

Datasheet

DLPVA-101-B

Variable Gain
Low-Frequency Voltage Amplifier



The picture shows model DLPVA-101-B-S with BNC input

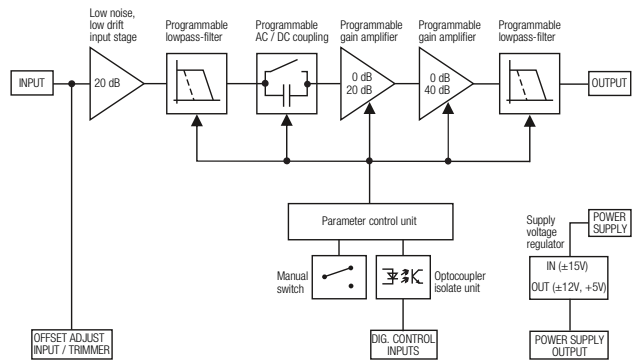
Features

- Variable gain 20 to 80 dB, switchable in 20 dB steps
- Bipolar input stage, recommended for low impedance sources less than 1 kΩ
- Single ended and true differential input models
- Bandwidth DC – 100 kHz, switchable to 1 kHz
- 0.7 μV/°C DC-drift
- 120 dB CMRR
- Down to 2.0 nV/√Hz input noise
- Switchable AC/DC-coupling
- Local and remote control

Applications

- Universal laboratory amplifier
- Automated measurements
- Industrial sensors
- Detector preamplifier
- Integrated measurement systems







Block Diagram



BS-DLPVA-B-F_R01

SOPHISTICATED TOOLS FOR SIGNAL RECOVERY



Datasheet		DLPVA-101-B								
Variable Gain Low-Frequency Voltage Amplifier										
Intended Use	<p>The DLPVA-101-B voltage amplifiers are variable gain voltage amplifiers. They are designed for fast amplification of small voltage signals. Operation is largely self-explanatory. If in doubt, consult this document or contact support@femto.de.</p> <p>For safe operation, please refer to the damage thresholds specified in the "Absolute Maximum Ratings", "Temperature Range" and "Power Supply" sections of this document.</p> <p>The operating environment must be free of smoke, dust, grease, oil, condensing moisture, and other contaminants that could affect the operation or performance.</p>									
Application Notes	<p>The DLPVA-101-B amplifiers are designed for use with low resistance sources. A high source resistance causes significant increase of the input offset voltage and may trigger overload status. See "Overload LED" section for details.</p> <p>When using a DLPVA-101-B-D with differential input, ensure that the common mode voltage, relative to the amplifier case, does not exceed the allowable range of ± 8 V. A floating source, such as an induction coil, without any connection to the amplifier ground will trigger the overload status as well.</p>									
Available Versions	<table border="0"> <tr> <td style="vertical-align: top;">DLPVA-101-B-S</td> <td>Variable gain voltage amplifier, gain settings 20/40/60/80 dB, single ended (bipolar), typical source resistance <1 kΩ, input 1 MΩ (BNC), bandwidth DC/1.5 Hz – 1/100 kHz</td> </tr> <tr> <td style="vertical-align: top;">DLPVA-101-B-D</td> <td>Variable gain voltage amplifier, gain settings 20/40/60/80 dB, true differential (bipolar), typical source resistance <10 kΩ, input 1 MΩ (LEMO®), bandwidth DC/1.5 Hz – 1/100 kHz</td> </tr> </table>		DLPVA-101-B-S	Variable gain voltage amplifier, gain settings 20/40/60/80 dB, single ended (bipolar), typical source resistance <1 k Ω , input 1 M Ω (BNC), bandwidth DC/1.5 Hz – 1/100 kHz	DLPVA-101-B-D	Variable gain voltage amplifier, gain settings 20/40/60/80 dB, true differential (bipolar), typical source resistance <10 k Ω , input 1 M Ω (LEMO®), bandwidth DC/1.5 Hz – 1/100 kHz				
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Datasheet

DLPVA-101-B

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Specifications	Test conditions	$V_S = \pm 15\text{ V}$, $T_A = 25\text{ }^\circ\text{C}$, output load impedance $1\text{ M}\Omega$, warm-up 20 minutes (min. 10 minutes recommended)		
Gain	Gain values Gain accuracy	20, 40, 60, 80 dB, indicated by LEDs, (@ output load $\geq 100\text{ k}\Omega$) $\pm 0.05\text{ dB}$		
Frequency Response	Lower cut-off frequency Upper cut-off frequency (-3 dB) Upper cut-off frequency roll-off	DC / 1.5 Hz, switchable 100 kHz / 1 KHz, switchable 12 dB/oct.		
Time Response	Rise/fall time (10 % - 90 %)	3.5 μs (@ bandwidth 100 kHz) 350 μs (@ bandwidth 1 kHz)		
Input	Input impedance Input voltage drift	1 $\text{M}\Omega$ 105 pF 0.7 $\mu\text{V}/^\circ\text{C}$		
	Equ. input noise voltage	gain settings	DLPVA-101-B-S	DLPVA-101-B-D
		20 dB 40, 60, 80 dB	5.0 nV/ $\sqrt{\text{Hz}}$ 2.0 nV/ $\sqrt{\text{Hz}}$	5.0 nV/ $\sqrt{\text{Hz}}$ 3.0 nV/ $\sqrt{\text{Hz}}$
	Equ. input noise current 1/f-noise corner Input bias current Input bias current drift Input offset voltage	2 pA/ $\sqrt{\text{Hz}}$ 80 Hz 0.8 μA 6 nA/ $^\circ\text{C}$ $\pm 4\text{ mV}$, adjustable by offset trimmer and external contr. voltage		
	True differential input, model "DLPVA-101-B-D" only: Common mode voltage range CMRR	$\pm 8\text{ V}$ 120 dB (@ 100 Hz) 100 dB (@ 10 kHz) 80 dB (@ 60 kHz)		
Output	Output voltage range Output impedance Max. output current Output overload recovery time	$\pm 10\text{ V}$ (@ $\geq 100\text{ k}\Omega$ output load) 50 Ω (terminate with $\geq 100\text{ k}\Omega$ load for best performance) $\pm 20\text{ mA}$ (short-circuit proof) 0.5 ms (after 20 x overload)		
Overload LED	<p>The amplifier features a LED to indicate 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 resistance, e. g. external AC coupling. In this case the bias current may cause a considerable input voltage. For proper operation please use a source resistance of less than 1 $\text{k}\Omega$ for model DLPVA-101-B-S and less than 10 $\text{k}\Omega$ for model DLPVA-101-B-D, respectively, or switch to a lower gain setting. - When using a DLPVA-101-B-D with differential input stage the Overload LED may turn on if the common mode input voltage exceeds the common mode voltage range. This is likely to happen when the source is floating with respect to the amplifier ground. For proper operation make sure that the common mode voltage stays within the allowed common mode voltage range with respect to the amplifier ground. Provide an electrical connection between the source ground and the amplifier ground to ensure the inputs cannot drift outside the tolerable common mode range. 			
Digital Control	Control input voltage range Control input current Overload output	Low: $-0.8 \dots +0.8\text{ V}$ High: $+1.8 \dots +12\text{ V}$, TTL / CMOS compatible 0 mA @ 0 V, 1.5 mA @ +5 V, 4.5 mA @ +12 V Non active: +5 V, max. 1 mA, active: 0.8 V, max. -10 mA		

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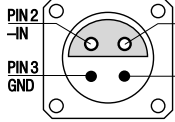
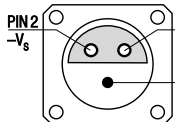
Specifications (continued)

Ext. Offset Control	Offset control voltage range Offset control input impedance	± 10 V (+10 V corresponds to +4 mV input offset voltage) 200 k Ω
Power Supply	Supply voltage Supply current	DC ± 15 V (± 14.5 V to ± 16 V) ± 75 mA typ. (depends on operating conditions, recommended power supply capability min. ± 150 mA)
Case	Weight Material	320 g (0.7 lbs) AlMg4.5Mn, nickel-plated
Temperature Range	Storage temperature Operating temperature	-40 °C ... $+80$ °C 0 °C ... $+60$ °C

Absolute Maximum Ratings

Digital control input voltage	-5 V/+16 V relative to digital ground DGND (pin 9)
Analog control input voltage	± 15 V relative to analog ground AGND (pin 3)
Power supply voltage	± 20 V
Model DLPVA-101-B-S only, single ended signal input: Input voltage	± 4.5 V
Model DLPVA-101-B-D only, true differential signal input: Input differential voltage	± 3 V
Input common mode voltage	± 9 V

Connectors

Input	Model DLPVA-101-B-S BNC jack (female)
	Model DLPVA-101-B-D LEMO® series 1S, 4-pin fixed socket (mating plug type: FFA.1S.304.CLAC52)
	 <p>PIN 1: non inverting input PIN 2: inverting input PIN 3: ground (GND) PIN 4: not connected (NC)</p>
Output	BNC jack (female)
Power supply	LEMO® series 1S, 3-pin fixed socket (mating plug type: FFA.1S.303.CLAC52)
	 <p>PIN 1: +15 V PIN 2: -15 V PIN 3: ground (GND)</p>

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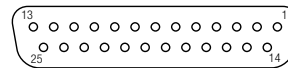
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Connectors (continued)

Control port

Sub-D 25-pin, female, qual. class 2



- Pin 1: +12 V (stabilized power supply output*)
- Pin 2: -12 V (stabilized power supply output*)
- Pin 3: AGND (analog ground for pins 1 – 8)
- Pin 4: +5 V (stabilized power supply output*)
- Pin 5: digital output: overload (referred to pin 3)
- Pin 6: NC
- Pin 7: NC
- Pin 8: input offset control voltage
- Pin 9: DGND (ground for digital control pins 10 – 14)
- 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: 100kHz / 1 kHz
- Pin 15 – 25: NC

*stabilized power supply output current
 +12 V: max. ±100 mA
 +5V: max. 50 mA

Remote Control Operation

General

Remote control input bits are opto-isolated and connected by logical OR function to local switch settings. For remote control set the corresponding local switches 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.

Gain setting

Gain	Pin 11 LSB	Pin 12 MSB
20 dB	low	low
40 dB	high	low
60 dB	low	high
80 dB	high	high

AC/DC setting

Coupling	Pin 13
AC	low
DC	high

Bandwidth setting

Bandwidth	Pin 14
1 kHz	low
100 kHz	high

Scope of Delivery

DLPVA-101-B, LEMO® 3-pin connector, LEMO® 4-pin connector (model DLPVA-101-B-D only), datasheet, transport package

Ordering Information

DLPVA-101-B-S Variable gain voltage amplifier, single ended (bipolar)
 DLPVA-101-B-D Variable gain voltage amplifier, true differential (bipolar)

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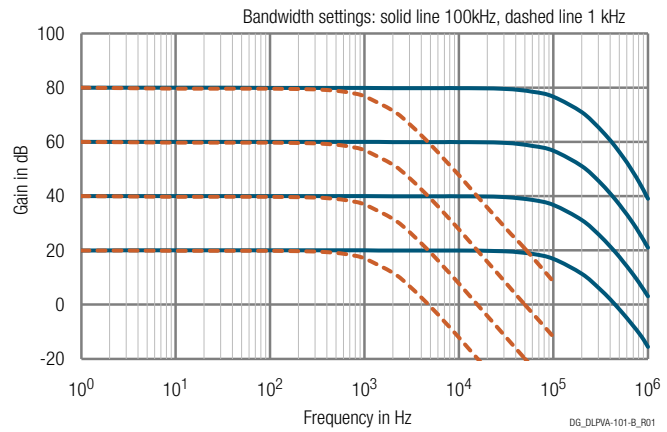
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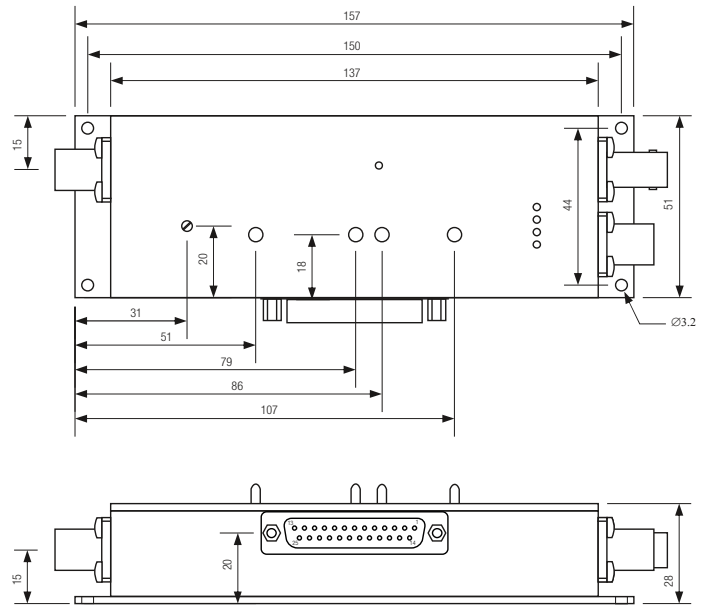
Typical Performance
Characteristics

DLPVA-101-B frequency response



Dimensions

DLPVA-101-B-D



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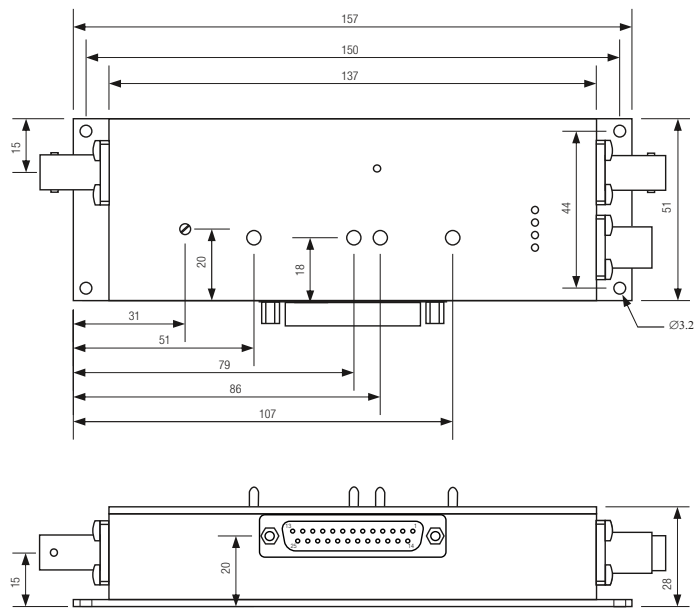
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all dimensions in mm unless otherwise noted

Dimensions continued

DLPVA-101-B-S



DZ-DLPVA-101-BLN-B-F-S_R01

all dimensions in mm unless otherwise noted

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