

## ■ LDP1000 SERIES

The smaller, the better

## ■ PLASMADETEK-E

New era of detection

## ■ PLASMADETEK 3

The new "HOT" products

# LD MAG

2016 EDITION



FOOD AND  
BEVERAGE



NATURAL GAS  
/ BIOGAS



INDUSTRIAL GAS



AGRICULTURE



ELECTRONIC  
/ SEMI CONDUCTOR



HEALTH  
AND SAFETY



HYDROCARBON  
PROCESSING



PHARMACEUTICAL  
AND MEDICINE



ENVIRONMENT



PETROCHEMICAL



ENERGY

# MULTIDETEK 2

## ENHANCED DESIGN AND NEW CAPABILITIES

Where **innovation** leads to **success**

**LDetek**

## LDETEK COMPANY PROFILE

LDetek is a Canadian based company specialized in manufacturing, developing and integrating online gas analyzer, gas chromatograph system and many other accessories. Our mission is to provide reliable and performing systems with the best technology on the market.

With its commitment to continuous improvement, LDetek thinking and members always push the technology limit further. It brings innovative products and solutions to a market in a severe need of new and better quality materials. The wide range of products, applications and patents developed, make LDetek product portfolio attractive to many different spheres of gas analysis activities. With a constant objective of offering quality products, LDetek always makes all efforts to get rigorous quality control and all necessary levels of approbation and/or certification.

Our products and services are provided by a team of specialists with a strong experience involved in gas analysis business.

With a well established network of offices and partners in over 35 countries, a complete and proactive worldwide support is provided.

### CONTACT INFORMATION

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### Partners Listing

Argentina, Buenos Aires  
Australia, Melbourne  
Australia, Peakhurst  
Brazil, Rio De Janeiro  
Brazil, Sao Paulo  
Chile, Santiago  
Colombia, Bogota  
Egypt, Cairo  
Finland, Helsinki  
France, Paris  
Germany, Frankfurt  
Greece, Athens  
Hungary, Budapest  
India, Mumbai  
Indonesia, Jakarta  
Iran, Tehran  
Israel, Acre  
Italy, Cesano Maderno  
Japan, Tokyo  
Korea, Seoul  
Malaysia, Selangor  
Mexico, Monterrey  
Netherlands, Lelystad

Nigeria, Lagos  
Norway, Oslo  
Pakistan, Karachi  
Philippines, Laguna, Binan  
Poland, Wroclaw  
Romania, Bucharest  
Russia, St-Petersburg  
Singapore  
South Africa, Edenvale  
Spain, Madrid  
Sweden, Stockholm  
Taiwan, Taipei  
Thailand, Bangkok  
Turkey, Istanbul  
UAE, Abu Dhabi  
Ukraine, Kiev  
United Kingdom, Oxon, Wantage  
USA, Colorado, Denver  
USA, Oregon, Dayton  
USA, Pennsylvania, King of Prussia  
USA, Texas, Houston  
Việt Nam, Ho Chi Minh City



# THE NEW HOT PRODUCT!

## PLASMADETEK 3

The PlasmaDetek 3 (patent pending) is a new detector with unique capabilities not available on the market yet. It is the only commercialized heated plasma emission detector that exists for gas chromatograph. By keeping the same principle and features of the PlasmaDetek 2 (spectroscopic emission with a micro-plasma), this new design offers the following new capabilities:

- **Heating with up to 200 Celsius**
- **Removable/changeable optical filters for a more flexible detector**
- **Changeable cell**
- **Possibility to connect a spectrometer fiber optic direct to the cell for specific lab or research project**



Patent pending

The PlasmaDetek 3 uses the plasma controller of the PlasmaDetek 2 which makes it compatible with any previous installation.

Clarity from DataApex will become compatible with the PlasmaDetek3, avoiding the use of the analog signal and simplify his use and installation.





# NEW ERA



## OF LIGHT HYDROCARBON MEASUREMENT

Looking for a **SAFE, SENSITIVE, LOW OPERATION COST** and **MAINTENANCE FREE** system?

The patent pending **PlasmaDetek-E** is the solution



### **SAFE**

No fuel ( $H_2$ ) and no related safety accessories



### **SENSITIVE**

< 1 ppb lowest detection possible



### **LOW OPERATING COST**

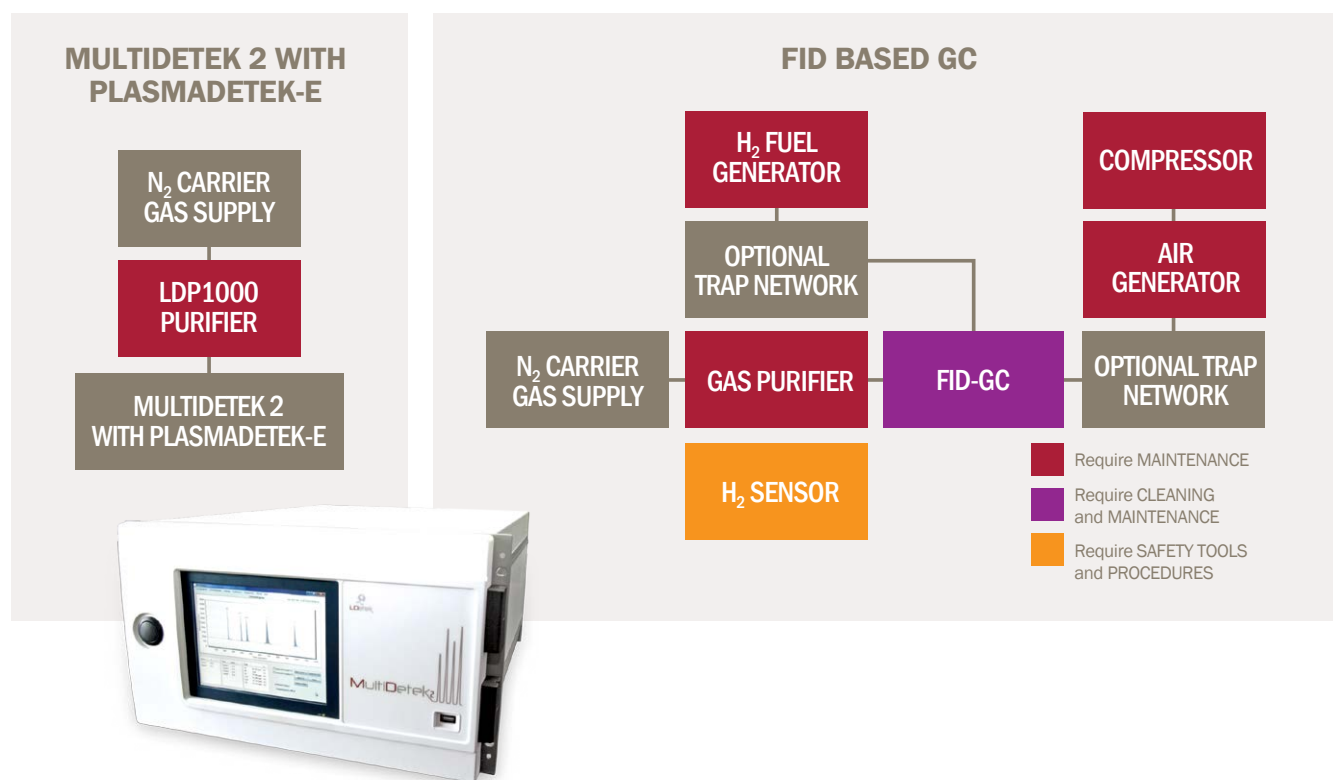
Only  $N_2$  carrier gas supply



### **MAINTENANCE FREE**

No periodic detector cleaning

## TYPICAL INSTALLATION FOR LIGHT HYDROCARBON MEASUREMENT



## INSTALLATION COST\* COMPARISON

Parts	MultiDetek 2 with PlasmaDetek-E	FID-GC
H <sub>2</sub> generator	N/A	\$7200
Zero air generator	N/A	\$2125
Air compressor	N/A	\$1200
H <sub>2</sub> safety accessories	N/A	\$1500
2 year maintenance cost	\$2000	\$5000
<b>Total cost*</b>	<b>\$2000</b>	<b>\$17 025</b>

\* costs are approximate and may vary for each system

N/A: not applicable

Please consult Application Note LD14-01 on LDetek web site for more technical details.



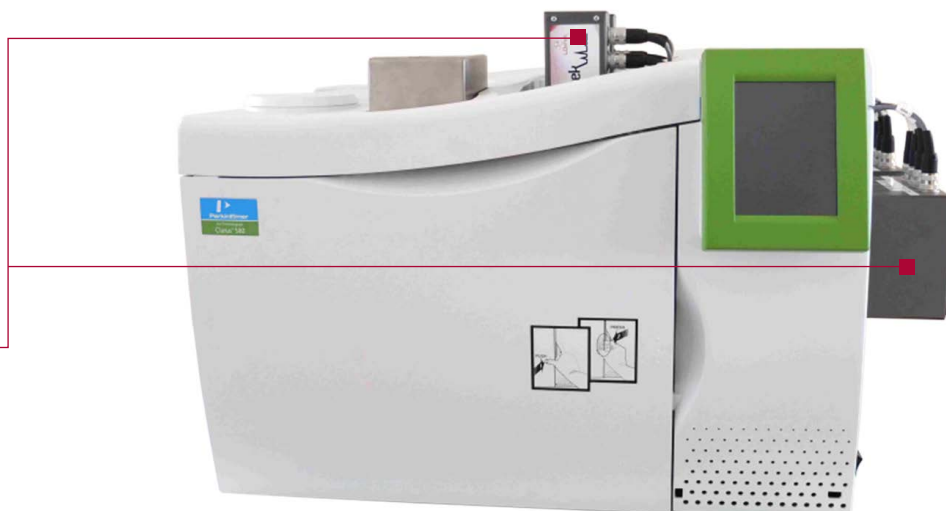
**PARTNER**

Antelia integrated PlasmaDetek series solutions in many GCs over the last years and is proud of its strong expertise for developing high performance applications. Antelia works with Perkin Elmer lab GC platform to develop their solutions. On top of that, Antelia also integrates PlasmaDetek on the compact GAS GC. Depending on the applications, Antelia uses the GAS compact series or the Perkin Elmer desktop GC.



**PlasmaDetek2(PED) mounted on the Clarus Perkin Elmer GC**

**PlasmaDetek1(PED) mounted on the Clarus Perkin Elmer GC**



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## APPLICATION SUMMARY

As part of a research project for measuring greenhouse gases in France, more precisely for the N<sub>2</sub>O and CO<sub>2</sub> for multiple soil sample analysis having a wide range of concentrations, the use of the PlasmaDetek2 (PED) detector and the Agilent 7890 GC combined with the Headspace 111 auto sampler system have been used in this proposed solution.

## CHALLENGE OF THE APPLICATION

The samples from different locations come in 40ml vials. More than 4000 samples have to be analyzed per campaign. The samples contain CO<sub>2</sub> concentrations ranging from 500ppm up to 80% and N<sub>2</sub>O concentration from 300ppb up to 5000ppm. The system of detection must be able to cover each sample within 15 minute cycle time. Low and high concentrations are analyzed with the same system.

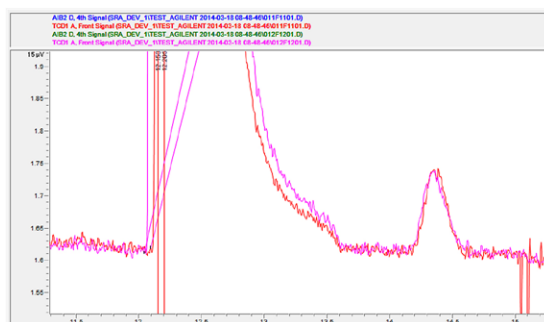
## SOLUTION

System implementation comprises a Headspace setter 111 positions coupled to an Agilent 7890 gas chromatograph (GC) equipped with purged valves and connected to two types of detectors, one TCD for high levels of CO<sub>2</sub> in particular, and a PED (PlasmaDetek2 from LDetek) for traces of N<sub>2</sub>O. The advantage of this notorious PED detector with respect to ECD detector, frequently encountered in this application, is the absence of radioactive source subject to a heavy administrative procedure and staff empowerment. The presence of these two sensors in the same instrument, allows analysis and quantification of high levels of CO<sub>2</sub> and very low levels of N<sub>2</sub>O.

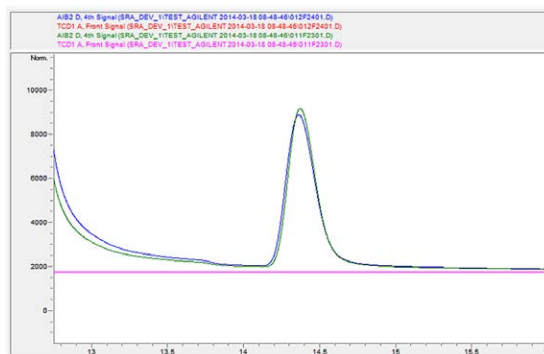
## SYSTEM PICTURE



## RESULTS



Chromatogram showing 80% CO<sub>2</sub> and 40ppm N<sub>2</sub>O using TCD channel. This channel gives the ability to measure high concentration CO<sub>2</sub>.



Chromatogram showing 40ppm N<sub>2</sub>O using PED (PlasmaDetek2) channel. This channel is used for measuring low concentration N<sub>2</sub>O.

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Code TVA FR 40342068731

 **Agilent Technologies**  
Premier Solution Partner

## PLASMADETEK2 (PED) MOUNTED ON DANI MASTER GC

### APPLICATION SUMMARY

At Microbial Analytics Sweden AB we have investigated gases dissolved in water for over two decades. The water is collected from deep boreholes in solid rock and the gases are dissolved in the water under very high pressure. The background is that some of these gases might act as fuel for microorganisms; other gases indicate ongoing microbiological processes. It is important to investigate these mechanisms because they might endanger long-term storage of for instance spent nuclear fuel. Also, in a shorter time span other structures underground might be heavily corroded by such mechanisms.

### SOLUTION

We have developed our own sampler design to collect and transfer the water pressurized to the laboratory. After extraction, we analyze the dissolved gases using several different gas chromatographs. The ranges of gases are the usual permanent gases, though present at unusual ratios and concentrations, as well as lighter hydrocarbons.

As a research institute it is important for us to keep the quality at a very high level. Because of this we have decided that all analytical results should be verified by multiple analyses on different gas chromatographs using alternative columns as well as alternative principles of detection.

Last year we decided to replace an older gas chromatograph that was set up with TCD detector as well as an FID detector and a methanizer. It was brought to our attention by the Swedish agent for PlasmaDetek2, Kovalent AB, that the plasma detector could be a useful alternative for the replacement instrument. Because of this we settled for the PlasmaDetek2 instead of the FID/methanizer setup on one channel in the new chromatograph, keeping TCD detection on the other channel.

For us this was a very fortunate decision since the PlasmaDetek2 has qualities difficult to obtain in other ways. Not only is it very easy to quantify carbon monoxide and

dioxide in the same run as the hydrocarbons without the need for a methanizer that has to be protected by switching valves. It is also possible to detect inert permanent gases in the same run. This is very much in line with our quality goals, to detect the analytes using different principles. Other instruments in our laboratory are still equipped with for instance FID detection and the results are compared, showing very good correlation.

Another positive effect was the ability to tune the sensitivity for different gases. In our samples we sometimes have to measure hydrogen at low concentration in the presence of comparatively high levels of neon. Chromatographic separation is possible, but not always optimal. Using the PlasmaDetek2, the sensitivity for hydrogen is much higher than for neon and the quantification gets a lot easier.

The PlasmaDetek2 (PED) detector has been a very positive experience for us!



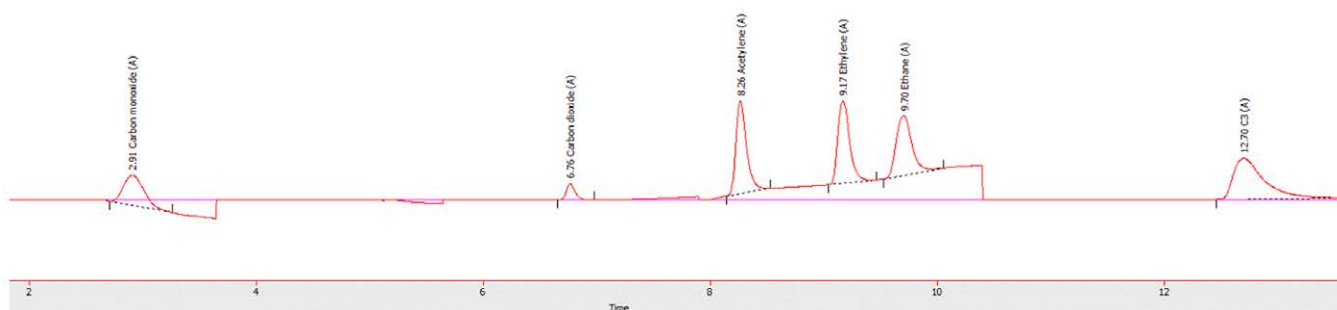
## RESULTS

The chromatogram below shows an example of analysis of a sample gas containing 0,10% of CO-CO<sub>2</sub>-C<sub>2</sub>H<sub>2</sub>-C<sub>2</sub>H<sub>4</sub>-C<sub>2</sub>H<sub>6</sub> and C<sub>3</sub> in balance nitrogen. The CH<sub>4</sub> is also measured in this application and the integration window appears at minute 5, but it is not present in the sample gas used for this analysis.

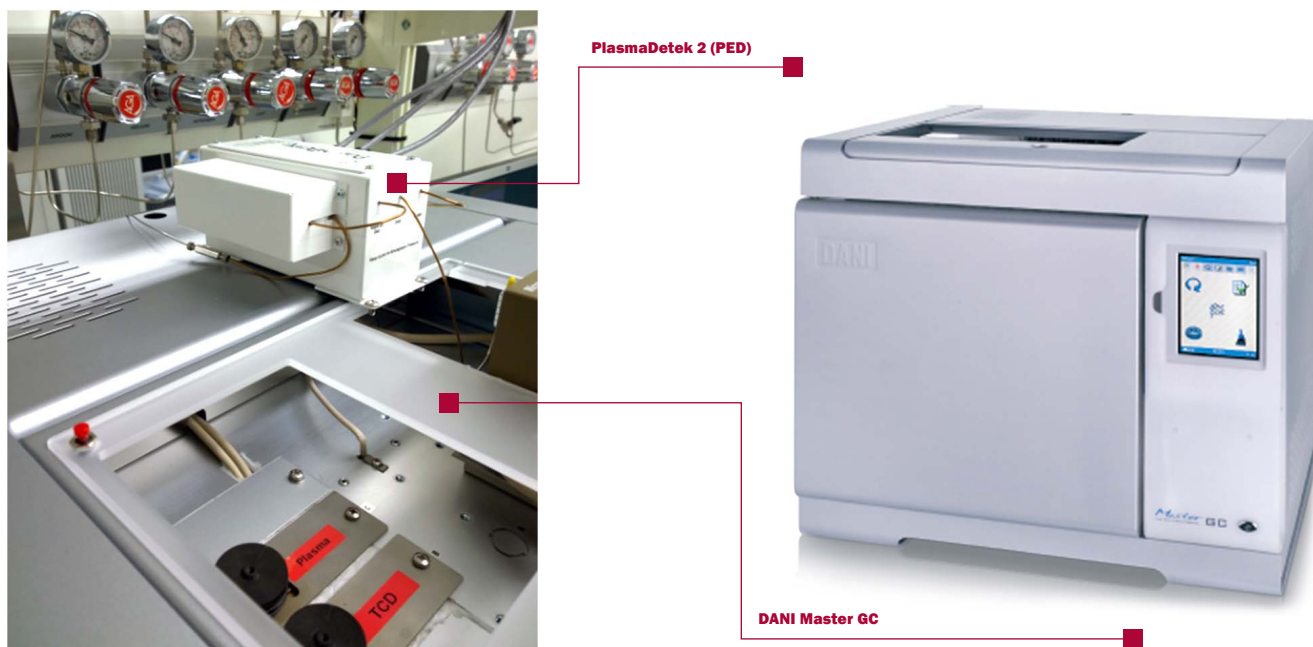
On the chromatogram, we can see that the CO peak is integrated in a slight drift that comes from the balance Nitrogen peak that elutes just before. The selectivity of the Plasmadetek2 (PED) for the CO measurement makes it suitable to measure it, even if the column used cannot separate N<sub>2</sub> from CO perfectly.

The C<sub>2</sub>'s are also shown in a slight drift that comes from the temperature programming of the column. The peaks can be separated and integrated with success at any concentration.

The configuration of the system uses a single Carboxen 1010 column for the separation. The column temperature was programmed to allow the peaks having a late elution time to come earlier. The injection volume used was 100 micro liters.



## SYSTEM PICTURE



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CREATVAR  
TECHNOLOGY CORP.

## ANALYSIS OF TRACE IMPURITIES IN ELECTRONIC GRADE HYDROGEN USING AGILENT GC WITH PDHID AND PLASMADETEK 2

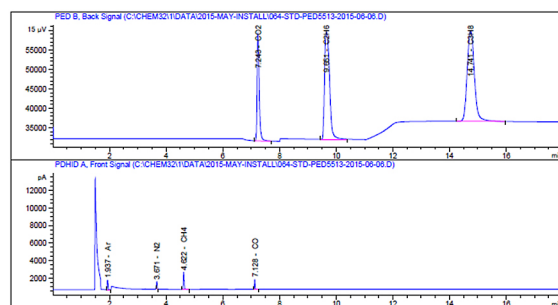
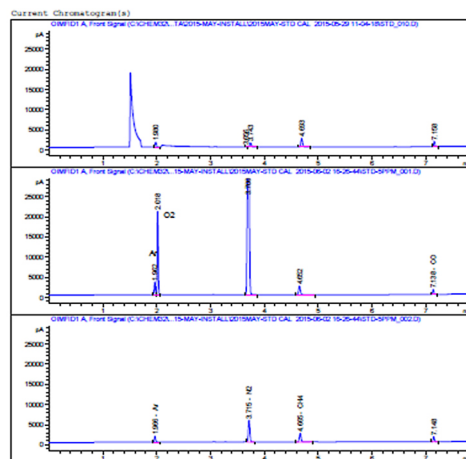
### APPLICATION

Impurities(Ar-O<sub>2</sub>-N<sub>2</sub>-CH<sub>4</sub>-CO-CO<sub>2</sub>) analysis of electronic grade Hydrogen at 10 to 20ppb level with the PDHID and Plasmadetek 2.

This analyzer has been configured with two independent channels, front channel for impurities(Ar-O<sub>2</sub>-N<sub>2</sub>-CH<sub>4</sub>-CO) measurement by PDHID and back channel for impurities(CO<sub>2</sub>,n-C<sub>2</sub>~4) measurement by PED. The system is based on a GC 6890N from Agilent equipped with electronic pressure control module. Two low leak rate 6 port and 4 port switching valves with Molsieve 5A column to perform bulk Hydrogen heart-cut technic and assure the baseline separation for Ar and O<sub>2</sub> in H<sub>2</sub> gas sample.



H2 Analyzer



Signal 1: PED B, Back Signal

RetTime [min]	Type	Area [15 $\mu$ V*s]	Amt/Area	Amount [ppm]	Grp	Name
7.243	BB S	1.44087e5	2.78998e-5	4.02000	CO2	
9.651	BB S	3.36276e5	3.28599e-5	11.05000	C2H6	
14.741	BB	4.07393e5	1.13159e-5	4.61000	C3H8	

Signal 2: PDHID A, Front Signal

RetTime [min]	Type	Area [pA*s]	Amt/Area	Amount [ppm]	Grp	Name
1.937	BBA	1860.75464	2.86443e-3	5.33000	Ar	
3.671	BB	1753.38501	3.59305e-3	6.30000	N2	
4.622	BB	4349.97461	1.13334e-3	4.93000	CH4	
7.128	BB	1978.74536	2.41567e-3	4.78000	CO	

LDL CALCULATION				
COMPONENT	Standard Gas Conc. (ppm)	Peak Height	3xNoise	MDL (ppb)
AR-PDDA	5.33	1826.99624	0.3381	9.36858
N2-PDDA	6.3	794.99384	0.3381	2.679304
CH4-PDDA	4.93	1911.48582	0.3381	8.72009
CO-PDDA	4.78	1107.18896	0.3381	1.45966
CO2-PEDB	4.02	19544.75508	6.4824	1.33331
C2H6-PEDB	11.05	16159.39258	6.4824	4.43275
C3H8-PEDB	4.61	15624.92695	6.4824	1.91258



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Agilent Technologies

Premier Solution Partner

# THE SMALLER, THE BETTER

## LDP1000 SERIES



The new Compact-LDP1000 offers all features of the LDP1000, but in a smaller package:

- **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



When space is limited, it is the ideal solution for your purification need for noble gases, nitrogen and hydrogen. It is also possible to install it on the back panel of the MD2 to get a complete GC system in a single chassis.

Both LDP1000 and Compact-LDP1000 can give real end of life combined with the MD2 and PlasmaDetek technology. It is now easy to know when the getter needs to be replaced and avoid any problem with the system connected with the purifier.

# AN ENHANCED DESIGN WITH **NEW CAPABILITIES**

## MULTIDETEK 2



The MultiDetek 2 (MD2) has been well known in the industrial world with its rack mount design and plug and play philosophy, as well as being a unique compact GC design allowing multiple measurements and multiple components in one single chassis with easy maintenance.

By keeping this successful ideology, some features have been added to the MD2 to meet even more the needs of the laboratory world and achieve more applications. Compactness, versatility and flexibility is now possible for a single GC.

### **FOUR INDEPENDENT HEATED ZONES FOR VALVES/DETECTORS/SPLIT/SPLITLESS INJECTOR**

The enhanced MD2 has now 4 independent heated zones for the valves and detectors. This design allows no cold point between each zone having a temperature up to 200 Celsius. The heated module covers are easy to remove and to put in place. Each module can contain up to 4 diaphragm valves with injector or one detector.



## TWO INDEPENDENT LARGE RAMPING OVENS

Up to two larger ramping ovens can be installed on each side of the MD2 providing capabilities to use wider columns size as well as up to 16 columns in one oven. Temperature is also independent and can go up to 350 Celsius. An extra heated zone can be added on top of every large ramping oven for adding additional combination of valves and detector.



DataApex Clarity chromatography software compatible

### COMPACT-LDP1000 MOUNTED ON THE BACK OF THE MD2

With the new design of the Compact-LDP1000, it is possible to mount the purifier on the back of the MD2 offering a complete solution on a single chassis. Isolation valve can be provided to isolate the purifier when needed.

# HYDROGENICS

SHIFT POWER | ENERGIZE YOUR WORLD

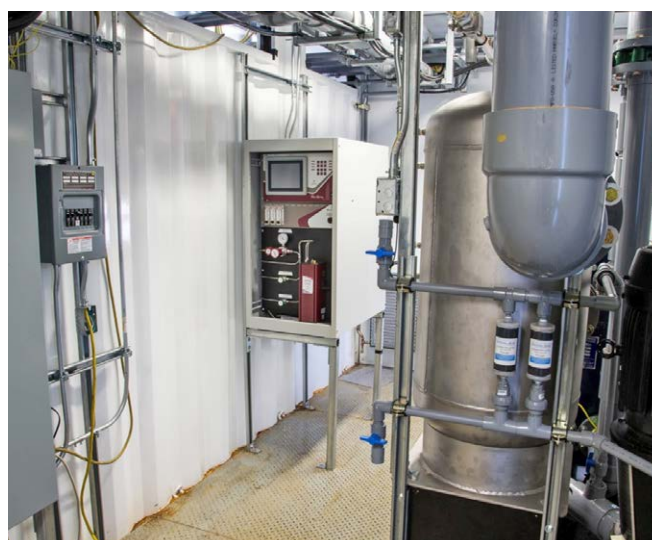
Hydrogenics is a leading developer and manufacturer of hydrogen generation and hydrogen-based power systems. With a proven track-record of over 60-years of experience in fuel cell technology and innovation.

Hydrogenics helps companies reduce their footprint by reducing carbon emissions and producing clean renewable energy that can be sent back into the power grid. Hydrogenics super-dense PEM fuel cell allows for large-scale energy storage with unprecedented high-overload capability.

## SOLUTION

The 1 MW pilot plant in Daesan Korea produces renewable electricity from unclean hydrogen and sends it back to the Korean power grid to be used for home and industry. Hydrogenics needed a company that offered advanced quality critical monitoring system and LDetek delivered with its turnkey solution cabinet system. The MultiDetek 2 checks the level of purity to ensure no contaminants in the hydrogen stream being delivered to the PEM fuel cell. LDetek provided a full system including cabinet, LDGSS (streams selector) and carrier gas purifier. As a company that values safety and reliability, Hydrogenics only chooses best-in-class partners, making LDetek an ideal choice to do business with.

## INSTALLATION PICTURES



[WWW.HYDROGENICS.COM](http://WWW.HYDROGENICS.COM)



## MULTIDETEK SERIES

- **Compact Gas Chromatograph**
- One chassis configuration (6U Rackmount)
- Multichannels, Multimethods, Multidetectors
- Up to 6 isothermal or 3 programmable oven combination
- Up to 5 high purity proportional diaphragm valves (carrier-sample)
- Easy maintenance with its slide out design and front opening door
- ppb, ppm and % gas analysis
- Built in PC with 8.4" touch screen LCD & user-friendly interface
- Up to 10 high performance diaphragm valves
- Ethernet connectivity for remote control
- Integrated compact purifier with real end of life monitoring
- Serial/Profibus/Modbus communication protocols
- Fast parallel chromatography
- Multi heated zones to avoid cold points
- Purged & real time monitored zones for hazardous gases
- Multi sample injection techniques



## PLASMADETEK SERIES

- **Stand alone detector for any GC**
- Heating up to 200 Celsius
- Ideal for ppb-ppm trace impurities
- Selective, sensitive and configurable
- Replaces ECD-FID-TCD-DID all in one detector
- Compatible with Helium, Argon, Nitrogen and Hydrogen as carrier gas
- Interchangeable optics & carrier gas type within seconds
- Compatible with Clarity from Data Apex



## LDP1000 SERIES

- **Purification of Noble gases, Nitrogen and Hydrogen**
- Interchangeable getter philosophy
- Enhanced 2 beds of purification
- Different gas flow capability
- Real end of life monitoring in combination with the PlasmaDetek series and MultiDetek 2



## LD8000 SERIES

- **ppb/ppm N2 in Ar - He - Ne - crude argon - multigas**
- Built-in multi-stream selector system.
- Integrated zero calibration gas generator system.



## LD2000 SERIES

- **ppb/ppm THC in air - O2 - N2 - CO - CO2 - H2 He - Ar - Ne - Kr - Xe**
- Electronic flow controllers for air, fuel and sample.
- Safety fuel shutoff valve.



## LDGSS SERIES

- **Stream selector system for vacuum up to high pressure gas lines**
- Options available for corrosive and toxic gases
- Leak proof, no stream contamination, no outboard leakage, no cross contamination
- Can be connected to the MD series for remote control switching and sequence programming
- Double block and bleed version available

## LABDETEK

- **Stand alone heated zone module**
- Large fast programmable oven up to 350 Celsius
- Isothermal zone up to 200 Celsius
- Multiple columns, valves, detectors, I/Os
- Integrated gas purifier system
- Multiple flow controllers
- User-friendly interface to control the device.
- Compatible with Clarity from Data Apex





Be sure to download our  
**CHROMATOMAG**  
 and visit our application notes section at

**www.ldetek.com**



Where **innovation** leads to **success**

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