

# Solus

$NH_3 + H_2O$   
 $HCl + H_2O$

Introducing Protea's new range of laser gas analysers - Solus. The Solus platform represents an extension of Protea's spectroscopic gas analysis equipment into laser based technology, allowing for highly selective, quick response and low range measurements of 1 or 2 gases in a cost-effective, re-configurable package.

Solus utilises the latest in Tuneable Laser Diode (TDL) spectroscopy, together with the best in micromachining technology, to deliver a precisely controlled narrow wavelength that can be tuned over a small range. The narrow linewidth allows for selection of precise spectral absorbance in the NIR region, free from cross-interferences of other absorbing gases. For some tuning ranges, a number of gases can be measured by tuning a single laser diode e.g.  $NH_3$  and  $H_2O$ .

The Solus range has been developed to incorporate the advantages in technology, including:

- \* Very low cost of ownership and maintenance costs
- \* Portable gas analysis
- \* Reconfigurable for multi-gases with replacement of laser diode
- \* Robust and light
- \* Simple to use, quick to deploy

Protea continues to offer training and support, so that the user is able to achieve the best performance out of the product.

Single or dual gas measurement via Tuneable Diode Laser Absorbance

Extremely quick measurement times (<3sec)

Low sample volume (15ml)

Built-in sampling system (filter, purge, flow control)

Integrated zirconia  $O_2$  sensor (optional)

Embedded PC (optional)

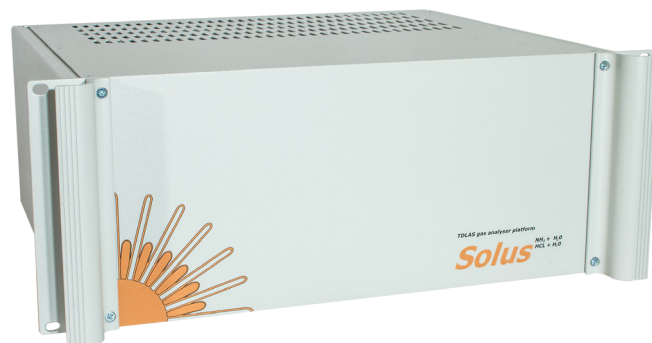
**Specific Applications for Solus:**

$NH_3$  slip in SCR

Automotive engine testing

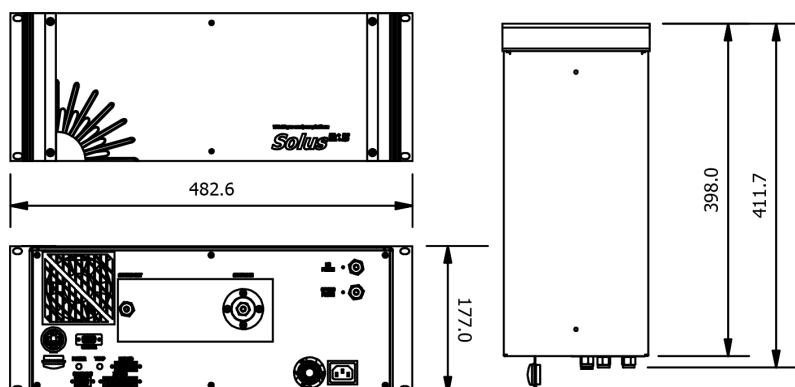
Marine emissions monitoring

Compliance monitoring under WID



## Hardware Specifications

Gases measured	$NH_3 + H_2O$ ; $HCl + H_2O$ ; All with $O_2$ measurements via optional zirconia sensor
Resolution	0.1nm
Tuning Range	2 – 2.5nm
Optics	Zinc Selenide
Detector	Photodiode
Pathlength	0.4 metres
Sample Cell Volume	15ml
Cell Temperature	190°C (variable on application)
Flow rate	0-5 lmin <sup>-1</sup>
On-board Sampling system	Heated inlet filter Flow Control Automated Nitrogen Purge Valve Mass Flow Control for dilution and/or analyte spiking No need for separate pre-analyser sample conditioning box
Weight	10kg, depending on options
Dimensions	483 x 398 x 177 mm (19" rack mountable, 4U)



Solus is a stand-alone gas monitoring unit designed for precise measurements of single component gases. Protea has a successful history in pioneering the use of full-spectrum FTIR analysers for process and emissions gas measurements in the UK. Using our experience of analyser design and knowledge of customer requirements, Solus has been developed to give selective gas measurements in a cost-effective and efficiently packaged design.

With the benefits of a portable, extractive analyser, Solus can be used for compliance monitoring from multiple sample points on site. It can also be set-up as a dedicated CEM, providing fixed emissions monitoring as part of an

existing CEM system or on its own. By integrating our already MCERTS approved  $ZrO_2$  sensor, Solus can give a unique measurements package that can complement already existing equipment e.g. take  $HCl + H_2O + O_2$  measurement from Solus to integrate with chemiluminescence/NDIR equipment for  $CO/NO_x/SO_2$ .

As an extractive analyser, Solus can be installed in easily accessible locations for service. The single pass cell and integrated heated filter mean that maintenance costs are kept low. Solus offers future upgrade benefits; with an extractive cell, improvements can be made to pathlength and optics for furthering the analyser life in multiple applications. Also, by simply changing the laser Solus can be set to measure new gases without any large cost outlay.

Running an embedded PC, Solus is a controllable gas sensor on the plant network with direct reading outputs via Ethernet. With Protea's in-house application support able to assist remotely, Solus is a unique offering for industrial gas analysis.

### Data System

Data System:	Embedded PC running Windows Embedded and PAS-Pro Ethernet and Wireless LAN connectivity – direct results output over LAN to plant Industrial rack mount, desktop or notebook PC if not embedded
Measurement Units	Concentration: ppb, ppm, mg/m <sup>3</sup> , %Vol Mass Emission: g/hr, kg/hr (utilising external flow input)
Ethernet	OPC Server and Client; Modbus TCP (optional)
Manual data retrieval	USB

### Solus $NH_3$ Measurements

Solus can operate with different laser diodes for different gas applications.  
The below specification are for  $NH_3 + H_2O$  combined laser, with optional  $O_2$  via zirconia sensor.

Wavelength	1.5 $\mu$ m
Standard measurement range	0 – 50ppm $NH_3$ ; 0 – 40%Vol $H_2O$ ; 0 -20.9%Vol $O_2$
Standard detection limit $NH_3$	0.1ppm (variable with integration time)
Maximum detection limit $NH_3$	20ppb (180sec integration time)
Max. Response Time (T90, direct) $NH_3$	2secs (variable with integration time)
Precision $NH_3$	0.1ppm (variable with integration time)
Accuracy	$\pm$ 2% of reading
Drift	$\pm$ 2%