

# 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 Rev 4.0

### Current

Output current	0 – 200mA (500mA on DLC-502), $\pm 10\mu\text{A}$ display resolution
Noise	Below 300pA/ $\sqrt{\text{Hz}}$
External modulation	0 – 100kHz ( $-3\text{dB}$ ), 100 $\mu\text{A/V}$ , plus direct RF, to 2.5GHz ( $-3\text{dB}$ )

### Temperature

Range	10 – 30°C (0 – 50°C option), $\pm 0.1^\circ\text{C}$ display resolution
Stability	$\pm 5\text{mK}/^\circ\text{C}$
TEC power	$\pm 2.5\text{A}$ , $\pm 9\text{V}$ (22W)
Sensor	NTC 10k $\Omega$ (provided) Alternately AD590, AD592, auto-detected; reads $^\circ\text{C}$ in all cases

### Photodetector

Photodiodes	Si-PIN, 740–1100nm, lensed $\pm 10^\circ$ ; options: 400–1100nm, $\pm 20^\circ$
Bandwidth	720kHz ( $-3\text{dB}$ ); CMRR >120dB
Coupling	ac (differential pair); dc
Dimensions	25x25x60mm

### Frequency feedback servos

Modulation	250kHz $\pm$ 20kHz; current driver output $\pm 500\text{mA}$ $\pm 8\text{V}$
Bandwidth	40kHz typical (laser-dependent)
Phase	0 – 360°
Feedback	Double integrator (slow, piezo) + single integrator (fast, current)
Gain	$\pm 20\text{dB}$ master plus $\pm 20\text{dB}$ on slow, fast channels

### Sweep/scan

Sweep	Scan rate 3Hz to 8Hz
Range	Typically 10 to 20GHz, laser dependent
Piezo output	0 – 120V, 5mA, 2 channels

### 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-202 laser control unit
2. PDD-001 photodetector
3. Manual
4. Laser head/diode connection/protection board with SMA RF input
5. Mounting plate for laser head board
6. Cables (power, laser, photodetector) and connectors