CRUDE ARGON ANALYSIS IN 30 SEC, THE FASTEST SOLUTION

KA CONFIG 8—N_2 ANALYSIS IN CRUDE ARGON

SOLUTION FEATURES

- **Fastest Crude argon analyser on the market**
  - 30 sec (15 sec optional) analysis possible with unique spectral compensation technology*
- **No consumable**
  - No oxygen trap
- **Performance** :
  - Down to < 10 ppm LOD based on Epd* technology (< 3 ppm with eLOD)
  - 30 sec cycle time (15 sec optional)
- **Robustness**
  - **µInProve*** GC valve
  - **µSense*** GC platform
  - Solid state Epd* sensor
- **Full data analysis and reporting software**

KEY SPECIFICATIONS

- Impurities: H_2. O_2. N_2, CH_4, CO, CO_2
- Measurement range: 10 ppm to 1%
- Matrix: Argon
- LDL: down to 50 ppb

TYPICAL APPLICATIONS

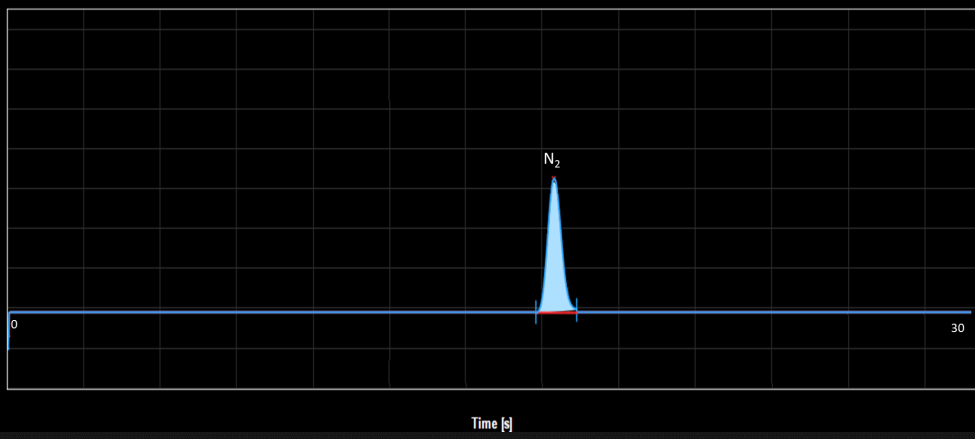
- Air Separation

Crude argon is a very common application for air separation plant optimisation. This application is used to ***improve argon recovery efficiency***. In 1998, we have introduced the first reliable crude argon instrument. It was a major breakthrough at the time. As it was the only reliable solution, customers accepted its 3 minutes cycle time and reliance on consumable O_2 trap. Our new innovative solution is a proof of our dedication to innovation and commitment to our customers.

Based on our **Epd*** technology and proprietary spectral compensation* algorithm, we are now offering a new breakthrough in that field with the ***simplest and fasted crude argon analyser***.

*Patent pending

CHROMATOGRAM EXAMPLE: CRUDE ARGON ANALYSIS



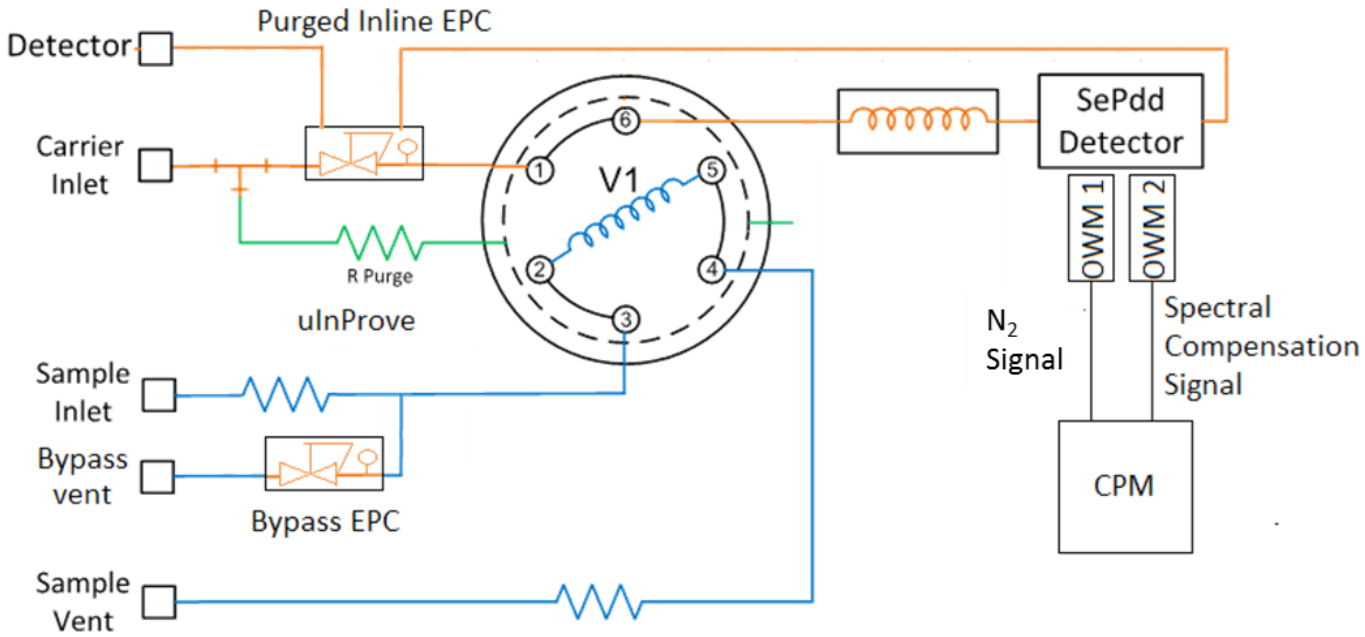
APPLICATION PERFORMANCE HIGHLIGHTS

We have over 30 years experience with this application. We introduced the first reliable crude argon analyser at the end of the 90s. Up until recently, such GC required 3 to 5 minutes to do the application with a relatively complex chromatographic method involving 2 valves in an injection-heartcut configuration and an O_2 trap which needed to be replaced quite often. Some variants of the method were introduced over the years to reduce cycle time. One of this variant consisted of injecting the sample directly into the O_2 trap. Despite being a good theoretical idea, it ended up being not suitable for process use due to the very frequent replacement of the O_2 trap and the impact on the measurement when the O_2 sample started to elute from the trap due to O_2 saturation.

Our new solution is very simple. Thanks to the power of our ***Epd* technology*** combined with the ***spectral compensation***. The **Epd*** technology, combined with our advanced CPM (Chromatographic Processing Module) monitors for this application two wavelengths. One that is specific to N_2 and one that is called the spectral compensation wavelength. This reference wavelength is used by our spectral compensation algorithm to compensate for **Epd** discharge fluctuation and remove any cross interferences with the N_2 peak.

We are the only company in the world to have this technology. We can do the analysis with a very ***simple chromatographic method,*** only involving one valve and one column. ***No O_2 trap***. All of this ***in a 30 seconds analysis cycle***. With a parallel chromatographic channel, the cycle time can be as short as 15 seconds. This is the simplest and ***fastest crude argon analyser in the world***. The benefit is a faster feedback for your argon recovery process.

Read our ***TN-05*** document to know more about the details of this application.

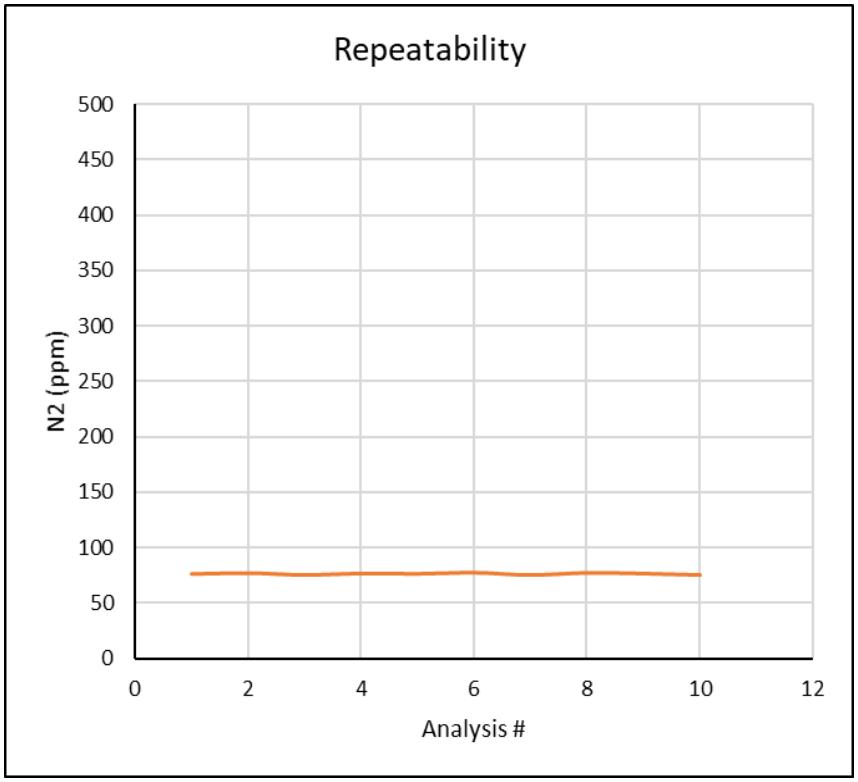


PERFORMANCE

This section provides results obtained for our fast crude argon solution. The instrument was configured for a measurement range of 500 ppm range. Many other ranges are possible depending or customer process requirements.

Molecule	Measurement Range (ppm)	Limit of Detection (ppm)[1]	Enhanced Limit of Detection[2]	Repeatability % reading[3]
N_2 (76.0ppm)	500	0.96	NA	0.81

Analysis #	N_2 (ppm)
1	76.0
2	76.6
3	75.3
4	76.4
5	76.1
6	76.9
7	75.3
8	76.8
9	76.3
10	75.3
Repeatability (ppm)	0.62
Repeatability (% reading)	0.81



COMPACT PANELMOUNT OR PORTABLE GC PLATFORM

FOR GC INTEGRATORS THAT NEED A COMPACT GC SOLUTION, THIS ROBUST AND EASY TO CONFIGURE OEM GC IS THE PERFECT SOLUTION. IT CAN BE CUSTOMISED WITH DIFFERENT TYPES OF DETECTORS, VALVES, ELECTRONICS MODULES, ETC..

FEATURES

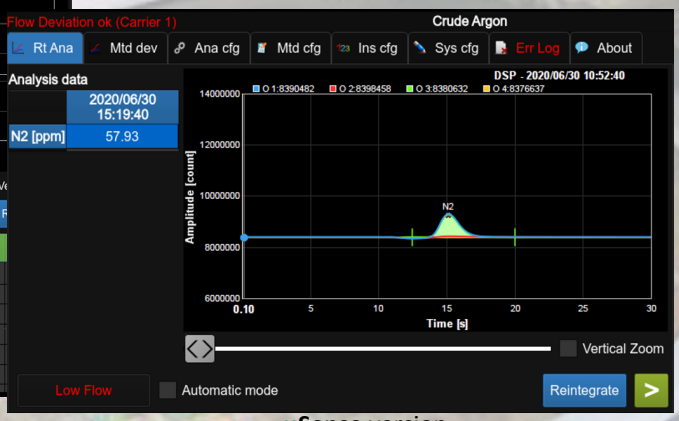
- Quick and easy configuration, no mechanical work required
- Up to 2 isothermal zones for columns
- Up to 3 chromatographic
- Up to 3 Electronic Pressure Controllers
- 1 gas detector : Epd**, ePID*, eDID**, TCD, FID, others
- Designed for panel mount. Optional 19'' rack mounting plate available.

ASDSense

PROCESS GC SOFTWARE

EASE OF USE, ROBUSTNESS, INNOVATIVE

iMov and **GCSense** version

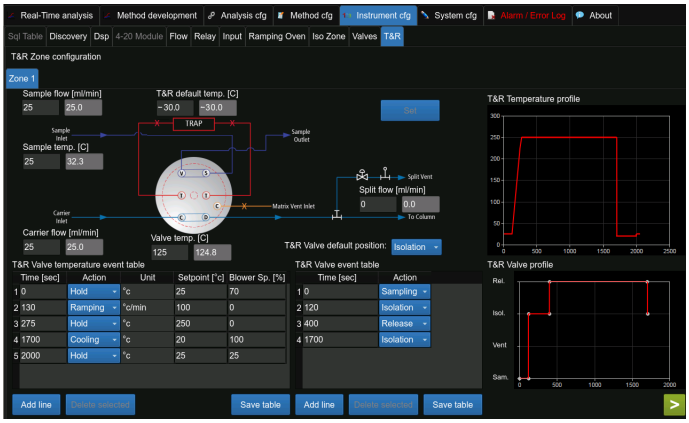


µSense version

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**

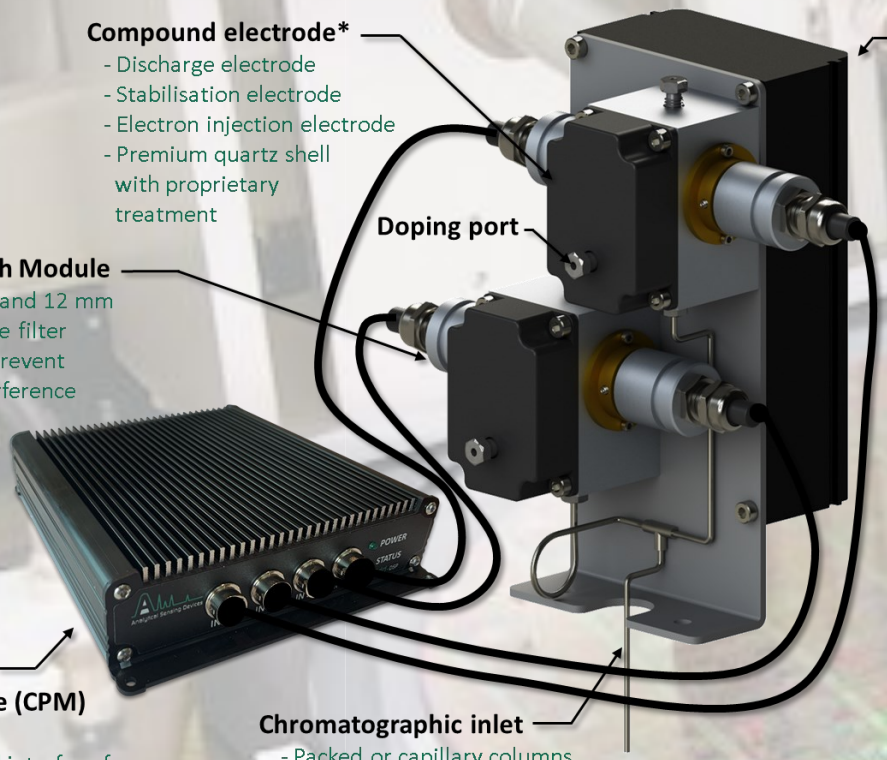


Trap and Release menu

Flow diagnostic menu

SePdd NG™ 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, µPacked 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_2 and hydrogen carrier

μInProve™ PURGED LIP SEALING VALVE

THE MOST RELIABLE AND DURABLE VALVE

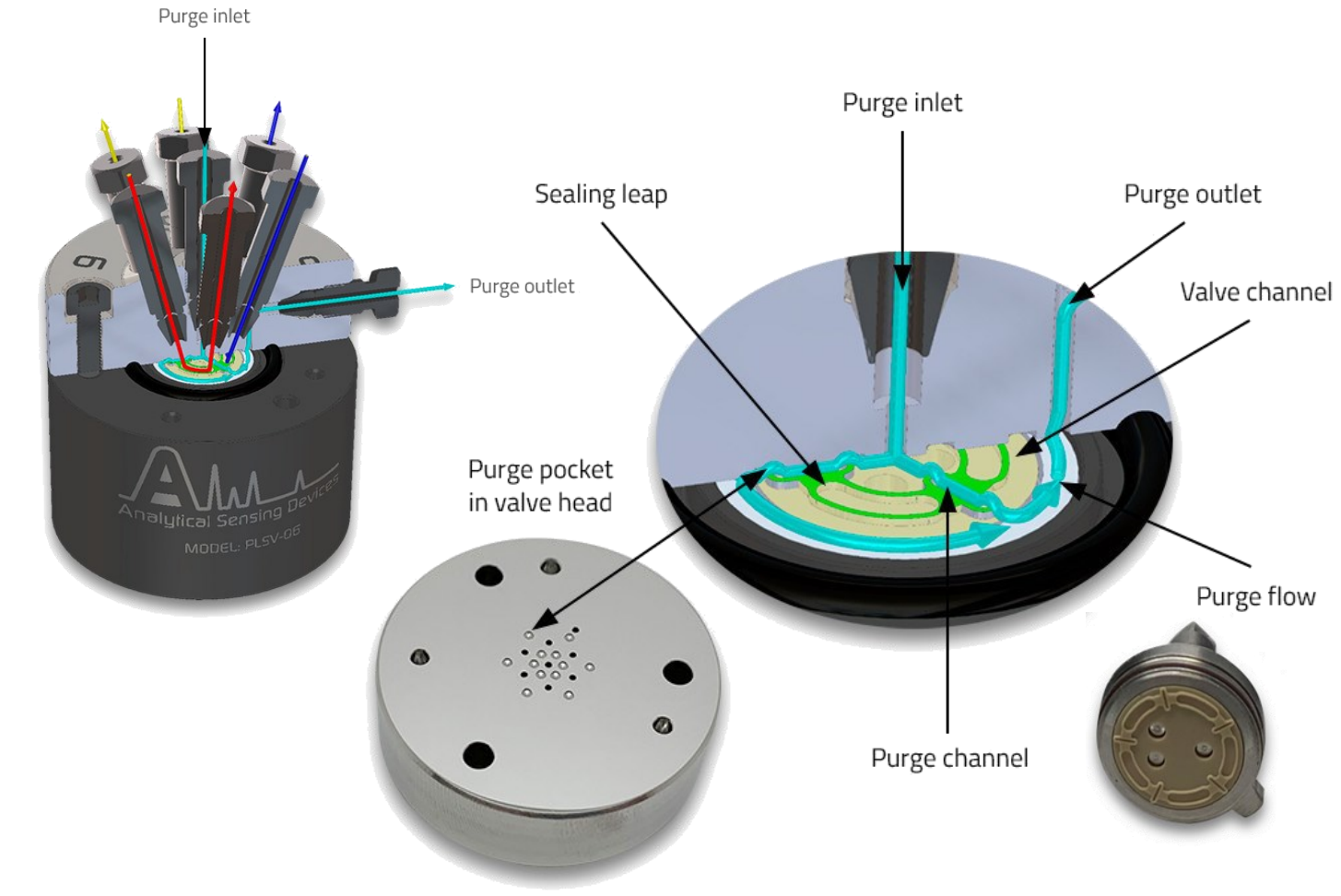
THE PLSV (PURGED LEAP SEALING VALVE) IS A DISRUPTIVE ANALYTICAL VALVE TECHNOLOGY THAT EXCEEDS THE LIFETIME OF A DIAPHRAGM VALVE AND HAS THE CONSTANT PRESSURE DROP AND THE SIMPLICITY OF A CONICAL ROTARY VALVE.

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 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[patent pending]
- **Long life time** - Over 1 million actuations in UHP applications due to unique reduced surface area insert technology[patent pending]
- **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

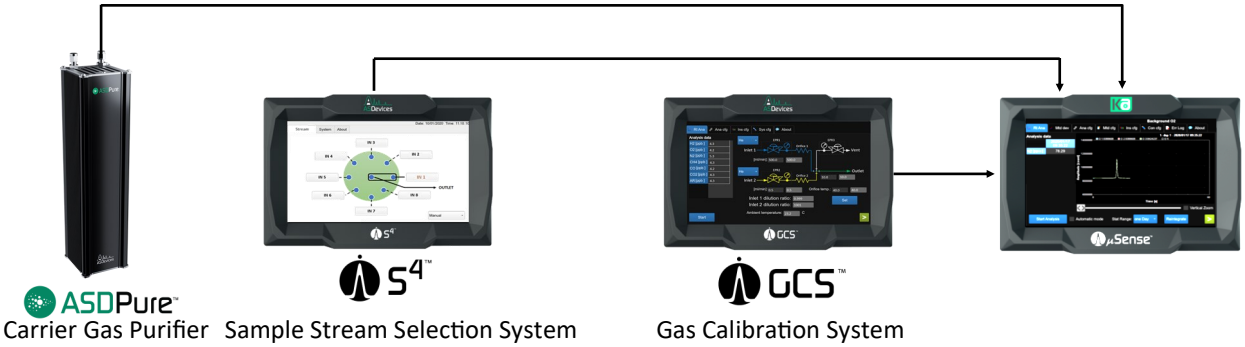


SPECIFICATIONS	
Analytical range [ppm]	0-10 to 0– 1000 (other ranges possible)
Limit of detection (3σ) [ppm]	1% range
Enhanced Limit of detection (eLOD) [ppm]	0.3% range
Linearity [%]	< 1%
Repeatability (σ) [%]	< 1% full scale range
Sensing technology	Enhanced Plasma Detector (Epd)
Chromatographic valve	uInprove PLSV
Carrier gas inlet pressure requirement [PSIG]	90
Sample gas inlet pressure requirement [PSIG]	1 to 5 (other possible)
Carrier gas type	Purified argon 5N
Dimension (H x W X D) [mm]	132 x 202 x 610 The instrument is provided with a 19'' rackmount mounting plate
Communication	RS-232, Ethernet, 4-20 mA (Optional)

ORDERING MODEL NUMBER	IMPURITIES	MATRIX(ES)
KA5000-CFG1-PACK1-AAAA	N_2	Argon

NOTE: *AAAA IN THE MODEL NUMBER REPRESENTS THE RANGE. FOR EXAMPLE, USD 0010 FOR 10 PPM AND 0100 FOR 100 PPM*

CHROMATOGRAPH WITH RECOMMENDED ACCESSORIES



Carrier Gas Purifier Sample Stream Selection System Gas Calibration System