



LDP1000 SERIES

USER'S MANUAL

GAS PURIFIER FOR NOBLE GASES, NITROGEN & HYDROGEN



LDP1000

Gas Purifier

USER'S MANUAL
V2.0



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Table of Content

1. Forwarning	2
2. Warranty & service policies	3
3. Declaration of conformity	6
4. Specifications	9
5. Cautions and installation information	11
5.1. Cautions	11
5.2. Installation steps.....	12
5.3. Installation Diagrams	13
6. Lifetime and LED indication	14
7. RS-232 Serial Communication	15
7.1 How to setup HyperTerminal.....	16
8. Drawings	18
8.1. LDP1000 Standard and Large series wiring diagram	18
8.2. Compact-LDP1000 series wiring diagram.....	19
8.3. LDP1000 Standard and Large series dimensions	20
8.4. Compact-LDP1000 series dimensions	20
8.5. Supporting plate with isolation valves option (large version of LDP1000 mounted)	21
9. Maintenance	22
9.1. Cartridge replacement procedure	22
9.2. Regeneration mode (available for O2/CO2 model only).....	24
10. Ordering information	26
10.1 Options	26
10.2 Spare parts.....	27

1. FORWARNING

This manual is required to be read by any user that wants to use the LDP1000Gas Purifier. It contains important information to successfully operate the instrument. LDetek makes assumption that all operators have taken the time to read this information prior to install, operate and troubleshoot the purifier.

If any error is suspected by the reader, please contact an LDetek employee. LDetek has the right to reserve to make any changes to subsequent editions of this document without prior notice to holders of this edition.

In no event shall LDetek be liable for any damages arising out of or related to this document or the information contained in it.

We would like to thank you for choosing LDetek as your gas purifier supplier.

2. WARRANTY & SERVICE POLICIES

Goods and part(s) (excluding getter) manufactured by Seller are warranted to be free from defects in workmanship and material under normal use and service for a period of twelve (12) months after installation and start up and not exceeding 18 months from shipment date. Goods, part(s) proven by Seller to be defective in workmanship and/or material shall be replaced or repaired, free of charge, F.O.B. Seller's factory provided that the goods, part(s) are returned to Seller's designated factory, transportation charges prepaid, within the twelve (12) months after installation and start up and not exceeding 18 months from shipment date.

The Seller shall not be liable to the Buyer, or to any other person, for the loss or damage directly or indirectly, arising from the use of the equipment of goods, from breach of any warranty, or from any other cause. **All other warranties, expressed or implied are hereby excluded.**

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Limitations of Remedy.SELLER SHALL NOT BE LIABLE FOR DAMAGES CAUSED BY DELAY IN PERFORMANCE. THE SOLE AND EXCLUSIVE REMEDY FOR BREACH OF WARRANTY SHALL BE LIMITED TO REPAIR OR REPLACEMENT UNDER THE STANDARD WARRANTY CLAUSE. IN NO CASE, REGARDLESS OF THE FORM OF THE CAUSE OF ACTION, SHALL SELLER'S LIABILITY EXCEED THE PRICE TO BUYER OF THE SPECIFIC GOODS

MANUFACTURED BY SELLER GIVING RISE TO THE CAUSE OF ACTION. BUYER AGREES THAT IN NO EVENT SHALL SELLER'S LIABILITY EXTEND TO INCLUDE INCIDENTAL OR CONSEQUENTIAL DAMAGES. CONSEQUENTIAL DAMAGES SHALL INCLUDE BUT ARE NOT LIMITED TO, LOSS OF ANTICIPATED PROFITS, LOSS OF USE, LOSS OF REVENUE, COST OF CAPITAL AND DAMAGE OR LOSS OF OTHER PROPERTY OR EQUIPMENT. IN NO EVENT SHALL SELLER BE LIABLE FOR PROPERTY DAMAGE AND/OR THIRD PARTY CLAIMS COVERED BY UMBRELLA INSURANCE AND/OR INDEMNITY COVERAGE PROVIDED TO BUYER, ITS ASSIGNS, AND EACH SUCCESSOR INTEREST TO THE GOODS PROVIDED HERE UNDER.

Major force. Seller is not liable for failure to perform due to labor strikes or acts beyond Seller's direct control.

SERVICE POLICY

1. If a product should fail during the warranty period, it will be repaired free of charge. For out of warranty repairs, the customer will be invoiced for repair charges at current standard labor and materials rates.
2. Customers who return products for repairs, within the warranty period, and the product is found to be free of defect, may be liable for the minimum current repair charge.
3. For parts replacement, the original part must be returned with serial and model numbers of the analyzer.

NO PART WILL BE SHIPPED IF THE ORIGINAL IS NOT SENT BACK TO LDETEKINC.

RETURNING A PRODUCT FOR REPAIR

Upon determining that repair services are required, the customer must:

1. Obtain an RMA (Return Material Authorization) number.
2. Supply a purchase order number or other acceptable information.
3. Include a list of problems encountered along with your name, address and telephone, and RMA number.
4. **Ship the parts in its original crating or equivalent. Failure to properly package the parts will automatically void the warranty.**
5. **Every gas connection must be capped with appropriate metal caps. Failure to do so will automatically void the warranty.**
6. Write RMA number on the outside of the box.
7. Use a LDetek approved carrier. Also, the delivery must be sent to the LDetek facility. LDetek will not accept airport to airport delivery.
8. LDetek does not cover transport fees.

Other conditions and limitations may apply to international shipments.

PROPRIETARY RIGHTS

Buyer agrees that any LDetek's software, firmware and hardware products ordered or included in the goods ordered are proprietary of LDetek. No changes, modifications, defacement, alteration, reverse engineering, neither software de compilations nor reproduction of such software or hardware products, or disclosures of programming content to other parties are not authorized without the express written consent of LDetek.

To maintain LDetek trade secret and other proprietary protection of such software and firmware, such items are not sold hereunder but are licensed to buyer.

LDetek Inc. reserves the right to interrupt all business relationship and warranty or service if there is any tentative from any customers to reverse engineering any of LDetek products or to tamper with any sealed module.

Trademarks and product identification as LDetek are the property of LDetek Inc. and shall be used only in connection with LDetek's products. No third party could remove or deface any model number or marks.

3. DECLARATIONS OF CONFORMITY

EU Declaration of Conformity

1. Product model: LDP1000 purifier series
2. Name and address of the manufacturer:

LDetek Inc.
990 Monfette E.
Thetford Mines, QC G6G 7K6
+1 (418) 755-1319
Email: info@ldetek.com

This product is in conformity with the following EU Directives ,Standard(s) or Normative Document(s):

3. Directives.

Low Voltage Directive (LVD) 2014/35/EU,

Electromagnetic Compatibility Directive (EMC) 2014/30/EU,

Restriction of Hazardous Substances (RoHS) Directive 2011/65/EU/2014/68/EU

Pressure Equipment Directive

This product does not bear CE marking for the Pressure Equipment Directive, but are supplied in accordance with Article 4, paragraph 3 of 2014/68/EU by using SEP (sound engineering practice) in the design and manufacturer and are provided with adequate instructions for use.

4. Standards:

EN61326-1:2013 Electrical equipment for measurement, control and laboratory use – EMC requirements – Class B (emissions) and Industrial Locations (immunity).

EN61010-1:2010 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 1: General Requirements

5. On behalf of the above-named company, I declare that under our sole responsibility, on the date that the equipment accompanied by this declaration is placed on the market, it conforms with all technical and regulatory requirements of the above listed EU Directives.



Dany Gagné / CTO
Thetford Mines, QC
Date: 06/21

990, rue Monfette Est, Thetford Mines G6G 7K6
Tél. 418 755-1319, Tél. 418 755 1329

UK Declaration of Conformity

1. Product model: LDP1000 purifier series
2. Name and address of the manufacturer:

LDetek Inc.
990 Monfette E.
Thetford Mines, QC G6G 7K6
+1 (418) 755-1319
Email: info@ldetek.com

This product is in conformity with the following UK Directives ,Standard(s) or Normative Document(s):

3. Directives.

Electrical Equipment (Safety) Regulations 2016 : S.I. 2016:1101

Electromagnetic Compatibility Regulations 2016: S.I. 2016:1091

The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012 : S.I. 2012:3032

Pressure Equipment (Safety) Regulations 2016: S.I. 2016:1105

4. On behalf of the above-named company, I declare that under our sole responsibility, on the date that the equipment accompanied by this declaration is placed on the market, it conforms with all technical and regulatory requirements of the above listed UK Directives.



Dany Gagné / CTO
Thetford Mines, QC
Date: 08/21

990, rue Monfette Est, Thetford Mines G6G 7K6
Tél. 418 755-1319, Tél. 418 755-1329

4. SPECIFICATIONS

	<i>Noble Gas Purifier</i>	<i>Nitrogen Purifier</i>	<i>Hydrogen Purifier</i>
Getter type:	Alloy of Zr/V/Fe 2 beds (400 and 200 Celsius)	Alloy of Zr/V/Fe 2 beds (400 and 200 Celsius)	Alloy of Zr/V/Fe 2 beds (400 and 200 Celsius)
Gases purified:	Ar/He/Ne/Xe/Kr	Nitrogen	Hydrogen
Impurities removed:	H ₂ O, O ₂ , CO, CO ₂ , N ₂ , N MHC, H ₂ , CH ₄ (Heated) H ₂ O, O ₂ , CO, CO ₂ , H ₂ (room temperature)	H ₂ O, O ₂ , CO, CO ₂ , THC, H ₂ , CH ₄ (Heated)	H ₂ O, O ₂ , CO, CO ₂ , N ₂ , THC(Heated)
Impurity level :	<10 ppb outlet impurities based on 10ppm inlet impurities 1 ppb version is available	<10 ppb outlet impurities based on 10ppm inlet impurities 1 ppb version is available	<10 ppb outlet impurities based on 10ppm inlet impurities 1 ppb version is available
Flow:			
Compact and Standard LDP1000 series	200 cc/min (nominal) 1 LPM (maximum)	200 cc/min (nominal) 1 LPM (maximum)	200 cc/min (nominal) 1 LPM (maximum)
Large-LDP1000 series	2 LPM (nominal) 10 LPM (maximum)	2 LPM (nominal) 10 LPM (maximum)	2 LPM (nominal) 10 LPM (maximum)
Gas connections:	1/8", 1/4" compression or 1/8", 1/4" face seal	1/8", 1/4" compression or 1/8", 1/4" face seal	1/8", 1/4" compression or 1/8", 1/4" face seal
Recommended operating pressure:	100 PSIG (689kPAG)	100 PSIG (689kPAG)	100 PSIG (689kPAG)
Supply:	115 VAC, 50 – 60 Hz or 220 VAC, 50 – 60 Hz	115 VAC, 50 – 60 Hz or 220 VAC, 50 – 60 Hz	115 VAC, 50 – 60 Hz or 220 VAC, 50 – 60 Hz
Power consumption:			
Compact and Standard Large	Start 200W/ Run 50W Start 300W/ Run 100W	Start 200W/ Run 50W Start 300W/ Run 100W	Start 200W/ Run 50W Start 300W/ Run 100W
Weight			
Compact-LDP1000:	2 lbs (0.9 kg)	2 lbs (0.9 kg)	2 lbs (0.9 kg)
LDP1000:	5 lbs (2.26 kg)	5 lbs (2.26 kg)	5 lbs (2.26 kg)
Large-LDP1000:	8 lbs (3.6kg)	8 lbs (3.6kg)	8 lbs (3.6kg)

	<i>Carbon dioxide Purifier</i>	<i>Oxygen Purifier</i>
Getter type:	Alloy of Zr/V/Fe 1 bed (40 Celsius)	Alloy of Zr/V/Fe 2 beds (room temperature)
Gases purified:	Carbon dioxide	Oxygen
Impurities removed:	H ₂ O, O ₂ , THC,	H ₂ , H ₂ O, CO, CO ₂ , CH ₄ , NMHC
Impurity level :	<10 ppb outlet impurities based on 10ppm inlet impurities	<10 ppb outlet impurities based on 10ppm inlet impurities
Flow:		
Compact and Standard LDP1000 series	200 cc/min (nominal) 1 LPM (maximum)	200 cc/min (nominal) 1 LPM (maximum)
Large-LDP1000 series	2 LPM (nominal) 10 LPM (maximum)	2 LPM (nominal) 10 LPM (maximum)
Gas connections:	1/8", 1/4" compression or 1/8", 1/4" face seal	1/8", 1/4" compression or 1/8", 1/4" face seal
Recommended operating pressure:	100 PSIG (689kPAG)	100 PSIG (689kPAG)
Supply:	115 VAC, 50 – 60 Hz or 220 VAC, 50 – 60 Hz	115 VAC, 50 – 60 Hz or 220 VAC, 50 – 60 Hz
Power consumption:	Maximum 50 watts (when regeneration mode activated) Normal 20 watts	Maximum 50 watts (when regeneration mode activated) Normal 20 watts
Weight		
Compact-LDP1000:	2 lbs (0.9 kg)	2 lbs (0.9 kg)
LDP1000:	5 lbs (2.26 kg)	5 lbs (2.26 kg)
Large-LDP1000	8 lbs (3.6kg)	8 lbs (3.6kg)

5. CAUTIONS AND INSTALLATION INFORMATION

5.1. Cautions

WARNING!



This product is not for use with oxygen, either pure oxygen or gases with a significant proportion of oxygen. The purifier's gettering alloy is pyrophoric at operating or ambient temperature. Use with significant amounts of oxygen can result in combustion of the material, potential damage to the surrounding area, and possible injury.

The installation process of this product must fully respect the installation procedure described in the user's manual. All steps of the procedure must be strictly followed in order to avoid any damage to the product or any accident caused by any bad manipulation of the product.

Special instructions for Hydrogen Purifier installation

To facilitate maintenance activities and emergency cases, isolation valves installation is required. Some isolation valves at the inlet and the outlet shall be installed at an accessible location, so that the hydrogen flow can be shut off when necessary. A bypass valve is also appropriated to keep flow to the analytical instruments connected to the outlet of the purifier.

High impurity levels (air) in the gas stream could cause the high temperature alarm. In such event, purifier power must be turned off and isolation valves must be closed.

Over Pressure vent must be installed at the outlet of the purifier. In case of high level air contamination, a high pressure increased may occur in the purifier, a relief valve must open to reduce a system pressure.

In no event shall LDeTek Inc. be liable for any direct, indirect, special, incidental, or consequential damage whether based on contract, tort, or any other legal theory and whether advised of the possibility of such damages.

5.2. Installation steps

1. After removing the purifier from the shipping container and protective wrapping, ensure that both end caps are tight, and that the unit is in good condition.
2. Make sure that the fittings in the gas line match those supplied with the purifier.
3. Start the flow of purge gas (minimum purity of 5N) through the gas line before the purifier inlet to purge the piping at approximately 100sccm for a minimum of 20 minutes.
4. While holding the purifier in the gas stream, quickly remove inlet cap, and make a connection with the fitting on the gas line. Tighten as recommended by fitting manufacturer. Leak check the fitting connection.

Note for high purity version:

A new face seal must be installed each time to ensure a good sealing.

5. Remove outlet end cap and quickly make a connection to the outlet gas line. Let it vent to atmosphere for 30 minutes at approximately 100sccm to eliminate air from the getter material.



Caution! The getter should never be heated when air is present

6. Connect the purifier on the electrical supply.



Caution! Be sure you connect the right operating voltage

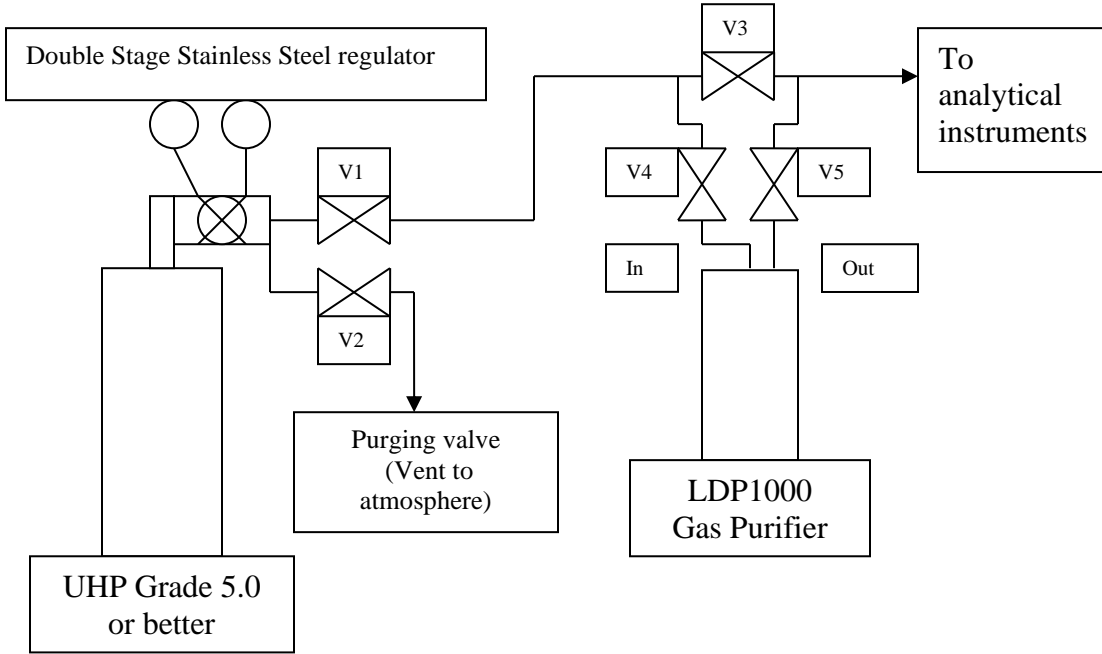
7. With the power on the purifier, let the gas vent to the atmosphere for 3 hours to allow complete purging of the unit.

Note: The cartridge is heated by step of 50Celsius every 15 minutes for a total time of 2 hours to get the operating temperature. (When the purifier is ready to operate, the yellow and red light must be off and green light stays on)

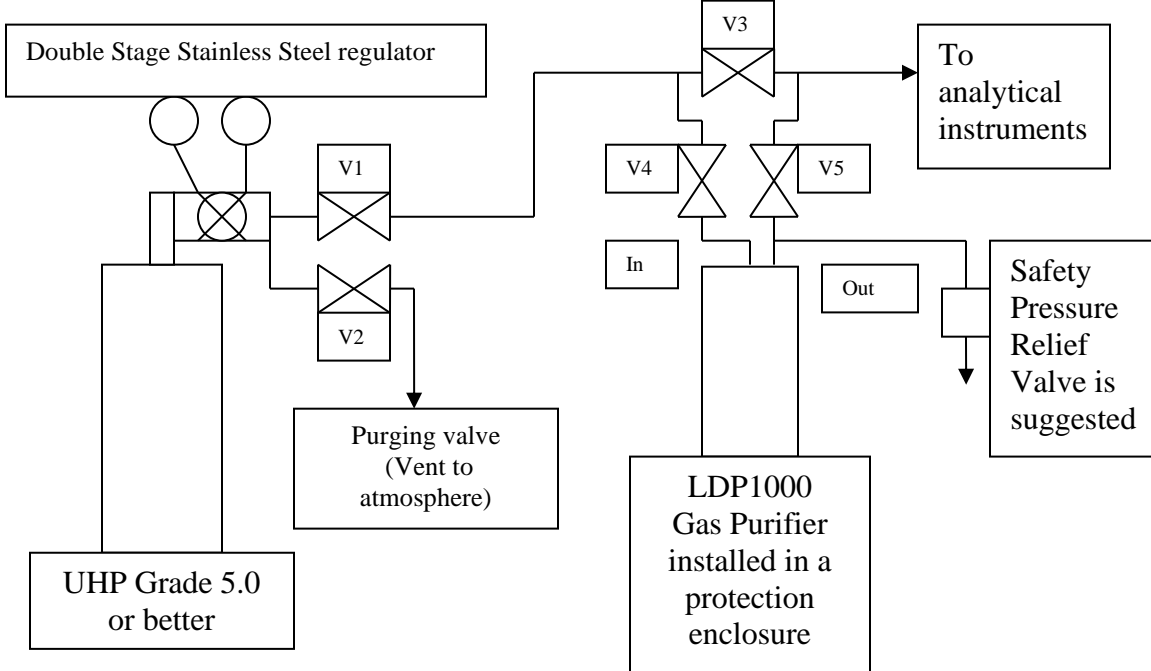
8. After the purging process, make sure there is no alarm and you're ready to go.

5.3. Installation Diagrams

Suggested installation for a Noble Gas/Nitrogen/Carbon dioxide and Oxygen Gas Purifier model:



Suggested installation for Hydrogen Gas Purifier model:



6. LIFETIME AND LED INDICATION

The LDP1000 getter has a lifetime of 2 years. The red light will indicate when the getter is not purifying the gas anymore. The cartridge getter can be replaced instead of the whole purifier. Some manipulation is required to change it. Please refer to maintenance section in this manual.

Here is the meaning of each LED on the side of the purifier:

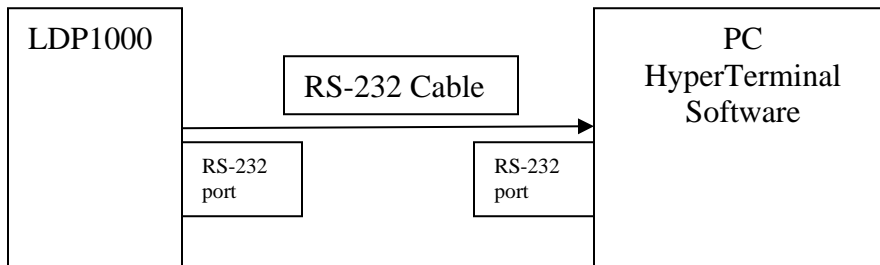
LED Color	Meaning
Red	The getter is not good anymore. It needs to be replaced.
Green	Power is ON
Yellow	Temperature deviation alarm. The getter is not at the normal operating temperature. It could be caused by air contaminations, heater problem, temperature sensor problem or other reasons. Please contact LDetek factory. Such alarm can result to a hazardous situation. Please refer to Warning section in this manual.

7. RS-232 SERIAL COMMUNICATION

The LDP1000 has a serial port that allows a communication to be transmitted to the Serial acquisition software. The standard Windows Hyper Terminal software is suggested to get the acquisition of the data transmitted by the LDP1000. The data transmitted are the Getter#1 operating temperature and Getter#2 operating temperature.

NOTE: Be sure to use an inverted DB9 cable. The pins #3 and #4 must be inverted.

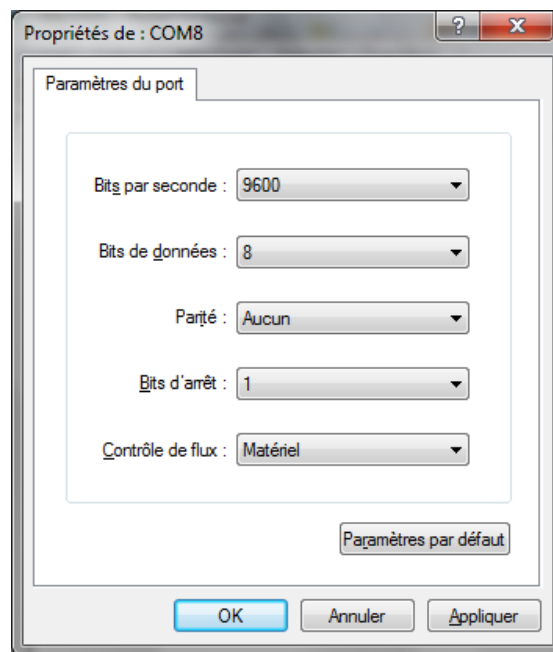
See below a block diagram of the electrical connections.



7.1 How to setup HyperTerminal

See below the instruction to setup the HyperTerminal:

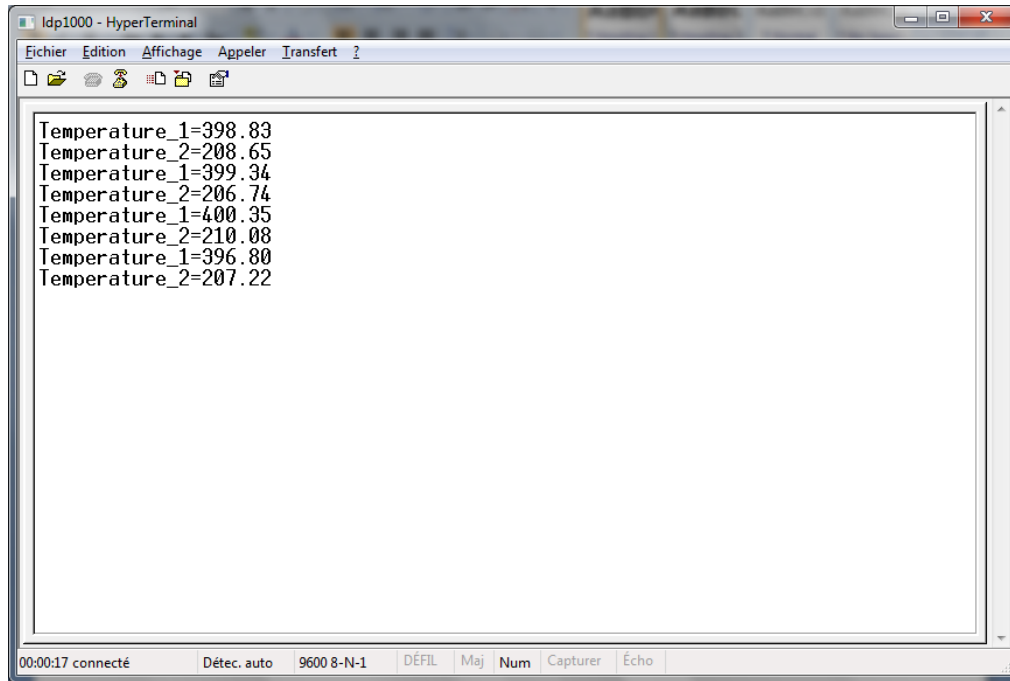
1. Select the Serial Port of your PC where you have connected the serial cable. In this case it was com # 8
2. The Baud rate must be set at 9600.
3. Bits must be set at 8
4. Parity : none



Once the HyperTerminal is configured, open the connection and the data will start to be transmitted to the Hyper Terminal software.

See screenshot below that demonstrate an example of the data transmitted.
The data are transmitted every 5 seconds.

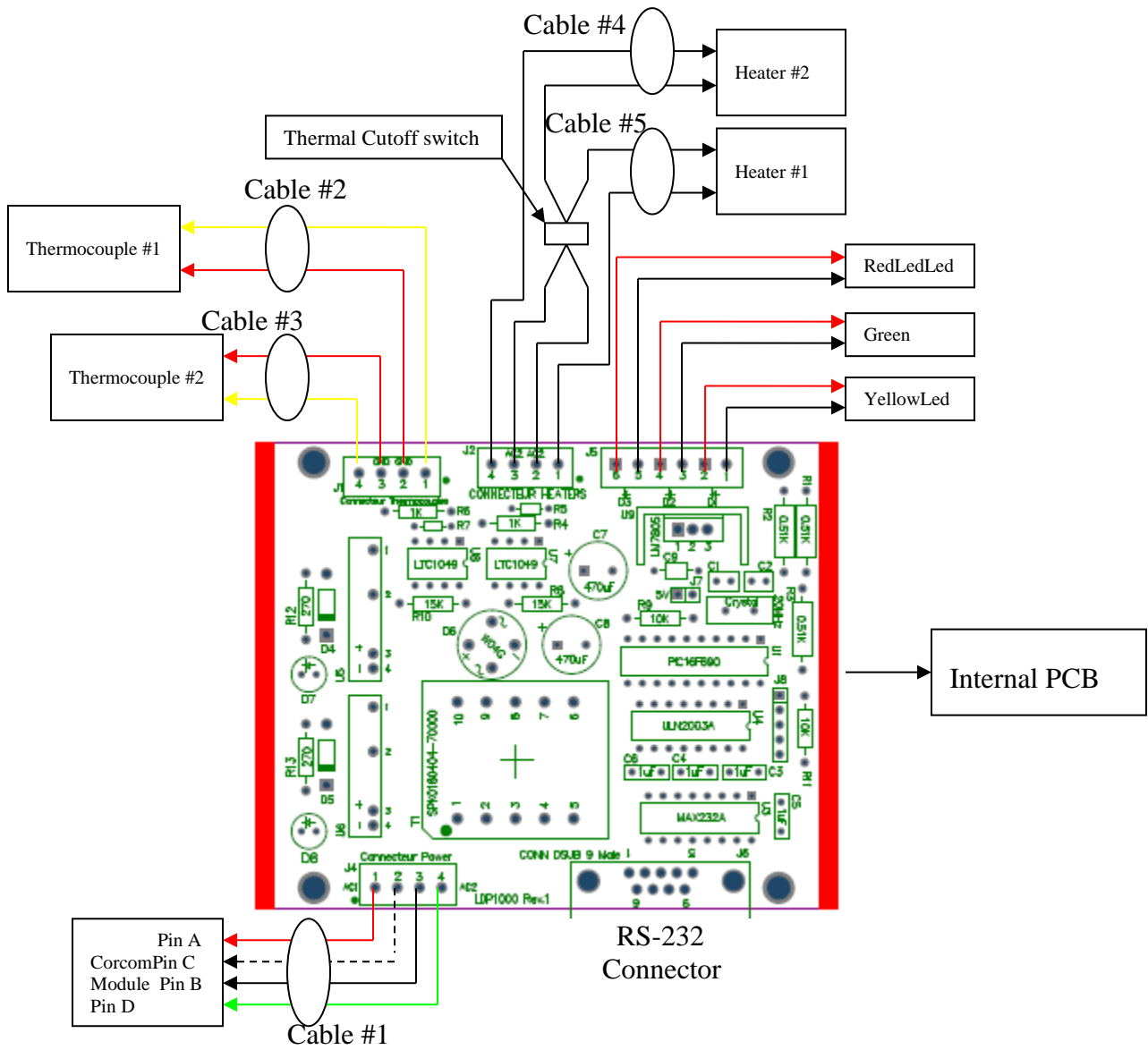
Temperature_1 is the temperature of the Getter #1 (also called 1st bed of purification)
Temperature_2 is the temperature of the Getter #2 (also called 2e bed of purification)



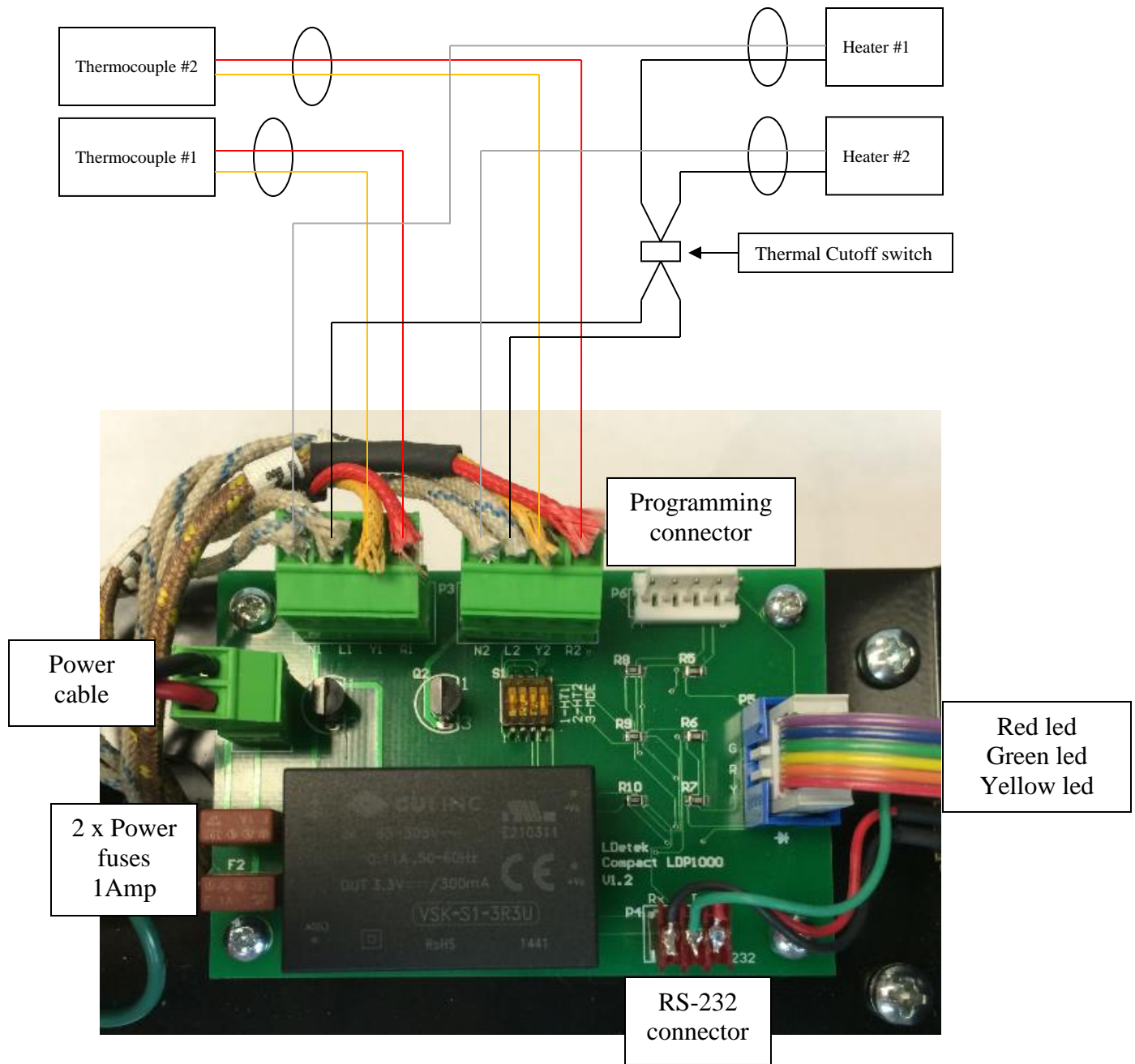
This feature is used as a troubleshooting tool. In the case of a malfunction of the LDP1000 or deviation temperature alarm, you can get connected and get the operating temperatures. It gives the chance to know where the problem comes from.

8. DRAWINGS

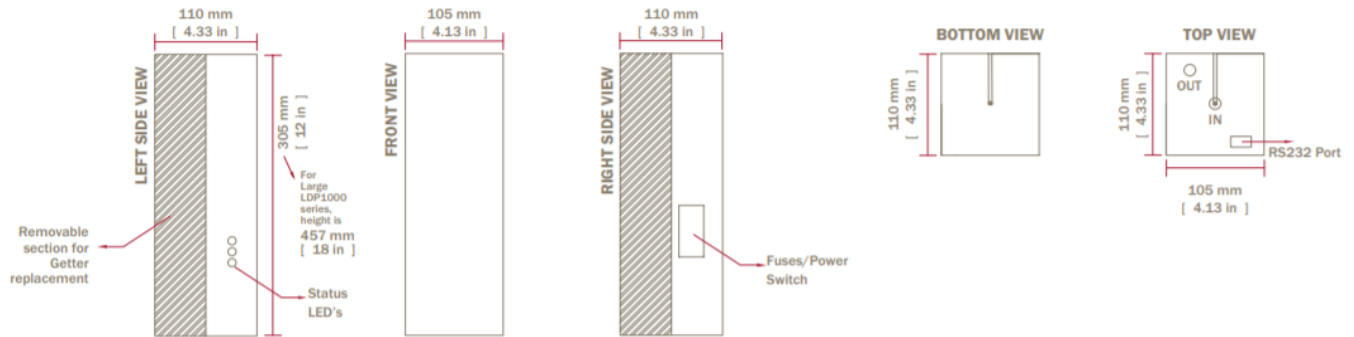
8.1. LDP1000 Standard and Large series wiring diagram



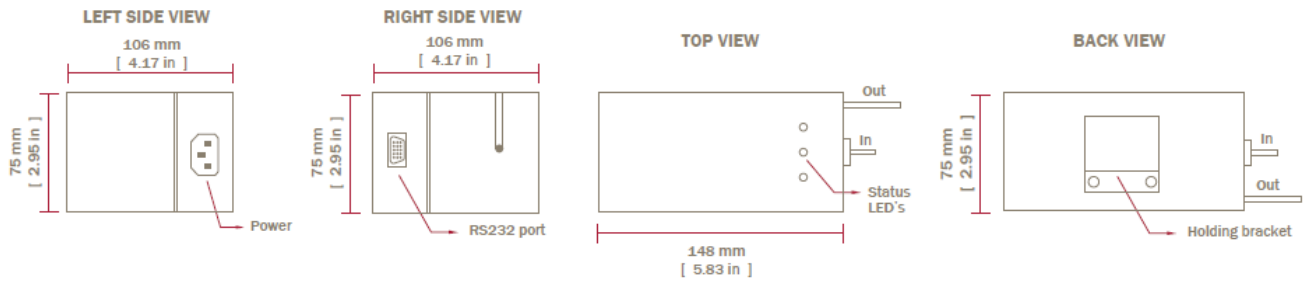
8.2. Compact-LDP1000 series wiring diagram



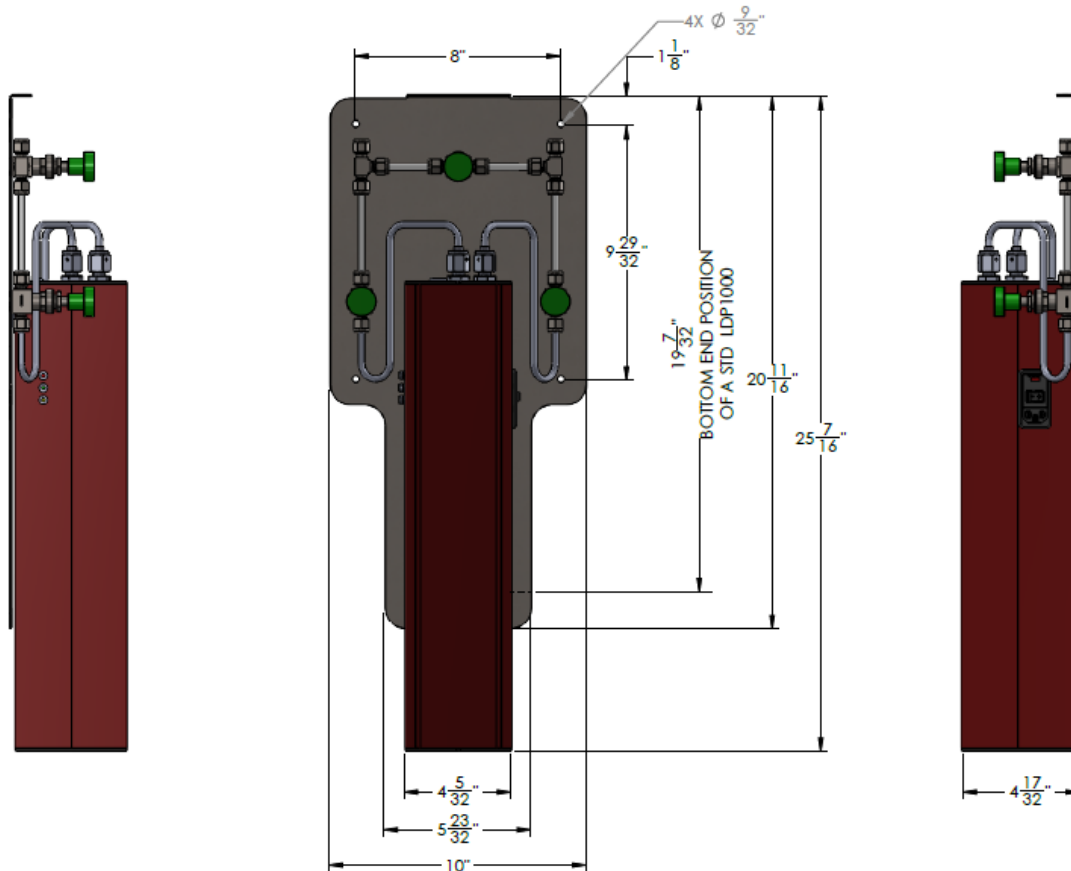
8.3. LDP1000 Standard and Large series dimensions



8.4. Compact-LDP1000 series dimensions



8.5. Supporting plate with isolation valves option (large version of LDP1000 mounted)



9. MAINTENANCE

In normal operation, the LDP1000 does not require any maintenance. Please refer to the lifetime and the LED indication section of this manual for detailed explanations of the alarms.

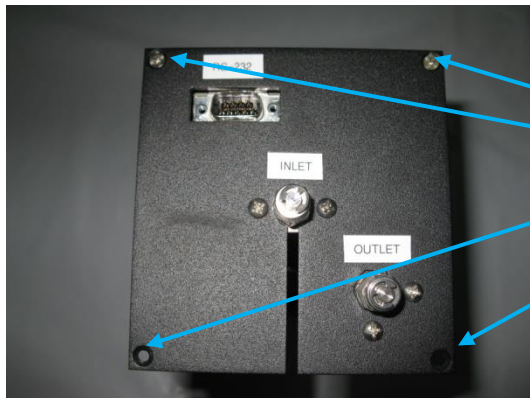
The LDP1000 cartridge can be easily changed on site. See following procedure that explains how to do it. Please contact LDetek at info@ldetek.com to get a replacement cartridge.

The Compact-LDP1000 is a disposable version and doesn't offer getter replacement.

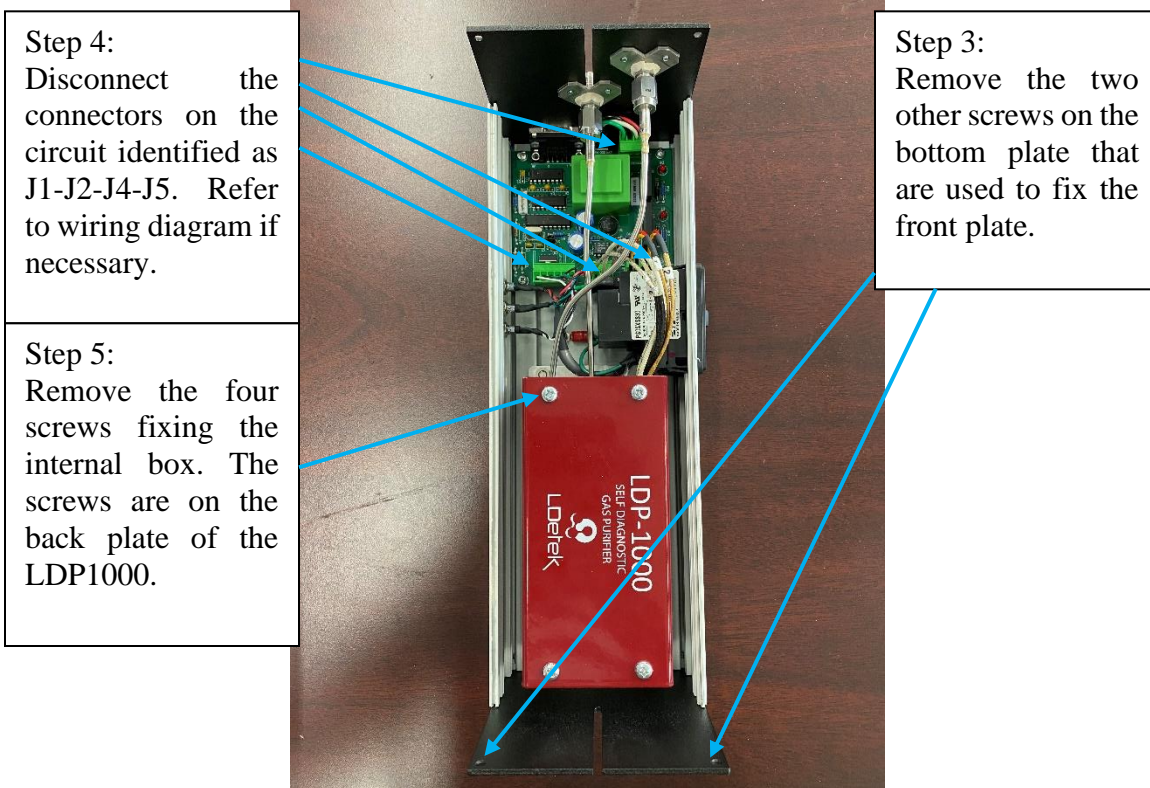
9.1. Cartridge replacement procedure

(only available with the LDP1000 standard and large series)

Step 1: Preparing the unit → Turn off the power on the LDP1000 unit and allow 2 hours to cool down, shut off the gas, and remove the inlet and outlet tubing connections and install plugs on it.

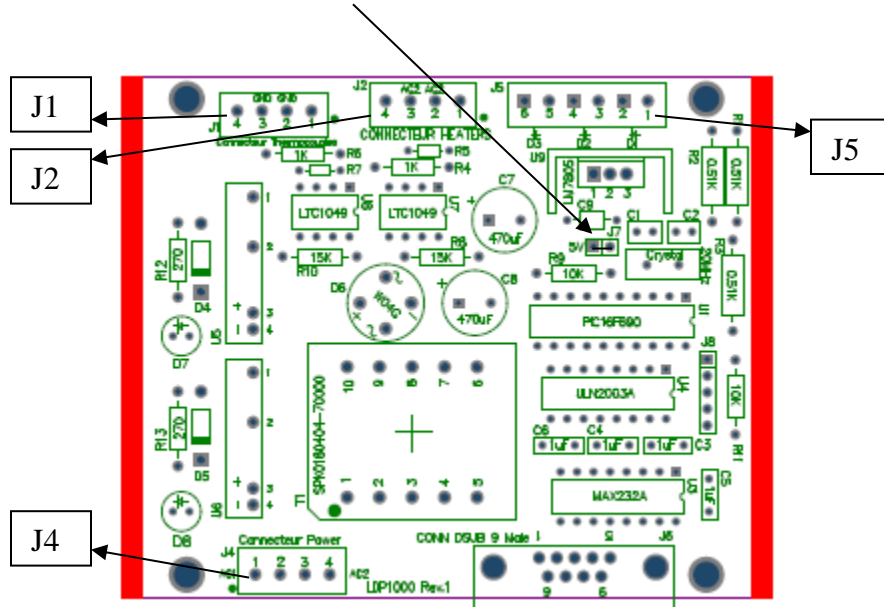


Step 2:
Remove the four screws
fixing the top plate.



Step 6: You can take off the old getter and install the new one by following the same steps in the reverse order, except replacing the front panel.

Step 7: After replacing with new getter, before the install the front panel, turn the switch on temporarily and short both pin of connector J7 to reset the micro controller. To short the pin, simply use a screw driver or a small metal tool to short both pins for about 1-2 seconds. After, you can turn off the power and re-install the front panel. The unit is now ready to operate normally on gas.



NOTE : MAKE SURE TO WELL PURGED THE LINE BEFORE TO CONNECT TO THE INLET (10 MINUTES PURGE). DO NOT EXPOSE THE DEVICE TO AIR; MAKE SURE TO QUICKLY CONNECT INLET AND OUTLET TO AVOID AIR CONTAMINATION OF THE UNIT. IF THIS NOTE ISN'T PROPERLY RESPECTED, SOME DAMAGE CAN OCCUR TO THE LDP1000 DEVICE. SEE WARNING NOTICE FOR MORE INFORMATION ABOUT RISK ASSOCIATED TO AIR CONTAMINATION.

Note for high purity version:

A new face seal must be installed each time to ensure a good sealing.

Disposing of spent getter cartridges

Obtain a return material authorization number from LDetek. Send an email to info@ldetek.com to do so. The RMA # should appear on the outside of the box.

9.2. Regeneration mode (available for O2/CO2 model only)

Once the purifier absorber material is saturated, it will need to be regenerated. If the gas line containing the purifier is to be vented to air, the purifier should be isolated from the air, in order to prevent saturating the absorber.

If the purifier has been exposed to air for more than 1 hour, a regeneration will be required.

Regeneration interval under normal operation (based on 24hours/day, 7 days/week). Considering nominal flow rate of 200sccm with 5ppm H₂O inlet impurity level, the regeneration interval will be every 6 months.

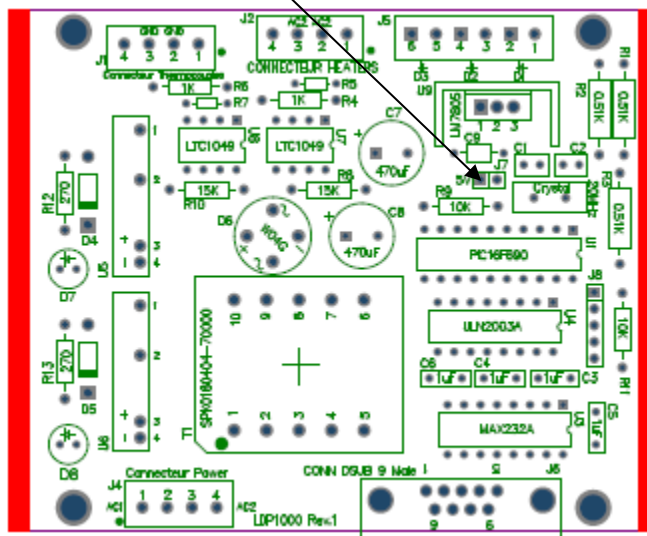
To regenerate the purifier, you may either:

A) Obtain a return material authorization number from LDETEK. Send an email to info@ldetek.com to do so. The RMA # should appear on the outside of the box.

B) Regenerate the unit on site:

1. Turn off power on the unit
2. Remove the front panel of the purifier by referring to previous section 8.1, follow steps 2 & 3
3. Be sure to have at minimum, a grade 5N Argon or Helium at the inlet of the unit at a fixed flow rate of 200sccm. (the use of a purifier gas is preferred to minimize the water content below 10ppb at the inlet). Be sure to vent to atmosphere the outlet of the purifier to avoid the contaminants going into the piping and gas analyzers.
4. Use the included jumper to short the pins identified as J7 on the PCB below.
5. Turn on the power. The unit internal getter will then warm up to 350Celsius.
6. Be sure to leave 200sccm flow rate at 350Celsius for a period of minimum of 8 hours.
7. Turn off the power, remove the jumper and re-install the front panel and be sure to avoid air exposition before to reconnect on the original CO₂ gas source. Very important to wait that the unit came back to ambient temperature before to remove the 5N Argon or Helium regeneration gas to avoid air contamination.

Jumper installation on J7 terminal



10. ORDERING INFORMATION

ORDERING INFORMATION:

LDP1000, LARGE LDP1000, COMPACT LDP1000, GETTER LDP1000 OR MINI LDP1000	-XXX	-X	-X	-X	-X
	Operating Voltage: 120 volts (-120) 220 volts (-220)	Gas type: N: Noble gases N2: Nitrogen version H2: Hydrogen O2: Oxygen CO2: Carbon dioxide	Connection size: 1/8" 1/4"	Connection Type: Compression (-C) VCR (-V)	Supporting plate: P-1/8C: Stainless steel supporting plate/ 1/8" compression with high purity bypass valve & 2 in/out isolation valves P-1/8V: Stainless steel supporting plate/ 1/8" VCR with high purity bypass valve & 2 in/out isolation valves P-1/4C: Stainless steel supporting plate/ 1/4" compression with high purity bypass valve & 2 in/out isolation valves P-1/4V: Stainless steel supporting plate/ 1/4" VCR with high purity bypass valve & 2 in/out isolation valves None: no plate

10.1 Options

A fixing Stainless Steel mounting plate can be ordered with the LDP1000. This plate can come alone or with a selection of 3 valves. A bypass valve that allow maintenance of the unit or bypass flow of the unit. An inlet & outlet isolation valve to allow isolation of the purifier when none operating. The mounting of it is leak proof and tested by LDeTek. All connections are welded. This ensures to have High Purity gas at the outlet of the Purifier and have easy manipulation of the unit.

Description	Part Number
Stainless Steel Mounting Plate	SSMP-LDP1000
Stainless Steel Mounting Plate with 3 mounted valves	SSMP-LDP1000-BPINOUT

10.2 Spare parts

Description	Part Number
Getter	Replacement getter (specify LDP1000 serial number when ordering) this is to ensure the right getter version is sent.
LDP1000FK	LDP1000 fuses kit
LDP1000GS	LDP1000 gasket kit (for VCR version only)
Compact-LDP1000FK	Compact-LDP1000 fuses kit

Thanks for using LDetek Products



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

271 St-Alphonse Sud, Thetford Mines, (Qc), Canada, G6G 3V7
Phone: 418 755-1319 • Fax: 418 755-1329 • info@ldetek.com www.ldetek.com

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