

moglabs

Diode Laser Controller



The MOGLabs diode laser controller provides everything needed to drive your tunable external cavity diode laser (ECDL), and lock it to an atomic or other frequency reference. It offers a combination of impressive performance and ease-of-use: ergonomic and low-noise analogue controls, and intuitive front-panel selection of the signals you need to monitor.

Features

Eight functions in one unit:

- Ultra low noise current source
- Temperature controller
- Photodetector
- Demodulator (lock-in amplifier)
- Feedback servos
- Piezo drivers
- Modulator driver
- Sweep ramp generator

Benefits

- Compact, high-performance, low cost
- Ergonomic design
 - Auto-lock to centre of oscilloscope trace
 - Intuitive controls with logarithmic response
 - Two oscilloscope trace selector switches
 - All cables at rear
- Use with MOGLabs laser, or your existing commercial or home-made laser

Applications

- Laser cooling and trapping
- Bose-Einstein condensation
- Quantum optics: squeezed light
- Electromagnetic transparency and slow light
- Time and frequency standards
- Laser spectroscopy
- Physics teaching labs

Precision and flexibility

Diode Laser Controller

Specifications DLC-202/252/502 Rev 6.0

Current

| | |
|---------------------|---|
| Output current | DLC-202: 0 – 200mA, ±10µA display resolution DLC-252/502: 250mA/500mA, ±100µA display resolution |
| Noise | Below 300pA/√Hz |
| External modulation | 0 – 100kHz (–3dB), 100µA/V, plus direct RF, to 2.5GHz (–3dB) |
| Compliance voltage | Max diode voltage 3.2V@200mA, 6V@100mA; optionally higher |

Temperature

| | |
|-----------|---|
| Range | 10 – 30°C (–40°C to 50°C optional), ±0.1°C display resolution |
| Stability | ±5mK/°C |
| TEC power | ±2.5A, ±9V (22W) |
| Sensor | NTC 10kΩ (provided) Alternately AD590, AD592, auto-detected; reads °C in all cases |

Photodetector

| | |
|-------------|--|
| Photodiodes | Si-PIN, 740–1100nm, lensed ±10°; options: 400–1100nm, ±20° |
| Bandwidth | 720kHz (–3dB); CMRR >120dB |
| Coupling | ac (differential pair); dc |
| Dimensions | 30x30x60mm (approx) |

Frequency feedback servos

| | |
|-----------------|---|
| Modulation | 250kHz ± 20kHz; current driver output ±500mA ±8V |
| Bandwidth | 40kHz typical (laser-dependent) |
| Phase | 0 – 360° |
| Feedback | Double integrator (slow, piezo) + single integrator (fast, current) |
| Gain | ±20dB master plus ±20dB on slow, fast channels |
| Sample and Hold | External control of lock/sweep; allows frequency jump and reload |

Sweep/scan

| | |
|--------------|--|
| Sweep | Scan rate 1Hz to 100Hz |
| Piezo output | 0 – 150V, 5mA, 2 channels; stack output limit can be set to 120V |
| Range | Typically 10 to 20GHz, laser dependent |

Power and dimensions

| | |
|------------|---|
| IEC input | 110/120 or 220/240V, 50/60 Hz, 3A |
| IEC output | Common ground with input |
| Dimensions | 19" 2U, 88x422x210mm (H x W x D), 4.3kg |

Package contents

| | |
|-------------------------------|---|
| 1. DLC-xx2 laser control unit | 4. Laser head/diode connection/protection board with SMA RF input |
| 2. PDD-001 photodetector | 5. Mounting plate for laser head board |
| 3. Manual | 6. Cables (power, laser, photodetector), 10kΩ NTC thermistor |