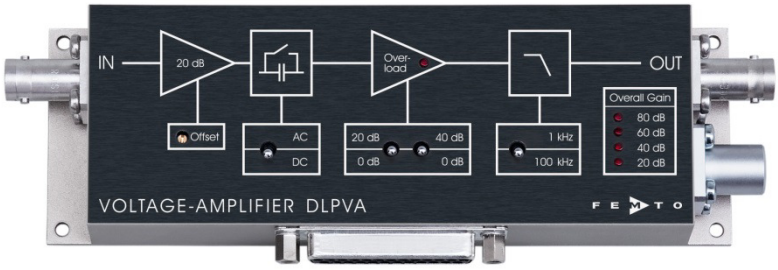
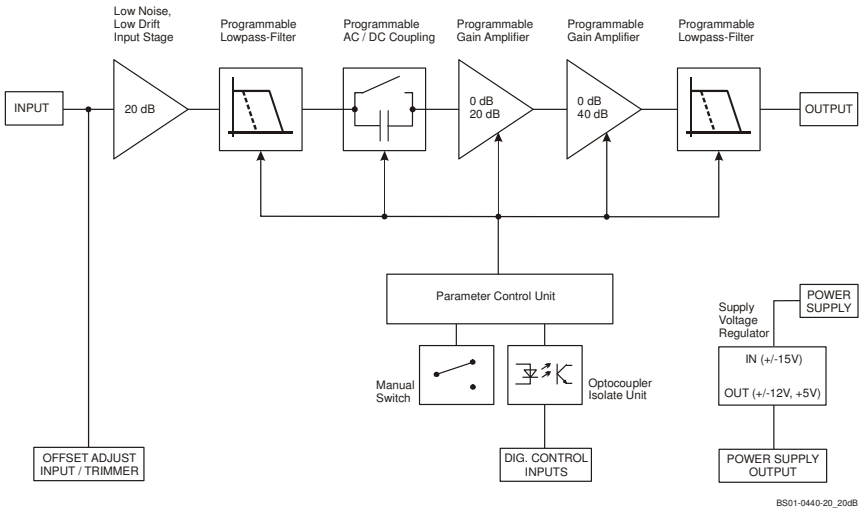
Variable Gain
Low-Frequency Voltage Amplifier



Features	• **Variable gain 20 to 80 dB, switchable in 20 dB steps** • **Bipolar input stage, recommended for low impedance sources smaller 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** • **2.4 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	

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Specifications

Test conditions: $V_S = \pm 15$ V, $T_A = 25$ °C, load impedance = 1 MΩ

Gain

Gain values	20, 40, 60, 80 dB indicated by four LEDs
Gain accuracy	±0.1 % (between settings) ±1 % (overall)
Gain flatness	±0.1 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 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 MΩ
Input capacitance	105 pF
Input voltage drift	0.7 µV/°C

Equivalent input voltage noise

Gain setting	DLPVA-100-B–S	DLPVA-100-B–D
60, 80 dB	2.4 nV/√Hz	3.6 nV/√Hz
40 dB	6.4 nV/√Hz	7.3 nV/√Hz
20 dB	60 nV/√Hz	60 nV/√Hz

Equivalent input current noise	2 pA/√Hz
1/f-noise corner	80 Hz
Input bias current	0.8 µA
Input bias current drift	6 nA/°C
Input offset voltage	±4 mV, adjustable by offset trimmer and external control voltage

True differential input, model "DLPVA-100-B-D" only:

Common mode voltage range	±8 V
CMRR	120 dB (@ 100 Hz) 100 dB (@ 10 kHz) 80 dB (@ 60 kHz)

Output

Output impedance	<100 Ω (terminate with > 10 kΩ load 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 20 x overload)

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Specifications (continued)

Overload LED

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.

The Overload LED may also turn on under the following operating conditions:

- 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 kΩ for model "B-S" and less than 10 kΩ for model "B-D", respectively, or switch to a lower gain setting.

- When using a DLPVA-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.

Remote Offset Control	Offset control voltage range	±10 V, corresponds to ±4 mV input offset voltage
	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 min. ±150 mA)
Case	Weight	0.32 kg (0.7 lbs)
	Material	AlMg4.5Mn, nickel-plated
Temperature Range	Storage temperature	–40 °C to +85 °C
	Operating temperature	0 °C to +60 °C

Absolute Maximum Ratings

Power supply voltage	±21 V
Control input voltage	+16 V / –5 V
Single ended input, model "DLPVA-100-B-S" only:	
Signal input voltage	±4.5 V
True differential input, model "DLPVA-100-B-D" only:	
Signal input differential voltage V_{DM}	±3 V
common mode voltage V_{CM}	±9 V

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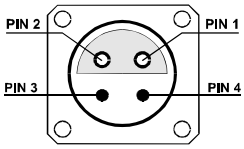
Connectors

Input

Single ended input, model "DLPVA-100-B-S":
BNC jack (female)

True differential input, model "DLPVA-100-B-D":
Lemo® series 1S, 4-pin fixed socket
(mating plug type: FFA.1S.304.CLAC52)

Pin 1:	non inverting input
Pin 2:	inverting input
Pin 3:	GND
Pin 4:	NC



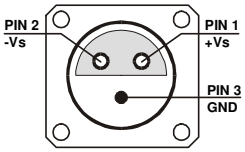
Output

BNC jack (female)

Power supply

Lemo® series 1S, 3-pin fixed socket
(mating plug type: FFA.1S.303.CLAC52)

Pin 1:	+15V
Pin 2:	–15V
Pin 3:	GND



Control port

Sub-D 25-pin, female

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

*check power supply for maximum deliverable current

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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 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.

Gain setting

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

AC/DC setting

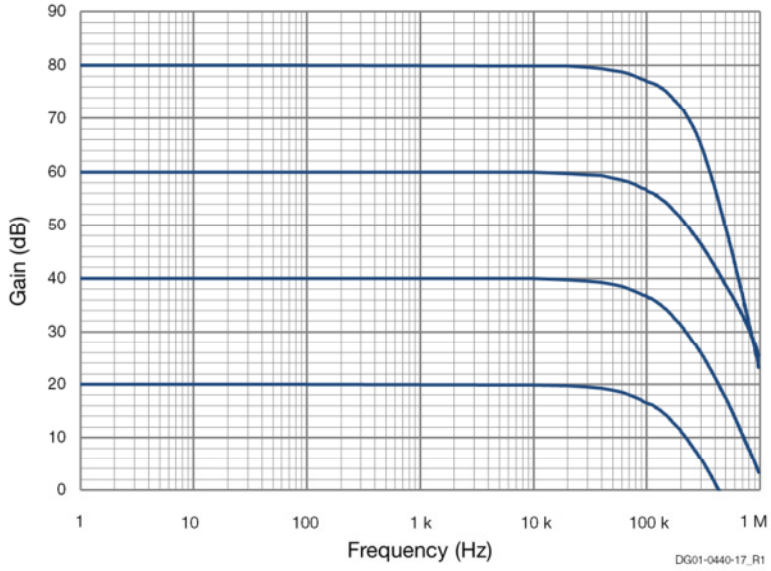
Coupling	Pin 13
AC	low
DC	high

Bandwidth setting

Bandwidth	Pin 14
1 kHz	low
100 kHz	high

Typical Performance Characteristics

Frequency response (logarithmic)



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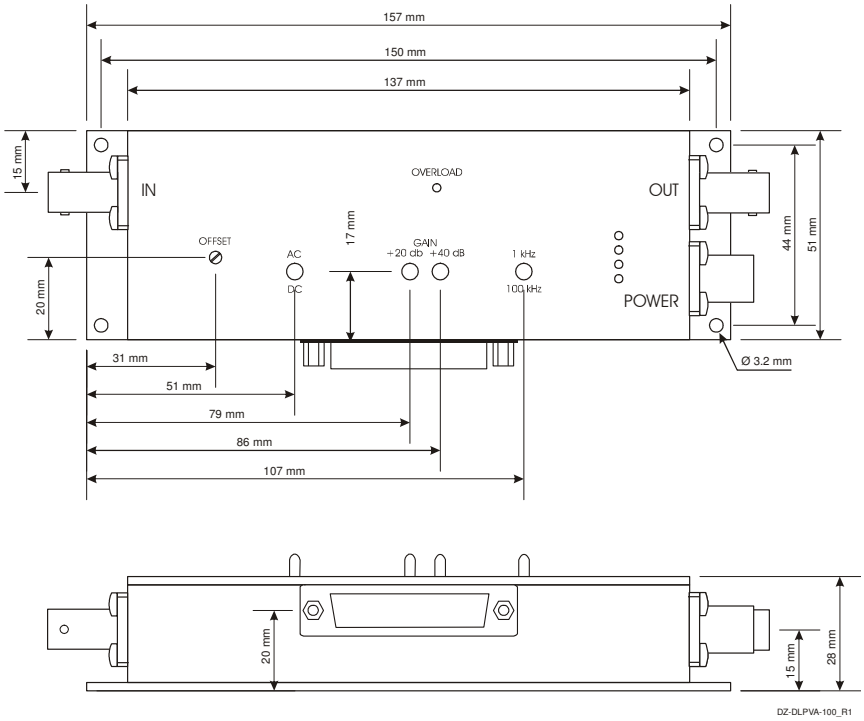
Dimensions



Model no.: DLPVA-100-B-S (DLPVA-100-B-D differs regarding input connector)

Ordering Information

Available models

Model no.: DLPVA-100-B-S
- Bipolar, single-ended input (BNC-connector input)

Model no.: DLPVA-100-B-D
- Bipolar, true differential input (Lemo®-connector input)

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