



Coarse and Fine Tunable Laser for Gas Sensing

VTEC tunable laser provides market-leading performances in a compact, easy to use package. The core of this laser module is based on Digital Supermode Distributed Bragg Reflector (DSDBR) Laser. The DSDBR Laser, with coarse and fine tuning characteristics, is able to continuously operate wavelength over 1528 nm -1625 nm and can reach a resolution of 1pm. Low noise and excellent stability are other notable features.

FEATURES

- Continuously operating wavelength over 1528 nm-1625 nm
- High power +13 dBm
- Tuning without mode-hop
- Optical output stability is 5 pm/hour

APPLICATIONS

- Optical spectroscopy
- Optical component characterization
- Fiber optic sensors
- Interferometer

CUSTOMIZED PRODUCTS

Other designs available on request

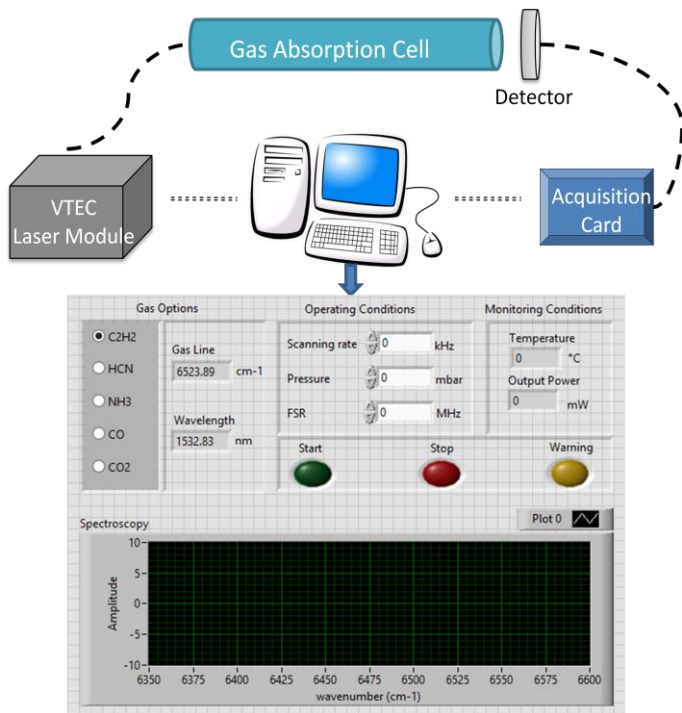
Draft Version: May 2014
Product Launch : 2015

SPECIFICATION

Parameter	Typical
WAVELENGTH	
Tuning Range	1528 nm-1625 nm
Absolute Accuracy	To be defined
Repeatability	To be defined
Stability	5 pm/hr
Resolution	1 pm
Sweep speed (scanning rate)	5 kHz
OPTICAL POWER	
Output power	+13 dBm /20 mW
Repeatability	To be defined
Stability	To be defined
Relative intensity noise(RIN)	-110 dB/Hz (10 MHz-1 GHz) -145 dB/Hz (1-10 GHz)
INTERFACES	
Optical output connector	FC/UPC
Optical fiber	900 μm split loose tube, PMF
Communication	TCP/IP
SPECTRUM	
Linewidth	1 MHz
SMSR	45 dB
Signal to source spontaneous emission ratio	To be defined
Signal to total source spontaneous emission ratio	To be defined
ENVIRONMENTAL	
Warm-Up Time	To be defined
Temperature	+15 to +30°C
Pressure	500-900 mm Hg
Humidity	≤85% R.H. at 40°C
DIMENSIONS AND WEIGHT	
Dimensions (H*W*D)	102mm*127mm*152mm
Weight	1.5 kg
POWER REQUIREMENTS	
Voltage And Frequency	AC 100-240±10%, 50/60

Note: VTEC reserves the right to change the detail specifications and designs as may be required to permit improvements in its products. Specifications are subject to change without notice.

GAS SENSING APPLICATION



The below data is the measurement results from the Trace Gas Research Group in Nijmegen. The operating conditions are:

- Pressure 250 mbar
- Scanning rate 5 kHz
- FSR = 500 MHz = 0.017 cm^{-1} (30 cm)
- HR mirrors 99.8% @ 1570 nm, effective optical path length 150 m

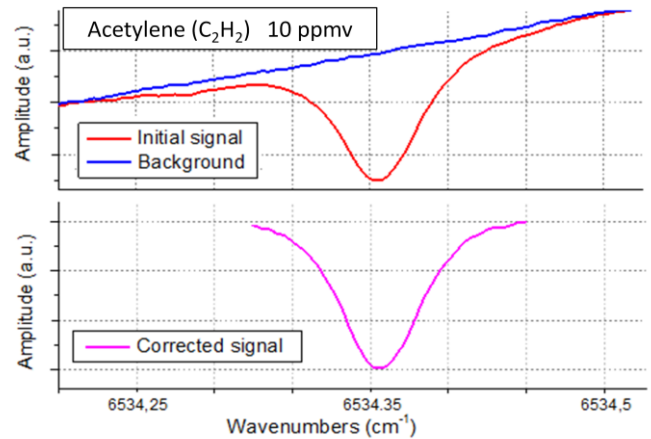


Figure 1 Acetylene spectroscopy measurement of the prepared concentration 10 ppmv. The correct signal is the result by subtracting the red initial signal from the background signal.

As one part of the trace gas detection system, the VTEC laser module supplies a novel broadband tunable laser operating wavelength over C and L Band. Based on the absorption spectroscopy principle, this system is sensitive to acetylene (C_2H_2), hydrogen cyanide (HCN), ammonia (NH_3) and so on.

The above diagram shows how the gas detection system works. From the user interface on PC, the operator could select the gas and its corresponding wavelength to control the optical output of the VTEC tunable laser module. Then the light is transmitted to the gas absorption cell via a fiber. A detector is put at the other side of the cell to collect the light signals and send to the acquisition card. All the information finally transfers back to the PC.

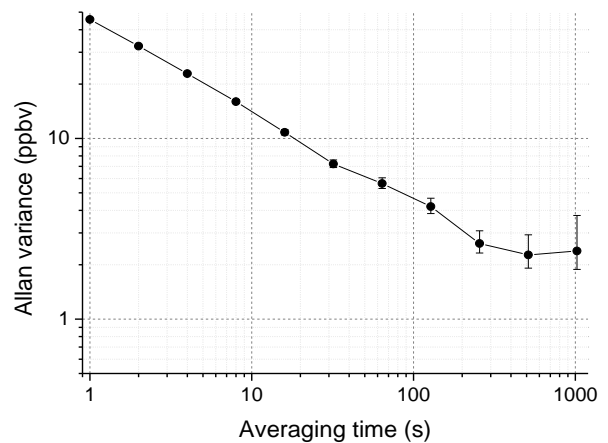


Figure 2 Allan variance for the C_2H_2 measurement. Current detection limit for C_2H_2 is 45 ppbv in 1 sec acquisition time

