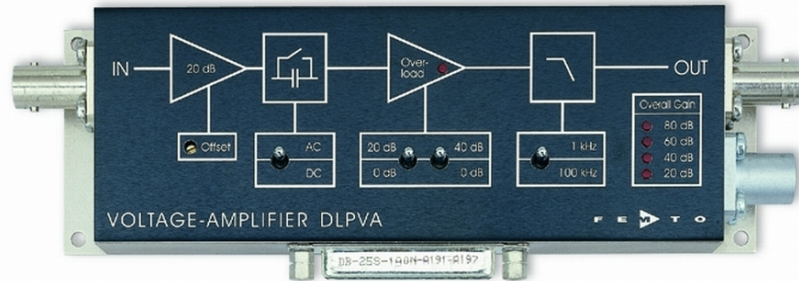


Variable Gain Low Frequency Voltage Amplifier



| | |
|----------------------|---|
| <p>Features</p> | <ul style="list-style-type: none"> • Variable Gain 20 to 80 dB, Switchable in 20 dB Steps • 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 |
| <p>Applications</p> | <ul style="list-style-type: none"> • Universal Laboratory Amplifier • Automated Measurements • Industrial Sensors • Detector Preamplifier • Integrated Measurement Systems |
| <p>Block Diagram</p> | <p style="text-align: right; font-size: small;">BS01-0440-19</p> |

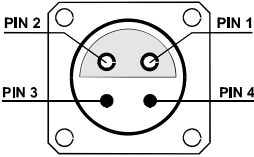
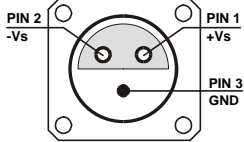
Variable Gain Low Frequency Voltage Amplifier

| Specifications | <i>Test Conditions</i> | <i>V_s = ± 15 V, T_a = 25°C</i> | | |
|----------------------|---|---|--------------------|---------------|
| Gain | Gain Values | 20, 40, 60, 80 dB indicated by four LEDs | | |
| | Gain Accuracy | ± 0.1 % | (between settings) | |
| | | ± 1 % | (overall) | |
| Frequency Response | Gain Flatness | ± 0.1 dB | | |
| | Lower Cut-Off Frequency | DC, switchable to 1.5 Hz | | |
| | Upper Cut-Off Frequency | 100 kHz, switchable to 1 kHz | | |
| Time Response | Upper Cut-Off Frequency Rolloff | 12 dB/Oct. | | |
| | Rise / Fall Time (10% - 90%) | 3.5 μs (@ BW = 100 kHz) 350 μs (@ BW = 1 kHz) | | |
| Input | Input Impedance | 1 MΩ | | |
| | Input Voltage Drift | 0.7 μV/K | | |
| | 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 | | | |
| Output | <i>True Differential Input, Model "DLPVA-100-B-D" only:</i> | | | |
| | Common Mode Voltage Range | ± 9 V | | |
| | CMRR | 120 dB | (@ 100 Hz) | |
| | | 100 dB | (@ 10 kHz) | |
| | | 80 dB | (@ 60 kHz) | |
| | Output Impedance | 50 Ω (terminate with > 10 kΩ 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 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 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 ± 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 | <table border="0"> <tr> <td>Offset Control Voltage Range</td> <td>± 10 V, corresponds to ± 4 mV input offset</td> </tr> <tr> <td>Offset Control Input Impedance</td> <td>200 kΩ</td> </tr> </table> | Offset Control Voltage Range | ± 10 V, corresponds to ± 4 mV input offset | Offset Control Input Impedance | 200 kΩ | | | | | | | | | | |
| Offset Control Voltage Range | ± 10 V, corresponds to ± 4 mV input offset | | | | | | | | | | | | | | |
| Offset Control Input Impedance | 200 kΩ | | | | | | | | | | | | | | |
| Remote Digital Control | <table border="0"> <tr> <td>Control Input Voltage Range</td> <td>Low: - 0.8 ... + 0.8 V High: + 1.8 ... + 12 V, TTL / CMOS compatible</td> </tr> <tr> <td>Control Input Current</td> <td>0 mA @ 0 V, 1.5 mA @ + 5 V, 4.5 mA @ + 12 V</td> </tr> <tr> <td>Overload Output</td> <td>Non active: + 5 V, max. 1 mA, active: 0.8 V, max. -10 mA</td> </tr> </table> | 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 | | | | | | | | |
| 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 | <table border="0"> <tr> <td>Supply Voltage</td> <td>± 15 V (± 14.5 V to ± 16 V)</td> </tr> <tr> <td>Supply Current</td> <td>± 75 mA typ. (depends on operating conditions, recommended power supply capability minimum 150 mA)</td> </tr> </table> | 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) | | | | | | | | | | |
| 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 | <table border="0"> <tr> <td>Weight</td> <td>0.32 kg (0.7 lbs)</td> </tr> <tr> <td>Material</td> <td>AlMg4.5Mn, nickel-plated</td> </tr> </table> | Weight | 0.32 kg (0.7 lbs) | Material | AlMg4.5Mn, nickel-plated | | | | | | | | | | |
| Weight | 0.32 kg (0.7 lbs) | | | | | | | | | | | | | | |
| Material | AlMg4.5Mn, nickel-plated | | | | | | | | | | | | | | |
| Temperature Range | <table border="0"> <tr> <td>Storage Temperature</td> <td>- 40 °C to + 100 °C</td> </tr> <tr> <td>Operating Temperature</td> <td>0 °C to + 60 °C</td> </tr> </table> | Storage Temperature | - 40 °C to + 100 °C | Operating Temperature | 0 °C to + 60 °C | | | | | | | | | | |
| Storage Temperature | - 40 °C to + 100 °C | | | | | | | | | | | | | | |
| Operating Temperature | 0 °C to + 60 °C | | | | | | | | | | | | | | |
| Absolute Maximum Ratings | <table border="0"> <tr> <td>Power Supply Voltage</td> <td>± 21 V</td> </tr> <tr> <td>Control Input Voltage</td> <td>+ 16 V / - 5 V</td> </tr> <tr> <td colspan="2"><i>Single Ended Input, Model “DLPVA-100-B-S” only:</i></td> </tr> <tr> <td>Signal Input Voltage</td> <td>± 4.5 V</td> </tr> <tr> <td colspan="2"><i>True Differential Input, Model “DLPVA-100-B-D” only:</i></td> </tr> <tr> <td>Signal Input Differential Voltage</td> <td>± 7.7 V</td> </tr> <tr> <td>Signal Input Com. Mode Voltage</td> <td>± 12 V</td> </tr> </table> | Power Supply Voltage | ± 21 V | Control Input Voltage | + 16 V / - 5 V | <i>Single Ended Input, Model “DLPVA-100-B-S” only:</i> | | Signal Input Voltage | ± 4.5 V | <i>True Differential Input, Model “DLPVA-100-B-D” only:</i> | | Signal Input Differential Voltage | ± 7.7 V | Signal Input Com. Mode Voltage | ± 12 V |
| Power Supply Voltage | ± 21 V | | | | | | | | | | | | | | |
| Control Input Voltage | + 16 V / - 5 V | | | | | | | | | | | | | | |
| <i>Single Ended Input, Model “DLPVA-100-B-S” only:</i> | | | | | | | | | | | | | | | |
| Signal Input Voltage | ± 4.5 V | | | | | | | | | | | | | | |
| <i>True Differential Input, Model “DLPVA-100-B-D” only:</i> | | | | | | | | | | | | | | | |
| Signal Input Differential Voltage | ± 7.7 V | | | | | | | | | | | | | | |
| Signal Input Com. Mode Voltage | ± 12 V | | | | | | | | | | | | | | |

Variable Gain Low Frequency Voltage Amplifier

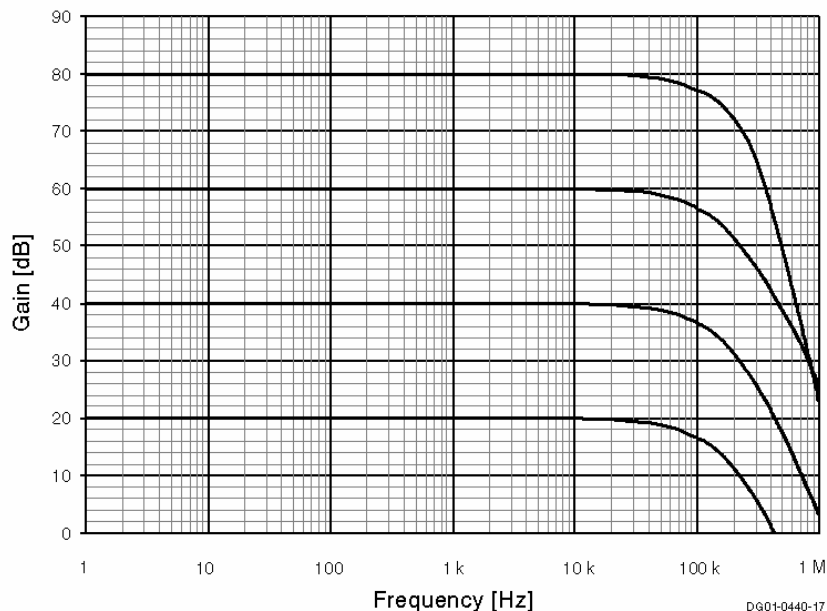
| | | |
|------------|--------------|---|
| Connectors | Input | <p><i>Single Ended Input, Model "DLPVA-100-B-S":</i> BNC</p> <p><i>True Differential Input, Model "DLPVA-100-B-D":</i> LEMO series 1S, 4-pin fixed socket</p> <p>Pin 1: non inverting input Pin 2: inverting input Pin 3: GND Pin 4: N.C.</p>  |
| | Output | BNC |
| | Power Supply | <p>LEMO series 1S, 3-pin fixed socket</p> <p>Pin 1: + 15V Pin 2: - 15V Pin 3: GND</p>  |
| | Control Port | <p>Sub-D 25-pin, female, qual. class 2</p> <p>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> |

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="border-bottom: 1px solid black;">Gain</th> <th style="border-bottom: 1px solid black;">Pin 11</th> <th style="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 |
| Gain | Pin 11 | Pin 12 | | | | | | | | | | | | | | |
| 20 dB | low | low | | | | | | | | | | | | | | |
| 40 dB | high | low | | | | | | | | | | | | | | |
| 60 dB | low | high | | | | | | | | | | | | | | |
| 80 dB | high | high | | | | | | | | | | | | | | |
| AC/DC Setting | <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="border-bottom: 1px solid black;">Coupling</th> <th style="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 | | | | | | | | | |
| Coupling | Pin 13 | | | | | | | | | | | | | | | |
| AC | low | | | | | | | | | | | | | | | |
| DC | high | | | | | | | | | | | | | | | |
| Bandwidth Setting | <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="border-bottom: 1px solid black;">Bandwidth</th> <th style="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 | | | | | | | | | |
| Bandwidth | Pin 14 | | | | | | | | | | | | | | | |
| 1 kHz | low | | | | | | | | | | | | | | | |
| 100 kHz | high | | | | | | | | | | | | | | | |

Typical Performance Characteristics

Frequency Response (Logarithmic)



DG01-0440-17

Variable Gain Low Frequency Voltage Amplifier

| | |
|-----------------------------|---|
| <p>Dimensions</p> | |
| <p>Ordering Information</p> | <p>Available Models</p> <p>Model No.: DLPVA-100-B-S - Bipolar, single-ended input (BNC-connector input)</p> <p>Model No.: DLPVA-100-B-D - Bipolar, true differential input (LEMO-connector input)</p> |

DZ01-0440-18

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