

MTL-5

Mini TEA CO₂ Laser



A compact, high peak power pulsed CO₂ laser solution designed to suit your experimental needs. The MTL-5 is a user-friendly, bench-top, Transverse Excited Atmospheric (TEA) Pressure pulsed CO₂ Laser.

The MTL-5 features self-diagnostic testing and built-in, fail-safe mechanisms designed to monitor system performance and to support system integrity. The laser offers high performance specifications for a variety of scientific and specialist applications.

The TEA CO₂ laser can be operated in either multi-mode or single mode (TEM₀₀) configuration. Multi-mode untuned output energy is rated at 150 mJ/pulse at 100 Hz.

The laser is supplied with a separate power supply that enables optimum space without compromising experiments.

An optional wavelength selection unit with precision grating control enables users to step tune easily between wavelengths (9.2 μm to 10.8 μm).

KEY FEATURES

- + 50 ns Pulse Width (typical)
- + High Repetition Rates, Single Shot – 100 Hz
- + Manual Grating Tuned Option (9.2 μm to 10.8 μm wavelength operation)
- + Untuned: 10.6 μm
Max. Energy Multi Mode 150 mJ/Pulse
- + Tuned: >60 lines available
Max. Energy Single Mode 50 mJ/Pulse
- + Compact Control Driver Unit
- + Precision Grating Control
- + Extended Service Lifetime



SPECIFICATIONS

Laser Head

The cylindrical laser head contains profiled electrodes to provide a homogenous discharge. A series of UV spark pre-ionisers are spaced along the discharge length. The laser gas is circulated internally via a flow chamber to give optimised uniform gas flow across the entire discharge section. The laser gas is cooled via an integral heat exchanger, which requires water cooling for operation above 20 Hz. The laser gas has been optimised to a proprietary

gas mixture and the laser has 2 main modes of operation: Flow or Slow Flow. The Flow mode provides maximum output energies as specified, and utilises a standard 3 component gas mixture. In addition, Slow Flow (<0.5 l/min) can be achieved. This mode of operation suits applications where reduced gas consumption is required and a lower energy circa.100 mJ is sufficient, e.g. remote environmental monitoring stations.

Power Supply

The power supply contains a switch mode charging unit rated at 1000 J/sec, 25 kV, and the main discharge capacitors are thyatron switched for low command jitter and highest reliability. The supply performs sophisticated discharge monitoring remotely via an optical fibre to ensure system performance, system integrity and arc event

detection. The supply will shut down the laser in the event of risk of potential system damage occurring and indicate the system status with LEDs. The supply has a LCD display switchable to read discharge voltage or repetition rate control functions. It can also accept external trigger control inputs.

Grating Tuned Option – Manual Tuning

Operation on 60 lines between 9.2 μm and 10.8 μm is achieved by adding the grating tuning option. A new and improved high precision, low backlash manual tuning accessory attaches to the

laser head in place of the 100% rear reflector assembly. The grating is separated from the discharge volume by a Brewster window. Maximum energy is 50 mJ per pulse on the strong gain lines.

Technical Specifications

| Tuning | Untuned | Untuned | Tuned |
|--------------------------------|-----------------------|-------------------|--------------------------|
| Mode | Multimode | TEM ₀₀ | TEM ₀₀ |
| Output Energy (mJ) Flowing Gas | 150 | 80 | 50 |
| Wavelength (μm) | c.a. 10.6 | c.a. 10.6 | 9.2 – 10.8 μm |
| Beam Divergence (mR) | 2 | 1 | 1 |
| Beam Diameter (mm) | 10x10 | 6 | 6 |
| Amplitude Stability (%) | $\pm 6\%$ p-p | | |
| Pulse Width (ns) FWHM | ca. 50 | | |
| Repetition Rate (Hz) | Single shot to 100 Hz | | |
| Cavity Length (cm) | 29.5 | | 38.5 |
| Dimensions (cm) L | 39.8 | | 58 |
| Excluding connectors (cm) W | 20 | | |
| Excluding connectors (cm) H | 22.5 | | |
| Weight (kg) | 13.5 | | 14 |
| Power Supply Dimensions (cm) L | 51 | | |
| Power Supply Dimensions (cm) W | 52 | | |
| Power Supply Dimensions (cm) H | 17 | | |
| Weight (kg) | 34 | | |

Accessories available for the MTL-5 Series include:

Gas Mixing Stations – Designed to allow mixing and metering of up to 3 component gases from independent gas cylinders. These comprise of 3 inlet ports, each with their own needle valve control, with individual flow meters for gas mixing.

Customer support is available worldwide.

edinst.com

Registered in England and Wales No: 962331 VAT No:GB 271 7379 37

All specifications are correct at the time of production. We reserve the right to change our specifications without notice.

©Edinburgh Instruments Ltd. 2026

STG05 / 06.26

