



## 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  $\mu$ l/min
- ▶ Operates to 200°C



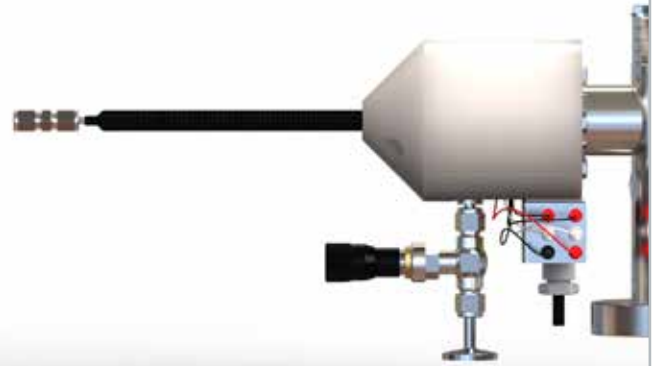
## HT/HP GAS SAMPLER

- ▶ 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



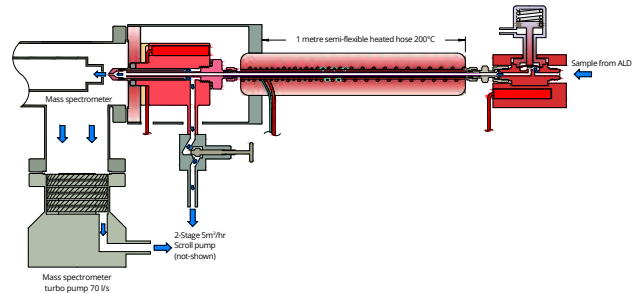
### VERY LOW PRESSURE SAMPLING INLET

- ▶ 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



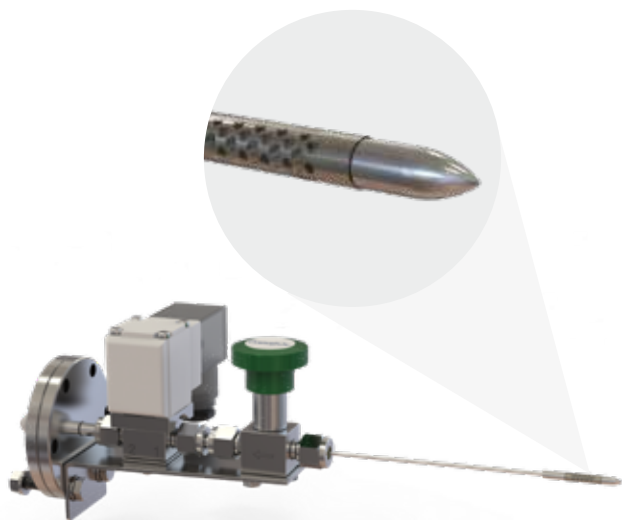
## QIC GLOVEBOX

- ▶ 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



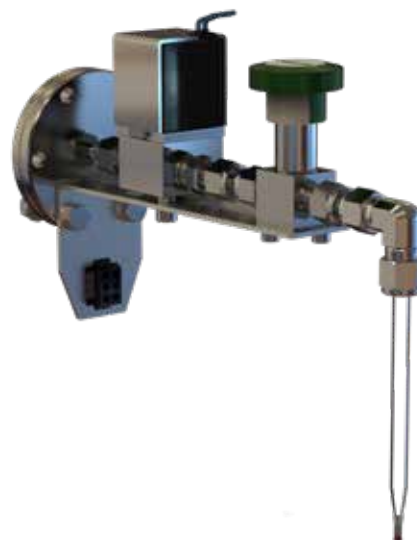
## CUVETTE

- ▶ 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



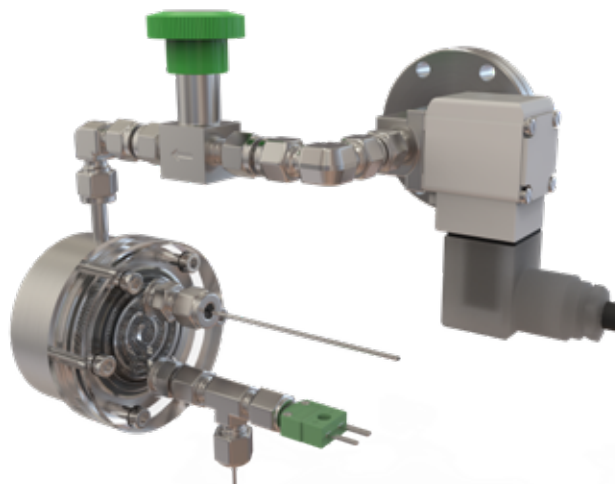
## ENZYME KINETICS PROBE

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



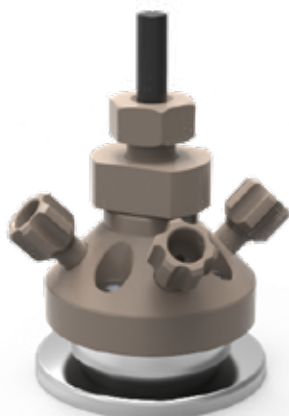
### DEMS DIRECT INLET

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



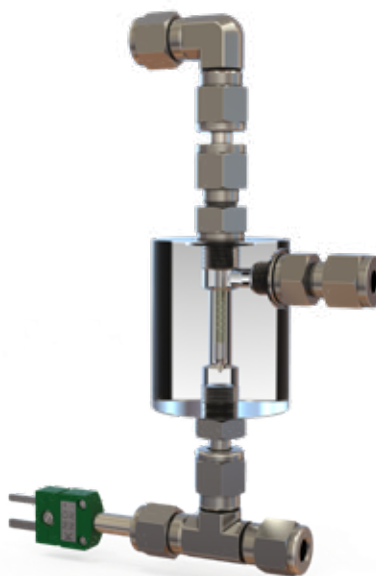
### LARGE CIRCULAR MEMBRANE CELL

- ▶ 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



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## **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

