



### SOLUTION FEATURES

- ◆ **Performance :**
  - ◆ Down to < 10 ppb LOD based on Epd\* technology (< 5 ppb with eLOD)
  - ◆ Linearity: < 1%
- ◆ **Robustness**
  - ◆  $\mu$ InProve\* GC valve
  - ◆ iMov\* GC platform
  - ◆ Solid state Epd\* sensor
- ◆ **Optional automated multi-stream analysis**
  - ◆ Analyse multiple streams sequentially
  - ◆ High sample integrity with iS<sup>4</sup> sample stream selection system
- ◆ **Full data analysis and reporting software**

### KEY SPECIFICATIONS

- ◆ Impurities: CH<sub>4</sub>, CO<sub>2</sub>, N<sub>2</sub>O, SF<sub>6</sub> (Optional)
- ◆ Matrix: Air
- ◆ LOD: < 10 ppb

### TYPICAL APPLICATIONS

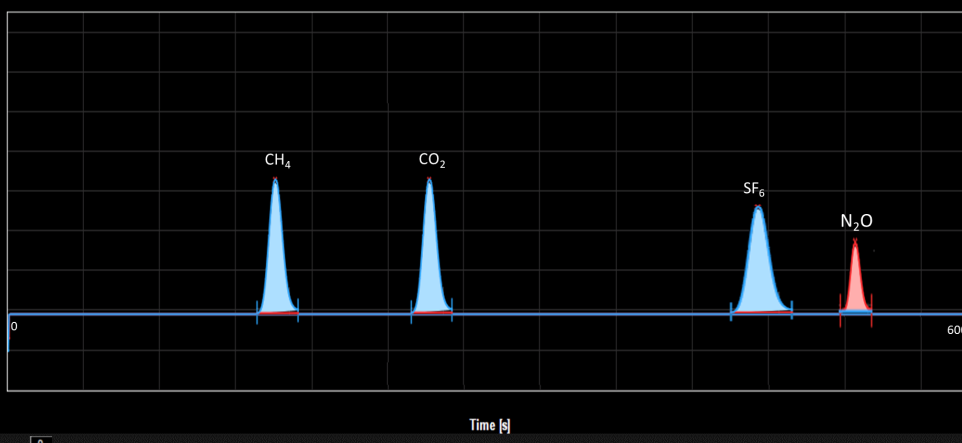
- ◆ Environmental monitoring

The measurement of green house gases is of outmost important in order to improve of quality of life. Our innovative solution is ecofriendly as it does not use combustibile such as H<sub>2</sub> which is required with FID solutions for the measurement of CH<sub>4</sub> and N<sub>2</sub>O.

Only solution is very simple. All the measurement are done using our solid state Epd\* technology and nitrogen carrier gas.

This simple chromatographic solution has been designed with robustness, performance and cost of ownership in mind.

### CHROMATOGRAM EXAMPLE: GREEN HOUSE ANALYSIS



## APPLICATION PERFORMANCE HIGHLIGHTS

In the field of chromatography, most GC integrators use LOD to define the sensitivity of the GC system. The LOD is typically calculated using 3 times the signal to noise (SNR) using a peak of relatively high intensity. This is a good starting point to compare detector performance but it ignores many factors associated with the chromatographic method itself.

We have over 30 years of experience in the measurement of ultra-trace analytes. We know very well that just using a LOD calculation to measure the performance is not robust. At trace level, you may lose the impurities inside the column. So the real limit of detection can be higher. Also, baseline shape as well as matrix interference, which causes drift, dramatically impact the performance.

For that reason, we use both LOD and MDL. The MDL is the **method detection limit**. Instead of purely looking at the signal intensity vs the detector noise, this method involves injecting consecutively a sample with a known precise concentration close to the expected limit of detection. As a rule of thumb, this test is typically done 3 times above the expected limit of detection. This test is more robust when compare to standard LOD, because it takes into account all factors.

Here, we are providing both, the LOD and MDL. The tests were done using our **iGCS** dilution system. So always be careful when looking at LOD. Not everybody use the same definition.

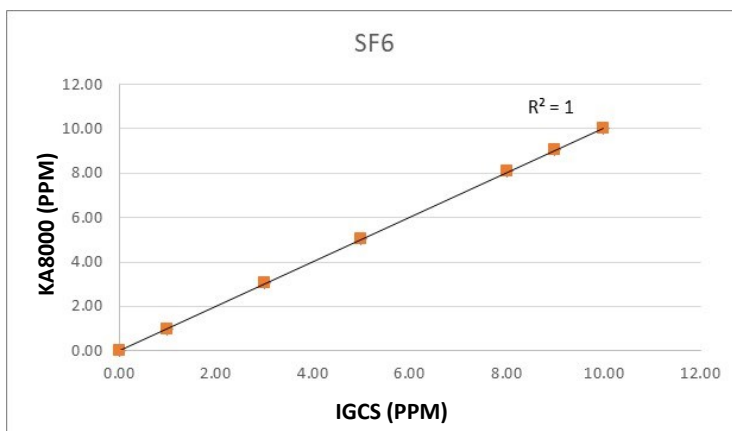
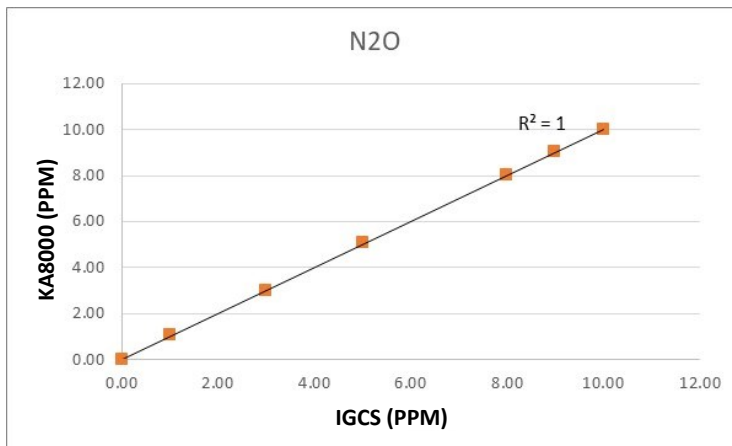
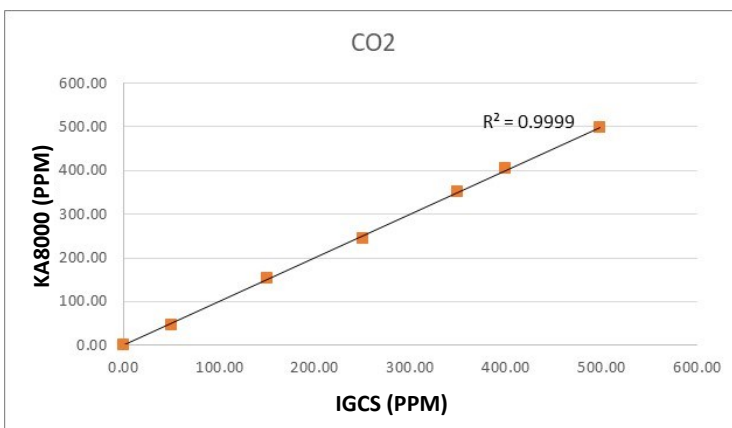
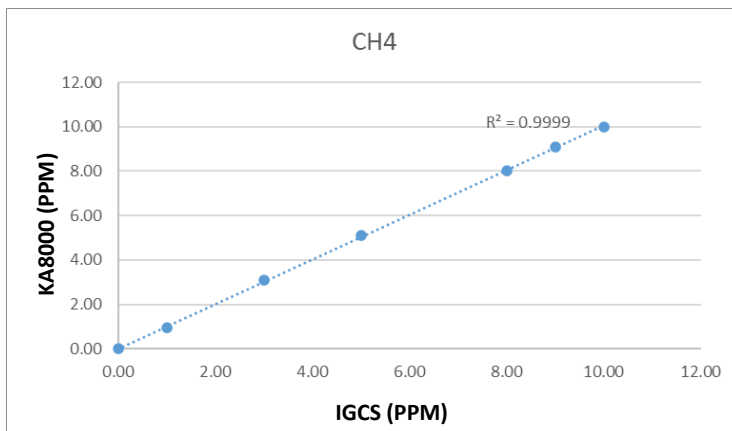
### LIMIT OF DETECTION (LOD) AND METHOD LIMIT OF DETECTION (MDL)

	Analysis #	CH4 [PPM]	CO2 [PPM]	N2O [PPM]	SF6 [PPM]
	1	9.44	512.0	10.02	9.91
	2	9.45	532.0	10.04	9.92
	3	9.50	541.0	9.98	9.89
	4	9.43	521.0	10.06	9.90
	5	9.43	532.0	10.02	9.90
	6	9.52	539.0	9.96	9.81
	7	9.45	526.0	10.04	9.92
	8	9.44	547.0	10.02	9.91
	9	9.52	529.0	10.03	9.85
	10	9.45	534.0	9.98	9.92
Without eLOD	$\sigma$	0.04	10.1	0.03	0.04
	MDL	0.11	30.3	0.10	0.11
	LOD	0.01	7	0.01	0.01
With eLOD	$\sigma$	0.01	3.37	0.01	0.01
	MDL	0.04	10.11	0.03	0.04
	LOD	0.004	2.33	0.003	0.003

### LINEARITY DATA

CH4 [ppm]		CO2 [ppm]		N2O [ppm]		SF6 [ppm]	
iGCS	KA8000	iGCS	KA8000	iGCS	KA8000	iGCS	KA8000
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00	0.95	50.00	47.00	1.00	1.05	1.00	0.98
3.00	3.10	150.00	153.00	3.00	3.01	3.00	3.06
5.00	5.10	250.00	245.00	5.00	5.06	5.00	5.02
8.00	8.01	350.00	352.00	8.00	8.02	8.00	8.07
9.00	9.09	400.00	406.00	9.00	9.05	9.00	9.06
10.00	10.00	498.00	498.00	10.00	10.00	10.00	10.00

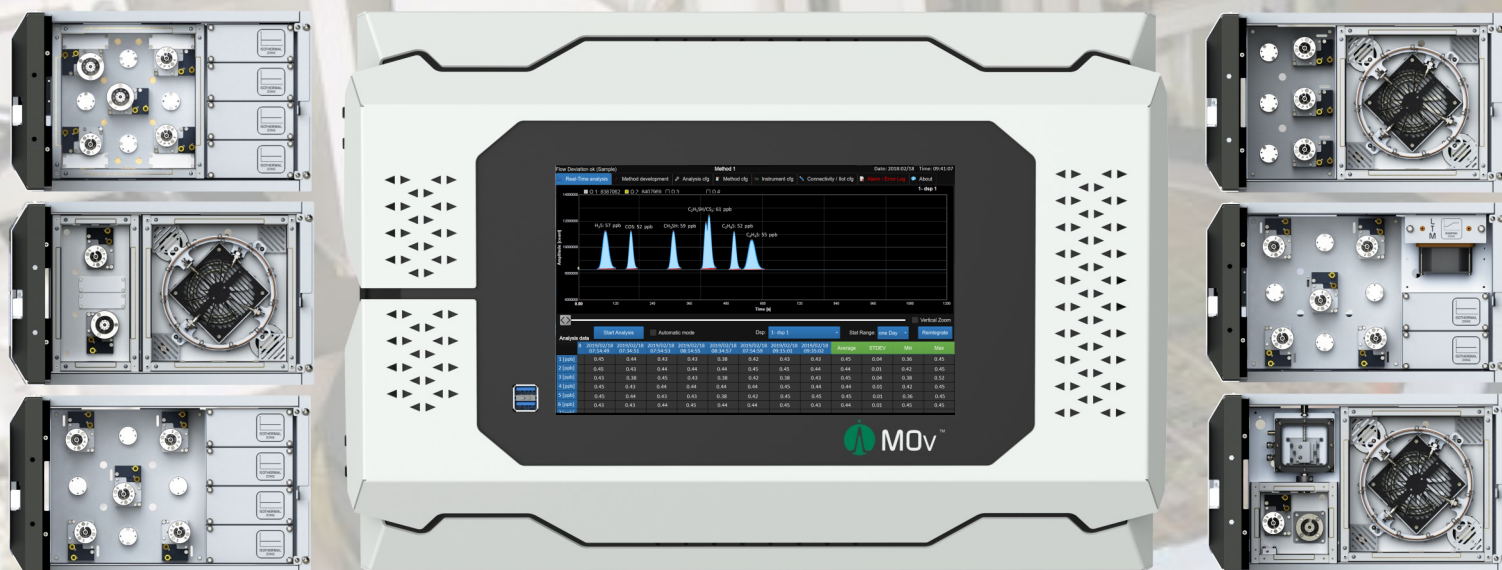
## LINEARITY CHART EXAMPLES





**MOV™**

# THE FIRST MODULAR AND CONFIGURABLE GC PLATFORM



THE iMOV HAS BEEN DESIGNED TO BE MODULAR AND EASY TO CONFIGURE. WITH ITS INNOVATIVE MODULAR THERMAL\* ZONE AND BROAD OFFERING OF STANDARD MODULES, IT ONLY TAKES A FEW HOURS TO FULLY CONFIGURE THE GC.

## FEATURES

- ◆ **Plug & Play**
  - ◆ Configure a full GC in just a few hours
  - ◆ No mechanical work required, just plug standard modules
- ◆ **Modular thermal zone concept\***
  - ◆ Up to 6 isothermal zones for columns or valves
  - ◆ 1 convection ramping oven
  - ◆ Up to 2 low thermal mass modules
- ◆ **Access all key components from the front door**
- ◆ **Up to 6 chromatographic valves**
- ◆ **Up to 5 purged electronic pressure controllers**
- ◆ **Up to 3 gas detectors: Epd\*\*, ePID\*, eDID\*\*, TCD, FID and others**
- ◆ **Designed for 19" rackmount or benchtop**
- ◆ **Based on ASDSense Embedded robust GC software**
- ◆ **I/O module: Isolated 4-20 mA outputs, Relay board, RS-232, Ethernet, Modbus**
- ◆ **Accessories available:**
  - ◆ GC Inlet
  - ◆ Autosampler
  - ◆ Sample Concentration System (iGCS)
  - ◆ External sampling system control (iS<sup>4</sup>)



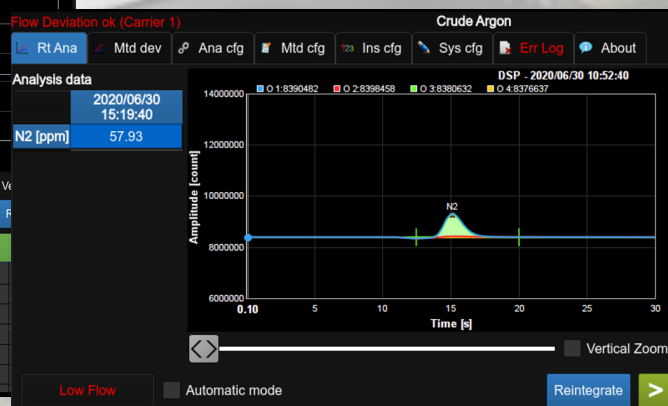
# ASDSense

## PROCESS GC SOFTWARE

### EASE OF USE, ROBUSTNESS, INNOVATIVE



iMov and GCSense version

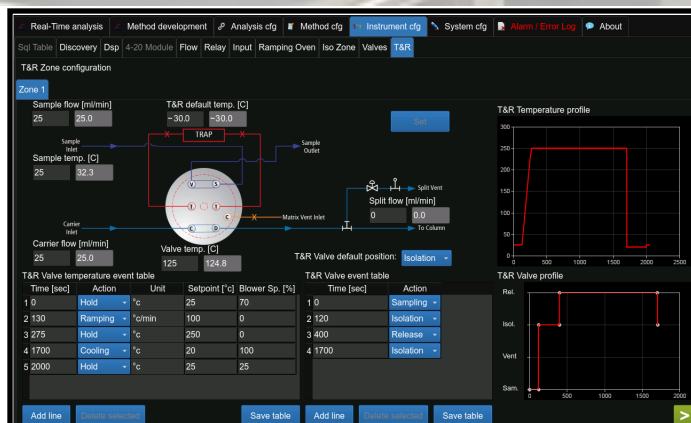


μSense version

THE ASDSense IS A POWERFUL GC SOFTWARE THAT RUNS ON ALL OUR OEM GC PLATFORM. IT HAS BEEN DESIGNED TO BE ROBUST FOR 24/7 PROCESS USE WITH LABORATORY LIKE DATA ANALYSIS FEATURES. ITS INTUITIVE AND FEATURE RICH SUCH AS MULTIPLE INNOVATIVE ADVANCED SIGNAL PROCESSING ALGORITHM, MAKES THE MOST POWERFUL AND VERSATILE PROCESS GC SOFTWARE.

## FEATURES

- ◆ Based on Industrial Real-Time Operating System
- ◆ Designed based on software redundancy for reliability
- ◆ Advanced signal processing
  - ◆ eLOD (Enhanced LOD) algorithm
  - ◆ Peak remodeling
  - ◆ Baseline cancellation
- ◆ Multi-methods capability with automatic sampling system synchronisation
- ◆ Data analysis
  - ◆ Data and chromatogram review
  - ◆ Statistical analysis
- ◆ Multiple calibration models available
  - ◆ Linear and quadratic
  - ◆ Multi-points calibration
- ◆ Password protected user access (3 levels)
- ◆ IIoT Ready
- ◆ Remote control
- ◆ Support MQTT IIoT protocol for M2M communication
- ◆ Digital relays, 4-20 mA, RS-232, Ethernet, Modbus



Trap and Release menus



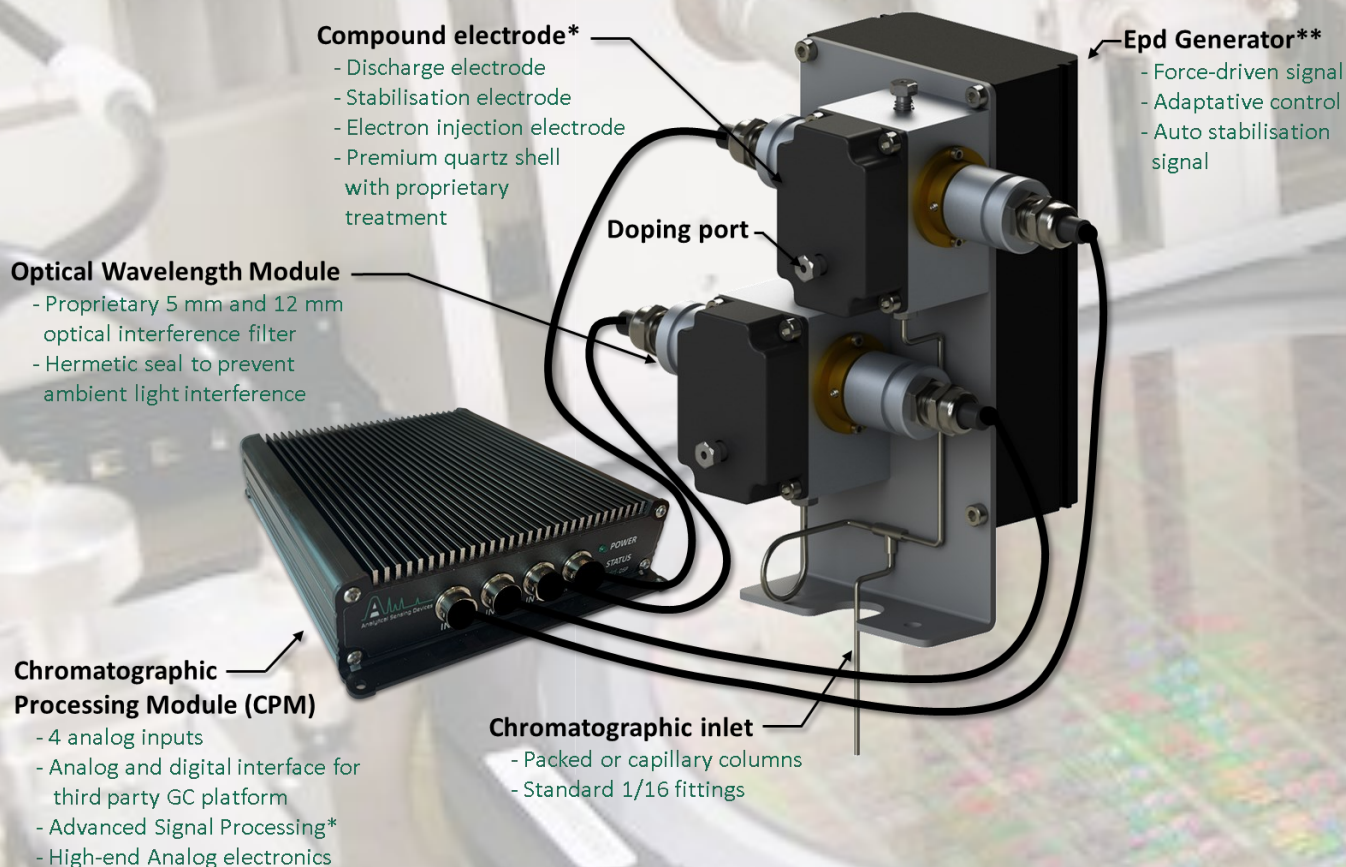
Flow diagnostic menu



**SePdd**<sup>NG™</sup>

## SCALABLE ENHANCED PLASMA DISCHARGE DETECTOR

A NEW SENSING TECHNOLOGY AND TOOLSET FOR CHROMATOGRAPHY



THE SEPDD IS A SCALABLE EPD\* BASED DETECTOR ARCHITECTURE. IT IS NOT JUST A GC DETECTOR, IT'S A COMPLETE SYSTEM. AVAILABLE IN 3 CONFIGURATIONS (DUO, TWIN AND QUATTRO), OPTIMISE AND SIMPLIFY YOUR CHROMATOGRAPHY LIKE YOU NEVER DID BEFORE. WITH THE CPM PLATFORM, TURN THE SEPDD INTO A FULL FEATURE COST-EFFECTIVE GC SOLUTION.

## FEATURES

- ◆ Up to 2 detectors for the price of one
  - ◆ SePdd available in Duo, Quattro and Twin versions
- ◆ Epd technology\*
  - ◆ Discharge cell available in metal or ceramic
  - ◆ Unique compound electrode\* that can withstand high temperature, high pressure and sub-atmospheric pressure
  - ◆ Plasma stabilisation and electron injection electrodes\*
- ◆ Optimised for packed,  $\mu$ Packed and Capillary columns
- ◆ Using configurable optical wavelength module
- ◆ Integrate it on any existing GC platform
- ◆ ppt to % measurement range
- ◆ Alternative to DID, PDHID, ECD, FPD, PFPD, SCD, FID, TCD, Mass Spectrometer and former PED technologies
- ◆ Compatible with argon, helium, nitrogen, oxygen, CO<sub>2</sub> and hydrogen carrier



## PURGED LIP SEALING VALVE

### THE MOST RELIABLE AND DURABLE VALVE

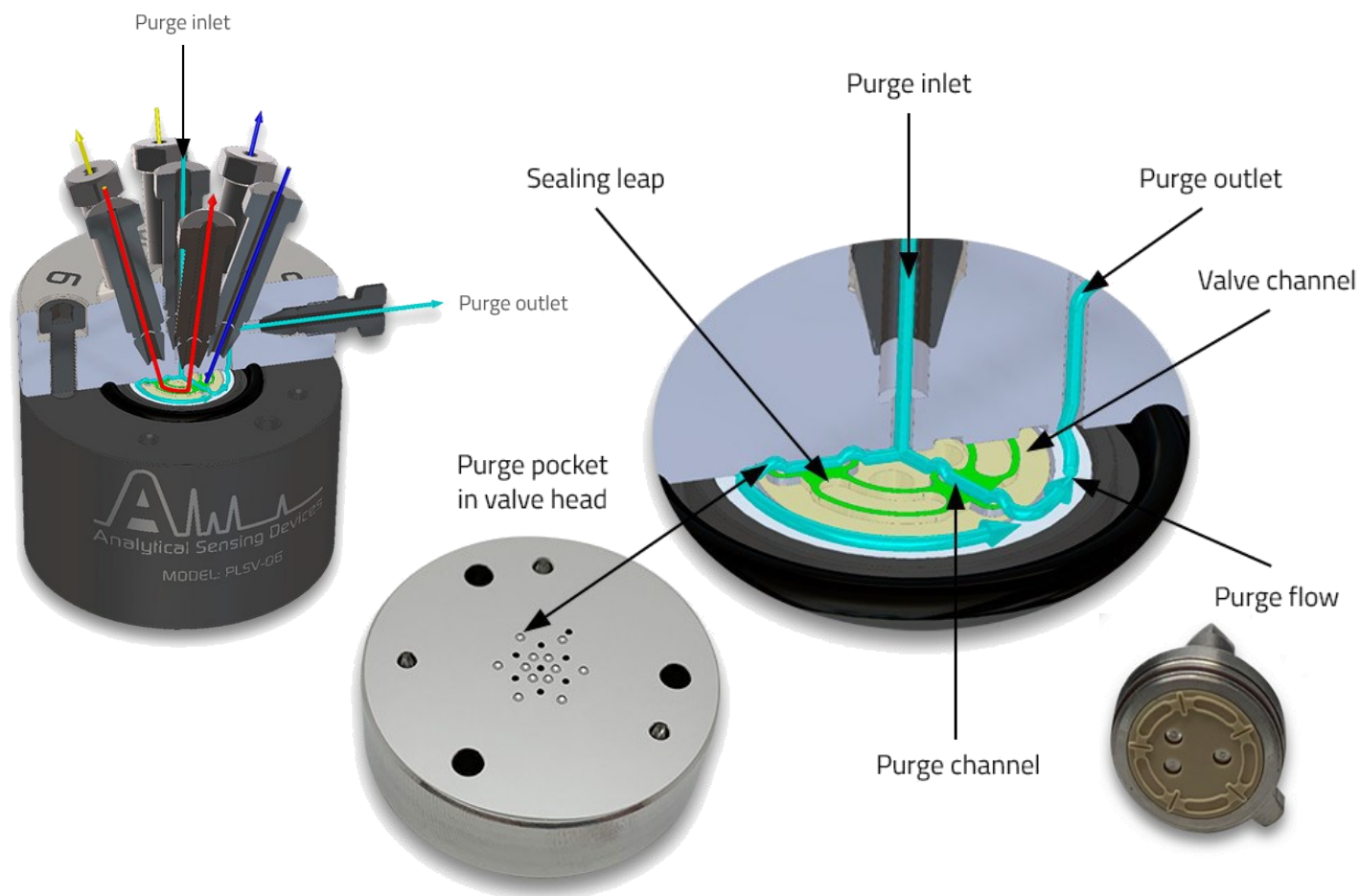
THE PLSV (PURGED LIP SEALING VALVE) IS A DISRUPTIVE ANALYTICAL VALVE TECHNOLOGY THAT EXCEEDS THE LIFETIME OF A DIAPHRAGM VALVE AND HAS THE CONSTANT PRESSURE DROP AND THE SIMPLICITY OF A CONICAL ROTARY VALVE.

BY DESIGN, IT IS ALSO IMPOSSIBLE FOR THIS VALVE TO DEVELOP A CROSS PORT LEAK. THIS NEW TECHNOLOGY IS BASED ON A REDUCED SEALING SURFACE AREA OFFERED BY THE VALVE'S INSERT THAT REPLACES THE TRADITIONAL ROTOR AND AN INNOVATIVE PURGE SYSTEM.

THIS REVOLUTIONARY TECHNOLOGY HAS BEEN DESIGNED TO MEET THE MOST ELEVATED STANDARDS THAT WE DEMAND FOR.

#### PLSV TECHNOLOGY FEATURES

- ◆ **No leak** - Inboard/outboard and cross port leaks are impossible due to unique purge technology <sup>patent pending</sup>
- ◆ **Long life time** - Over 1 million actuations in UHP applications due to unique reduced surface area insert technology <sup>patent pending</sup>
- ◆ **Constant pressure drop** - No change in pressure/flow drop characteristic across temperature range and life span
- ◆ **No dead volume** - Internal flow path contains no unswept volume
- ◆ **Small footprint** - With the use of our electrical or pneumatic compact actuator, install multiple valves in a constrained space, replacing diaphragm valve in existing



## SPECIFICATIONS

Standard Analytical range [ppm]	CH <sub>4</sub> , N <sub>2</sub> O, SF <sub>6</sub> : 0-10 ppm CO <sub>2</sub> : 0-500 ppm
Limit of detection (3σ) [ppm]	0.010 ppm or 0.5% range whichever is larger
Enhanced Limit of detection (eLOD) [ppm]	0.003 ppm or 0.2% range whichever is larger
Linearity [%]	< 1%
Repeatability [%]	< 1% full scale range
Sensing technology	Enhanced plasma detector (Epd)
Chromatographic valve	uInprove PLSV
Carrier gas inlet pressure requirement [kPa (PSIG)]	620 (90)
Carrier gas type	Nitrogen
Dimension (H x W X D) [mm]	312 x 483 x 508
Communication	RS-232, Ethernet, 4-20 mA outputs (optional)

ORDERING MODEL NUMBER	IMPURITIES	MATRIX(ES)
KA8000-C9-P1-AAA	CH <sub>4</sub> , CO <sub>2</sub> , N <sub>2</sub> O	Air
KA8000-C9-P2-AAA	CH <sub>4</sub> , CO <sub>2</sub> , N <sub>2</sub> O, SF <sub>6</sub>	Air

**NOTE:** AAA IN THE MODEL NUMBER REPRESENTS THE RANGE. USE 001 FOR STANDARD RANGES. CONTACT US FOR CUSTOM RANGES.

## RECOMMENDED ACCESSORIES FOR ASD CHROMATOGRAPH

