

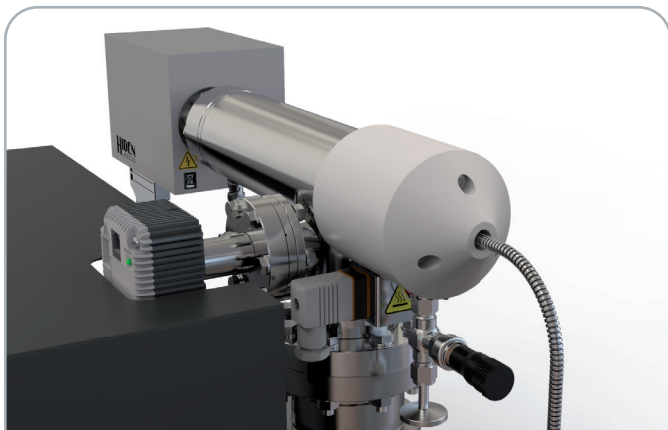
Sampling Inlets for Hiden Mass Spectrometers

► Gas, Vapour and Liquid Sampling Systems

Hiden Gas Analysis systems are versatile. Inlet systems are user interchangeable, allowing for transformation of your mass spectrometer to suit new or multiple application requirements.

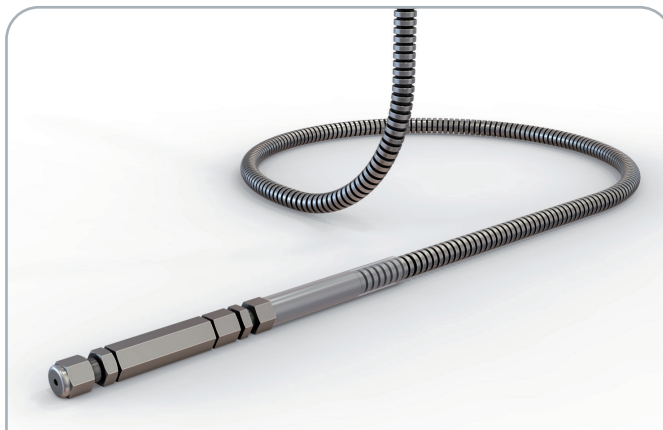
Gas Sampling Inlets

For a wide range of sample flow rates, and sample pressure ranges



STANDARD QIC – QUARTZ INERT CAPILLARY

- ▶ Sample pressure range 2 bar to 100 mbar
- ▶ Operates to 200°C
- ▶ Capillary length: 1.8 m (standard)
- ▶ Fast 300 ms sampling response
- ▶ Sample consumption rates from 0.8 to 20 ml/min
- ▶ Swagelok 1/16" or 1/8" connection
- ▶ Corrosion resistant option available
- ▶ Fast response 0.9 m capillary also available, with sample consumption rates from 1.6 to 20 ml/min
- ▶ Flexible construction



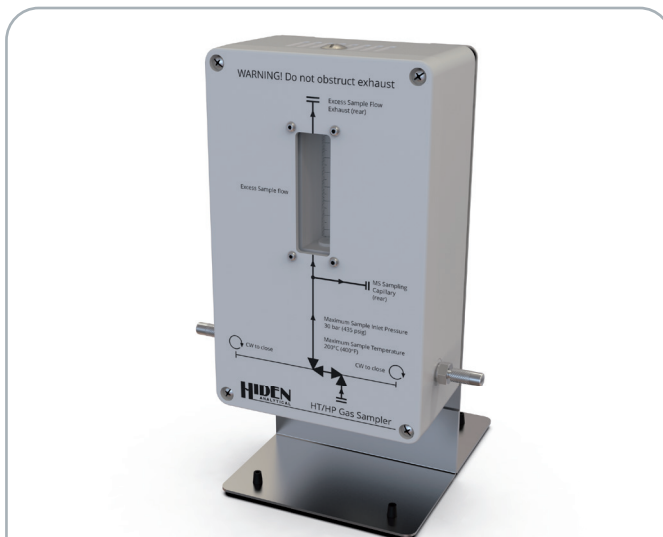
LOW PRESSURE STAINLESS STEEL CAPILLARY

- ▶ Sample pressure range 250 to 25 mbar
- ▶ Operates to 200°C
- ▶ Capillary length: 0.9 m
- ▶ All stainless steel assembly
- ▶ Swagelok 1/16" or 1/8" connection
- ▶ Interchangeable with regular capillary in standard QIC systems
- ▶ Corrosion resistant option available



ULTRA-LOW FLOW QIC HEATED CAPILLARY INLET

- ▶ For evolved gas studies. For OEMS, online electrochemical MS, where evolved gas flow is limited
- ▶ Sample consumption rate of 250 μ l/min
- ▶ Operates to 200°C



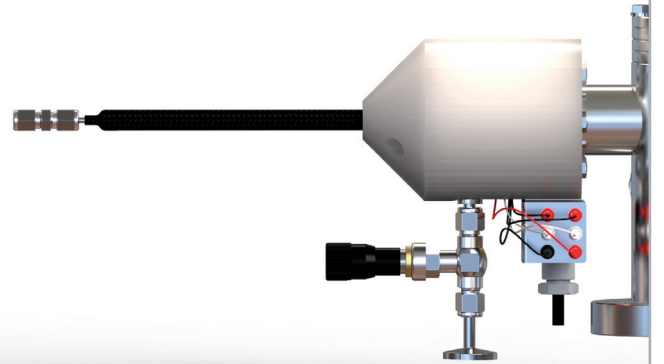
HT/HP GAS SAMPLER

- ▶ Sample pressure range 0.1 to 30 bar
- ▶ Connects to standard QIC Inlet
- ▶ Heated to 200°C



MICRO-FLOW INLET

- ▶ Sampling rate 12 $\mu\text{l}/\text{min}$. 24 $\mu\text{l}/\text{min}$ option
- ▶ Single or multi-capillary inlet option
- ▶ 8 – 16 s response. Specially engineered to maintain a good response



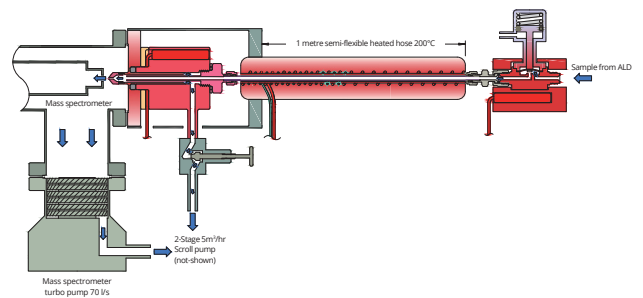
VERY LOW PRESSURE SAMPLING INLET

- ▶ Sample pressure range 10 to 1 mbar
- ▶ Heated to 120°C
- ▶ Capillary length: 0.3 m
- ▶ Swagelok 1/8" connection
- ▶ Rigid construction



TRI-VALVE SAMPLING HEAD

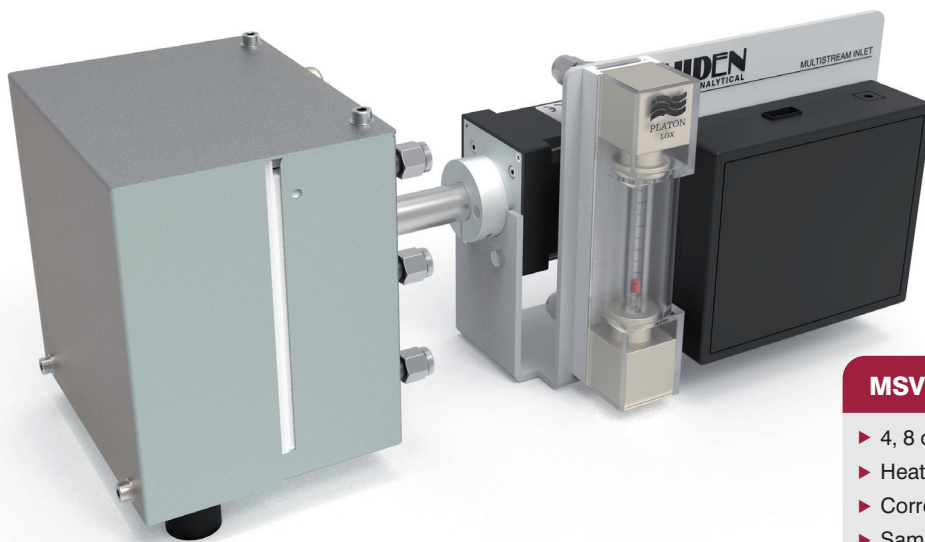
- ▶ Sample pressure range $<10^{-4}$ mbar to 1000 mbar
- ▶ Flexible connection to process chamber
- ▶ Automatic sample line switching



SGL – HEATED LOW PRESSURE INLET WITH ISOLATION VALVE

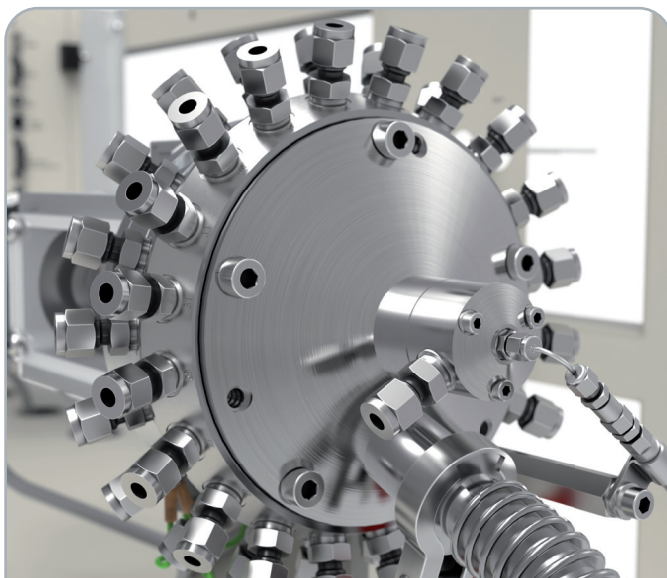
- ▶ For sampling ALD processes with options from 1-5 mbar or 5-50 mbar
- ▶ Heated to 200°C
- ▶ Air actuated heated (200°C) isolation 'ALD' valve included, not shown

Multistream Gas Sampling Inlets



MSV MULTI-STREAM SELECTOR

- ▶ 4, 8 or 16-way available
- ▶ Heating option (160°C)
- ▶ Corrosion resistant option
- ▶ Sample flow rate : 50 ml/min
- ▶ Flow meter option



PROTEUS

- ▶ 20, 40, 80-way multi-port valve
- ▶ Heated to 120°C
- ▶ Standard flow > 100 ml/min
- ▶ Low flow configuration – from 4 ml/min
- ▶ High flow configuration – to 10 l/min
- ▶ No crosstalk between streams

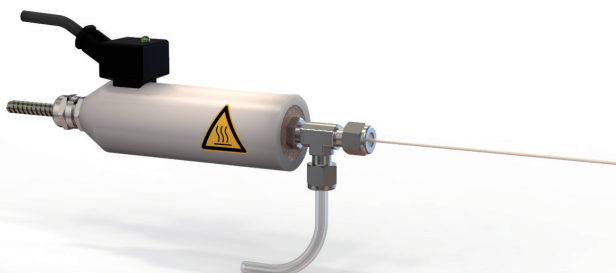


TWIN CAPILLARY INLET

- ▶ Typical application – measuring input and output of reaction vessel
- ▶ Heated to 160°C
- ▶ Fast switching valve between capillaries - less than one second
- ▶ Two capillaries of either 0.9 m or 1.8 m

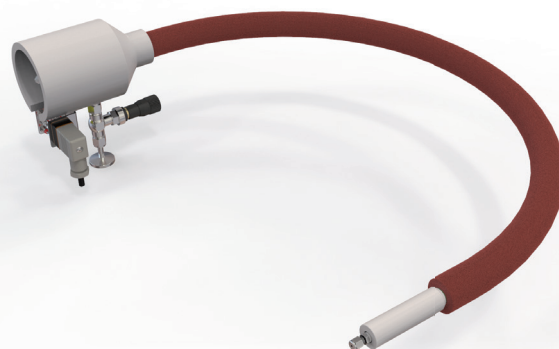
Gas Sampling Inlets - Thermal Analysis

For furnace, glovebox, reactor and evolved gas analysis



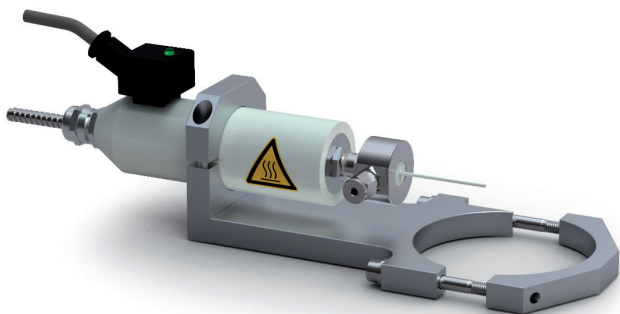
HOT-ZONE INLET

- ▶ For sampling from furnaces; interface from furnace to QIC
- ▶ Includes heated filter assembly
- ▶ Allows direct sample analysis to 1700°C
- ▶ General design to suit most furnaces



QIC HT250 INLET

- ▶ Sample pressure range 2 bar to 100 mbar
- ▶ Heated to 250°C (HT250) / 450°C (HT450)
- ▶ Sample consumption rates from 0.8 to 20 ml/min
- ▶ Capillary length: 1.8 m
- ▶ Swagelok 1/16" or 1/8" connection
- ▶ Interchangeable with standard QIC Inlet
- ▶ Corrosion resistant option available
- ▶ Flexible and robust steel hose



TGA-MS

- ▶ A range of interfaces are available for TGA-MS evolved gas analysis
- ▶ Specially designed to suit designated TGA instrument
- ▶ Most manufacturers and models covered



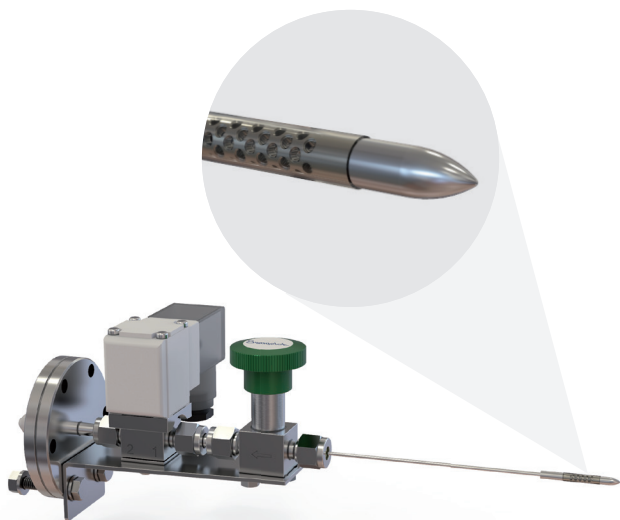
QIC GLOVEBOX

- ▶ Heated to 200°C
- ▶ Provides low dead volume interface with glovebox

QIC HEATED EXTENSION

- ▶ Available as upgrade to standard QIC systems
- ▶ Extends length by 2 m (standard extension) or 4 m, 6 m on request

Gas Sampling Inlets for Analysis of dissolved gases in liquids



DIRECT MEMBRANE INLET PROBE

- ▶ For immersion and/or insertion in liquid or sludge samples, soil core sampling for example



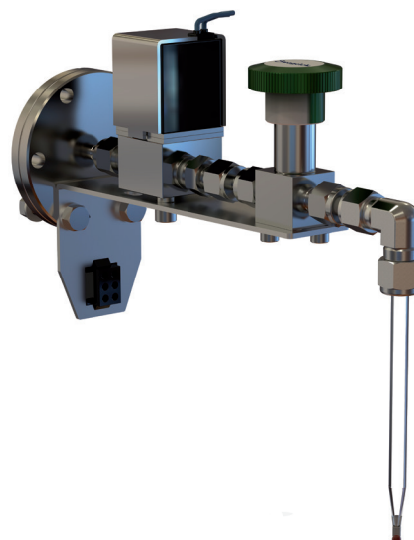
CUVETTE

- ▶ Cuvette style sample cell for biofuel research
- ▶ Removable cover for light sensitive research



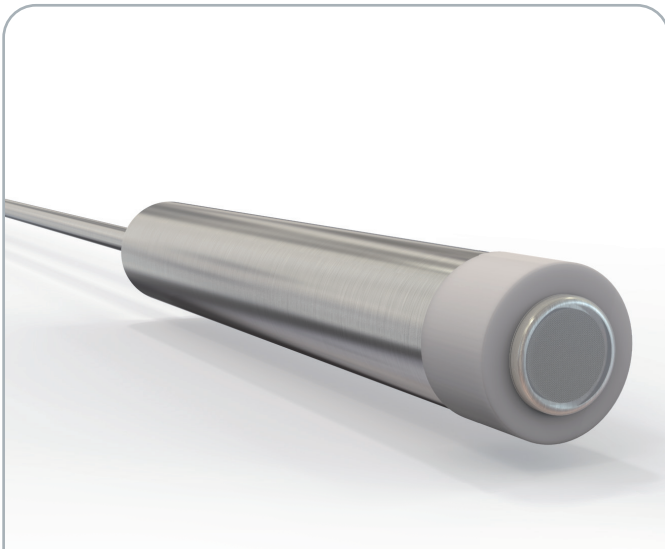
DENITRIFICATION PROBE

- ▶ Flow through probe, low flow design for denitrification studies
- ▶ Allows for water vapour removal using liquid nitrogen cold trap



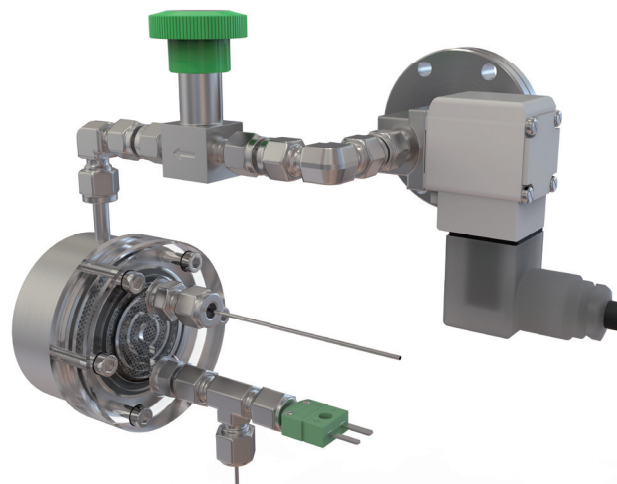
ENZYME KINETICS PROBE

- ▶ Probe sampler for the study of the chemical reactions that are catalysed by enzymes
- ▶ All glass probe construction



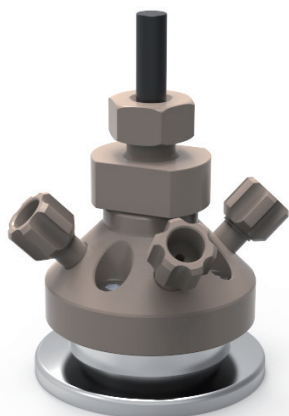
DEMS DIRECT INLET

- ▶ Probe sampler for in situ measurement of electrochemical products
- ▶ Can be positioned at the electrodes of Redoxme™ cells and/or users' own cells



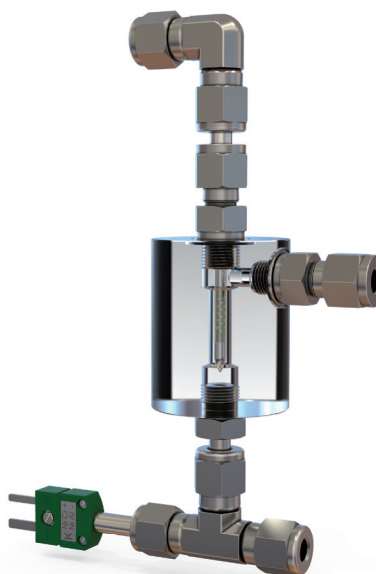
LARGE CIRCULAR MEMBRANE CELL

- ▶ Flow through dissolved species probe inlet, with liquid flow connections
- ▶ Larger surface area for fast and sensitive measurements
- ▶ Integrated thermocouple for on-line sample temperature measurement



DEMS

- ▶ A combined mass spectrometry inlet and electrochemical cell for real time differential mass resolved determination of gaseous or volatile electrochemical reactants, reaction intermediates and products while scanning electrochemical parameters
- ▶ Allows static or dynamic electrolyte flow
- ▶ Thin layer and dual layer cells



FLOW-THROUGH DISSOLVED SPECIES PROBE

- ▶ For analysis of sample with continuous flow, extracted sea or estuary water for example

Hidden **APPLICATIONS**

Hidden's quadrupole mass spectrometer systems address a broad application range in:

GAS ANALYSIS

- ▶ dynamic measurement of reaction gas streams
- ▶ catalysis and thermal analysis
- ▶ molecular beam studies
- ▶ dissolved species probes
- ▶ fermentation, environmental and ecological studies



Hidden Analytical Ltd.
420 Europa Boulevard
Warrington WA5 7UN England

T +44 [0] 1925 445 225
F +44 [0] 1925 416 518
E info@hidden.co.uk
W www.HiddenAnalytical.com



Sales Offices:

We have sales offices situated around the globe. **Visit our website for further information.**

Hidden systems are supplied with at least one sampling inlet, systems are user upgradeable and can accommodate a wide range of inlet systems. To confirm compatibility for specific inlet systems for operation with your system please contact Hidden Analytical or your local representative.

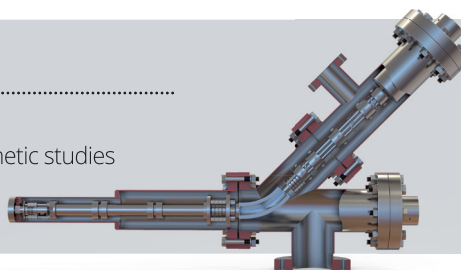
SURFACE ANALYSIS

- ▶ UHV TPD
- ▶ SIMS - Quadrupole and ToF
- ▶ end point detection in ion beam etch
- ▶ elemental imaging – 3D mapping



PLASMA DIAGNOSTICS

- ▶ plasma source characterisation
- ▶ etch and deposition process reaction kinetic studies
- ▶ analysis of neutral and radical species



VACUUM ANALYSIS

- ▶ partial pressure measurement and control of process gases
- ▶ reactive sputter process control
- ▶ vacuum diagnostics
- ▶ vacuum coating process monitoring

