

# 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	0 – 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 relock

### Sweep/scan

Sweep	Scan rate 4Hz to 70Hz
Piezo output	0 – 150V, 5mA, 2 channels; stack output limit can be set to 120V
Range	Typically 10 to 30GHz, 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