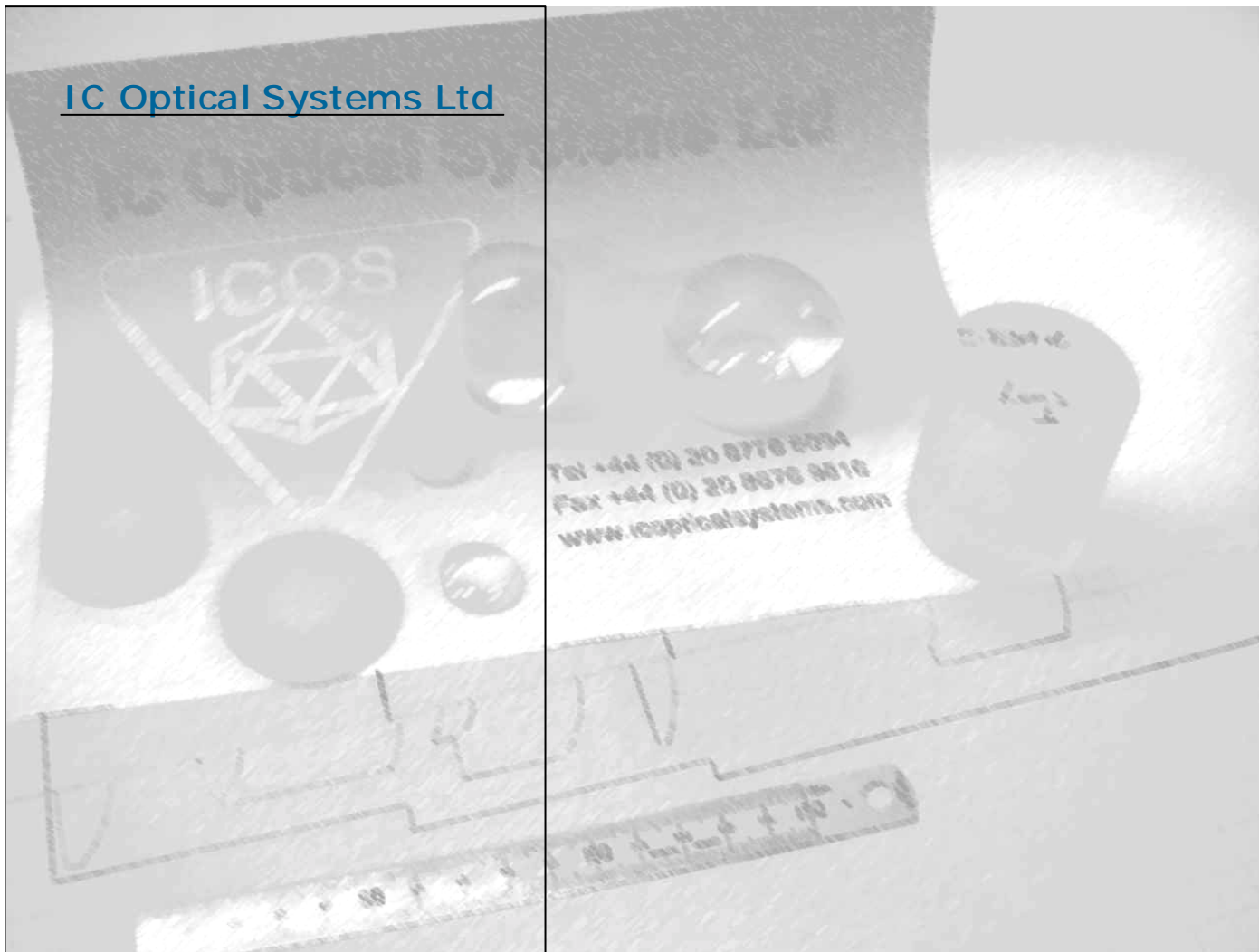


## IC Optical Systems Ltd



IC Optical Systems Ltd is the premier manufacturer of high quality Fabry-Perot substrates, etalons and CS100 Controllers for use in Spectroscopy, Astronomy, Doppler Wind Lidar and many other industrial, laboratory, field and Space applications.

## IC Optical Systems Ltd

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## CS100 Controller & ET Series Etalons



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# CS100 Controller & ET Series Etalons

## What is the ICOS system?

The ICOS servo-stabilized Fabry-Perot interferometer system comprises ET-Series II PZT tuned etalons, and the unique CS100 control unit, which stabilizes the spacing and parallelism of these etalons to an unrivalled degree of accuracy. As a turn-key system, power-up to operation need only take minutes. The unique construction of ET-Series II etalons ensures that when the recommended balance conditions are dialled into the CS100, the etalon will be aligned and ready for use.

## How does it work?

The CS100 is a three-channel bridge system which uses capacitance micrometers and PZT actuators, incorporated into the etalon, to monitor and correct errors in mirror parallelism and spacing. Two channels control parallelism and the third maintains spacing by referencing the cavity length-sensing capacitor to a high stability standard reference capacitor, also located in the etalon. Because this is a closed-loop system, non-linearity and hysteresis in the PZT drive are eliminated entirely, as of course are drifts in cavity parallelism and spacing.

The CS100 can be operated manually from front panel controls, or under computer control using either the IEEE-488 or RS232 interfaces, or the analog drive input.

## How stable is it?

The CS100 will control the spacing and parallelism of an ET etalon to better than 0.01% of a Free Spectral Range (FSR). The stability of a transmitted wavelength will depend on the ambient environment, and can be as good as 1 part in  $10^{10}$  if the etalon is mounted in the optional sealed cell and the system carefully temperature controlled. Under either computer or manual control, the CS100 allows random access tuning of an ET-Series II etalon over its spectral range with sub-millisecond response time.

## The CS100 Controller.

The high quality modular construction of the CS100 makes it robust and reliable. High quality precision components are used throughout to ensure the performance of the unit. The standard equipment includes an RS232 interface, allowing full remote control of the etalon parallelism, mirror spacing and system response time. A  $\pm 10\text{V}$  analog input gives linear control of the etalon spacing over a range of approximately  $\pm 1\mu\text{m}$ .

## CS100 Specifications

Electronic Noise Equivalent Displacement of Etalon Mirrors (with standard 3m cables)	10pmHz <sup>-1/2</sup> RMS
Electronic Drift (Temperature Stability)	$0 \pm 50\text{pm } ^\circ\text{C}^{-1}$
Setting Time (Response to step input)	<1.0ms
Resolution	12 bits
Output voltage to Piezo-electric Transducers	$\pm 750\text{ V}$
Interfaces	RS232
Analogue Input	$\pm 10\text{V}$
Operational Temperature Range	0-50°C ambient
Size: 19 inch rack cabinet	483 x 133 x 380mm 520 x 153 x 400mm
Mains Voltage	210-260 VAC or 0-130 VAC at 50/60Hz

## ET-Series II Etalons

Tunable by up to 15 orders in the visible, these etalons are cemented and optically contacted and thus making their construction mechanically robust with an exceptionally high level of vibrational immunity.

### ET-Series II Etalon Specification

Clear Apertures	28mm, 50mm, 70mm, 85mm, 100mm, 116mm, 150mm
Surface Quality	FS etalons $\lambda/50$ , $\lambda/100$ , $\lambda/200$ ( $\lambda = 633\text{nm}$ ) before coating WF etalons $\lambda/50$ ( $\lambda = 633\text{nm}$ ) CQ etalons $\lambda/200$ ( $\lambda = 633\text{nm}$ ) ZS etalons $\lambda/100$ ( $\lambda = 3\mu\text{m}$ )
Wedge Angle	Zero $\pm 1$ fringe or 10-15 arc min (nominal)
Mirror Spacing	Specified by user in the range $3\mu\text{m}$ -100mm
Cavity Tuning	CQ, FS and WF etalons $3\mu\text{m}$ (nominal)
Range	ZS etalons $7.5\mu\text{m}$ (nominal)
FS – Fused Silica,	WF – Water-free Silica,
ZS – Zinc Selenide,	CQ – Crystal Quartz.