LDetek

WHERE INNOVATION LEADS TO SUCCESS

OUR PRODUCTS

PLASMADETEK LINE PRODUCTS

PLASMADETEK 2 More about

INTELLIGENT PLASMA EMISSION DETECTOR

PLASMADETEK More about

PLASMA EMISSION DETECTOR

MULTIDETEK LINE PRODUCTS

MULTIDETEK 2 More about

ENHANCED TRACE GAS ANALYZER FOR MULTIPLE IMPURITIES

MULTIDETEK More about

TRACE GAS ANALYZER FOR MULTIPLE IMPURITIES

ONLINE ANALYZERS

LD8000 More about

ONLINE TRACE NITROGEN IN ARGON, HELIUM AND CRUDE ARGON ANALYZER

LD8000+ More about

ONLINE TRACE PPB NITROGEN IN ARGON/HELIUM ANALYZER

LD2000 More about

ONLINE TRACE HYDROCARBONS ANALYZER

ACCESSORIES

LDP1000 More about

GAS PURIFIER FOR NOBLE, NITROGEN OR HYDROGEN GASES

LDGSS More about

HIGH PURITY GAS STREAM SELECTOR

TRAPS AND ACCESSORIES More about

LDETEK

Literature :

APPLICATIONS

CHROMATOGRAMS

LD8000

Design Report v2

Trace N2 in Ar or He

PlasmaDetek

Plasma Emission Detector System for Gas Chromatograph

This plasma emission detector gives the opportunity to any system integrator or GC manufacturer to integrate a plug and play philosophy detector system. With its unique design, the PlasmaDetek allows to do new techniques and existing analysis configuration based on simplicity. PPB to % analysis can be done with capillary or packed columns. With the choice of argon or helium as carrier gas, combined with the selectivity configuration, the chromatography becomes easier.

> FEATURES:

- Argon or helium carrier gas
- 4 in 1 detector
- Selective and non-selective configuration
- Wide range of applications
- Easy to interface with any GC and analyzer design
- PPB to % detection
- Very stable signal
- Maintenance free
- Fast installation and tune up
- Intelligent version based on DSP platform
- Low noise detector

> APPLICATIONS:

- Laboratory and industrial gas chromatograph
- High purity gases
- Permanent gases
- Noble and rare gases
- Petrochemical and Hydrocarbon Processing
- Air analysis
- Environmental
- Energy industries
- Greenhouse application
- Etc...

Other gas analysis possible, please contact factory.

LDetek

> SPECIFICATIONS:

CARRIER GAS	Argon and Helium
POWER	80 to 240 VAC, 50-60 Hz
GAS CONNECTIONS	1/16" (can be customized)
OPERATION OUTLET PRESSURE	Atmospheric or Vacuum
OPERATING TEMPERATURE	10°C to 50°C (in stable environment)
FILTER	10u SS particle filter on the gas inlet
DETECTOR SIGNAL OUTPUT CONNECTION	BNC Coaxial type (can be customized)
POWER CONSUMPTION	Max 10 Watts
OUTPUT VOLTAGE	0-5 Volts (can be customized)

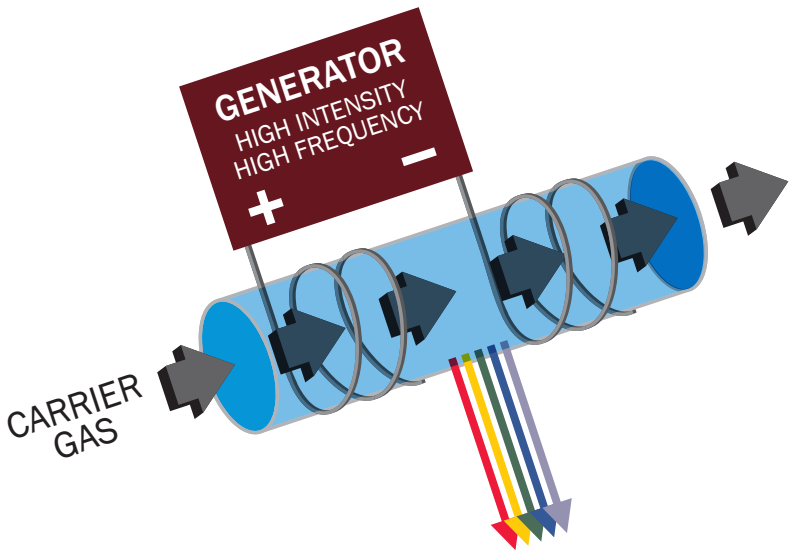
> PRINCIPLE OF PLASMA EMISSION DETECTOR (PED)

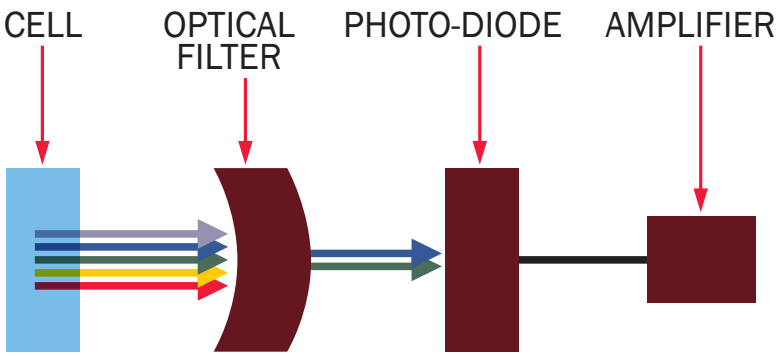
The PED is a quartz cell with a unique design submitted to a high intensity and frequency electromagnetic field.

The principle based on spectroscopic emission cell is not a new technique, but the characteristics of the Plasma-Detek system that make it stable and efficient are the frequency, the intensity as well as the mechanical and electrodes design.

A luminous phenomenon, called electroluminescence, is created and is used as emission technique to quantify analytes.

When the carrier gas is ionized, spectral lines are emitted and detected by an optical system including filter and photo-diode. The emission varies for each substance that is brought along with the carrier gas.

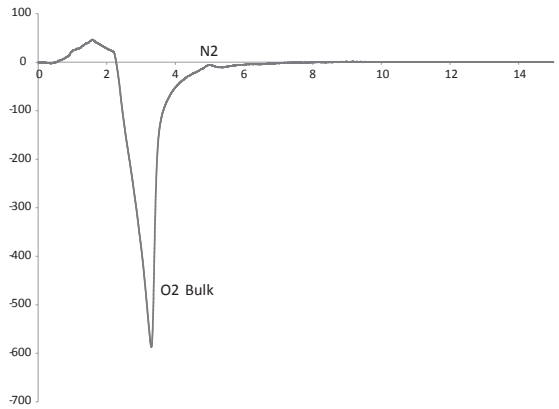




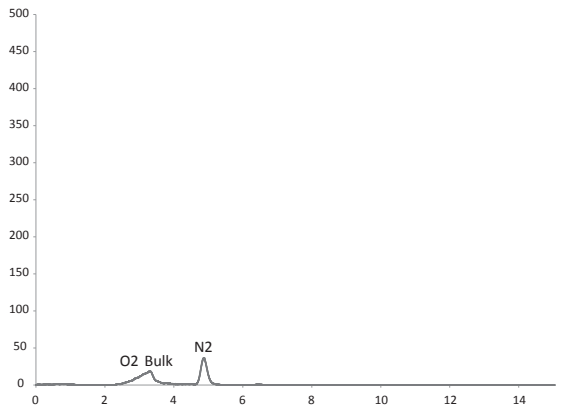
> SELECTIVITY

The selective configuration gives the possibility to be more sensitive on some impurities to make the chromatography easier and get better results. No need to add a supporting gas or other devices. The specific optical filter system is chosen for the application desired.

By having such selectivity, you can reduce analysis time and make fast chromatography. In some cases, consumables such as traps can be avoided. It becomes a cost effective solution, maintenance free system and can give better limit of detection by reducing residual background effect.



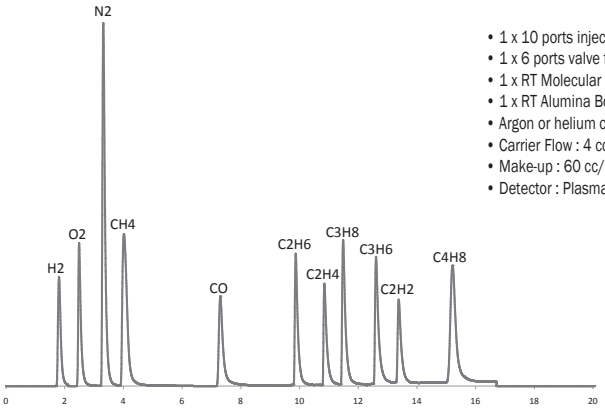
1 ppm N2 in pure O2 with non-selective detector system



1 ppm N2 in pure O2 with PlasmaDetek N2 selective configuration

> ALL IN ONE DETECTOR

The PlasmaDetek can replace many detectors and get all measurements with only one module. No need of doping gas, fuel or other support devices. Measuring permanent gases and light hydrocarbons have never been so easy. Many other gases can be detected, please contact LDetek for more information.



- 1 x 10 ports injection valve
- 1 x 6 ports valve for channel selection
- 1 x RT Molecular Sieve 5A 30m x 0.53mm
- 1 x RT Alumina Bond 30m x 0.53mm x 10mm
- Argon or helium carrier
- Carrier Flow : 4 cc/min
- Make-up : 60 cc/min
- Detector : PlasmaDetek two outputs

10ppm H2 - O2 - N2 - CH4 - CO - C2H6 - C2H4 - C3H8 - C3H6 - C2H2 - C4H8

> ARGON AND HELIUM CARRIER GAS

Having the choice of argon or helium as carrier gas brings the advantage of making easier chromatography configuration. Argon can be cost effective compared to helium in some cases.

Good sensitivity is also obtained with both carriers giving the possibility to work from ppb to % application.

LDetek

PRINTED IN CANADA

PlasmaDetek GC Detectors

Download the complete specification and technical data sheet (2 530 ko)

PLASMADETEK 2

PLASMA EMISSION DETECTOR SYSTEM FOR GAS ANALYSIS

This microprocessor based plasma emission detector system gives all the tools to the GC integrator, manufacturer and user to integrate a plug and play detection system. With its customable configuration capability, a detector has never been so intelligent.

THE PLASMADETEK 2 SPECIFICATION

CARRIER GAS	· Argon and Helium
POWER	· 90 to 240 VAC, 50-60 Hz
GAS CONNECTIONS	· 1/16'' (can be customized)
OPERATION OUTLET PRESSURE	· Atmospheric or Vacuum
OPERATING TEMPERATURE	· 10°C to 50°C (in stable environment)
FILTER	· 10u SS particle filter on the gas inlet
DETECTOR SIGNAL OUTPUT CONNECTION	· BNC Coaxial type (can be customized)
POWER CONSUMPTION	· Max. 10 Watts

PICTURE GALLERY

THE PLASMADETEK 2 FEATURES

- Argon or helium carrier gas
- No dead volume design
- All in one detector by replacing existing technologies commonly used
- Selective and non-selective configuration
- Analog or digital interface
- Wide range of applications
- Easy to interface with any GC and analyzer design
- PPB to % detection
- Very stable signal
- Maintenance free
- Fast installation and tune up
- Configuration software
- Possibility of customable protocol to control the device
- Detect organic and inorganic compounds, permanent gases and noble gases (including Ne)

PlasmaDetek GC Detectors

Download the complete specification and technical data sheet (1,2 Mo)

MULTIDETEK

TRACE GAS ANALYZER FOR MULTIPLE IMPURITIES

With its plug and play philosophy, this compact system provides an attractive and cost effective solution for the industrial market. Based on the Plasma Emission Detector technology, this stand-alone Gas Chromatograph is a flexible and customized platform providing analysis from ppb to %.

THE MULTIDETEK SPECIFICATION

DETECTOR TYPE	• Plasma Emission Detector design (PlasmaDetek)
CARRIER	• Argon and Helium
RANGE	• Application dependant
REPEATABILITY	• < 1% full scale
ACCURACY	• Better than ±1% full scale
STANDARD FEATURES	• Manual or autoranging (user selectable) • Microprocessor controlled • 5.6'' TFT intelligent LCD module with Touch Screen • Self diagnosis system with auto-resolve alarm • 4-20 mA isolated output • Alarm Historic • Digital system status ouput for remote monitoring (dry relay contact)
OPTIONS	• Serial port: RS-232 / 422 / 485 / Profibus for monitoring
GAS CONNECTIONS	• Sample: 1/8'' compression fittings or 1/8 VCR • Vent: 1/8'' compression fitting
CALIBRATION GAS	• Zero: LDP1000 purified gas (Getter) • Span: 70% to 90% of the scale
SAMPLE PRESSURE REQUIREMENTS	• 10 to 30 PSIG
CARRIER PRESSURE REQUIREMENTS	• 100 PSIG
OPERATING TEMPERATURE	• 10°C to 45°C
SUPPLY	• 115 VAC, 50 – 60 Hz or 220 VAC, 50 – 60 Hz
POWER CONSUMPTION	• 200 Watts (application dependant)
DRIFT	• < ± 1% over 24 hours

THE MULTIDETEK COMBINATIONS

	H_2	Ar	O_2	N_2	He	CO_2	NH_3
H_2	–	•	•	•	•	•	•
Ar	•	–	•	•	•	•	•
O_2	•	•	–	•	•	•	•
N_2	•	•	•	–	•	•	•
CH_4	•	•	•	•	•	•	•
CO	•	•	•	•	•	•	•
CO_2	•	•	•	•	•	–	•
NMHC	•	•	•	•	•	•	–
N_2O	•	•	•	•	•	–	•
C_2H_2	•	•	•	•	•	–	–
C_2H_4	•	•	•	•	•	–	–
C_2H_6	•	•	•	•	•	–	–
C_3H_8	•	•	•	•	•	–	–
Ne	•	–	•	•	•	•	•

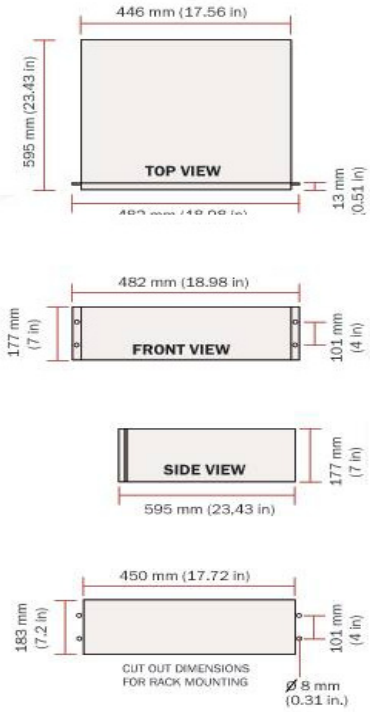
Sample Impurities

*Other applications are possible. Please contact factory for further details.

THE MULTIDETEK FEATURES

- Multi trace impurities in one chassis
- Based on the PlasmaDetek technology
- Compact rackmount 4U
- ppb to % application
- User friendly
- Touch screen interface
- Large scale measurement
- High performance Diaphragm valves

THE MULTIDETEK DIMENSIONS



MULTIDETEK APPLICATION NOTES

PlasmaDetek GC Detectors

Download the complete specification and technical data sheet (2,9 Mo)

MULTIDETEK 2

GAS CHROMATOGRAPH SYSTEM

With its plug and play philosophy, offering more features than never LDetek push further the possibilities with its new chromatograph system. It provides an attractive and cost effective solution for the industrial and laboratory market. Based on the LDetek high performances Plasma Emission Detector technology, this stand-alone Gas Chromatograph is a flexible and customized platform providing the best solution for any type of gas analysis from ppb to % using argon or helium as carrier gas.

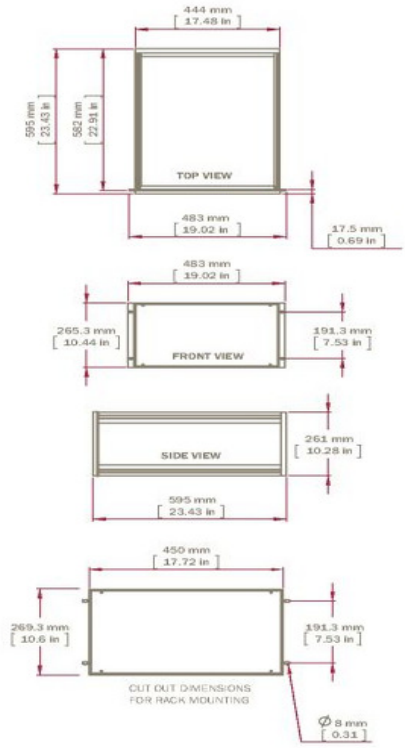
THE MULTIDETEK 2 SPECIFICATION

DETECTOR TYPE	• Plasma Emission Detector design (PlasmaDetek)
RANGE	• Application dependant
REPEATABILITY	• < 1% full scale
ACCURACY	• Better then ± 1% full scale
STANDARD FEATURES	• Manual or autoranging (user selectable) • Microprocessor controlled • Windows XP embedded user friendly interface • Ethernet port for remote control • Isothermal and/or programmed ramping ovens • Electronic flow control regulators for carrier & sample gases • 8.4'' LCD large touch screen • Self diagnosis system with auto-resolve alarm • 4-20 mA isolated outputs • Alarm Historic • Digital system status output for remote monitoring (dry relay contact) • 2 alarms contact • High resolution Chromatogram output
OPTIONS	• Serial port: RS-232 / 422 / 485 / Profibus for monitoring • Integrated compact purifier in the chassis for generating high purity carrier gas • Integrated stream selector system • Digital input for remote starting • Analog inputs for connecting external instruments • Remote control for stream selector (LDGSS)
GAS CONNECTIONS	• Sample: 1/8'' compression fittings or 1/8 VCR • Vent: 1/8'' compression fitting
CALIBRATION GAS	• Zero: LDP1000 purified gas (Getter) • Span: 70% to 90% of the scale
SAMPLE PRESSURE REQUIREMENTS	• 10 to 30 PSIG
CARRIER PRESSURE REQUIREMENTS	• 100 PSIG
OPERATING TEMPERATURE	• 10°C to 45°C
SUPPLY	• 115 VAC, 50 - 60 Hz or 220 VAC, 50 - 60 Hz
DRIFT	• < ± 1% over 24 hours

THE MULTIDETEK 2 FEATURES

- Multi trace impurities in one chassis
- Multiple configurations available in one chassis
- Based on the PlasmaDetek technology
- Use argon or helium as carrier gas
- Isothermal and/or programmed ramping ovens available
- LDetek's electronic mass flow controllers for carrier & sample gas
- Optional integrated purifier for generating high purity carrier gas in the chassis
- Easy maintenance with its slide out design
- Compact & robust industrial rackmount 6U chassis
- ppb to % application
- Large 8.4'' LCD touch screen & user friendly interface
- High performance diaphragm valves
- Ethernet connectivity for remote control
- Profibus/Modbus communication protocols
- Data storage software (LDchrom)

THE MULTIDETEK 2 DIMENSIONS



MULTIDETEK 2 APPLICATION NOTES

PlasmaDetek

GC Detectors

LD2000

Download the complete specification and technical data sheet (2 346 ko)

THE LD2000 FEATURES

- LDetek FID design offering low maintenance
- Bootloader integrated for software update via Ethernet
- Large scale measurement
- 4-20 mA output as standard
- Range Identification Relay
- Unique LDetek Electronic flow controller design
- 3U cabinet

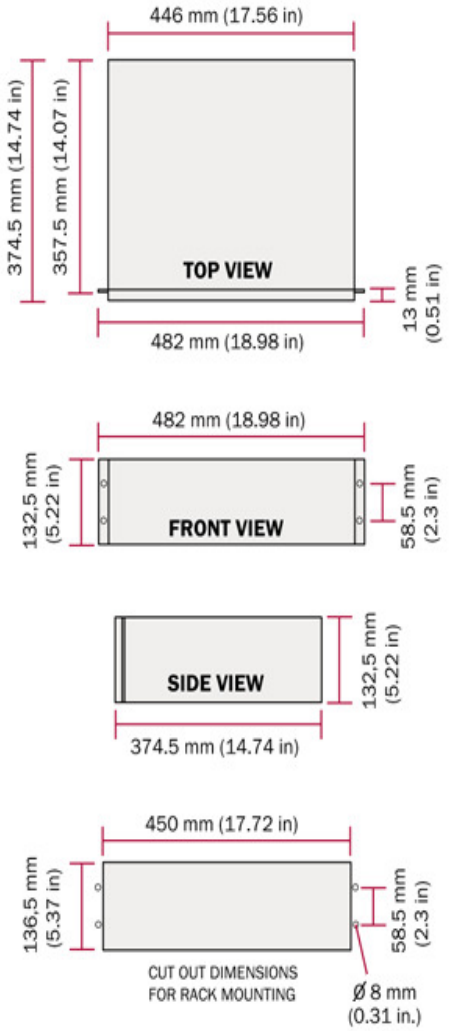
ONLINE TRACE TOTAL HYDROCARBON ANALYZER

The LD2000 is an easy to use instrument that offers the ideal solution for the total hydrocarbon measurements. Its compact and robust design perfectly fit on any industrial installation. The LDetek FID and electronic platform bring the performances required by the market.

THE LD2000 SPECIFICATION

DETECTOR TYPE	• Flame Ionisation Detector
RANGE	• 0 – 10 ppm> • 0 – 100 ppm • 0 – 1000 ppm • Other range possible
REPEATABILITY	• < 1% full scale
ACCURACY	• Better than ± 1% full scale
STANDARD FEATURES	• Manual or autoranging (user selectable) • Microprocessor controlled • 5.6'' TFT intelligent LCD module with Touch Screen • Self diagnosis system with auto-resolve alarm • 4-20 mA isolated output • Alarm Historic • Digital ouputs for remote monitoring: (all dry relay contacts) – System status (1 output) – Range in use (3 output) – Calibration in use (1 output)
OPTIONS	• Serial port: RS-232 / 422 / 485 / Profibus • 2 alarm outputs (user programmable set point)
GAS CONNECTIONS	• Sample: 1/8'' compression fittings • Vent: 1/8'' compression fitting
CALIBRATION GAS	• Zero: LDP1000 purified gas (Getter) • Span: 80%-90% of full scale of methane
SAMPLE FLOW REQUIREMENTS	• 50 to 200 sccm
AIR FLOW REQUIREMENTS	• 200 to 600 sccm
FUEL FLOW REQUIREMENTS	• 40 to 150 sccm
RECOMMENDED MAXIMUM OPERATING PRESSURE	• 40 PSIG)
RECOMMENDED MINIMUM OPERATING PRESSURE	• 10 PSIG
OPERATING TEMPERATURE	• 10 °C to 45 °C
SUPPLY	• 115 VAC, 50 – 60 Hz or 220 VAC, 50 – 60 Hz
POWER CONSUMPTION	• Maximum 50 watts
DRIFT	• < ± 1% over 24 hours
WEIGHT	• 27 lbs (12 kg)

THE LD2000 DIMENSIONS



THE LD2000 ORDERING INFORMATIONS

PlasmaDetek GC Detectors

LDP1000

Download the complete specification and technical data sheet (1 320 ko)

THE LDP1000 FEATURES

- Compact design
- 2 steps purification
- Interchangeable getter
- Easy-to-use
- Internal heater, insulation and electronics assembly
- Temperature controlled unit for better performance
- Nitrogen version available
- Hydrogen version available

GAS PURIFIER FOR NOBLE, NITROGEN OR HYDROGEN GASES

The LDP1000 is sub ppb purifier ideal for calibration gas for online analyzer as well as carrier gas for Chromatograph. Its two steps purification design ensures that no undesired impurity is released from the purifier.

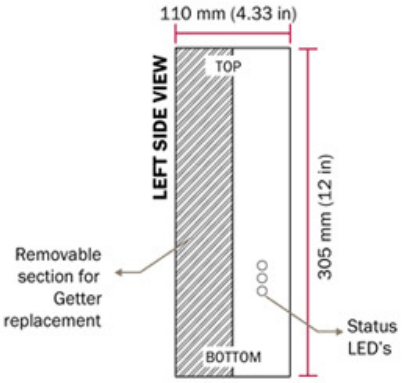
THE LDP1000 SPECIFICATION

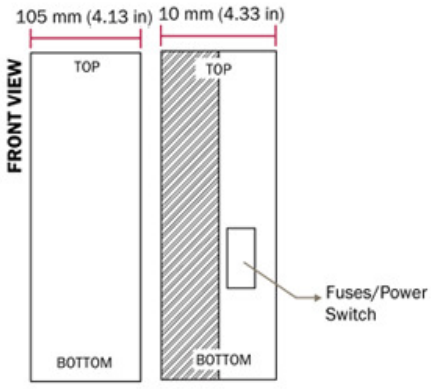
GETTER TYPE	• Alloy of Zr/V/Fe • 2 beds (350 and 200 Celsius)
GASES PURIFIED	• Ar/He/Ne/Xe/Kr. Nitrogen and hydrogen version available.
IMPURITIES REMOVED	• H_2O, O_2, CO, CO_2, N_2, THC, H_2, CH_4 (Heated) • H_2O, O_2, CO, CO_2, H_2 (room temperature)
IMPURITY LEVEL	• <10ppb and <1 ppb available
FLOW	• 200 cc/min (nominal)
GAS CONNECTIONS	• 1/16'' – 1/8'' – 1/4'' • compression or VCR®
RECOMMENDED OPERATING PRESSURE	• 100 PSIG (689 kPAG)
MINIMUM OPERATING PRESSURE	• 10 PSIG (28 kPAG) optional 1 PSIG (7 kPAG)
SUPPLY	• 120 VAC, 50 – 60 Hz or 220 VAC, 50 – 60 Hz
POWER CONSUMPTION	• Start up : maximum 200 Watts (*allow quick start up*) • Normal operation : maximum 50 Watts (*design for low consumption*)
DIMENSIONS	• 12'' (304.8) high, 4.12'' (104 mm) deep, 4.25'' (108 mm) wide
WEIGHT	• 5 lbs (2.26 kg)

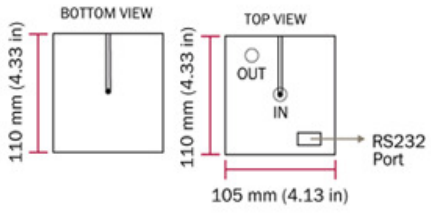
THE LDP1000 ORDERING INFORMATIONS

-xxx	Operating Voltage	120 Volts (-120) 220 Volts (-220)
-X	Gas type	None: Noble gases N: Nitrogen version H: Hydrogen
-X	Connection Size	1/16'' 1/8'' 1/4''
-X	Connection Type	Compression (-C) VCR (-V)
-X	Supporting plate	None: no plate P: supporting plat with bypass valves

THE LDP1000 DIMENSIONS







LDP1000 APPLICATION NOTES

LD12-5 IMPROVING GAS CHROMATOGRAPH MEASUREMENTS WITH THE USE OF THE LDP1000 GAS PURIFIER.

Application Note LD12-5 (1,6 Mo)

PlasmaDetek GC Detectors

TRAPS AND ACCESSORIES

WHY USING TRAPS?

They are necessary to remove interference components in carrier and sample gas used for GC's and on-line instruments. For the GC's, a combination of moisture, hydrocarbons and Oxygen traps is used to prevent column degradation what is well known to increase detector noise and create ghost peaks. The use of such traps is also necessary on Make-up gas that must also be interference free.

A selection of single component removal traps or multi-components removal traps is also necessary to remove interference components presents in sample lines with on-line instruments.

Our selection of traps is normally used when the LDP1000 (Gas purifier) cannot be used.

MOISTURE REMOVAL LDH2O-T

Our Moisture Trap LDH2O-T is used to remove moisture at the outlet of it. It can be installed on any carrier gas line, make-up gas line and sample line to remove moisture interference. Different sizes and connection types are available depending of the flow rate and the outlet purity specifications needed.

HYDROCARBON REMOVAL LDHC-T

The hydrocarbons trap series are commonly used when trace HC's is present is sample, carrier or make-up gas lines. Presence of hydrocarbons in gas lines creates a deterioration of some type of detector like common PED. Different sizes and connection types are available depending of the flow rate and the outlet purity specifications needed.

OXYGEN REMOVAL LDO2-T

The Oxygen traps series are also offer with numerous configuration types that can cover any needs.

MULTI-COMPONENTS REMOVAL LDH2O/HC/O2-T

Our LDetek special trap that combines removal of H2O/HC's and O2 in one unit is also a great alternative when the removal of all interference components is necessary. It avoids having complex tubing configuration with multiple fittings that increase leakage possibilities in the installation. Our Multi-Components trap can be configured the way you need it.

LDEPC ELECTRONIC FLOW CONTROLLER

LDetek is now offering its LDEPC as a stand alone flow controller unit for any gas type. Its high purity design combined with multiple communication mean is the ideal tool for gas flow control. This tool can be controlled with analog voltage, SPI, serial or usb port.

LDMINIPURIFIER

The LDminipurifier for noble gas is the best solution for generating high purity Argon/Helium for any gas chromatograph when space available is restricted. Its compact design is ideal for portable gas analyzer. It can also be the solution for eliminating problems coming from any source of contaminations that results to columns degradation and detector instability.

COLUMNS

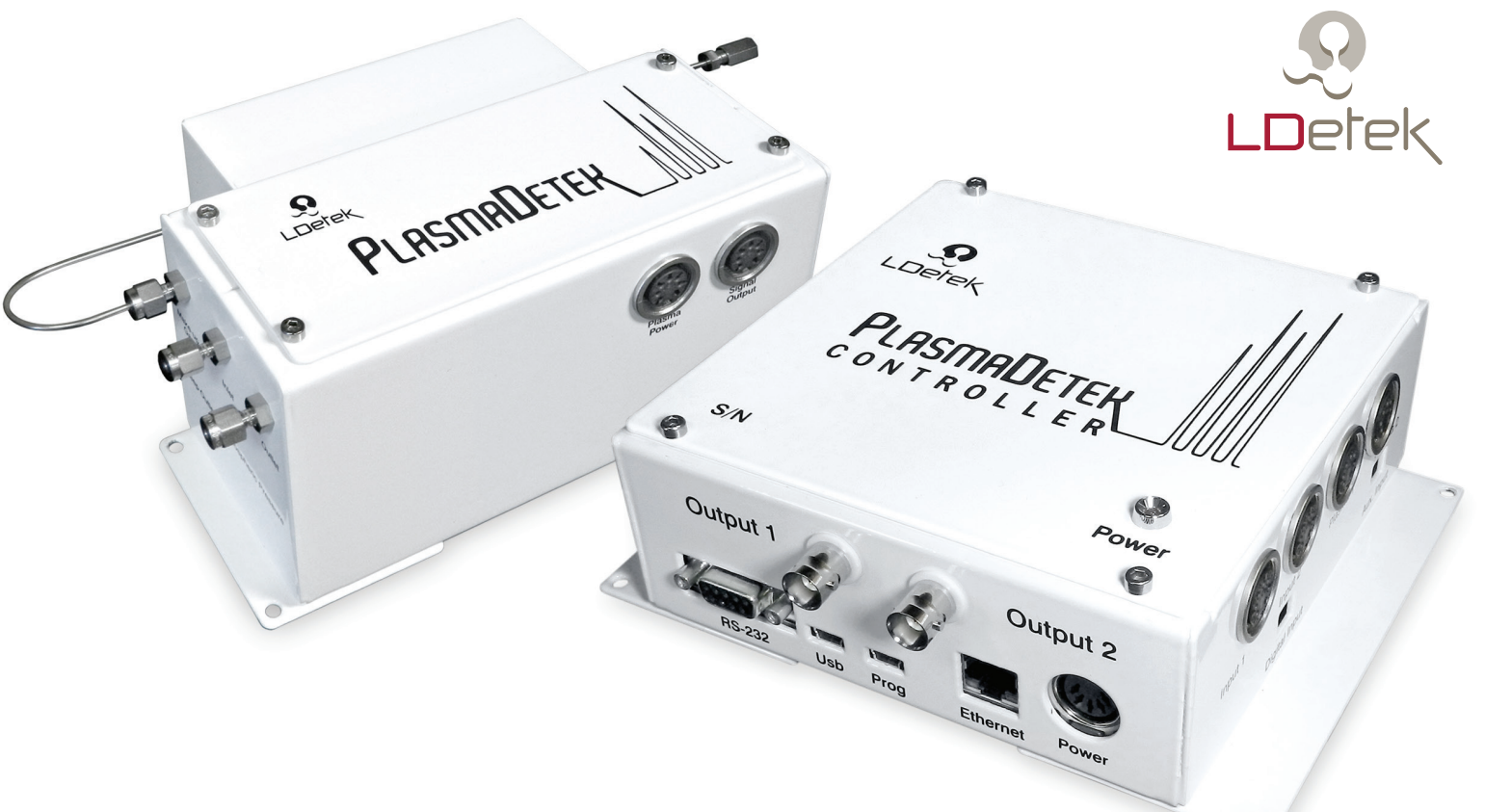
LDetek can also offer a large selection of Packed type columns that can cover your needs for any GC application. Our columns can be coiled within your specifications and can be activated/regenerated in house. LDetek also have the capabilities to configure your custom request. We can also offers numerous types of columns ending:

Stainless Steel or Brass Double ferrules type
Stainless Steel single ferrules type
Stainless Steel Face Seal fittings type
Silver brazed type

Argotek column LD12-3
HSR-Etek column LD12-7

PlasmaDetek 2

INTELLIGENT PLASMA EMISSION DETECTOR SYSTEM
FOR GAS CHROMATOGRAPH



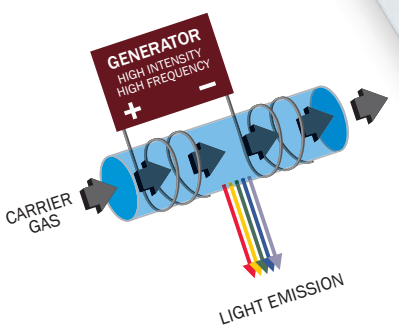
This microprocessor based plasma emission detector system gives all the tools to the GC integrator, manufacturer and user to integrate a plug and play detection system. With its customable configuration capability, a detector has never been so intelligent.

IN A GLANCE:

- Argon or helium carrier gas
- No dead volume design
- All in one detector by replacing existing technologies commonly used
- Selective and non-selective configuration
- Analog or digital interface
- Wide range of applications
- Easy to interface with any GC and analyzer design
- PPB to % detection
- Very stable signal
- Maintenance free
- Fast installation and tune up
- Configuration software
- Possibility of customable protocol to control the device
- Detect organic and inorganic compounds, permanent gases and noble gases (including Ne)

DOPING AGENT INJECTOR TEMPERATURE CONTROLLED

By controlling the temperature of the doping agent injection device, better stability of the measurement is achieved. The temperature is controlled by the PlasmaDetek controller and can be adjusted for the specific application. The use of different doping agents is application dependant is part of the selectivity mode.



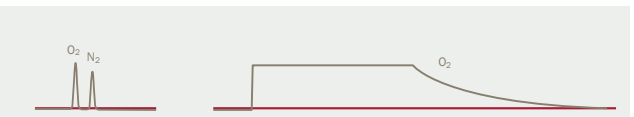
PED DESIGN WITH NO DEAD VOLUME

The PlasmaDetek design avoids the creation of phantom peaks that occurs in conventional ionization detector. Its unique design made of a monolitic quartz makes the detector dead volume free. It is not affected by pressure or flow swings.

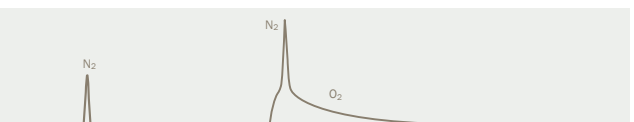
SELECTIVE AND NON-SELECTIVE CONFIGURATION

The selectivity mode simplifies the chromatography and can be configured for specific application.

Conventional ionization detector



Plasmadetek



MICROPROCESSOR BASED CONTROLLER

With an integrated DSP, the signal can be processed to improve measurement as well as providing desired signal for any GC. Configurable with LDetek plasma configurator provided with each PlasmaDetek. Cost saving by having no electrometer needed to acquire the signal. Multiple stage of amplification integrated to achieve low to high concentration.

2 ANALOG OUTPUTS AS STANDARD

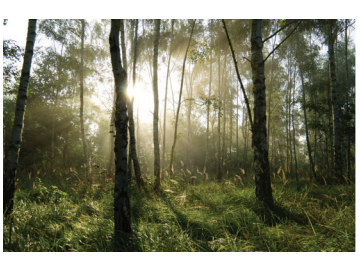
Both analog output can be used in parallel to interface with the desired signal acquisition system. Coaxial cables are provided with detector.

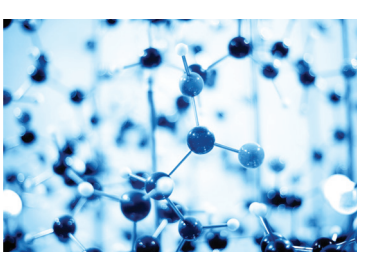
SERIAL INTERFACE

USB and RS-232 connection are available to provide digital signal and avoid analog interface. Custom digital communication can also be implemented to communicate and configure the PlasmaDetek from your own system.

ETHERNET PORT

Connect the PlasmaDetek to your network to communicate with the device.

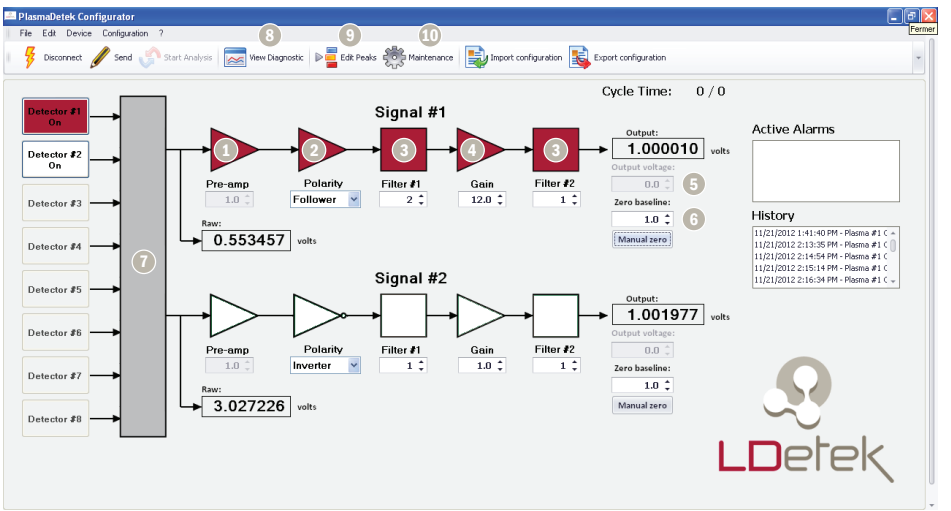


SPECIFICATIONS:

CARRIER GAS	Argon and Helium
POWER	80 to 240 VAC, 50-60 Hz
GAS CONNECTIONS	1/16” (can be customized)
OPERATION OUTLET PRESSURE	Atmospheric or Vacuum
OPERATING TEMPERATURE	10°C to 50°C (in stable environment)
FILTER	10u SS particle filter on the gas inlet
DETECTOR SIGNAL OUTPUT CONNECTION	BNC Coaxial type (can be customized)
POWER CONSUMPTION	max 10 Watts

PLASMADETEK CONFIGURATOR:



1	Adjust the amplification directly on the source light of the plasma to change the measurement scale of the detector. PPB to % application can be achieved with the same detector.
2	**Signal Polarity:** negative peaks can now be inverted to get positive peaks.
3	**Filtering:** Digital filtering can be applied to improve signal provided to the GC.
4	**Gain:** adjust the gain of the signal for the specific measurement.
5	**Output voltage:** set the output voltage scale that fits to the GC signal acquisition system.
6	**Zero baseline:** set and perform zero baseline directly in the detector.
7	Connect up to 8 detector to the same plasma controller.
8	**Diagnostic tool:** Graphic tool to trend the raw or the output voltage.
9	**Peak Table:** edit a peak event table to change all possible parameters at specific time analysis can be started manually or by digitally and the detector will follow your specific configuration.
10	Maintenance menu: all tools to troubleshot the detector is provided.

LDetek

Where innovation leads to success

MultiDetek

New trace gas analyzer for multiple impurities

With its plug and play philosophy, this compact system provides an attractive and cost effective solution for the industrial market. Based on the Plasma Emission Detector technology, this stand-alone Gas Chromatograph is a flexible and customized platform providing analysis from ppb to %.

LDetek

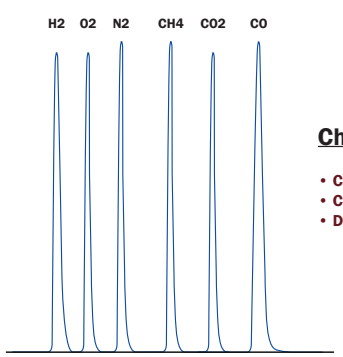
> FEATURES:

- Multi trace impurities in one chassis
- Based on the PlasmaDetek technology
- Compact rackmount 4U
- ppb to % application
- User friendly
- Touch screen interface
- Large scale measurement
- High performance Diaphragm valves

> APPLICATIONS:

- Air Separation Unit
- Crude Argon production for nitrogen monitoring
- Speciality gas laboratories
- Process control
- Gas purification
- Steel industries
- Chemical plant
- Welding gas control
- Helium liquification plants
- Quality control for truck filling station
- Semiconductor manufacturing

HIGH PURITY ARGON ANALYSIS



Chromatogram

- **Carrier gas : Argon**
- **Configuration : one injection valve**
- **Detector : PlasmaDetek**

The combination of the PlasmaDetek and the high performance diaphragm valve bring outstanding measurement performance. A longer useful time and better performance on common GC techniques are achieved. They also allow new methods that are not possible with other commercial detectors and valves.

The possibility of the PlasmaDetek to work with argon or helium carrier from ppb to % measurements give a big advantage to this analyzer over the existing systems.

> CAPABILITIES:

(MOST POPULAR APPLICATIONS)

	H2	Ar	O2	N2	He	CO2	NH3
H2	-	●	●	●	●	●	●
Ar	●	-	●	●	●	●	●
O2	●	●	-	●	●	●	●
N2	●	●	●	-	●	●	●
CH4	●	●	●	●	●	●	●
CO	●	●	●	●	●	●	●
CO2	●	●	●	●	●	-	●
NMHC	●	●	●	●	●	●	-
N2O	●	●	●	●	●	-	●
C2H2	●	●	●	●	●	-	-
C2H4	●	●	●	●	●	-	-
C2H6	●	●	●	●	●	-	-
C3H8	●	●	●	●	●	-	-
Ne	●	-	●	●	●	●	●

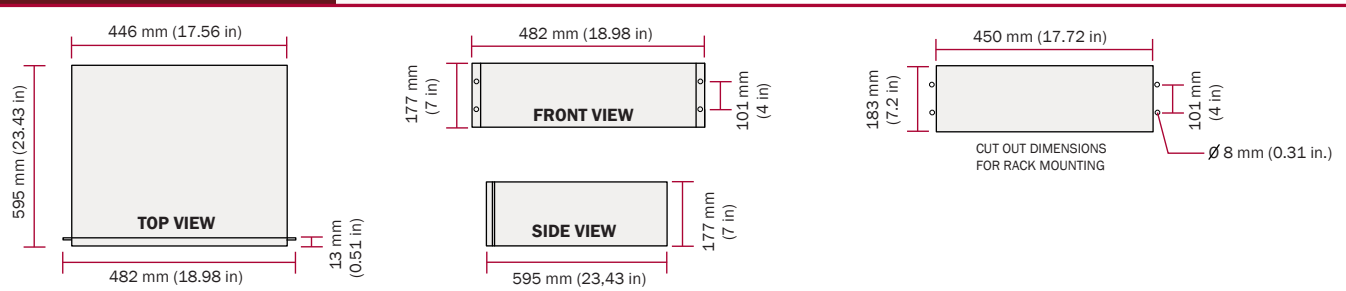
Samples
Impurities

*some application requires more than one chassis/Multidetek
Other measurement possible, please consult factory

> SPECIFICATIONS:

DETECTOR TYPE	Plasma Emission Detector design (PlasmaDetek)
CARRIER	Argon and Helium
RANGE	Application dependant
REPEATABILITY	< 1% full scale
ACCURACY	Better than ±1% full scale
STANDARD FEATURES	• Manual or autoranging (user selectable) • Microprocessor controlled • 5.6" TFT intelligent LCD module with Touch Screen • Self diagnosis system with auto-resolve alarm • 4-20 mA isolated output • Alarm Historic • Digital system status ouput for remote monitoring (dry relay contact)
OPTIONS	Serial port: RS-232 / 422 / 485 / Profibus for monitoring
GAS CONNECTIONS	Sample: 1/8'' compression fittings or 1/8 VCR - Vent: 1/8'' compression fitting
CALIBRATION GAS	Zero: LDP1000 purified gas (Getter) - Span: 70% to 90% of the scale
SAMPLE PRESSURE REQUIREMENTS	10 to 30 PSIG
CARRIER PRESSURE REQUIREMENTS	100 PSIG
OPERATING TEMPERATURE	10 °C to 45 °C
SUPPLY	115 VAC, 50 – 60 Hz or 220 VAC, 50 – 60 Hz
POWER CONSUMPTION	200 Watts (application dependant)
DRIFT	< ± 1% over 24 hours

> DIMENSIONS:



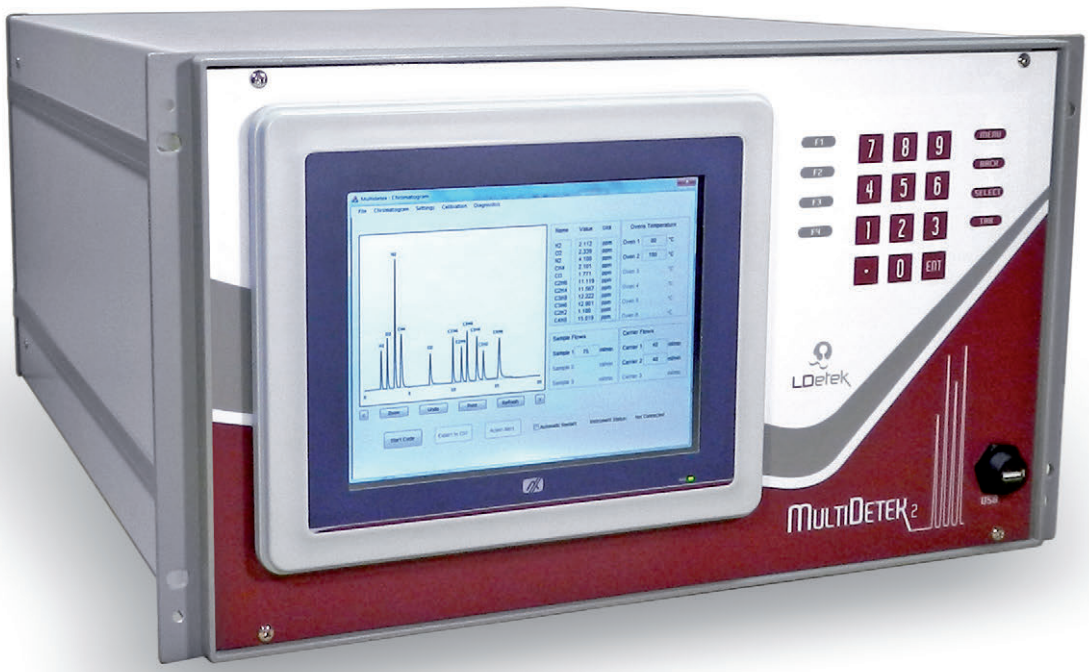
LDetek

271, Saint-Alphonse Sud, Thetford Mines (Quebec) Canada G6G 3V7

Phor

MULTIDETEK 2

MICRO GC FOR MULTIPLE IMPURITIES



LDetek

With its plug and play philosophy, offering more features than never LDetek push further the possibilities with its new chromatograph system. It provides an attractive and cost effective solution for the industrial and laboratory market.

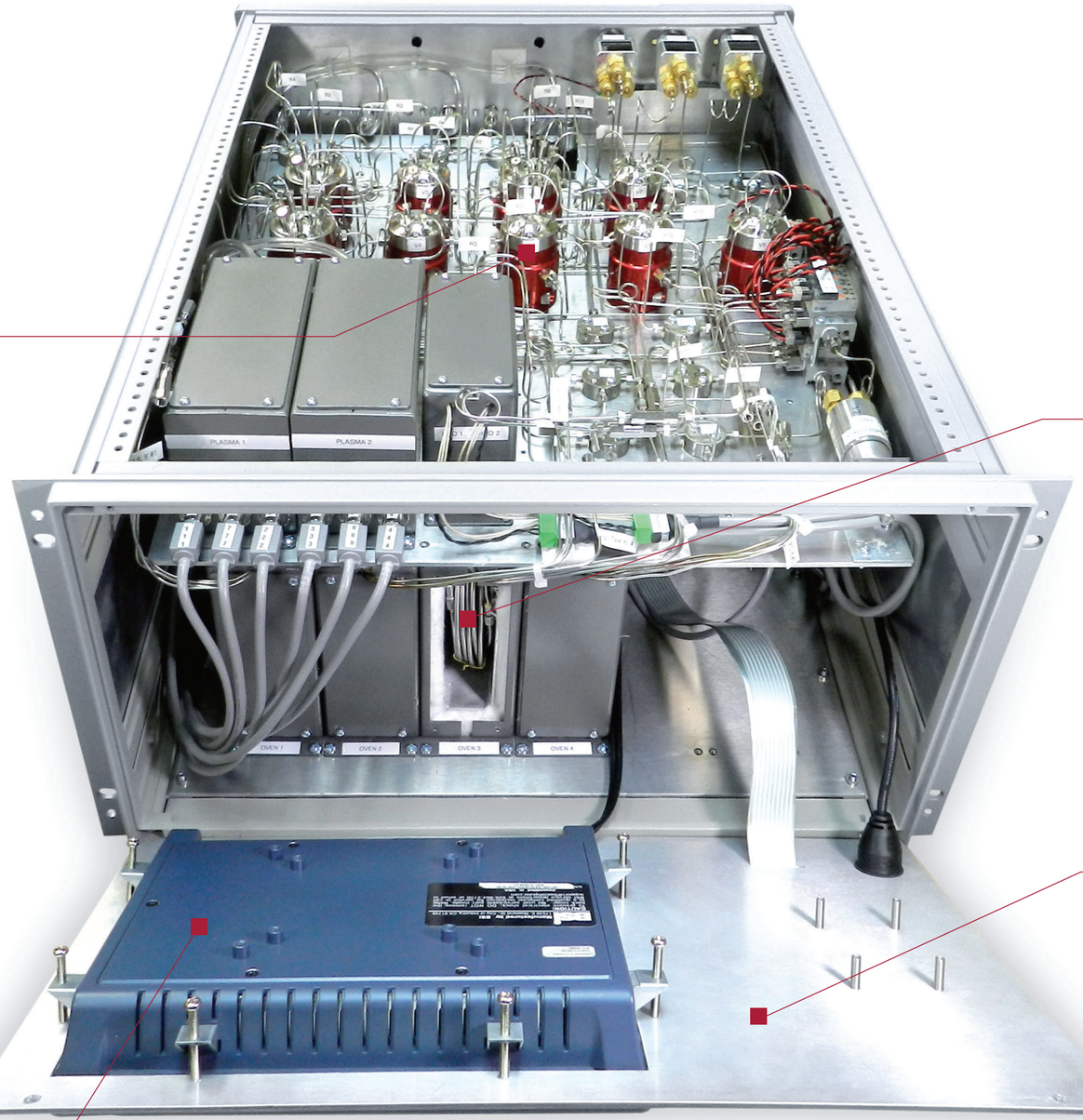
Based on the LDetek high performances Plasma Emission Detector technology, this stand-alone Gas Chromatograph is a flexible and customized platform providing the best solution for any type of gas analysis from ppb to % using argon or helium as carrier gas.

FEATURES & DESIGN:

- Multi trace impurities in one chassis
- Multiple configurations available in one chassis
- Based on the PlasmaDetek technology
- Use argon or helium as carrier gas
- Isothermal and/or programmed ramping ovens available
- LDetek's electronic mass flow controllers for carrier & sample gas
- Optional integrated purifier for generating high purity carrier gas in the chassis
- Easy maintenance with its slide out design
- Compact & robust industrial rackmount 6U chassis
- ppb to % application
- Large 8.4'' LCD touch screen & user friendly interface
- High performance diaphragm valves
- Ethernet connectivity for remote control
- Profibus/Modbus communication protocols
- Data storage software (LDchrom)

LDETEK HIGH PERFORMANCE DIAPHRAGM VALVE

The combination of the PlasmaDetek and the high performance diaphragm valve bring outstanding measurement performance. A longer lifetime and better performance on common GC techniques are achieved. They also allow new methods that are not possible with other commercial detectors and valves. Consult LDetek application notes for more information.



ISOTHERMAL OVEN FOR ANY TYPE OF COLUMNS

The oven design can accept any type of packed, micro packed and capillary columns. It offers a very stable and quick temperature control able to proceed to high temperature column regeneration in the unit. The front access to the ovens can be done without removing unit from its rack. With its optional ramping and programmed oven, some more applications are feasible with reduced analysis time.

FRONT ACCESS TO THE ISOTHERMAL AND/OR PROGRAMMED RAMPING OVENS

The Multidetek-2 has been designed to give a complete access to all the hardware parts without removing the unit from the rack. The complete maintenance of the system can then be done by keeping the system on gas. This design gives the benefits to reduce the recovery time of the GC after proceeding to maintenance of the system.

LARGE 8.4'' TOUCH SCREEN & USER FRIENDLY INTERFACE

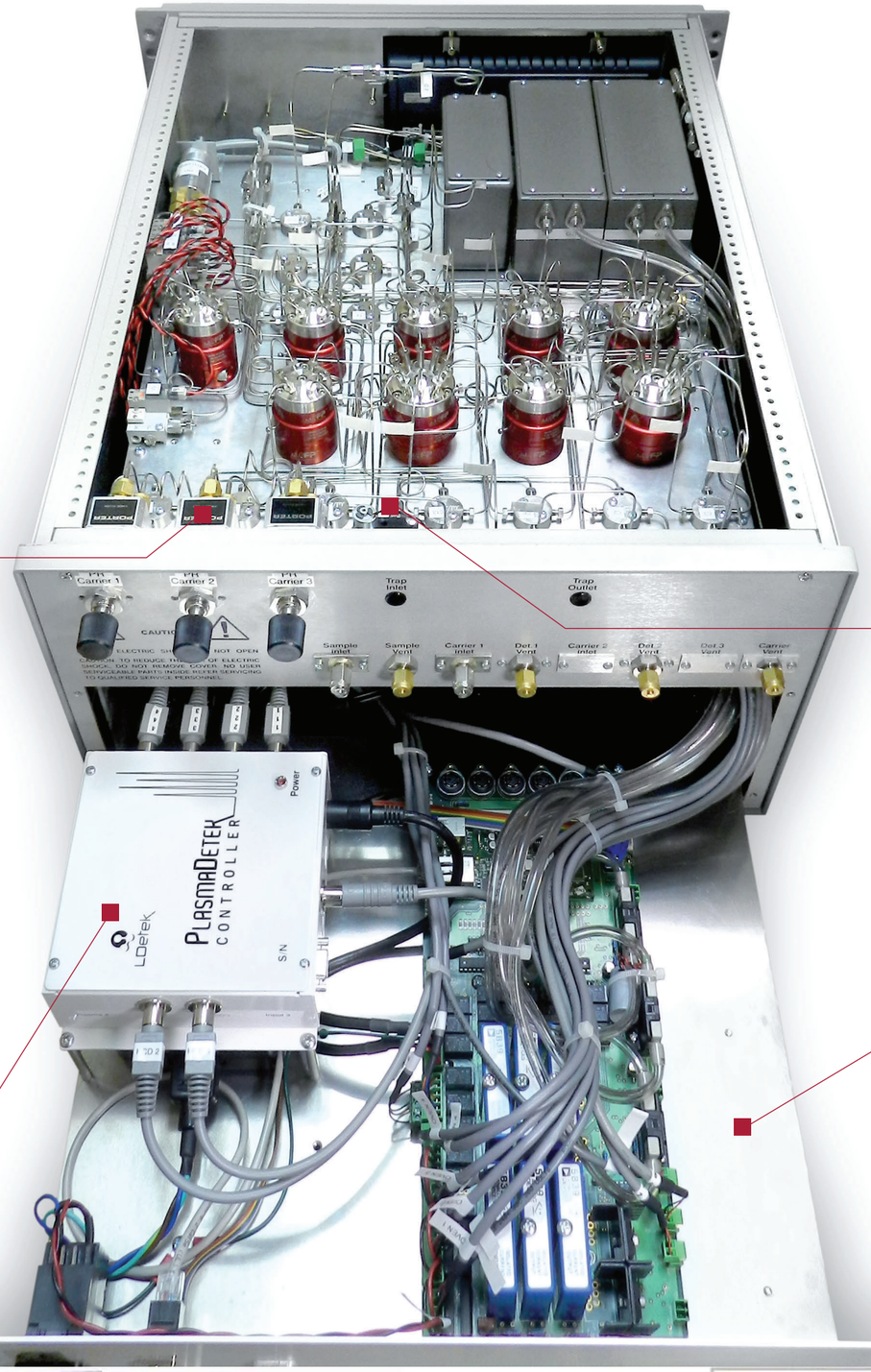
The Multidetek-2 offers an easy and complete interface working on Windows XP enbedded. With its 8.4'' clear LCD touch screen, it allows the operator to navigate easily through the different menus. Moreover, the system includes an Ethernet port for remote control.

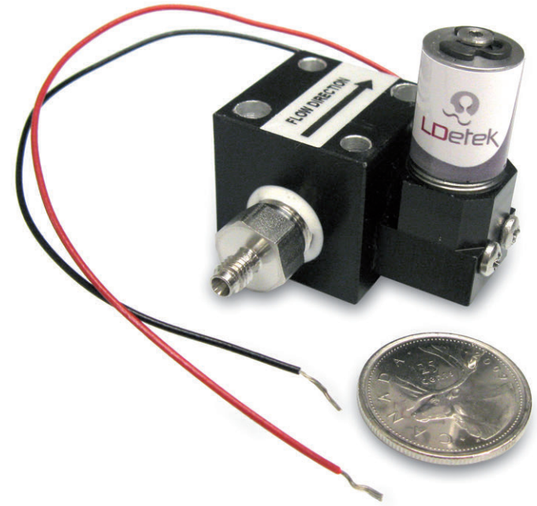
ELECTRONIC FLOW CONTROLLER
(LDETEK DESIGN)

With its electronic flow controller, the Multidetek-2 offers the possibility to have automatic carrier flow adjustment. LDetek has developed its own valve design offering low dead volume and fast response time to allow accurate carrier flow. A manual version of the carrier flow regulator can also be used.

LDETEK HIGH PERFORMANCE
PLASMA DETECTOR

Using its redesign Plasma emission detector, the Multidetek-2 can now achieve lower detection limit and can also extend his range of applications. Its plasma detector has the benefit to be a clean and maintenance free system. It can easily achieve low ppb detection limit using either argon or helium as carrier gas. The detector can be configured for low ppb as well as high percentage level. It then gives the opportunity to configure the Multidetek-2 system for any kind of gas analysis applications.





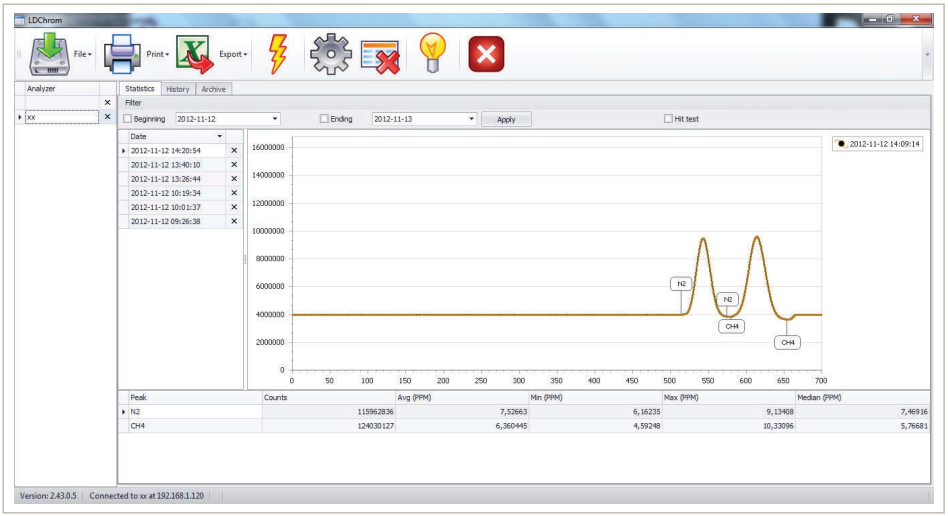
ELECTRONIC SAMPLE VALVE
(LDETEK DESIGN)

Keeping its already proof LD8000 micro valve design for sample control, the Multidetek-2 guarantee no leak and no dead volume with this high performance electronic controlled online valve to achieve ppb levels.

EASY MAINTENANCE
WITH ITS SLIDE OUT DESIGN

The same approach has been done on the back side of the unit. Other critical components can be reached from the back for maintenance purpose using its pull out rails system. Again, it gives the benefit to perform system maintenance with reduced recovery time without removing the gas lines from the unit. Also offering its optional integrated mounted in gas purifier module, the Multidetek-2 bring some more benefits by reducing installation cost and space. Its compact design which can introduce multiple configurations with an integrated purifier and stream selector system in one chassis push further the possibilities of this GC system.

LDetek



With the LDchrom data storage software, the chromatograms can be store at the user's convenience. It can generate reports, trend the detector signals and oven temperatures. All data can be saved and export to Excel. Offering its multiple modes, LDchrom can acquire data from multiple Multidetek configurations.

- LDetek Data storage software (LDchrom)

APPLICATIONS:

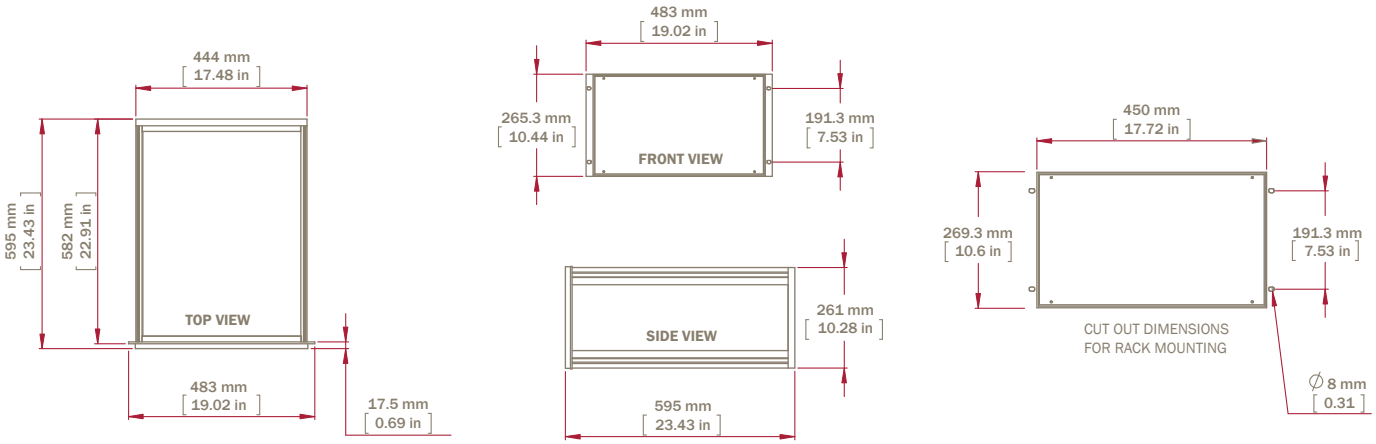
- Air Separation Unit
- Crude Argon production for nitrogen monitoring
- Speciality gas laboratories
- Process control
- Gas purification
- Beverage industries
- Environmental analysis
- Glove box
- Steel industries
- Chemical plant
- Welding gas control
- Helium liquification plants
- Quality control for truck filling station
- Semiconductor manufacturing

CAPABILITIES:

SPECIFICATIONS:

DETECTOR TYPE	Plasma Emission Detector design (PlasmaDetek)
RANGE	Application dependant
REPEATABILITY	< 1% full scale
ACCURACY	Better than ±1% full scale
STANDARD FEATURES	• Manual or autoranging (user selectable) • Microprocessor controlled • Windows XP embedded user friendly interface • Ethernet port for remote control • Isothermal and/or programmed ramping ovens • Electronic flow control regulators for carrier & sample gases • 8.4'' LCD large touch screen • Self diagnosis system with auto-resolve alarm • 4-20 mA isolated outputs • Alarm Historic • Digital system status ouput for remote monitoring (dry relay contact) • 2 alarms contact • High resolution Chromatogram output
OPTIONS	• Serial port: RS-232 / 422 / 485 / Profibus for monitoring • Integrated compact purifier in the chassis for generating high purity carrier gas • Integrated stream selector system • Digital inputs for remote starting • Analog inputs for connecting external instruments • Remote control for stream selector (LDGSS)
GAS CONNECTIONS	Sample: 1/8'' compression fittings or 1/8 VCR Vent: 1/8'' compression fitting
CALIBRATION GAS	Zero: LDP1000 purified gas (Getter) Span: 70% to 90% of the scale
SAMPLE PRESSURE REQUIREMENTS	10 to 30 PSIG
CARRIER PRESSURE REQUIREMENTS	100 PSIG
OPERATING TEMPERATURE	10 °C to 45 °C
SUPPLY	115 VAC, 50 – 60 Hz or 220 VAC, 50 – 60 Hz
POWER CONSUMPTION	
DRIFT	< ± 1% over 24 hours

DIMENSIONS:



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LD2000

ONLINE TRACE TOTAL HYDROCARBON ANALYZER

The LD2000 is an easy to use instrument that offers the ideal solution for the total hydrocarbon measurements. Its compact and robust design perfectly fits on any industrial installation. The LDetek FID and electronic platform bring the performances required by the market.

FEATURES:

- LDetek FID design offering low maintenance
- Bootloader integrated for software update via Ethernet
- Large scale measurement
- 4-20 mA output as standard
- Range Identification Relay
- Unique LDetek Electronic flow controller design
- 3U cabinet

APPLICATIONS:

- Air separation unit
- Cryogenic truck loading station
- Speciality gas laboratories
- Process control
- Steel Industries
- Chemical plants
- Welding gas control
- Gas management system
- Quality control for truck fills and gas cylinders
- Safety
- Product validation
- Scrubber & oxidizer efficiency
- Carbon bed breakthrough detection
- Well logging
- Industrial hygiene & safety monitoring
- Fence line (perimeter) monitoring around industrial sites
- CEMS (continuous emission monitoring systems)

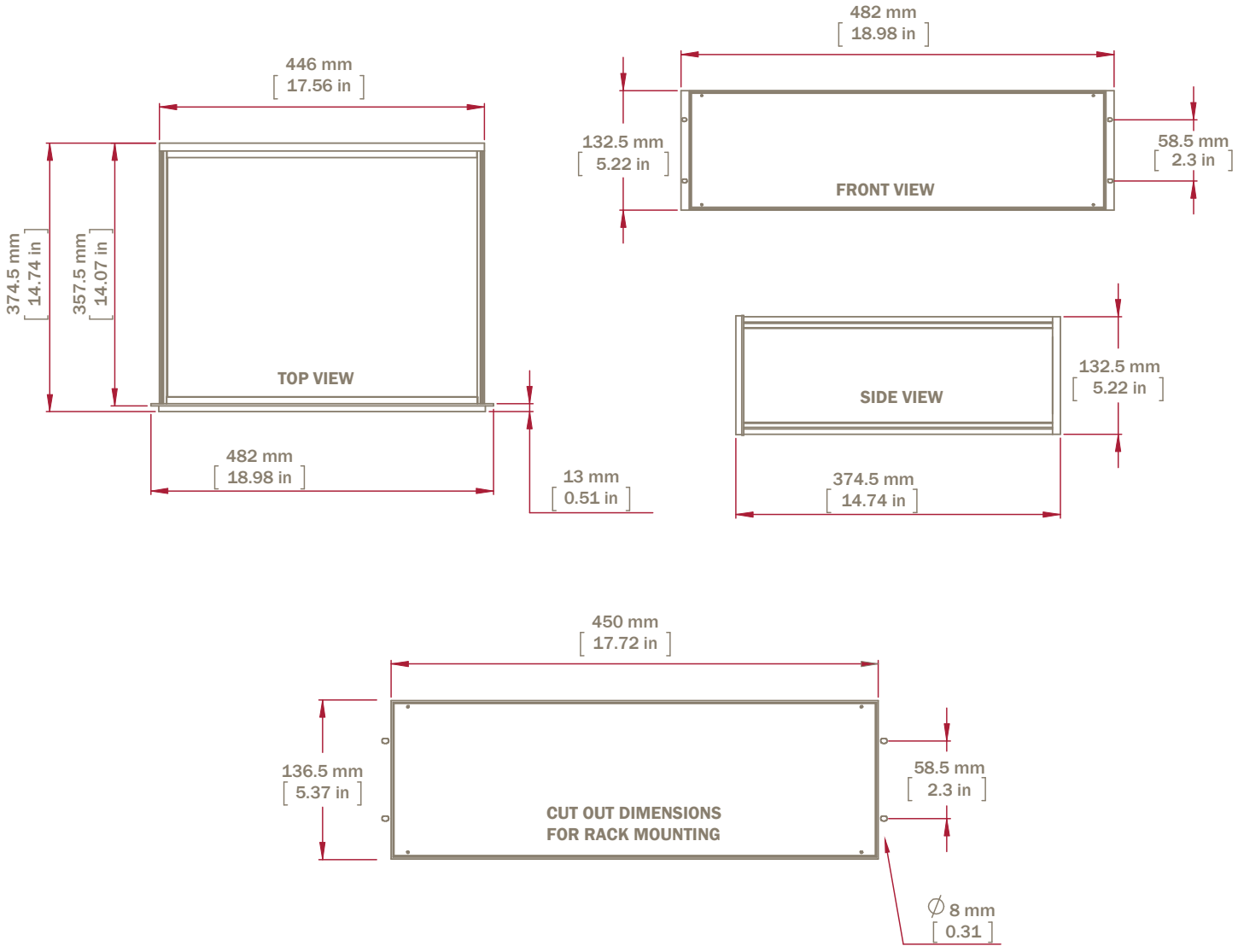
SPECIFICATIONS:

DETECTOR TYPE	Flame Ionisation Detector
RANGE	0–10 ppm 0–100 ppm 0–1000 ppm other range possible
REPEATABILITY	< 1% full scale
ACCURACY	Better than ±1% full scale
STANDARD FEATURES	• Manual or autoranging (user selectable) • Microprocessor controlled • 5.6" TFT intelligent LCD module with Touch Screen • Self diagnosis system with auto-resolve alarm • 4-20 mA isolated output • Alarm Historic • Digital ouputs for remote monitoring: (all dry relay contacts) - System status (1 output) - Range in use (3 output) - Calibration in use (1 output)
OPTIONS	• Serial port: RS-232 / 422 / 485 / Profibus • 2 alarm outputs (user programmable set point)
GAS CONNECTIONS	Sample: 1/8'' compression fittings Vent: 1/8'' compression fitting
CALIBRATION GAS	Zero: LDP1000 purified gas (Getter) Span: 80%-90% of full scale of methane
SAMPLE FLOW REQUIREMENTS	50 to 200 sccm
AIR FLOW REQUIREMENTS	200 to 600 sccm
FUEL FLOW REQUIREMENTS	40 to 150 sccm
RECOMMENDED MAXIMUM OPERATING PRESSURE	40 PSIG
RECOMMENDED MINIMUM OPERATING PRESSURE	10 PSIG
OPERATING TEMPERATURE	10 °C to 45 °C
SUPPLY	115 VAC 50 – 60 Hz or 220 VAC 50 – 60 Hz
POWER CONSUMPTION	Maximum 50 watts
DRIFT	< ± 1% over 24 hours
WEIGHT	

ORDERING INFORMATION:

LD2000	-X	-XXX	-X	-XXX
	Ar: Argon **H:** Helium **O:** Oxygen **N:** Nitrogen **A:** Air	Operating Voltage: **120:** 120 volts **220:** 220 volts	**A:** Alarm option	Serial communication **RS2:** RS-232 **RS4:** RS-485 **PFB:** Profibus

DIMENSIONS:



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LD8000

TRACE NITROGEN IN ARGON, HELIUM AND CRUDE ARGON ANALYZER

The LD8000 is the new standard for trace Nitrogen. Its unique design brings reliability and accuracy needed for such measurement. Its own Plasma Emission Detector System extends the lifetime of the cell. This Duty Cycle Controlled System has the property to decrease contamination and coating inside the plasma cell giving a more efficient, reliable and accurate analyzer.

FEATURES:

- Unique Plasma Emission Detector design based on a Duty Cycle Controlled System.
- Bootloader integrated for software update via Ethernet
- Large scale measurement
- 4-20 mA output as standard
- Range Identification Relay
- Maintenance free
- LAN/Web control
- Micro-valve for very low dead volume and fast purging time
- Low sample consumption
- 3U cabinet
- Optional zero gas calibration free system

APPLICATIONS:

- Air separation unit
- Cryogenic truck loading station
- Speciality gas laboratories
- Process control
- Argon purification plant
- Steel Industries
- Chemical plants
- Welding gas control
- Helium liquification plants
- Gas management system
- Semiconductor manufacturing
- Quality control for truck fills and gas cylinders

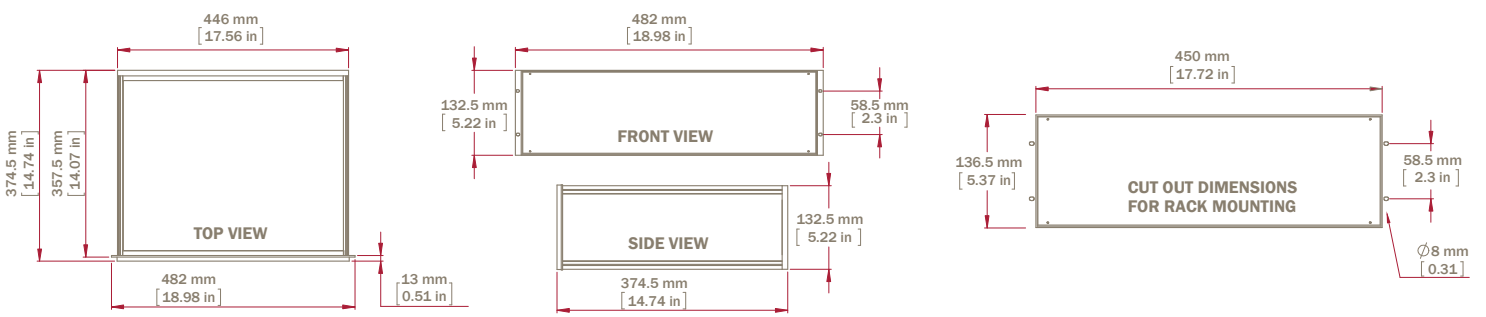
SPECIFICATIONS:

DETECTOR TYPE	Plasma Emission Detector design based on a Duty Cycle Controlled System	
RANGE	0 – 1 ppm, resolution to 10 ppb 0 – 10 ppm, resolution to .1 ppm	0 – 100 ppm, resolution to 1 ppm other range possible up to 10000 ppm
REPEATABILITY	< 1% full scale	
ACCURACY	Better than ±1% full scale	
STANDARD FEATURES	• Manual or autoranging (user selectable) • Microprocessor controlled • 5.6" TFT intelligent LCD module with Touch Screen • Self diagnosis system with auto-resolve alarm • LAN/Web control	• 4-20 mA isolated output • Alarm Historic • Safe calibration procedure to avoid any bad calibration • Digital ouputs for remote monitoring: (all dry relay contacts) - System status (1 output) - Range in use (3 output) - Calibration in use (1 output)
OPTIONS	• Internal sampling system for zero, span and sample with remote capabilities • Serial port: RS-232 / 422 / 485 / Profibus	• 2 alarm outputs (user programmable set point) • Zero calibration gas free system
GAS CONNECTIONS	Sample: 1/8'' compression fittings	Vent: 1/8'' compression fitting
CALIBRATION GAS	Zero: LDP1000 purified gas (Getter)	Span: 8.0 to 9.5 ppm N2/Ar
SAMPLE FLOW REQUIREMENTS	15 to 200 sccm	
FLOW ACCURACY	0 to 200 sccm ± 1% full scale	
MAX OPERATING PRESSURE	30 PSIG (207 kPAG)	
MIN OPERATING PRESSURE	4 PSIG (28 kPAG) optional 1 PSIG (7 kPAG)	
OPERATING TEMPERATURE	10 °C to 45 °C	
SUPPLY	115 VAC, 50 – 60 Hz or 220 VAC, 50 – 60 Hz	
POWER CONSUMPTION	Maximum 40 watts	
DRIFT	< ± 1% over 24 hours	
WEIGHT	29 lbs (13 kg)	

ORDERING INFORMATION:

LD8000	-X	-XXX	-X	-XXX	-X	-XXX
	Ar: Argon **H:** Helium **D:** Dual (Argon + Helium) **C:** Crude Argon	Operating Voltage: **120:** 120 volts **220:** 220 volts	**A:** Alarm option	Integrated sampling system **S1:** 1 sample + zero + span **S2:** 2 samples + zero + span	**C:** zero gas free system	Serial communication: **RS2:** RS-232 **RS4:** RS-485 **PFB:** Profibus

DIMENSIONS:



LDetek

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LD8000 PLUS

Online PPB Trace Nitrogen in Argon/Helium analyzer

The LD8000-Plus is designed for ultra-pure Argon or Helium gas analysis. With its integrated ppb sub-system, unique performance can be achieved. Low ppb trace nitrogen online is now possible without the need of a gas chromatograph. This compact design makes it very attractive for any industrial or laboratory installation.

FEATURES:

- Unique Plasma Emission Detector design based on a Duty Cycle Controlled System.
- PPB sub-system integrated
- Bootloader integrated for software update via Ethernet
- Large scale measurement
- 4-20 mA output as standard
- Range Identification Relay
- Maintenance free
- Bypass sample flow control to insure high purity
- Low sample consumption
- 3U cabinet

APPLICATIONS:

- Air separation unit
- Speciality gas laboratories
- Process control
- Argon purification plant
- Chemical plants
- Helium liquification plants
- Gas management system
- Semiconductor manufacturing

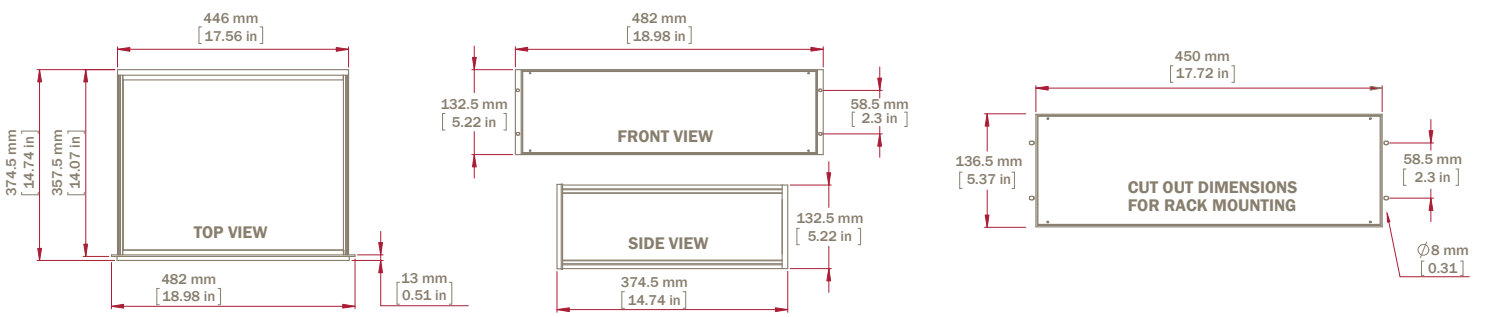
SPECIFICATIONS:

DETECTOR TYPE	Plasma Emission Detector design based on a Duty Cycle Controlled System. Sub ppb system integrated.	
RANGE	0 – 100 : resolution 0.1 ppb 0 – 500 : resolution 1 ppb	0 – 5000 : resolution to 1 ppb, other range possible
REPEATABILITY	< 0.2% of range used	
ACCURACY	Better than ± 0.5% of range used	
STANDARD FEATURES	• Manual or autoranging (user selectable) • Microprocessor controlled • 5.6" TFT intelligent LCD module with Touch Screen • Self diagnosis system with auto-resolve alarm	• 4-20 mA isolated output • Alarm Historic • Safe calibration procedure to avoid any bad calibration • Digital ouputs for remote monitoring: (all dry relay contacts) - System status (1 output) - Range in use (3 output) - Calibration in use (1 output)
OPTIONS	• Serial port: RS-232 / 422 / 485 / Profibus • 2 alarm outputs (user programmable set point)	
GAS CONNECTIONS	Sample: 1/8'' face seal fittings	Vent: 1/8'' compression fitting
CALIBRATION GAS	Zero: LDP1000 purified gas (Getter)	Span: 3 to 4 ppm N_2/Ar
SAMPLE FLOW REQUIREMENTS	15 to 200 sccm	
RECOMMENDED MAXIMUM OPERATING PRESSURE:	20 PSIG (689 kPAG)	
RECOMMENDED MINIMUM OPERATING PRESSURE:	10 PSIG (28 kPAG)	
OPERATING TEMPERATURE	10°C to 45°C (must be stable)	
SUPPLY	115 VAC, 50 – 60 Hz or 220 VAC, 50 – 60 Hz	
POWER CONSUMPTION	Maximum 70 watts	
DRIFT	< ± 0.5% of range	
WEIGHT	37 lbs (17 kg)	

ORDERING INFORMATION:

LD8000-Plus	-XXX	-X	-XXX
	Operating Voltage: **120:** 120 volts **220:** 220 volts	**A:** Alarm option	Serial communication: **RS2:** RS-232 **RS4:** RS-485 **PFB:** Profibus

DIMENSIONS:



LDetek

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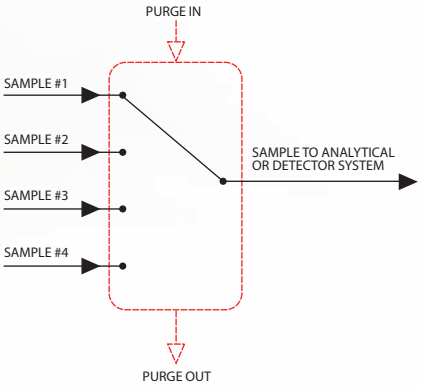
LDGSS

High Purity Gas Stream Selector

The LDGSS now brings to the gas industry the most reliable and easy way to provide clean gas to any process GC and on line process analyzers. It's compact design, based on high purity connections with an unique diaphragm valve with no dead volume, is the ideal solution for any streams selection needs. This concept allows a quick response time, the possibility to work in vacuum mode and avoid drifting problems.



> FEATURES:

- compact design reducing project costs.
- Leak proof, tested and certified
- Air diffusion resistant
- Unique diaphragm valve with no dead volume for stream selection
- No stream cross contamination
- Quick purging time
- Optional purge gas flow to avoid contamination
- Easy to operate
- Oxygen cleaned and compatible
- Can be easily integrated to any type of process G.C. or on line process analyzers

> APPLICATIONS:

- Air Separation industry
- Semiconductor manufacturing
- Laboratory GC's installation
- System's Integrators
- Glove box

LDetek

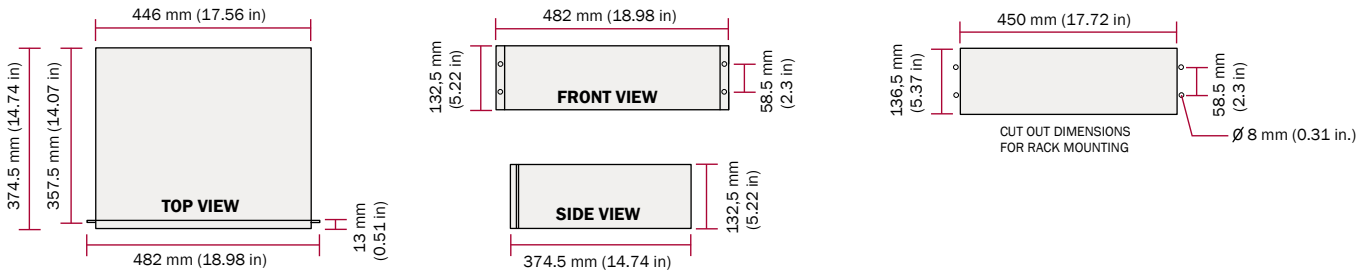
> SPECIFICATIONS:

NUMBER OF INLETS	2 to 9 streams configurable
STANDARD FEATURES	Front mounted stream bypass valves
	Dry contacts that remotely give status of selected channel
	Local or Remote control via 12VDC supply
	Front Mounted rotary switch selector
	Electrical or pneumatic actuation for the diaphragm valve
OPTIONS	Back Pressure Regulator mounted between LDGSS outlet and analyzer to maintain constant pressure.
	Purged cabinet for hazardous application
SAMPLE BYPASS ADJUSTABLE VALVE FLOW RANGE	0 to 500 ml/min
INTERNAL DIAPHRAGM VALVE PURGING FLOW	5 ml/min total
GAS INLET & OUTLET CONNECTIONS	1/16'' - 1/8'' - 1/4''Stainless Steel Compression Type Swagelok compatible.
	1/8'' - 1/4'' Stainless Steel High Purity VCR type
PURGED GAS VENT CONNECTIONS	1/4'' Stainless Steel Compression Type Swagelok compatible
SUPPLY	85VAC to 240VAC 50/60Hz
POWER CONSUMPTION	10 watts
MAXIMUM OPERATING PRESSURE	300 PSIG (2068Kpa) (21 Bar)
MINIMUM OPERATING PRESSURE	1 PSIG (6.89Kpa) (0.07 Bar) (lowest pressure can be achieve for glove box application by adding the optional metal bellow pump)
	The LDGSS can even works in vacuum mode.
NOMINAL WORKING PRESSURE	20 PSIG (138Kpag)
REMOTE CONTROL VOLTAGE INPUT	12 VDC at 200mA maximum
WEIGHT	14 lbs (6Kg)

> ORDERING INFORMATION:

LDGSS	-XXX	-X	-X/X	-XXX	-XXX
	Operating Voltage 120 : 120 volts 220 : 220 volts	Number of Inlets 2 to 9 : 2 to 9 streams	Gas Inlets Connections Size 1/16 : 1/16 inches 1/8 : 1/8 inches 1/4 : 1/4 inches	Gas Inlets Type VCR : Face seal Type SWG : Compression Type	Back Purged Reg. BPR : Regulator

> DIMENSIONS:



LDetek

271 St-Alphonse Sud, Thetford Mines, (Qc), Canada, G6G 3V7

Phone: 418 755 1319 Fax: 418 755 1329 info@ldetek.com www.ldetek.com

PRINTED IN CANADA

LDP1000

Gas purifier compatible with any trace gas analysis system

Ideal for calibration gas, the LDP1000 is a sub ppb purifier that calibrates gas for **online analyzers** as well as carrier gas for **chromatograph**.

Designed with two steps of purification, this **unique purifier** ensures no undesired impurity is released during process.

> WHY CHOOSING LDP10000?

2 beds of purification
Allows perfect purification

RS-232 port
Monitor the temperature of the 2 beds of purification

LEDs indication
Self-diagnostic and status of the purifier

Cost effective solution for long-term use
Interchangeable getter

LDetek

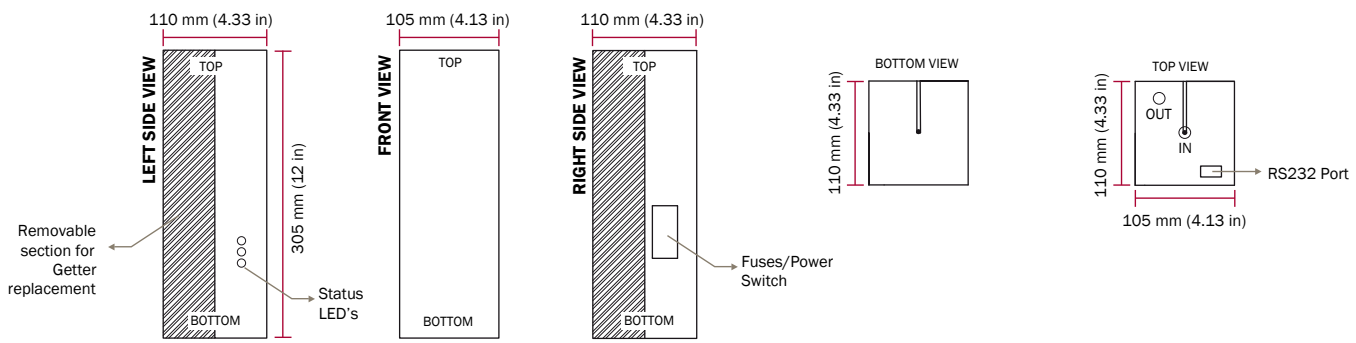
> SPECIFICATIONS:

GETTER TYPE	Alloy of Zr/V/Fe 2 beds (350 and 200 Celsius)
GASES PURIFIED	Ar/He/Ne/Xe/Kr. Nitrogen and hydrogen version available.
IMPURITIES REMOVED	H_2O,O_2,CO,CO_2,N_2,THC, H_2, CH_4 (Heated) H_2O,O_2,CO,CO_2,H_2 (room temperature)
IMPURITY LEVEL	<10ppb and <1 ppb available
FLOW	200 cc/min (nominal)
GAS CONNECTIONS	1/16''– 1/8''– 1/4'' compression or VCR®
RECOMMENDED OPERATING PRESSURE	100 PSIG (689 kPAG)
MINIMUM OPERATING PRESSURE	10 PSIG (28 kPAG) optional 1 PSIG (7 kPAG)
SUPPLY	120 VAC, 50 – 60 Hz or 220 VAC, 50 – 60 Hz
POWER CONSUMPTION	Start up : maximum 200 Watts (allow quick start up) Normal operation : maximum 50 Watts (design for low consumption)
DIMENSIONS	12" (305 mm) high, 4.12" (104 mm) deep, 4.25" (108 mm) wide
WEIGHT	5 lbs (2.26 kg)

> PART ORDERING:

LDP1000 OR GETTER	**-XXX**	**-X**	**-X**	**-X**	**-X**
	Operating Voltage	Gas type	Connection size	Connection Type	Supporting plate
	120 Volts (-120) 220 Volts (-220)	None: Noble gases N: Nitrogen version H : Hydrogen	1/16'' 1/8'' 1/4''	Compression (-C) VCR (-V)	None : no plate P : supporting plate with bypass valves

> DIMENSIONS:



271, St-Alphonse Sud, Thetford Mines (Quebec) CANADA G6G 3V7
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LD8000

Trace Nitrogen in Argon or Helium analyzer

DESIGN REPORT v2

LDetek

PCT CE RoHS

The need of trace nitrogen in argon or helium analysis in the industry is not something new. Many instruments have been and still are on the market to achieve such measurement for different type of applications. The most popular use is without any doubt in air separation industry for the production of argon.

The demand and the production of gas more and more pure require good analytical instrumentations. It is even more the case for the measurement of nitrogen. Small leakage, dead volume, change in temperature, bad accuracy, etc can all cause big headaches.

In this document, information about the design of the LDetek LD8000 trace nitrogen in argon or helium analyzer will be described to explain how we achieve such good performance. Those results are also described to show that the LD8000 is now the solution for any applications that require such measurement.

Analyzer Components

> Plasma Emission Detector (PED)

Detection principle

The LD8000 is using a Plasma Emission Detector where the principle is based on a spectroscopic emission cell. This is actually not a new technique, but the unique design of LDetek in terms of frequency, intensity as well as the mechanical and electrodes conception make the system very stable and efficient.

A luminous phenomenon, called electroluminescence, is created and is used as emission technique to quantify the nitrogen analyte. A plasma is created with the argon or helium flowing in the cell and when concentration of nitrogen changes, spectral lines emission change as well. The light is then directed in an optical filter that will discriminate the spectral lines. At the end, a photo-diode will convert light to current to make a proportional electric signal of nitrogen in the sample.

With its unique design, LDetek achieves unsurpassed performance that provides now a reference trace nitrogen in argon or helium analyzer.

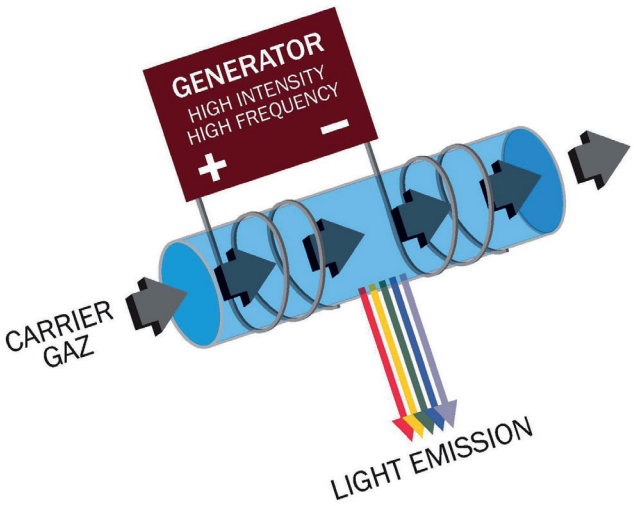

Figure 1: Plasma detector principle

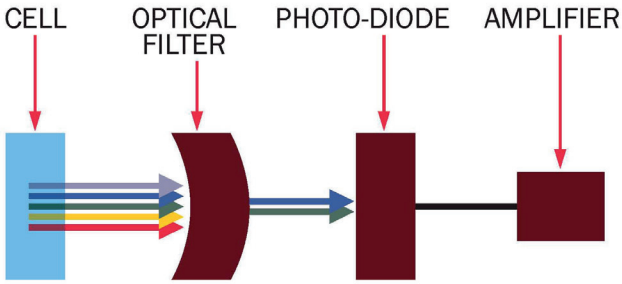

Figure 2: Light to current transformation

Plasma Cell

The cell of the PED is generally made of quartz. The material used has strong UV transmission properties. It is also durable, inert and heat resistant.

LDetek plasma detector has a specific cell design that provides a stable plasma. This unique conception will help getting low noise and good sensitivity when nitrogen is flowing in the detector along with the argon or helium. The wall cell design made of quartz combined with specific electrodes shape and inlet/outlet flow path configuration are some of the key parameters that give the performance of a PED.

Plasma Generator

The plasma generator is also quite important. Its specific voltage, frequency and current make the glow discharge in the cell very stable. The combination of the cell design and generator is critical in such application. LDetek has developed a perfect combination to get a stable light emission from the plasma. The components of the generator are well proven to be efficient and resistant over the years.

The generator is also based on a duty cycle controlled system that extends lifetime of the cell. The cell is put ON and OFF on a specific frequency and period to help the system to give the performance desired as well as decreasing the degradation of the detector.

Optical Filter and photo-diode

Optical filter is made specifically for LDetek specifications with properties to avoid interferences, temperature drift, loss of sensitivity and wavelength shifting over time. The wavelength, size, transmission lines and material are all critical characteristics that need special care to obtain such good performances.

The photo-diode will then convert the light out of the filter to current that is proportional of the amount of nitrogen in the sample. An electronic circuit designed by LDetek is then used for precision treatment of analog signal coming out of the photodiode.

Even if it sounds straightforward, LDetek has a unique way to install and align all items together. LDetek established rigorous procedures in a way to achieve high and same performances for each unit.

Figure 3: Plasma Detector module in the LD8000

> FLOW CONTROL

Flow management in such analyzer is critical in terms of dead volume and leakage. It is important to have a flow control device that will not introduce air and dead legs in the system. The LD8000 has an operating range as low as 0-1 ppm with a few ppb as detection limit. Conventional Mass Flow Controllers (MFC) is not suitable for such analysis. Since air is made of 78% of nitrogen, the chance to have some nitrogen introduced in the system with MFC is too high.

LDetek has designed its own flow control system to avoid air infiltration by the flow control device. The instrument can work with a flow as low as 25 cc/min and have a quick response time without apparition of dead volume.

Micro-Valve

LDetek have worked to develop a valve that meets the performances requirement. This miniature valve has a very small orifice size and offers ultra low flow rate. Since the LD8000 can work on relatively low flow, this valve design does not introduce delay or drifting problems.

Standard valves (figure 5) introduce “spikes” in the reading caused by dead volume located inside the valve. Measuring in so low concentration can be a big problem when having nitrogen released after calibration or upset condition in the sample.

With the LDetek micro-valve performance (figure 6), this problem is avoided and stable reading is obtained after any changes of concentration.

The inlet pressure can range from low as 4 PSIG to 30 PSIG without reading fluctuation. With an optional pump offered by LDetek, the instrument could work in even lower pressure.

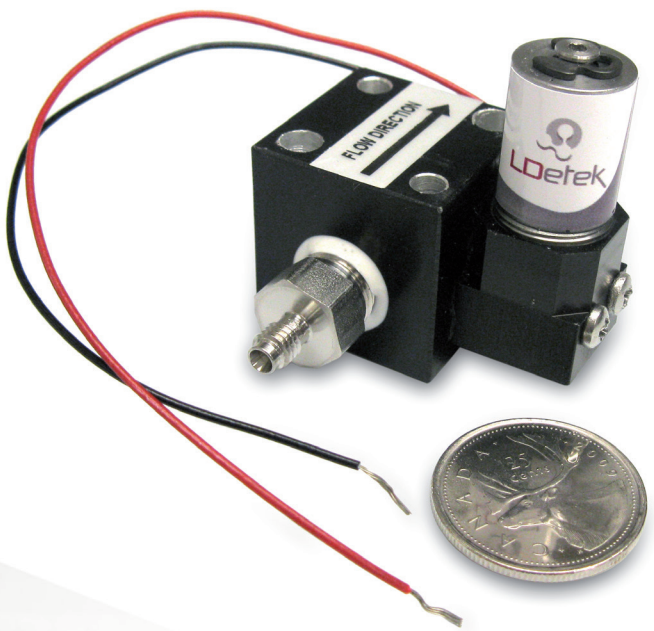

Figure 4: Micro-Valve for sample control

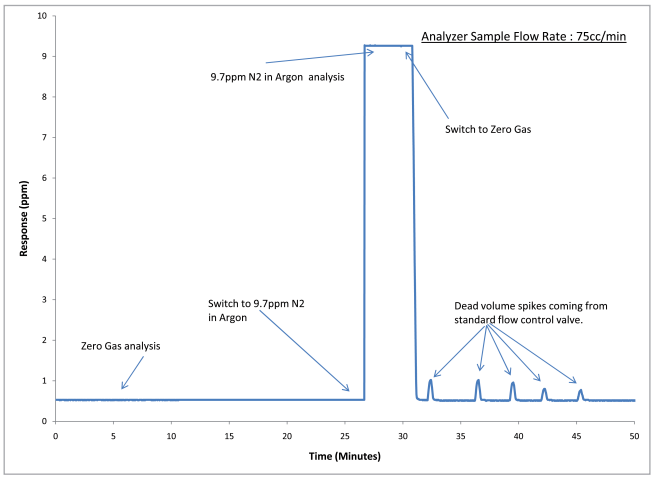

Figure 5: Standard valve performance

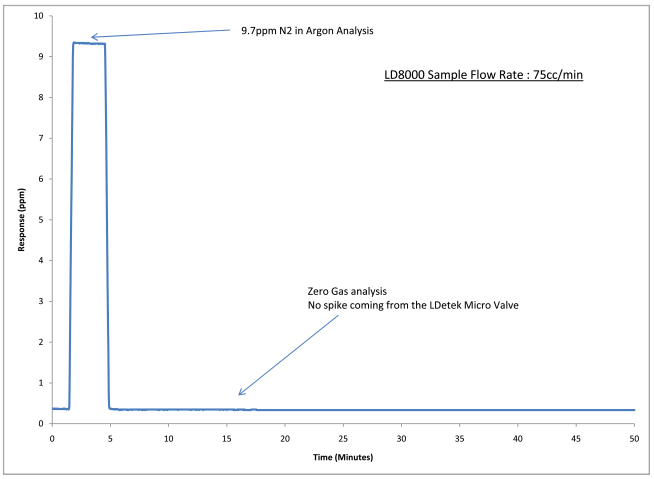

Figure 6: LDetek valve performance

Flow Transducer

The flow transducer is the biggest source of contamination for such analyzer. To avoid any problem with such device, the transducer is installed at the end of the flow path after the detector and is connected to the microcontroller unit to give information to the micro-valve to control a stable flow.

So why not using a MFC after the detector? That would avoid any chance of contamination or leakage? Actually, the PED must work at atmospheric pressure and it must not be pressurized. Since the PED is a cell made of quartz, it can break with a backpressure coming from the vent. Furthermore, you want to keep a constant pressure in the detector to get a stable plasma.

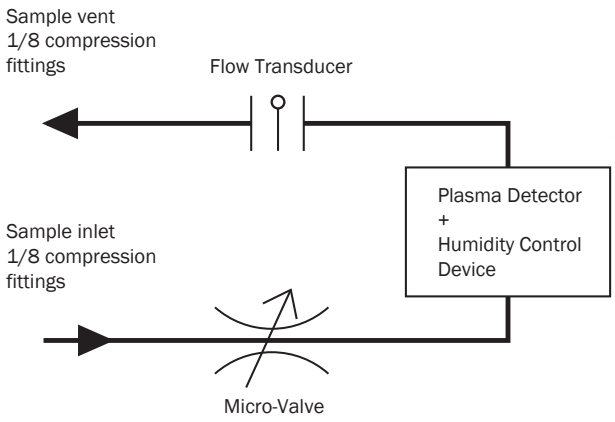

Figure 7: Flow path of the LD8000

> NO NEED OF ZERO CALIBRATION GAS!

An option is available that avoids the need of a pure reference gas to make the zero calibration. The LD8000 can be designed in a way that components are added inside the analyzer to generate zero gas.

Only the sample gas is connected to the instrument and zero calibration can be achieved. A valve's system is used to change the flow path to the detector. During zero calibration, the sample goes to a small gas purifier to get pure argon or helium.

There is no consumable in such configuration. Since the integrated gas purifier is used only during zero calibration and the valve system isolates it, the lifetime of the purifier is extended. Such system will save the needs of pure argon supply, gas regulator, piping, external purifier, bypass valve for the purifier, etc. The payback is quite evident!

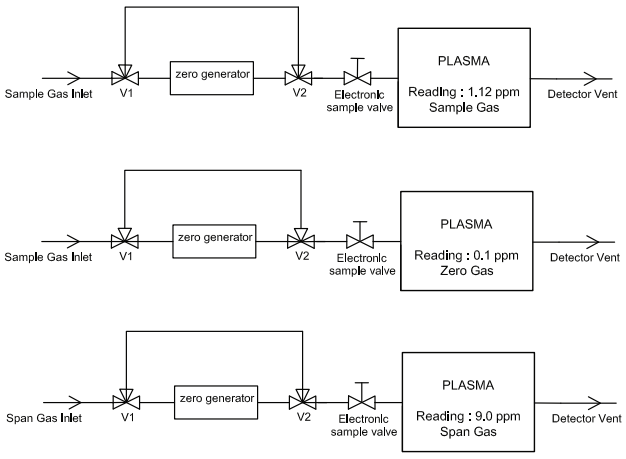

Figure 8: LD8000 with integrated zero calibrator

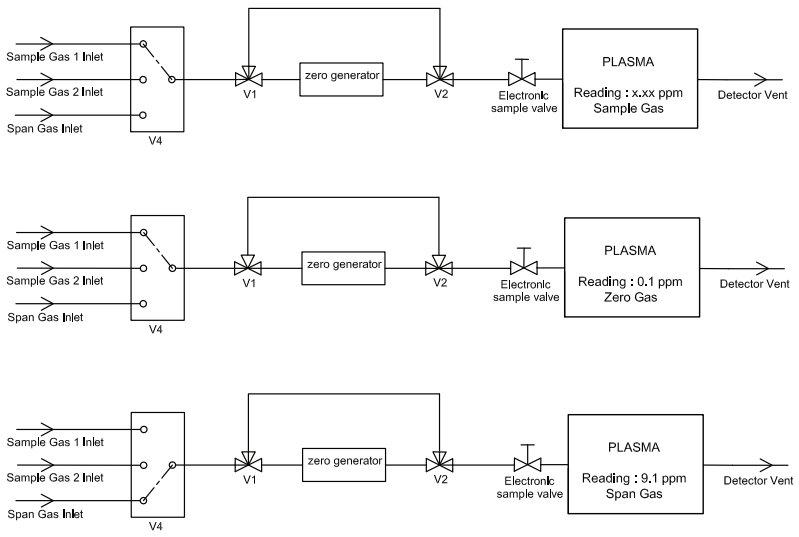

Figure 9: LD8000 with integrated zero calibrator & stream selector

> HUMIDITY CONTROL DEVICE (HCD)

Moisture is the worst « enemy » of nitrogen in the plasma. First of all, its emission wavelength is closed to nitrogen and some interference can occur. Furthermore, the level of energy available in the plasma is more consumed by H20 than N2. That reduces the light intensity of nitrogen ending by a loss of sensitivity.

In each LD8000, a Humidity Control Device is included in the detector module. This device introduces a constant amount of H20 and other chemical vapors compounds in the detector to stabilize the influence of the moisture on the measurement of N2. With the combination of the moisture trap installed outside of the cabinet on the sample line, the analyzer becomes stable at any variation of humidity in the sample.

> MAINTENANCE ?

No maintenance is required in the analyzer. The detector is a non-depleting type device as well as the other components inside the cabinet. Same for the flow control system, however if a defective part needs to be changed, no need to change a complete and expensive flow module or MFC (Mass Flow Controller). You can replace only the micro-valve or transducer.

The unit has been designed in a way to make life easier if parts need to be changed. No need to send back the instrument to factory. Any kind of parts, including the detector module, can be replaced on site by a technician.

The moisture trap installed outside the analyzer should be replaced or regenerated every year to get the best performance in stability and accuracy of the LD8000.

Analyzer Performance

The design of the LD8000 brings outstanding performances for the market demand. Even if this analyzer is used for ppm measurement, we get stability, accuracy and noise level for ppb analysis. With the design described above, some tests have been done to show the performances in different situations. Those performances have been tested with argon sample, since it is the most popular application on the market.

> RESPONSE TIME

The LD8000 has a fast response time to ensure a good purity control in the different applications of such analysis. However, such good result is always dependant of the installation along with the instrument. The stream selector system is critical to be able to achieve such good response time. We strongly suggest to use the LDGSS from LDetek which has been designed specifically for such application.

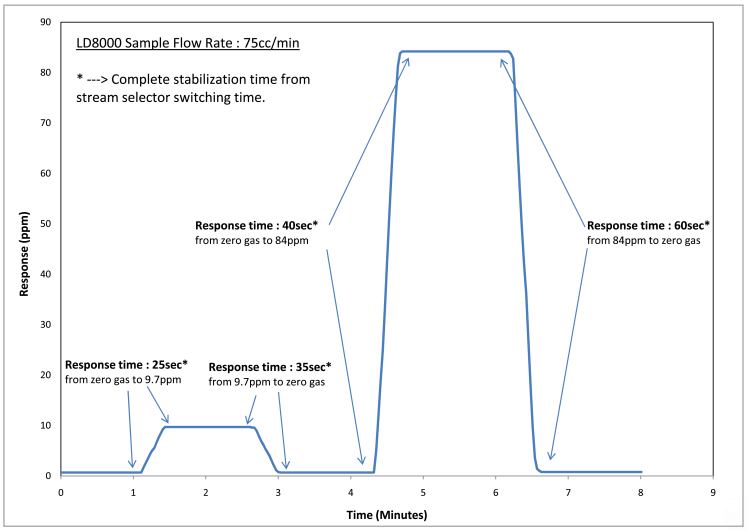

Figure 10:
*LD8000 Reponse time

> NOISE

The electronic for the acquisition of the detector has been designed to avoid any noise that could influence the reading of the analyzer. But more importantly, the design of the detector itself is very important to minimize the noise as much as possible. The position of the optical filter along with the photo-diode is critical to get the specification of the LD8000. Bad response of those components means electrical gain increase to achieve the measurement desired and at the same time the noise level will be amplified. When mounting the detector, special care is done by LDetek specialist.

The amplifier board used to manage the signal from the photo-diode was also particularly well designed. This board takes very low voltage to amplify it on a scale up to 0-10 volts.

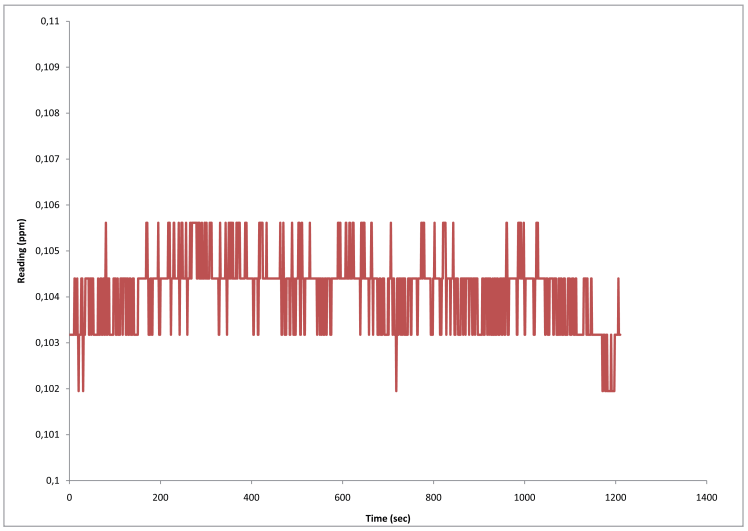

Figure 11:
*Noise level acquired on the analog output with a sample gas of about 0.104 ppm

* Note:
This result has been obtained in LDetek facilities with the LDGSS stream selector device with a well purged system according to LDetek standard methods.

> STABILITY

Stability of the analyzer has been evaluated through a few hours period. Temperature variation has been caused to show the stability of the reading even with an unstable temperature environment. Those variations have been done on the analyzer itself and not on the whole system installation which can be different from site to site.

With a deviation of 4.4 Celsius (31.6 to 36 degrees) on a 36 hours period, the reading has moved down from 300 ppb to 280 ppb. This slight variation gives a 4.5 ppb / Celsius change. Considering that most of the installations are temperature controlled, no temperature effect will be observed. Moreover, the resolution of the analyzer is 10 ppb and slight temperature variation will not been seen by the software reading.

Stability has been evaluated on a 24 hours basis with stable environment (figure 13). The drift observed is less than 2 ppb.

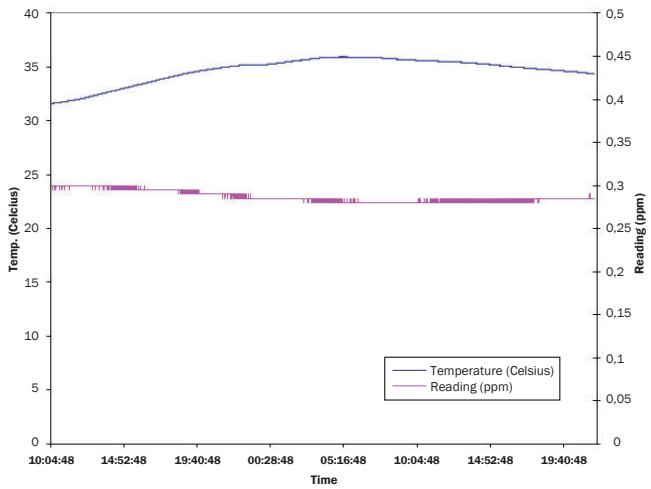

Figure 12: *Signal versus temperature

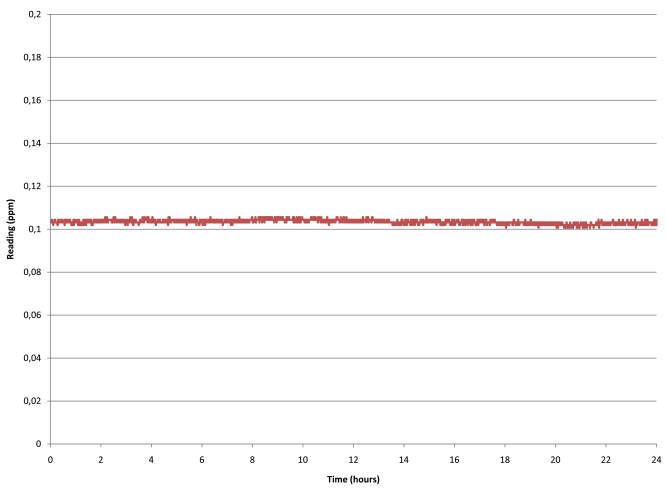

Figure 13: *24 hours stability on stable environment

> LINEARITY AND ACCURACY

Special care has been made on the linearity of the system. Knowing that existing instruments on the market do not offer linearity on the complete range of 0-100 ppm, LDetek has improved its detection system to be sure that working and calibrating the instrument on the range 0-100 ppm will offer the best performance.

On figures 14, calibration of the instrument has been done with a zero gas going through the LDP1000 gas purifier and the same dilution system for the different concentrations measured.

We have also made step changes in low concentration to show the accuracy of the instrument. Figure 15 demonstrates that a 10 ppb step change is easily detectable by the LD8000. Measuring pure gas on the range 0-1 ppm is more and more popular and such performance is appreciated from gas producers.

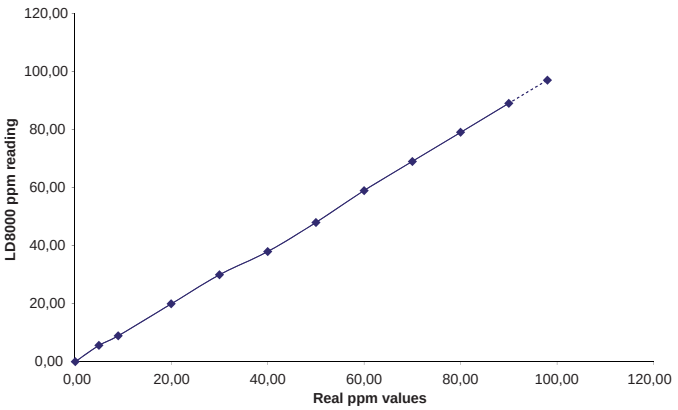

Figure 14: *LD8000 linearity on 0-100 ppm range

*Note:
This result has been obtained in LDetek facilities with the LDGSS stream selector device with a well purged system according to LDetek standard methods.

> DETECTION LIMIT

Referring to the noise of the LD8000 from figure 11, we get maximum 3.6 ppb peak to peak. Using the standard deviation method, we have used 15 consecutive points where we get the maximum peak to peak noise. Five times the standard deviation gives a LDL of 4.4 ppb.

This kind of instrument is mostly used for concentration higher than 100 ppb. The LDL is low enough for all Air Separation Unit or glove box application.

If LDL lower than that is required, LDetek is manufacturing the LD8000-Plus, which is the ppb version of the trace Nitrogen analyzer. We can detect lower than 1 ppb with signal to noise ratio very low. Please contact factory.

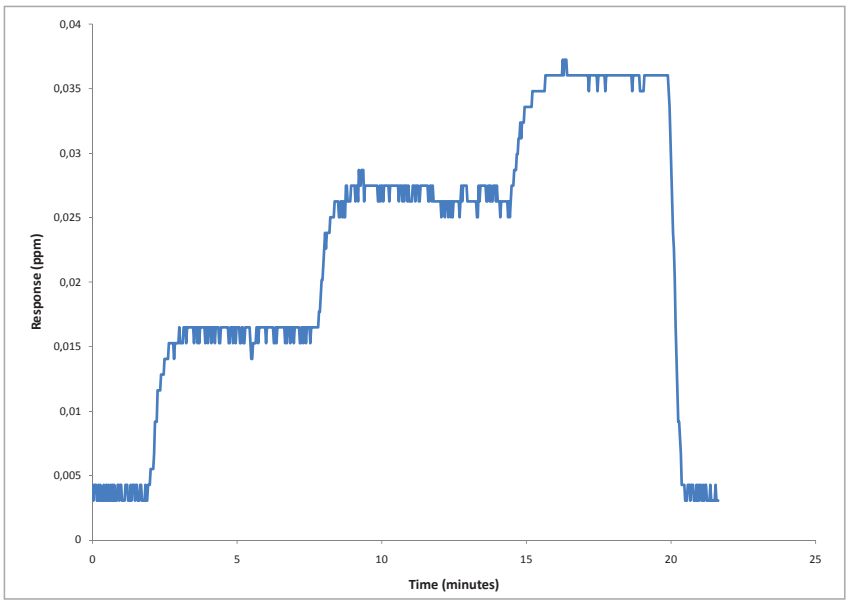

Figure 15:
*10 ppb concentration step changes

*Note:
This result has been obtained in LDetek facilities with the LDGSS stream selector device with a well purged system according to LDetek standard methods.

Conclusion

LDetek has put a lot of effort and time to introduce on the market a trace nitrogen in argon or helium analyzer with outstanding performances. We are proud to offer a reliable instrument that has been carefully designed with specialists having over ten years experience in trace nitrogen measurement and plasma emission detector.

For more information, comments or questions, don't hesitate to contact LDetek (info@ldetek.com).

Where innovation leads to success!

LDetek