

# NEW LEVEL OF PERFORMANCE FOR PERMANENT GAS ANALYSIS KA CONFIG 3—TRACE PERMANENTS GAS ANALYSIS IN MULTIPLE GAS MA-



## SOLUTION FEATURES

- ◆ **Performance :**
  - ◆ Down to < 15 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  $iS^4$  sample stream selection system
- ◆ **Full data analysis and reporting software**

## KEY SPECIFICATIONS

- ◆ Impurities:  $H_2$ ,  $O_2$ ,  $N_2$ ,  $CH_4$ ,  $CO$ ,  $CO_2$ , Ar, Ne
- ◆ Measurement range: 10 ppm to 100 ppm
- ◆ Matrix:  $H_2$ ,  $O_2$ ,  $N_2$ , Ar, He, Air,  $CH_4$ ,  $CO$ ,  $CO_2$
- ◆ LDL: < 15 ppb

## TYPICAL APPLICATIONS

- ◆ Bottling centre
- ◆ Filling station
- ◆ Quality control
- ◆ R&D

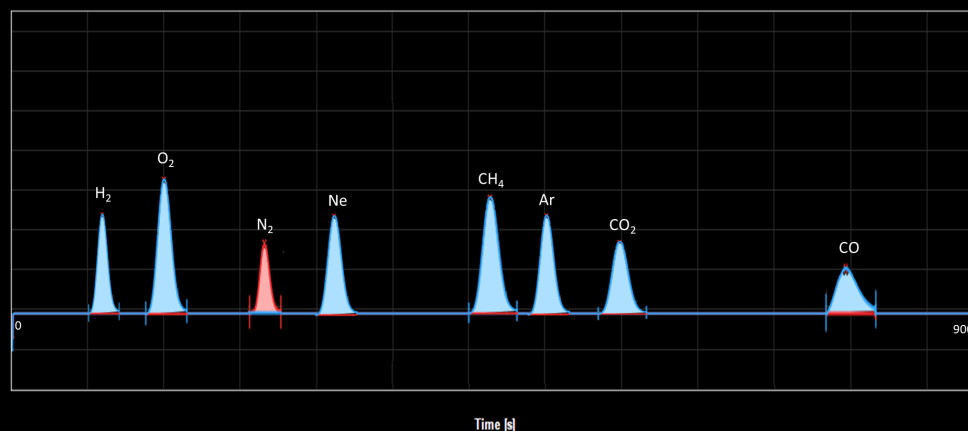
Customers are requiring more stringent control of gas quality. The level of impurities in gases is now expected to be well below 50 ppb for many applications.

Technologies like Discharge Ionisation Detectors and there variants only offer limits of detection in the range of 50 ppb which is now insufficient.

With its ultra sensitive Epd detector, high quality components, advanced signal processing and unsurpassed analytical performance , this **KA Solution GC** is the perfect tool for gas quality certification.

\*Patent pending

## CHROMATOGRAM EXAMPLE: PERMANENT GASES ANALYSIS IN He



## 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.

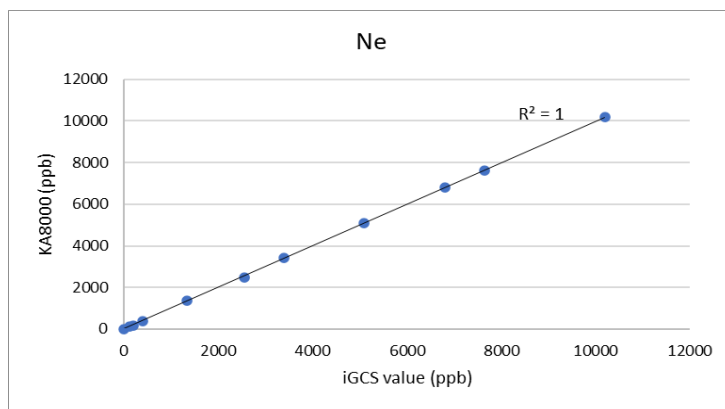
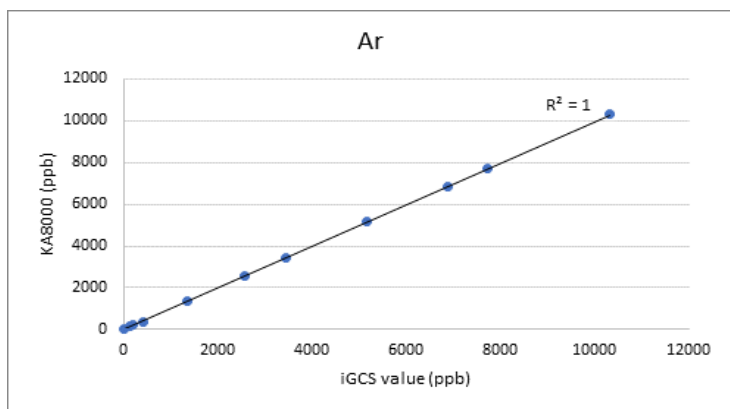
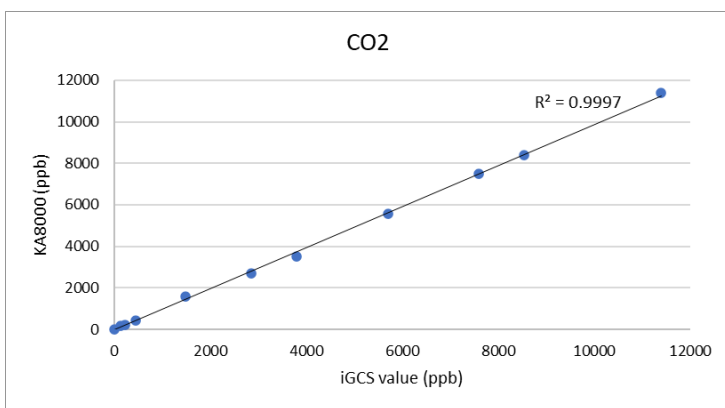
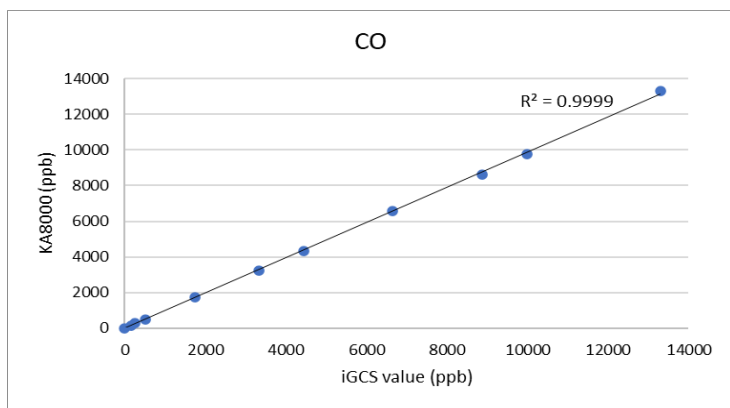
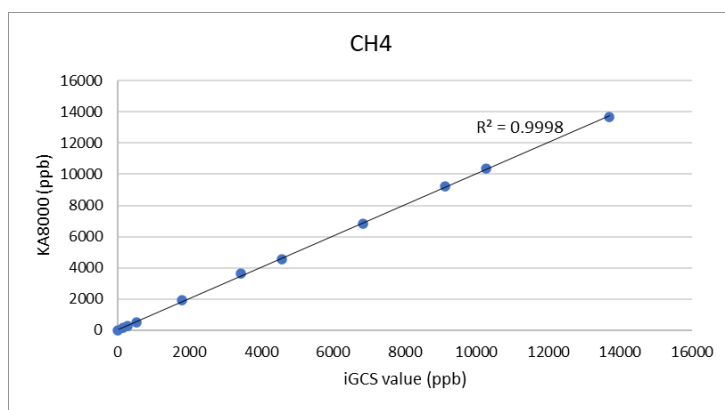
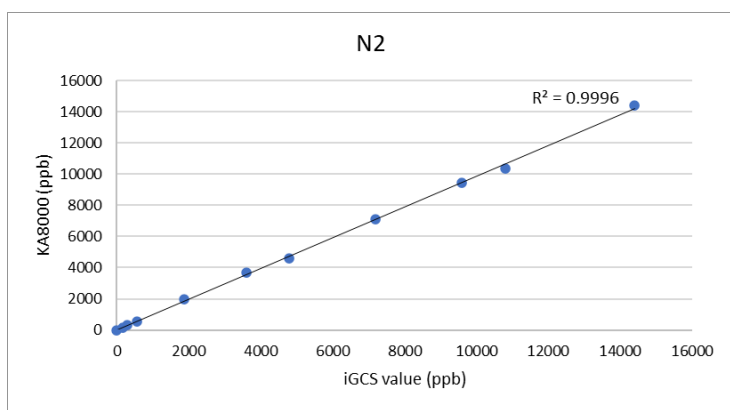
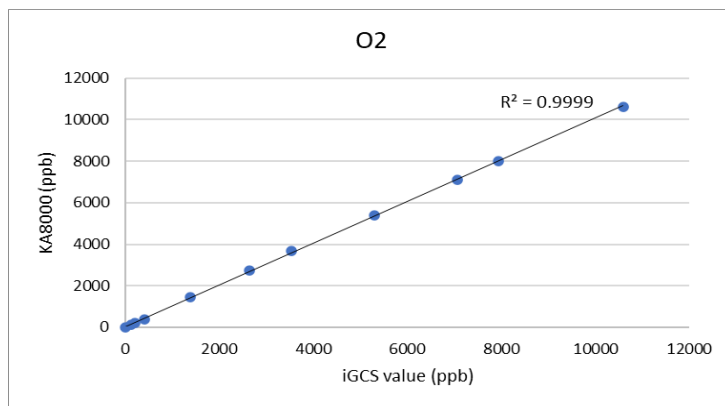
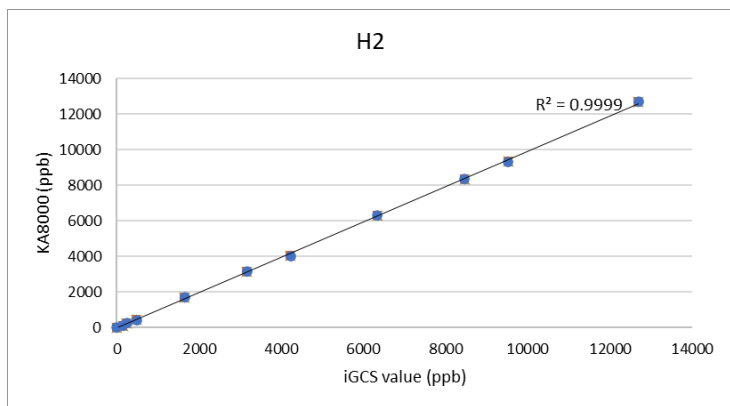
### LIMIT OF DETECTION (LOD) AND METHOD LIMIT OF DETECTION (MDL)

	Analysis #	H2 [PPB]	O2 [PPB]	N2 [PPB]	CH4 [PPB]	CO [PPB]	CO2 [PPB]	Ar [PPB]	Ne [PPB]
	1	56.0	32.0	58.0	37.0	46.0	44.0	49.0	55.0
	2	63.0	35.0	68.0	35.0	74.0	64.0	45.0	51.0
	3	50.0	23.0	47.0	40.0	47.0	41.0	51.0	49.0
	4	63.0	40.0	59.0	52.0	44.0	50.0	48.0	56.0
	5	69.0	37.0	70.0	40.0	47.0	56.0	44.0	51.0
	6	62.0	42.0	50.0	57.0	70.0	32.0	52.0	48.0
	7	66.0	30.0	51.0	41.0	60.0	40.0	46.0	52.0
	8	63.0	40.0	68.0	40.0	47.0	44.0	44.0	50.0
	9	62.0	42.0	59.0	52.0	60.0	50.0	52.0	49.0
	10	69.0	38.0	51.0	55.0	44.0	41.0	49.0	23.0
Without eLOD	$\sigma$	5.7	6.1	8.4	8.1	11.2	9.1	3.1	9.3
	MDL	17.2	18.2	25.1	24.4	33.7	27.3	9.4	27.9
	LOD	5	6	3	8	10	9	10	9
With eLOD	$\sigma$	0.8	0.3	0.2	1.5	2.2	1.1	2.2	1.1
	MDL	2.3	1.0	0.5	4.6	6.7	3.4	6.7	3.4
	LOD	0.8	0.4	0.2	1.6	2.3	1.5	2.3	1.5

### LINEARITY DATA

H2 [PPB]		O2 [PPB]		N2 [PPB]		CH4 [PPB]		CO [PPB]		CO2 [PPB]		Ar [PPB]		Ne [PPB]	
Reference	Reading	Reference	Reading	Reference	Reading	Reference	Reading	Reference	Reading	Reference	Reading	Reference	Reading	Reference	Reading
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
151	121	126	145	171	122	162	175	157	124	135	153	122	151	121	142
249	249	207	223	282	307	268	266	260	275	223	219	201	208	200	189
488	443	407	388	553	519	526	505	511	500	438	434	396	371	392	381
1656	1718	1382	1443	1877	1954	1786	1934	1734	1711	1486	1571	1343	1341	1330	1352
3174	3152	2649	2755	3599	3700	3425	3640	3324	3252	2849	2697	2574	2556	2550	2501
4233	4044	3533	3665	4800	4603	4566	4571	4433	4340	3800	3515	3433	3405	3400	3425
6350	6301	5300	5402	7200	7122	6850	6827	6650	6592	5700	5589	5150	5165	5100	5075
8466	8360	7066	7117	9600	9470	9133	9227	8867	8648	7600	7494	6867	6816	6800	6815
9525	9328	7950	7984	10800	10369	10275	10389	9975	9783	8550	8413	7725	7701	7650	7612
12700	12700	10600	10600	14400	14400	13700	13700	13300	13300	11400	11400	10300	10300	10200	10200

# LINEARITY CHART EXAMPLES





# 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.

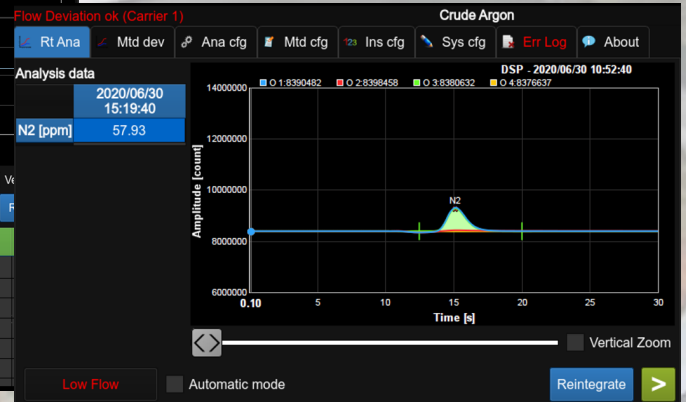
## FEATURES

- ◆ **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, others**
- ◆ **Designed for 19" rackmount or benchtop**
- ◆ **Based on ASDSense Embedded robust GC software**
- ◆ **I/O modules : Isolated 4-20 mA outputs, Relay board, RS-232, Ethernet, Modbus**
- ◆ **Accessories**
  - ◆ GC Inlet
  - ◆ Autosampler
  - ◆ Sample Concentration System (iGCS)
  - ◆ External sampling system control (iS<sup>4</sup>)





iMov and GCsense version

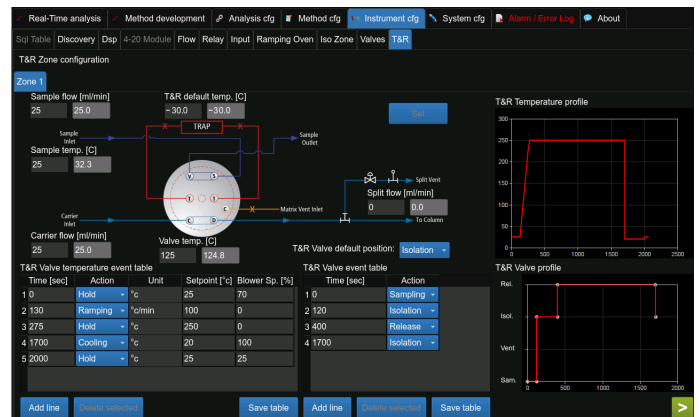


µSense version

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 menu

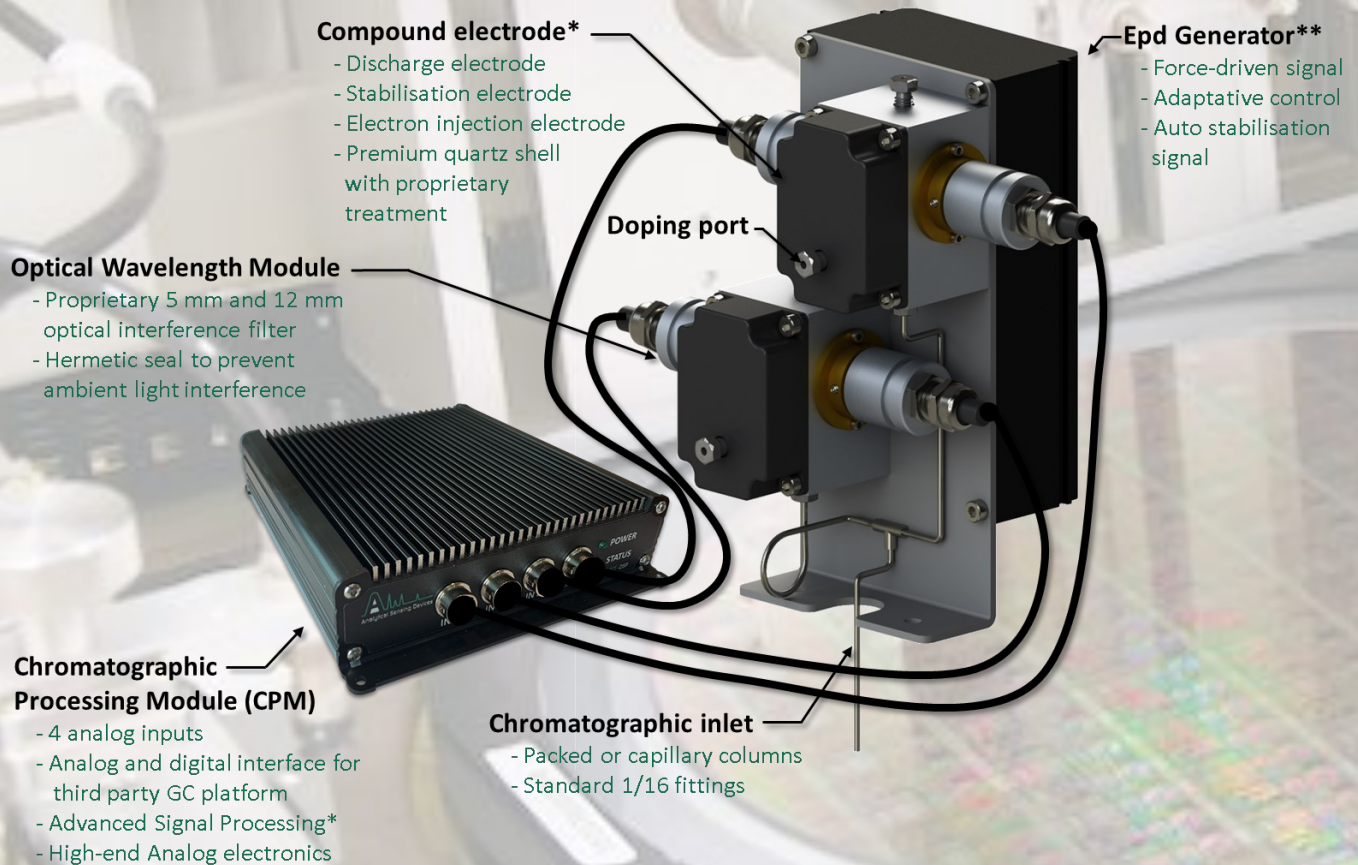


Flow diagnostic menu



**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

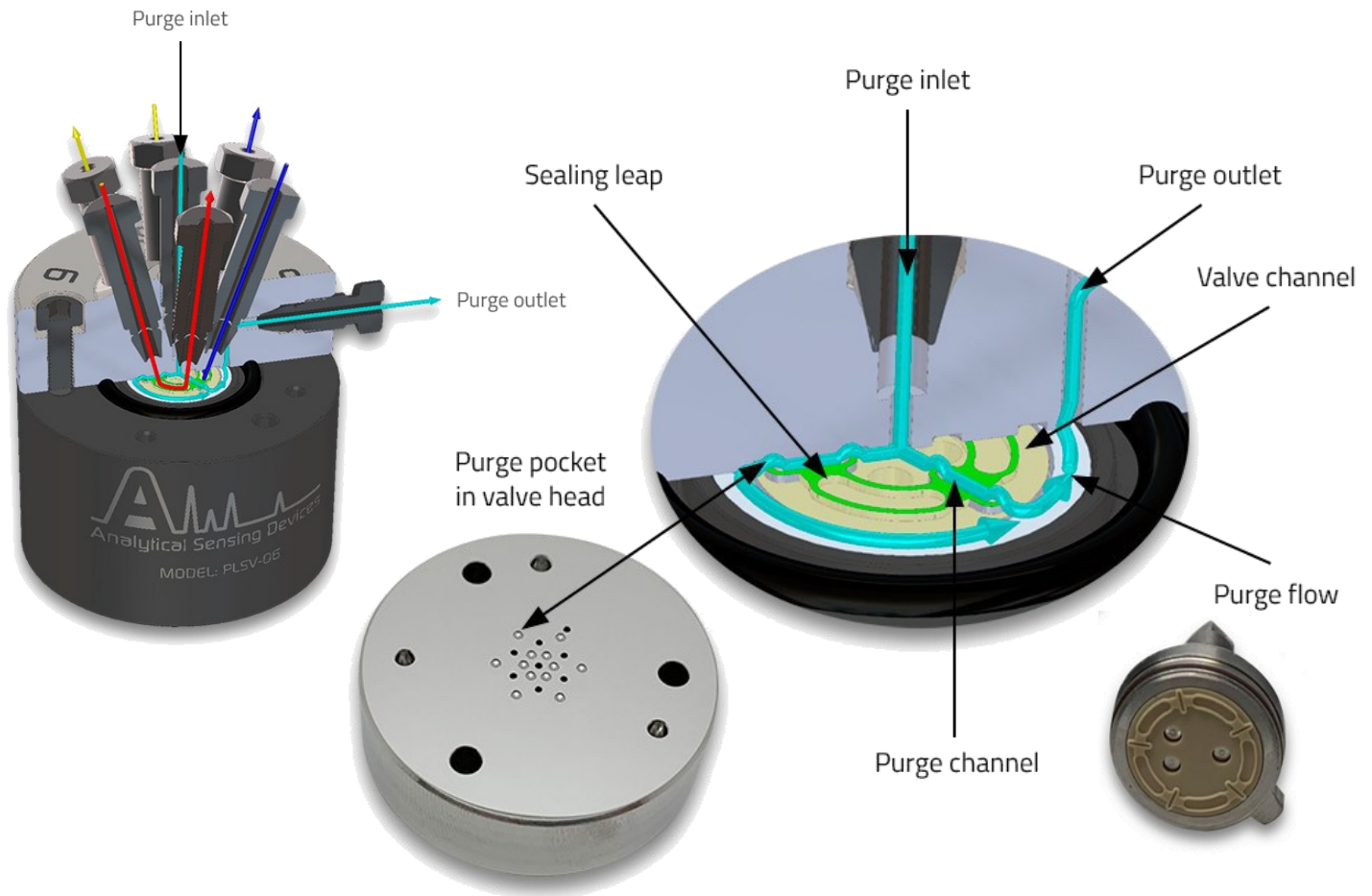
THE PLSV (PURGED LEAP SEALING VALVE) IS A DISRUPTIVE ANALYTICAL VALVE TECHNOLOGY THAT EXCEEDS THE LIFE-TIME OF A DIAPHRAGM VALVE AND HAS THE CONSTANT PRESSURE DROP AND THE SIMPLICITY OF A CONICAL ROTARY VALVE.

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 OUR 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

Analytical range [ppm]	0-10 or 0-100
Limit of detection (3 $\sigma$ ) [ppm]	0.015 ppm or 0.5% range whichever is larger
Enhanced Limit of detection (eLOD) [ppm]	0.005 ppm or 0.2% rangew hichever is larger
Linearity [%]	< 1%
Repeatability ( $\sigma$ ) [%]	< 1% full scale range
Sensing technology	Enhanced Plasma Detector (Epd)
Chromatographic valve	uInprove PLSV
Carrier gas inlet pressure requirement [PSIG]	90
Sample gas inlet pressure requirement [PSIG]	5 to 15
Carrier gas type	Purified helium 5N
Dimension (H x W X D) [mm]	312 x 483 x 508
Communication	RS-232, Ethernet, 4-20 mA outputs (optional)

MATRIX	He	Ar	H <sub>2</sub>	N <sub>2</sub>	O <sub>2</sub>	CO	CO <sub>2</sub>	CH <sub>4</sub>
<b>IMPURITIES</b>								
H <sub>2</sub>	X	X		X	X	X	X	X
Ar	X		X	X	X	X	X	X
O <sub>2</sub>	X	X	X	X		X	X	X
N <sub>2</sub>	X	X	X		X	X	X	X
CO	X	X	X	X	X		X	X
CO <sub>2</sub>	X	X	X	X	X	X		X
CH <sub>4</sub>	X	X	X	X	X	X	X	
Ne	X							

ORDERING MODEL NUMBER	IMPURITIES	MATRIX(ES)
KA8000-CFG3-PACK1-AAA	H <sub>2</sub> , O <sub>2</sub> , N <sub>2</sub> , CH <sub>4</sub> , CO, CO <sub>2</sub>	He, Ar, H <sub>2</sub> , N <sub>2</sub> , O <sub>2</sub>
KA8000-CFG3-PACK2-AAA	H <sub>2</sub> , O <sub>2</sub> , N <sub>2</sub> , CH <sub>4</sub> , CO, CO <sub>2</sub> , Ar, Ne	He, Ar, H <sub>2</sub> , N <sub>2</sub> , O <sub>2</sub>
KA8000-CFG3-PACK3-AAA	H <sub>2</sub> , O <sub>2</sub> , N <sub>2</sub> , CH <sub>4</sub> , CO, CO <sub>2</sub>	He, Ar, H <sub>2</sub> , N <sub>2</sub> , O <sub>2</sub> , CO, CO <sub>2</sub> , CH <sub>4</sub>
KA8000-CFG3-PACK4-AAA	H <sub>2</sub> , O <sub>2</sub> , N <sub>2</sub> , CH <sub>4</sub> , CO, CO <sub>2</sub> , Ar, Ne	He, Ar, H <sub>2</sub> , N <sub>2</sub> , O <sub>2</sub> , CO, CO <sub>2</sub> , CH <sub>4</sub>

**NOTE:** AAA IN THE MODEL NUMBER REPRESENTS THE RANGE. USE 010 FOR 10 PPM AND 100 FOR 100 PPM

## CHROMATOGRAPH WITH RECOMMENDED ACCESSORIES

