# FIR SERIES

FAR Infrared lasers/Terahertz lasers

EDINBURGH INSTRUMENTS


**Edinburgh Instruments optically pumped FIR (Terahertz) lasers provide coherent radiation in the range of 40 µm to 1.22 mm (0.25 THz – 7.5 THz). When combined with the PL Series of $CO_2$ lasers, the FIR laser becomes a powerful tool for laser line measurements at high peak powers.**

### 295

The model 295 is a standalone FIR laser designed for operation with high power $CO_2$ lasers. Guaranteed powers of 150 mW when pumped by the PL5, and 500 mW when pumped by the PL6, are available at 118.8 µm and 184.3 µm. The output beam diameter is 11 mm (PL5 pump) or 13 mm (PL6 pump).

The 295 has a 3 bar invar support frame and allows UHV pumping for extended sealed operation.

### 395 Twin Laser

The 395 features two identical FIR laser cavities within a single 5 bar invar stabilised frame. This is particularly designed for applications where two FIR outputs with a frequency offset are required, such as plasma diagnostics.

Both FIR cavities are pumped by a single PL6 laser to ensure optimum stability of the Intermediate Frequency (IF). Each of the two outputs can be optimised individually and it has a beam diameter of 13 mm.

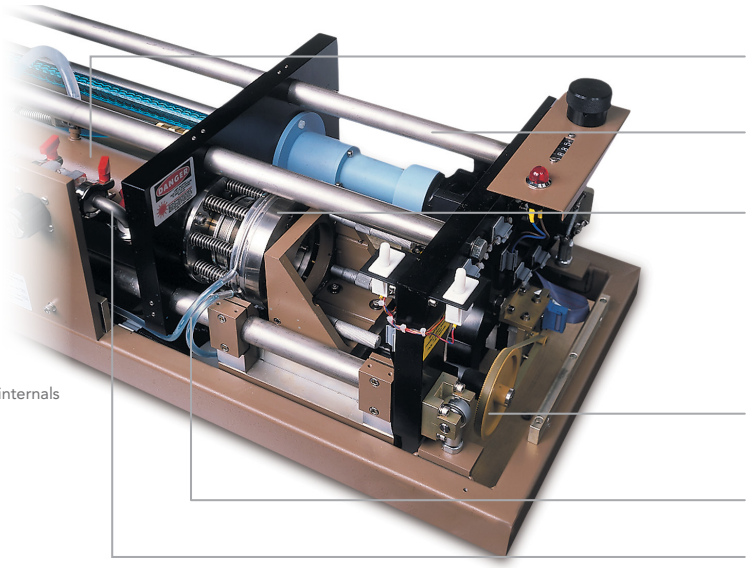
### FIRL-100

The FIRL-100 has both a $CO_2$ pump laser and an FIR laser combined into a single compact unit. The lasers and coupling optics are mounted within a stable 5 bar invar rod frame. The output FIR beam diameter is 11 mm.

The $CO_2$ section provides 80 lines between 9.1 µm and 10.9 µm with >50 W on the strongest lines. Mode performance ($M^2$ <1.25) is assured by internal profiling of the tube and the use of high-quality optics. The resonator design features a diffraction grating, two ZnSe Brewster windows and a ZnSe output coupler.

Access to the $CO_2$ radiation beam diagnostics for Infrared experiments is available via a precision, two position sliding mirror mechanism.

# SPECIFICATIONS




Cut away showing internals of FIRL-100 laser

## FIRL-100 Technical Specifications

| | |
|---|---|
| **Tuning Range** | 40 µm to 1.222 mm |
| **Mode** | > 90% TEM00 on main mode |
| **Beam Diameter** | 11 mm |
| **Polarisation** | Parallel or perpendicular to input pump laser (depends on FIR laser gas and line) |
| **$CO_2$ Laser Output** | 80 lines accessible at 9.1 µm – 10.9 µm<br>50 W on the strongest line |
| **Cooling** | Closed cycle thermocirculator |

## FIRL-100 Output of selected lines

| Wavelength (µm) | FIR Molecule | $CO_2$ pump line | Typical Power |
|---|---|---|---|
| 96.5 | $CH_3OH$ | 9R10 | 60 mW |
| 118.8 | $CH_3OH$ | 9P36 | 150 mW |
| 184.3 | $CH_2F_2$ | 9R32 | 150 mW |
| 432.6 | $CH_3OH$ | 9R20 | 30 mW |
| 513.0 | $CH_3OH$ | 9R28 | 10 mW |

## FIR Series accessories include:

### Laser stabilisers –

For applications demanding excellent medium and long term stability, an active stabiliser may be required. This will compensate for laser output fluctuations caused by changes in ambient conditions and lock the variation in laser frequency or power to a value close to the passive jitter.

### Laser Pumping and Refilling Systems –

All flowing gas laser systems are supplied with the necessary valves, gauges and vacuum couplings. A range of turbo molecular and dry scrolling pumps are available.

### Gas Mixing Stations –

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

Customer support is available worldwide.

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STG07 / 06.26