amplifier!</b>		
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	

## Ultra Low Noise Variable Gain Low Frequency Voltage Amplifier

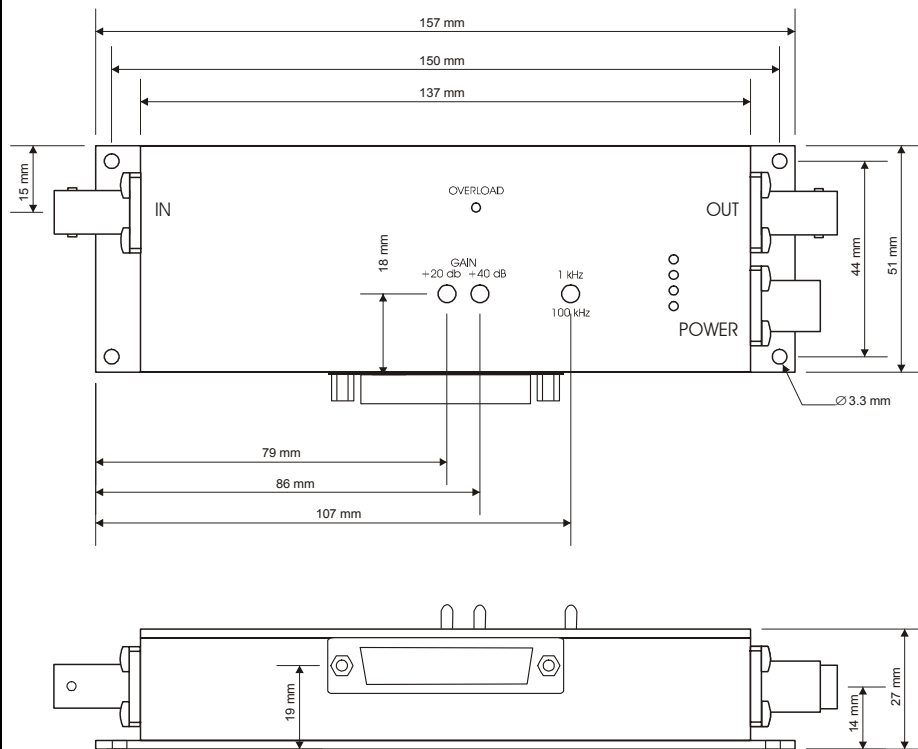
Remote Control Operation	<p><b>General</b></p> <p>Remote control input bits are opto-isolated and connected by logical OR to local switch setting. For remote control a switch setting, set the corresponding local switch to "0 dB" and "1 kHz" and select the wanted setting via a bit-code at the corresponding digital inputs. Mixed operation, e.g. local gain setting and remote controlled bandwidth setting, is also possible.</p>																				
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-bottom: 1px solid black; padding: 2px;"><b>Gain Setting</b></td> <td style="border-bottom: 1px solid black; padding: 2px;">Gain</td> <td style="border-bottom: 1px solid black; padding: 2px;">Pin 11</td> <td style="border-bottom: 1px solid black; padding: 2px;">Pin 12</td> </tr> <tr> <td style="padding: 2px;">40 dB</td> <td style="padding: 2px;">low</td> <td style="padding: 2px;">low</td> <td style="padding: 2px;">low</td> </tr> <tr> <td style="padding: 2px;">60 dB</td> <td style="padding: 2px;">high</td> <td style="padding: 2px;">low</td> <td style="padding: 2px;">low</td> </tr> <tr> <td style="padding: 2px;">80 dB</td> <td style="padding: 2px;">low</td> <td style="padding: 2px;">high</td> <td style="padding: 2px;">high</td> </tr> <tr> <td style="padding: 2px;">100 dB</td> <td style="padding: 2px;">high</td> <td style="padding: 2px;">high</td> <td style="padding: 2px;">high</td> </tr> </table>	<b>Gain Setting</b>	Gain	Pin 11	Pin 12	40 dB	low	low	low	60 dB	high	low	low	80 dB	low	high	high	100 dB	high	high	high
<b>Gain Setting</b>	Gain	Pin 11	Pin 12																		
40 dB	low	low	low																		
60 dB	high	low	low																		
80 dB	low	high	high																		
100 dB	high	high	high																		
	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="border-bottom: 1px solid black; padding: 2px;"><b>Bandwidth Setting</b></td> <td style="border-bottom: 1px solid black; padding: 2px;">Bandwidth</td> <td style="border-bottom: 1px solid black; padding: 2px;">Pin 14</td> </tr> <tr> <td style="padding: 2px;">1 kHz</td> <td style="padding: 2px;">low</td> <td style="padding: 2px;">high</td> </tr> <tr> <td style="padding: 2px;">100 kHz</td> <td style="padding: 2px;">high</td> <td style="padding: 2px;">low</td> </tr> </table>	<b>Bandwidth Setting</b>	Bandwidth	Pin 14	1 kHz	low	high	100 kHz	high	low											
<b>Bandwidth Setting</b>	Bandwidth	Pin 14																			
1 kHz	low	high																			
100 kHz	high	low																			

Typical Performance Characteristics



# Ultra Low Noise Variable Gain Low Frequency Voltage Amplifier

Dimensions



DZ-DLPVA-BUN-S

FEMTO Messtechnik GmbH  
 Klosterstr. 64  
 D-10179 Berlin · Germany  
 Tel.: +49-(0)30-280 4711-0  
 Fax: +49-(0)30-280 4711-11  
 e-mail: info@femto.de  
 http://www.femto.de

Specifications are subject to change without notice. Information furnished herein is believed to be accurate and reliable. However, no responsibility is assumed by FEMTO Messtechnik GmbH for its use, nor for any infringement of patents or other rights granted by implication or otherwise under any patent rights of FEMTO Messtechnik GmbH. Product names mentioned may also be trademarks used here for identification purposes only.  
 © by FEMTO Messtechnik GmbH  
 Printed in Germany