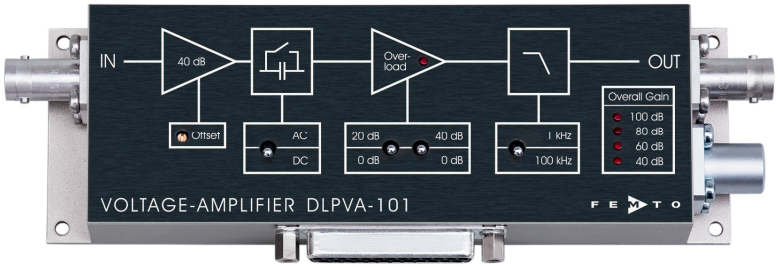
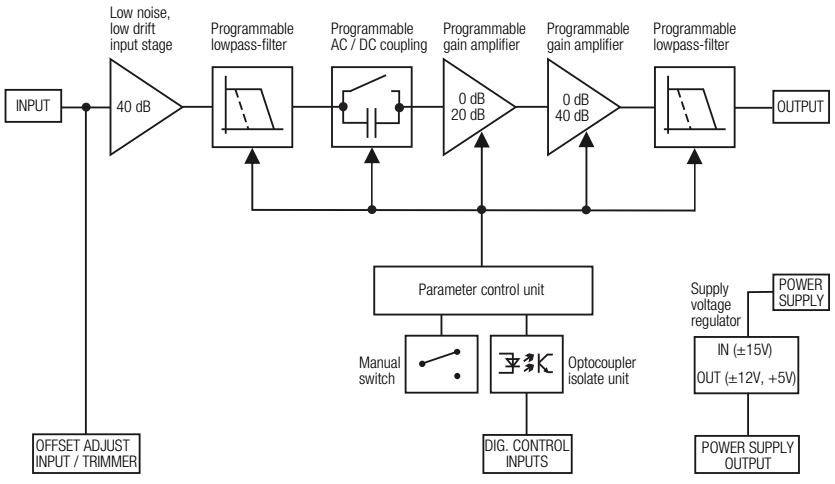
Variable Gain
Low-Frequency Voltage Amplifier



Features	• **Variable gain 40 to 100 dB, switchable in 20 dB steps** • **Bipolar input stage, recommended for low impedance sources less than 100 Ω** • **DC-coupled, single ended** • **Very low input voltage noise down to 700 pV/√Hz** • **Bandwidth DC – 100 kHz, switchable to 1 kHz** • **0.5 µV/°C DC-drift** • **Switchable AC/DC-coupling** • **Local and remote control**
Applications	• **Low-noise laboratory amplifier** • **Pulsed thermal EMF analysis** • **Industrial sensors** • **Detector preamplifier** • **Integrated measurement systems**
Block Diagram	

BS-DLPVA-BLN-S_R01

Variable Gain
Low-Frequency Voltage Amplifier

Intended Use	The DLPVA-101-BLN-S voltage amplifier is a variable gain voltage amplifier. It is designed for fast amplification of small voltage signals. Operation is largely self-explanatory. If in doubt, consult this document or contact support@femto.de. For safe operation, please refer to the damage thresholds specified in the "Absolute Maximum Ratings", "Temperature Range" and “Power Supply” sections of this document. The operating environment must be free of smoke, dust, grease, oil, condensing moisture, and other contaminants that could affect the operation or performance.	
Application Notes	The DLPVA-101-BLN-S amplifier is designed for use with low resistance sources up to 100 Ω. A high source resistance causes significant increase of the input offset voltage and may trigger overload status. See “Overload LED” section for details.	
Available Version	DLPVA-101-BLN-S	Variable gain voltage amplifier, gain settings 40/60/80/100 dB, single ended (bipolar), typical source resistance <100 Ω, input 1 MΩ (BNC), bandwidth DC/1.5 Hz – 1/100 kHz
Related Models	DLPVA-101-B-S	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
	DLPVA-101-B-D	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
	DLPVA-101-F-S	Variable gain voltage amplifier, gain settings 20/40/60/80 dB, single ended (FET), typical source resistance <1 MΩ, input 1 TΩ (BNC), bandwidth DC/1.5 Hz – 1/100 kHz
	DLPVA-101-F-D	Variable gain voltage amplifier, gain settings 20/40/60/80 dB, true differential (FET), typical source resistance <1 MΩ, input 1 TΩ (LEMO®), bandwidth DC/1.5 Hz – 1/100 kHz
	DLPVA-100-BUN-S	Ultra-low-noise variable gain voltage amplifier, gain settings 40/60/80/100 dB, single ended (bipolar), typical source resistance <50 Ω, input 1 kΩ (BNC), bandwidth 1.5 Hz – 1/100 kHz
Available Accessories	PS-15-25-L 	Power Supply Input: AC 100 – 240 V Output: DC ±15 V
	LUCI-10 	Compact digital I/O interface for USB remote control, supports opto-isolation of amplifier signal path from PC USB port, 16 digital outputs, 3 opto-isolated digital inputs, bus-powered operation

Variable Gain Low-Frequency Voltage Amplifier

Specifications	Test conditions	$V_S = \pm 15$ V, $T_A = 25$ °C, output load impedance 1 MΩ, warm-up 20 minutes (min. 10 minutes recommended)
Gain	Gain values	40, 60, 80, 100 dB indicated by LEDs, (@ output load ≥100 kΩ)
	Gain accuracy	± 0.05 dB
Frequency Response	Lower cut-off frequency	DC / 1.5 Hz, switchable
	Upper cut-off frequency (–3 dB)	100 kHz / 1 KHz, switchable
	Upper cut-off frequency roll-off	12 dB/oct.
Time Response	Rise/fall time (10 % - 90 %)	3.5 µs (@ bandwidth 100 kHz) 350 µs (@ bandwidth 1 kHz)
Input	Input impedance	1 MΩ ‖ 13 pF
	Input voltage drift	0.5 µV/°C
	Equ. input noise voltage	gain settings: noise 40 dB: 0.8 nV/√Hz 60, 80, 100 dB: 0.7 nV/√Hz
	Equ. input noise current	3 pA/√Hz
	1/f-noise corner	80 Hz
	Input bias current	1 µA
	Input bias current drift	8 nA/°C
	Input offset voltage	±0.5 mV, adjustable by offset trimmer and external control voltage
Output	Output voltage range	±10 V (@ ≥100 kΩ output load)
	Output impedance	50 Ω (terminate with ≥100 kΩ load for best performance)
	Max. output current	±20 mA (short-circuit proof)
	Output overload recovery time	0.5 ms (after 20 x overload)
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 when 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 100 Ω or switch to a lower gain setting.	
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
Ext. Offset Control	Offset control voltage range	±10 V (+10 V corresponds to +0.5 mV input offset voltage)
	Offset control input impedance	200 kΩ
Power Supply	Supply voltage	DC ±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	320 g (0.7 lbs)
	Material	AlMg4.5Mn, nickel-plated
Temperature Range	Storage temperature	–40 °C ... +80 °C
	Operating temperature	0 °C ... +60 °C

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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
Signal Input voltage	±0.7 V

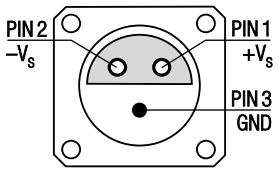
Overvoltage at the signal input can severely degrade the noise performance or destroy the amplifier!

Connectors

Input: BNC jack (female)

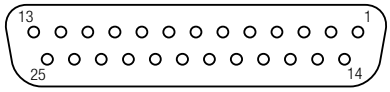
Output: BNC jack (female)

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



Pin 1: +15 V
Pin 2: –15 V
Pin 3: ground (GND)

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

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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
40 dB	low	low
60 dB	high	low
80 dB	low	high
100 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-BLN-S, LEMO® 3-pin connector, datasheet, transport package

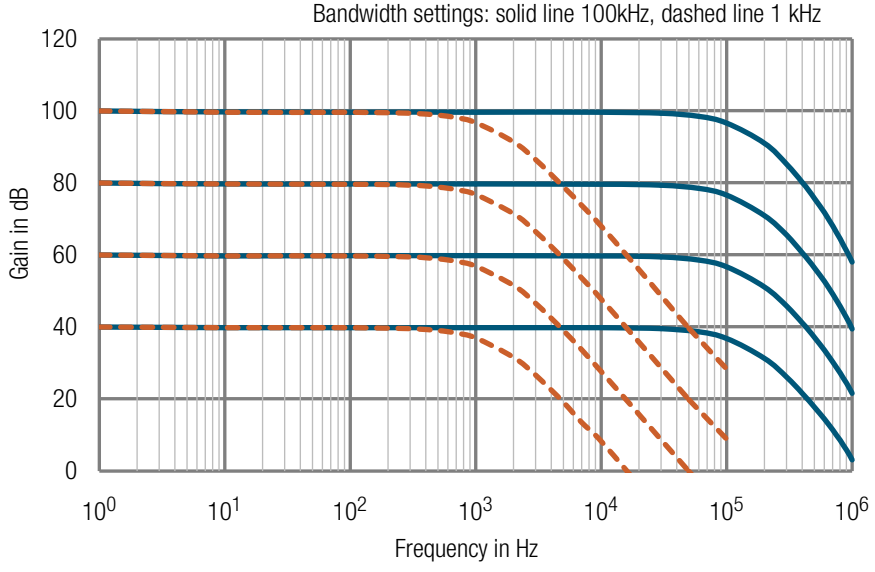
Ordering Information

DLPVA-101-BLN-S	Variable gain voltage amplifier, single ended (bipolar)

Typical Performance Characteristics

DLPVA-101-BLN-S frequency response

Bandwidth settings: solid line 100kHz, dashed line 1 kHz



DG_DLPVA-101-BLN_R01

Variable Gain
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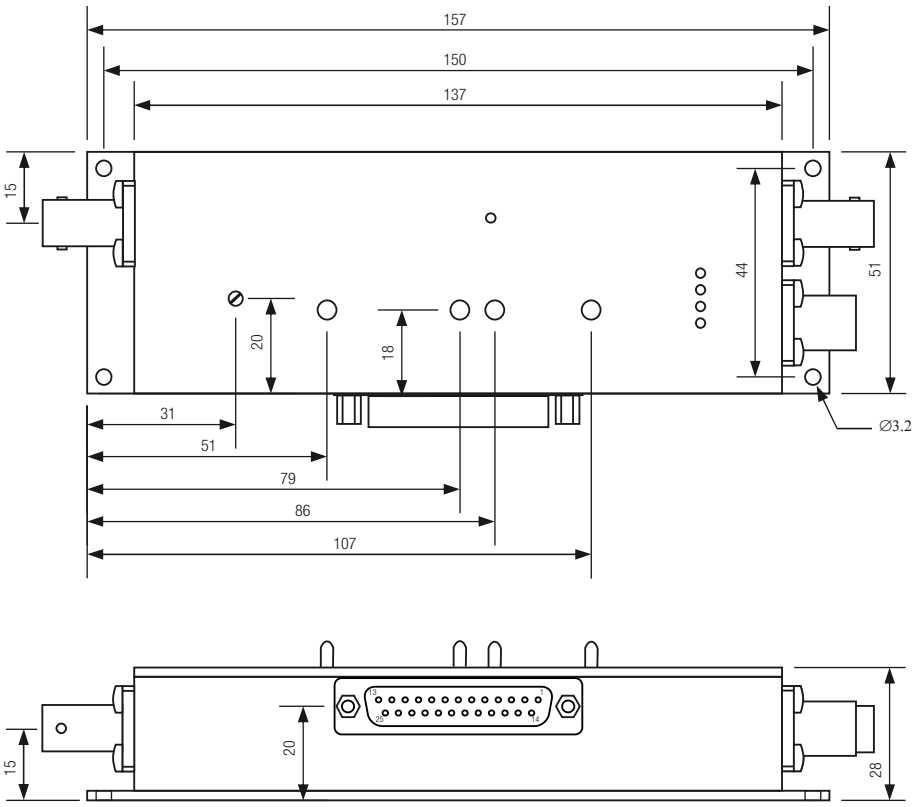
Dimensions

DLPVA-101-BLN-S



DZ-DLPVA-101-BLNS-B-F-S_R01

all dimensions in mm unless otherwise noted

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