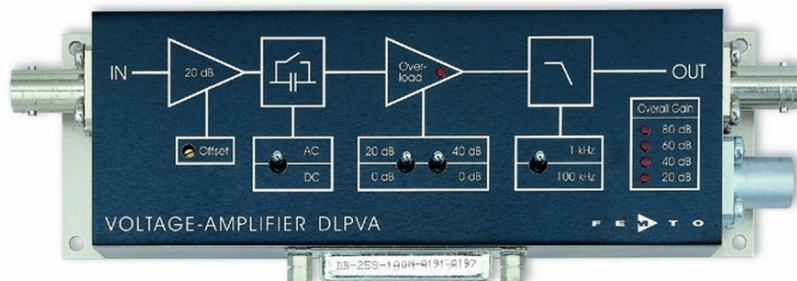


Variable Gain Low Frequency Voltage Amplifier



<p>Features</p>	<ul style="list-style-type: none"> • Variable Gain 20 to 80 dB, Switchable in 20 dB Steps • FET Input Stage, 1 TΩ Impedance • Protection against ± 3 kV Transients • Single Ended and True Differential Input Models • Bandwidth DC - 100 kHz, Switchable to 1 kHz • 1.3 μV/°C DC-Drift • 120 dB CMRR • 5.5 nV/√Hz Input Noise • Switchable AC/DC-Coupling • Local and Remote Control
<p>Applications</p>	<ul style="list-style-type: none"> • Universal Laboratory Amplifier • Automated Measurements • Industrial Sensors • Detector Preamplifier • Integrated Measurement Systems
	<p style="text-align: right; font-size: small;">BS01-0440-19</p>

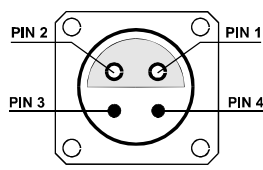
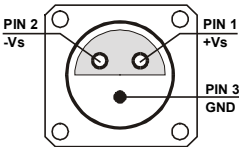
Variable Gain Low Frequency Voltage Amplifier

Specifications	Test Conditions	$V_s = \pm 15\text{ V}$, $T_a = 25^\circ\text{C}$		
Gain	Gain Values	20, 40, 60, 80 dB indicated by four LEDs		
	Gain Accuracy	$\pm 0.1\%$ (between settings) $\pm 1\%$ (overall)		
	Gain Flatness	$\pm 0.1\text{ dB}$		
Frequency Response	Lower Cut-Off Frequency	DC, switchable to 1.5 Hz		
	Upper Cut-Off Frequency	100 kHz, switchable to 1 kHz		
	Upper Cut-Off Frequency Roll-off	12 dB/Oct.		
Time Response	Rise / Fall Time (10% - 90%)	$3.5\ \mu\text{s}$ (@ BW = 100 kHz) $350\ \mu\text{s}$ (@ BW = 1 kHz)		
	Input	Input Impedance	$1\ \text{T}\Omega$	
	Input Voltage Drift	$1.3\ \mu\text{V/K}$		
	Equivalent Input Voltage Noise	<u>Gain Setting</u>	<u>DLPVA-100-F-S</u> <u>DLPVA-100-F-D</u>	
		60, 80 dB	$5.5\ \text{nV}/\sqrt{\text{Hz}}$ $6.9\ \text{nV}/\sqrt{\text{Hz}}$	
		40 dB	$8\ \text{nV}/\sqrt{\text{Hz}}$ $10\ \text{nV}/\sqrt{\text{Hz}}$	
		20 dB	$60\ \text{nV}/\sqrt{\text{Hz}}$ $60\ \text{nV}/\sqrt{\text{Hz}}$	
	Equivalent Input Current Noise	$1.6\ \text{fA}/\sqrt{\text{Hz}}$		
	1/f-Noise Corner	80 Hz		
	Input Bias Current	$1\ \text{pA}$		
	Input Bias Current Drift	Factor 2.3 / 10°C		
	Input Offset Voltage	$\pm 5\ \text{mV}$, adjustable by offset trimmer and external control voltage		
	<i>Single Ended Input, Model "DLPVA-100-F-S" only:</i>			
	Input Voltage Range for linear Amplification:	$\pm 0.6\ \text{V}$		
	<i>True Differential Input, Model "DLPVA-100-F-D" only:</i>			
	Common Mode Voltage Range	$\pm 5\ \text{V}$		
	CMRR	$120\ \text{dB}$	(@ 100 Hz)	
		$100\ \text{dB}$	(@ 10 kHz)	
		$80\ \text{dB}$	(@ 60 kHz)	
	Output	Output Impedance	$50\ \Omega$ (terminate with $> 10\ \text{k}\Omega$ load for best performance)	
		Output Voltage Range	For Linear Amplification $\pm 10\ \text{V}$ (@ $> 10\ \text{k}\Omega$ load)	
		Output Current (max.)	$\pm 20\ \text{mA}$	
Output Overload Recovery Time		$0.5\ \text{ms}$ (after 20x overload)		

Variable Gain Low Frequency Voltage Amplifier

Overload LED	<p>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.</p> <p>The Overload LED may also turn on under the following operating conditions:</p> <ul style="list-style-type: none"> - 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 MΩ or switch to a lower gain setting. - When using a DLPVA-F-D with differential input stage the Overload LED may turn on if the common mode input voltage exceeds ± 5 V or if the source is totally floating with respect to the amplifier ground. For proper operation make sure that the common mode voltage stays within ± 5 V with respect to the amplifier ground and make a valid connection between the source ground and the amplifier ground to ensure that the inputs cannot drift outside the tolerable common mode range. 	
Remote Offset Control	Offset Control Voltage Range	± 10 V, corresponds to ± 5 mV input offset
	Offset Control Input Impedance	200 kΩ
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	± 75 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
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	± 15 Vp
	Transient Input Voltage	± 3 kV (discharge from 5 nF source)

Variable Gain Low Frequency Voltage Amplifier

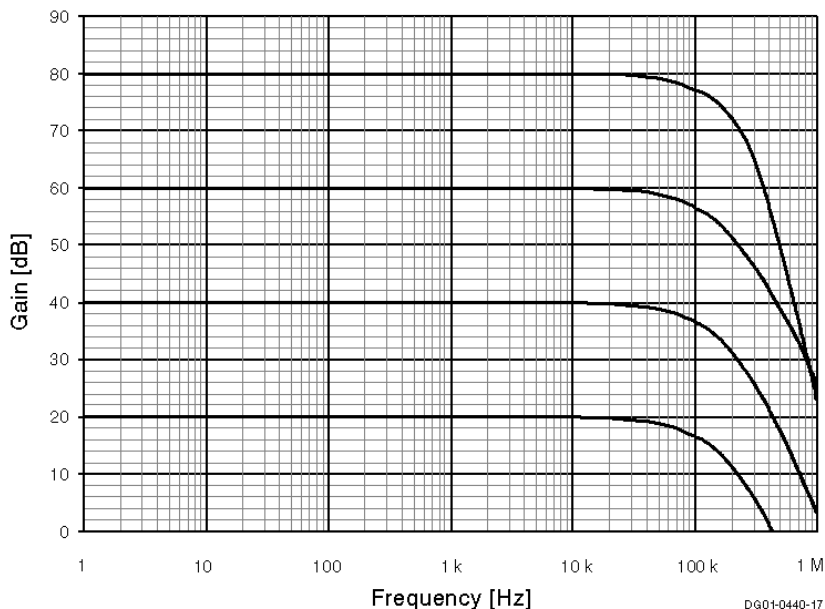
Connectors	<p>Input</p> <p><i>Single Ended Input, Model "DLPVA-100-F-S":</i> BNC</p> <p><i>True Differential Input, Model "DLPVA-100-F-D":</i> LEMO series 1S, 4-pin fixed socket Pin 1: non inverting input Pin 2: inverting input Pin 3: GND Pin 4: N.C.</p> <div style="text-align: center;">  </div> <p>Output</p> <p>BNC</p> <p>Power Supply</p> <p>LEMO series 1S, 3-pin fixed socket Pin 1: + 15V Pin 2: - 15V Pin 3: GND</p> <div style="text-align: center;">  </div> <p>Control Port</p> <p>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: offset control voltage input 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: digital control input: AC/DC Pin 14: digital control input: 100 kHz / 1 kHz Pin 15 - 25: NC</p>
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Variable Gain Low Frequency Voltage Amplifier

Remote Control Operation	<p>General</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", "AC" 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>															
Gain Setting	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">Gain</th> <th style="text-align: left; border-bottom: 1px solid black;">Pin 11</th> <th style="text-align: left; border-bottom: 1px solid black;">Pin 12</th> </tr> </thead> <tbody> <tr> <td>20 dB</td> <td>low</td> <td>low</td> </tr> <tr> <td>40 dB</td> <td>high</td> <td>low</td> </tr> <tr> <td>60 dB</td> <td>low</td> <td>high</td> </tr> <tr> <td>80 dB</td> <td>high</td> <td>high</td> </tr> </tbody> </table>	Gain	Pin 11	Pin 12	20 dB	low	low	40 dB	high	low	60 dB	low	high	80 dB	high	high
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AC/DC Setting	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">Coupling</th> <th style="text-align: left; border-bottom: 1px solid black;">Pin 13</th> </tr> </thead> <tbody> <tr> <td>AC</td> <td>low</td> </tr> <tr> <td>DC</td> <td>high</td> </tr> </tbody> </table>	Coupling	Pin 13	AC	low	DC	high									
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Bandwidth Setting	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">Bandwidth</th> <th style="text-align: left; border-bottom: 1px solid black;">Pin 14</th> </tr> </thead> <tbody> <tr> <td>1 kHz</td> <td>low</td> </tr> <tr> <td>100 kHz</td> <td>high</td> </tr> </tbody> </table>	Bandwidth	Pin 14	1 kHz	low	100 kHz	high									
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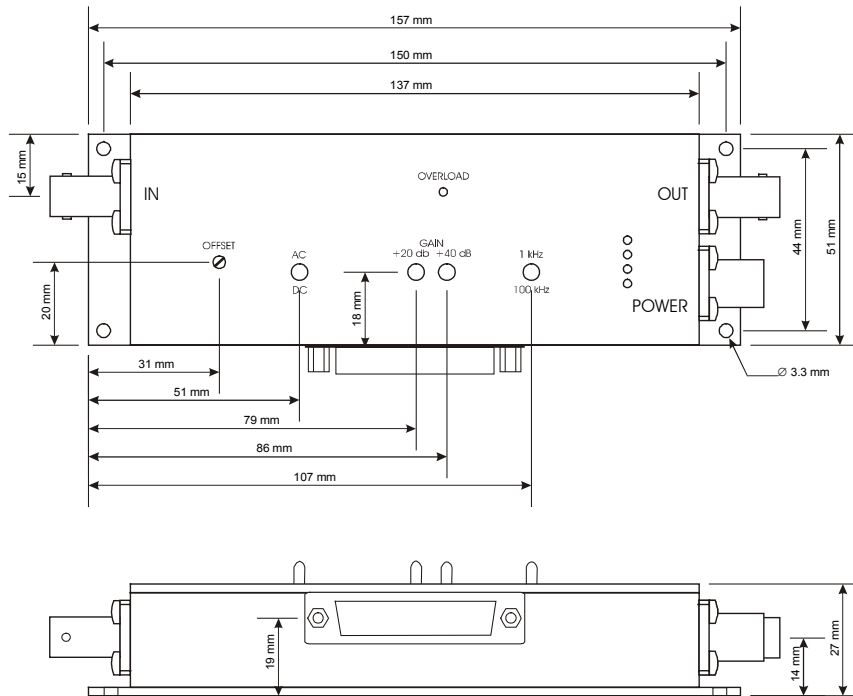
Typical Performance Characteristics

Frequency Response (Logarithmic)



Variable Gain Low Frequency Voltage Amplifier

Dimensions



D201-0440-18

Ordering Information

Available Models

- Model No.: DLPVA-100-F-S
- FET, single-ended input (BNC-connector input)
- Model No.: DLPVA-100-F-D
- FET, true differential input (LEMO-connector input)

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