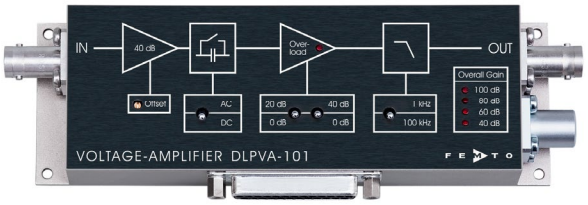
Measurement Devices

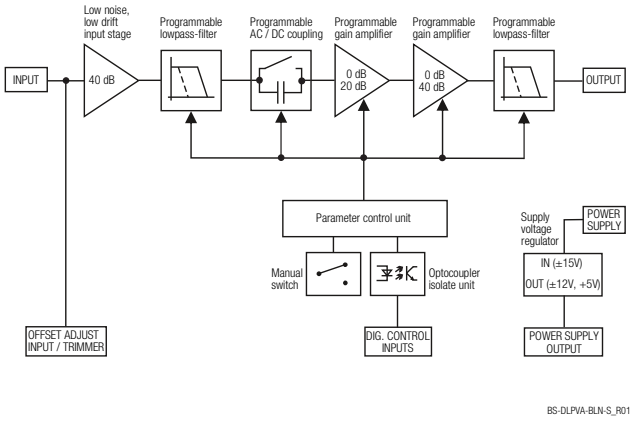
FEMTO®

LASER COMPONENTS®

# Datasheet DLPVA-101-BLN-S

## Variable Gain
## Low-Frequency Voltage Amplifier




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



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## Variable Gain Low-Frequency Voltage Amplifier

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|---|---|---|
| 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.<br>For safe operation, please refer to the damage thresholds specified in the "Absolute Maximum Ratings", "Temperature Range" and “Power Supply” sections of this document.<br>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<br>Input: AC 100 – 240 V<br>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 |

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# Variable Gain Low-Frequency Voltage Amplifier

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|---|---|---|
| Specifications | Test conditions | $V_S$ = ±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<br>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)<br>350 µs (@ bandwidth 1 kHz) |
| Input | Input impedance | 1 MΩ ll 13 pF |
| | Input voltage drift | 0.5 µV/°C |
| | Equ. input noise voltage | gain settings: 40 dB; 60, 80, 100 dB<br>noise: 0.8 nV/√Hz; 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.<br>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<br>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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# Variable Gain Low-Frequency Voltage Amplifier

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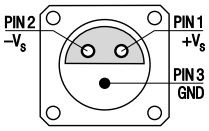
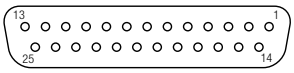
|---|---|---|
| Absolute Maximum Ratings | Digital control input voltage | –5 V/+16 V relative to digital ground DGND (pin 9) |
| | Analog control input voltage | ±15 V relative to analog ground AGND (pin 3) |
| | Power supply voltage | ±20 V |
| | Signal Input voltage | ±0.7 V |
| | Overvoltage at the 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.<br>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

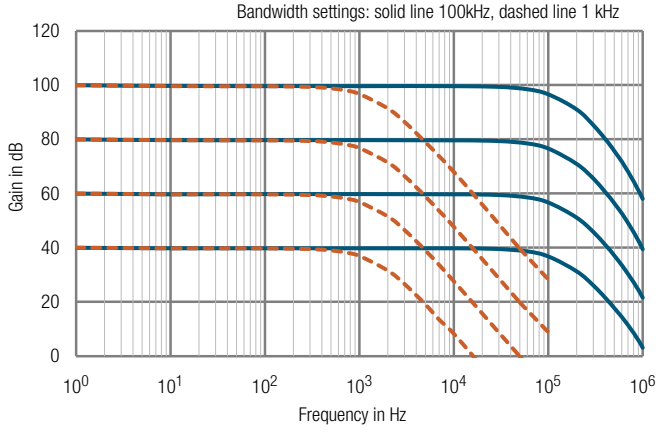
| Bandwidth | Pin 14 |
|---|---|
| 1 kHz | low |
| 100 kHz | high |

| | | |
|---|---|---|
| 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

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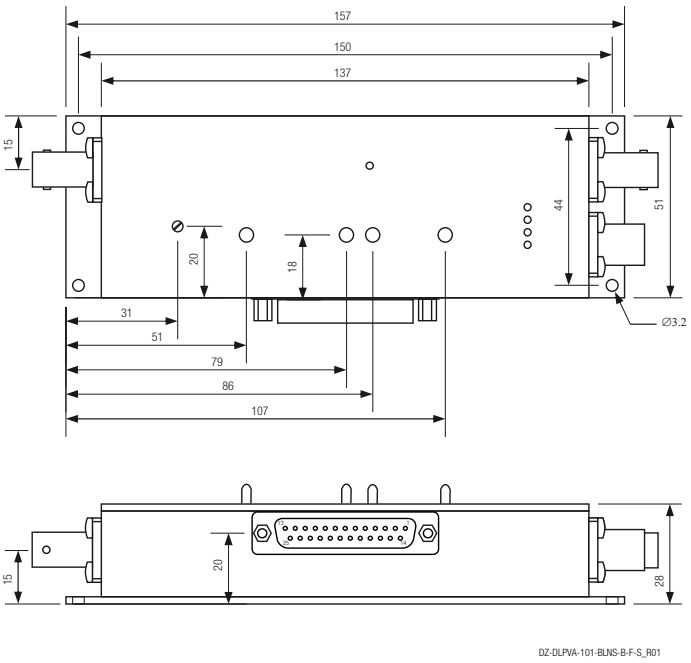
## Datasheet DLPVA-101-BLN-S

# Variable Gain
# Low-Frequency Voltage Amplifier

Dimensions

DLPVA-101-BLN-S




all dimensions in mm unless otherwise noted



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