



## **Service Manual**

# **Multipoint Sampler Innova-1409**

BI7717-11



# Index

Index	3
Safety Consideration	4
	5
Chapter 1 Introduction	6
1.1 Introduction to the Service manual	7
1.2 Introduction to the 1409	7
1.2.1 The Sampler System	7
1.2.2 Front Panel	9
1.2.3 Back Panel	10
1.2.4 Interconnection diagram	11
Chapter 2 Service Software BZ7006	12
2.1 Installation of the Service software BZ7006	13
2.1.1 System requirements	13
2.1.2 Installation of the program	13
2.2 Testing procedure	14
2.2.1 Starting the program	14
2.2.2 Connection of the 1409	14
2.2.3 1409 Multipoint Sampler Id identification:	15
2.2.4 1409 Multipoint Sampler Configuration:	16
2.2.5 Testing the Sample valves	16
2.2.6 Reset 1409	17
2.2.7 1409 Multipoint Sampler Status:	17
2.3 Closing the program	17
Chapter 3 Mechanical parts and PCB's	18
3.1 Mechanical parts and PCB	19
3.1.1 Power supply ZG0370A	19
3.1.2 Center manifold UM1119A	19
3.1.3 6 channels Sample manifold UM1120A	20
3.1.4 Multipoint Sampler PCB ZD0900A	21
Chapter 4 Parts replacements	22
4.1 Parts replacements	23
4.2 Fields replaceable parts.	26
4.3 Electrical drawing of ZD0900A	27

## **Safety Consideration**

July 2015

## SAFETY CONSIDERATIONS

**PLEASE READ THESE SAFETY CONSIDERATIONS CAREFULLY AND MAKE SURE YOU UNDERSTAND THEM PROPERLY BEFORE YOU START OPERATING THE 1409 MULTIPOINT SAMPLER.**

### EXPLOSION HAZARD



**THE 1409 MULTIPOINT SAMPLER IS NOT DESIGNED FOR USE IN POTENTIALLY EXPLOSIVE ENVIRONMENTS.**

This means that the instrument must **not** be placed and operated in an area with a potentially explosive atmosphere.

When monitoring potentially flammable or toxic gases it is essential that:

- 1) the instrument itself is placed in a well-ventilated area **outside** the potentially hazardous zone; and
- 2) a sufficiently long tube is connected to the "Sampler Waste Air Outlet" so that the sampled gas is carried **away** to the open air or to an extraction and/or filtration unit.

TO AVOID THE POSSIBILITY OF AN EXPLOSION, MONITORING OF FLAMMABLE GASES **IN EXPLOSIVE CONCENTRATIONS** MUST NEVER BE ATTEMPTED.



**AVOID WATER CONDENSATION IN THE INSTRUMENT.**

Liquids must be prevented from entering the instrument. It is therefore important that warm humid gases be not drawn into a cold instrument because condensation will take place. If such a situation is likely to occur, you should ensure that the gases are drawn through water-trap filters before they enter the sampler channels of the 1409. This will remove water vapour in the gases and thus prevent condensation within the instrument. The water-trap filter should be used in the immediate environment of the instrument so it maintains either the same temperature, or a lower temperature than the instrument.

**Note:** that some gases may be absorbed by the water trapped in the filter. This will reduce the gases' concentration.

# **Chapter 1**

## **Introduction**

July 2015

### 1.1 Introduction to the Service manual

This Service Manual is intended for the service and maintenance of the 1409 Multipoint Sampler, hereafter referred to as the 1409.

It will provide the service engineer with information about the operating principle on a technical level and the use of the Service software BZ7006 for fault finding and testing.

A Service Note that will be published on our web site, <http://innova.lumasenseinc.com>, informs any product change that will impair the safety or performance of the device.

The operation and maintenance procedures are fully described in the Technical Documentation BE6037 delivered with the 1409 and the service technician must fully acquainted with the operation of the instrument prior to any attempt to service it.

Due to the complexity of the 1409 the service and repair is only possible on module level and only a few individual components are made available for field service.

Handling of the electronic parts must be done with proper ESD equipment to avoid any possibility of an electrostatic discharge to the components. Modules returned to LumaSense Technologies A/S for repair/credit will be discarded if not properly packed in ESD material.

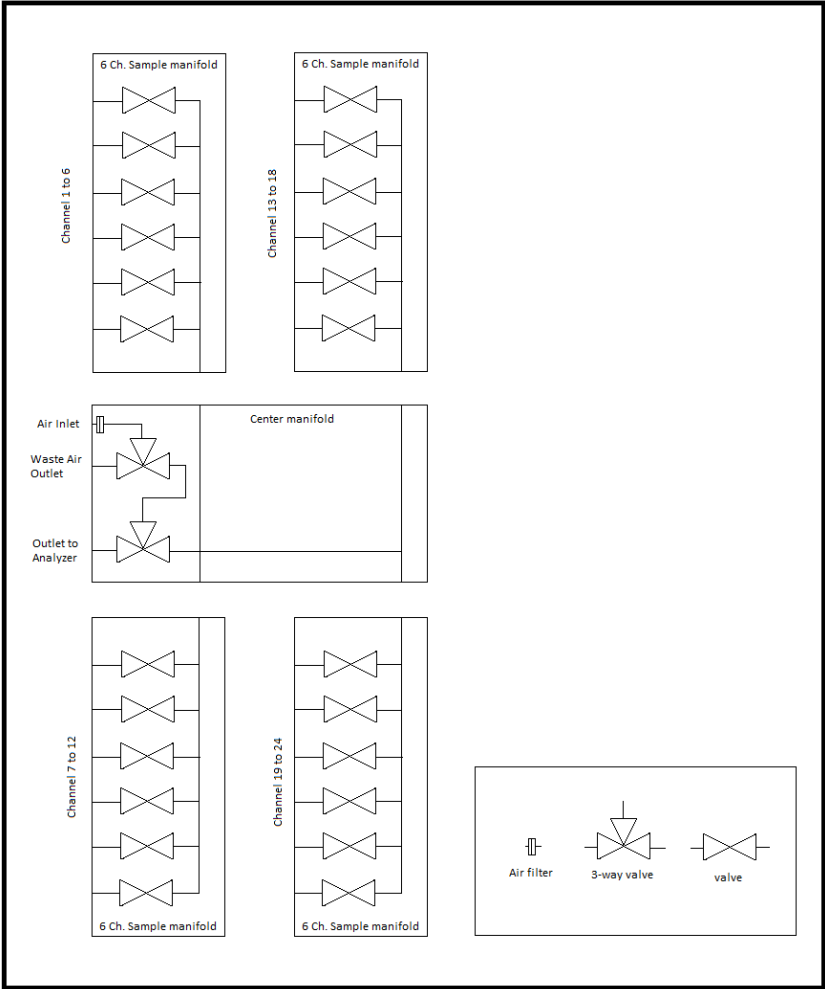
### 1.2 Introduction to the 1409

#### 1.2.1 The Sampler System

The pneumatic system of the 1409 is shown schematically in [Fig.1.1](#). The sampler system is constructed of stainless steel (AISI 316) to minimize adsorption of samples. The 1409 is delivered with 6, 12, or 24 channels. All inlet channels are with a solenoid valve. Each inlet channel has a tube-mounting stub on the back-plate of the 1409 to connect each channel to the respective sampling point. The inlet channels converge into one; a three-way valve then directs the gas sample to the Gas Monitor for analysis, or through the waste-air outlet on the 1409's back-plate.

An external pump (optional) can be connected in the airway system to the waste air outlet. The 1409's sampler system functions efficiently, transporting gas samples from the sampling point at approximately 4 metres per second. However, this speed depends on the type of pump, the diameter of the tubing and the length of tubing attached to the 1409. An air-filter is attached to the end of each sampling tube to keep the samples free of particles.

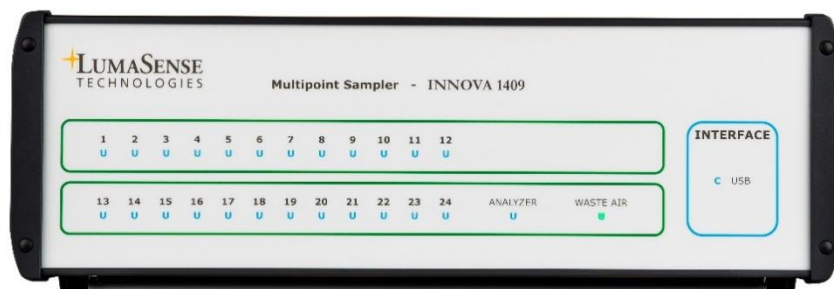
Fig. 1.1 Schematic diagram of the 1409 Pneumatic System.





### 1.2.2 Front Panel

*Fig.1.2 The front panel of the 1409*



#### **LED indicators:**

Each channel is numbered, and has a correspondingly numbered lamp. When the lamp is lit, it indicates that the corresponding sampling valve is open.

The **Analyzer** and **Waste Air** lamps indicate which way the internal 3 way valve is set.

**Interface:** This lamp indicates that the USB interface is connected.

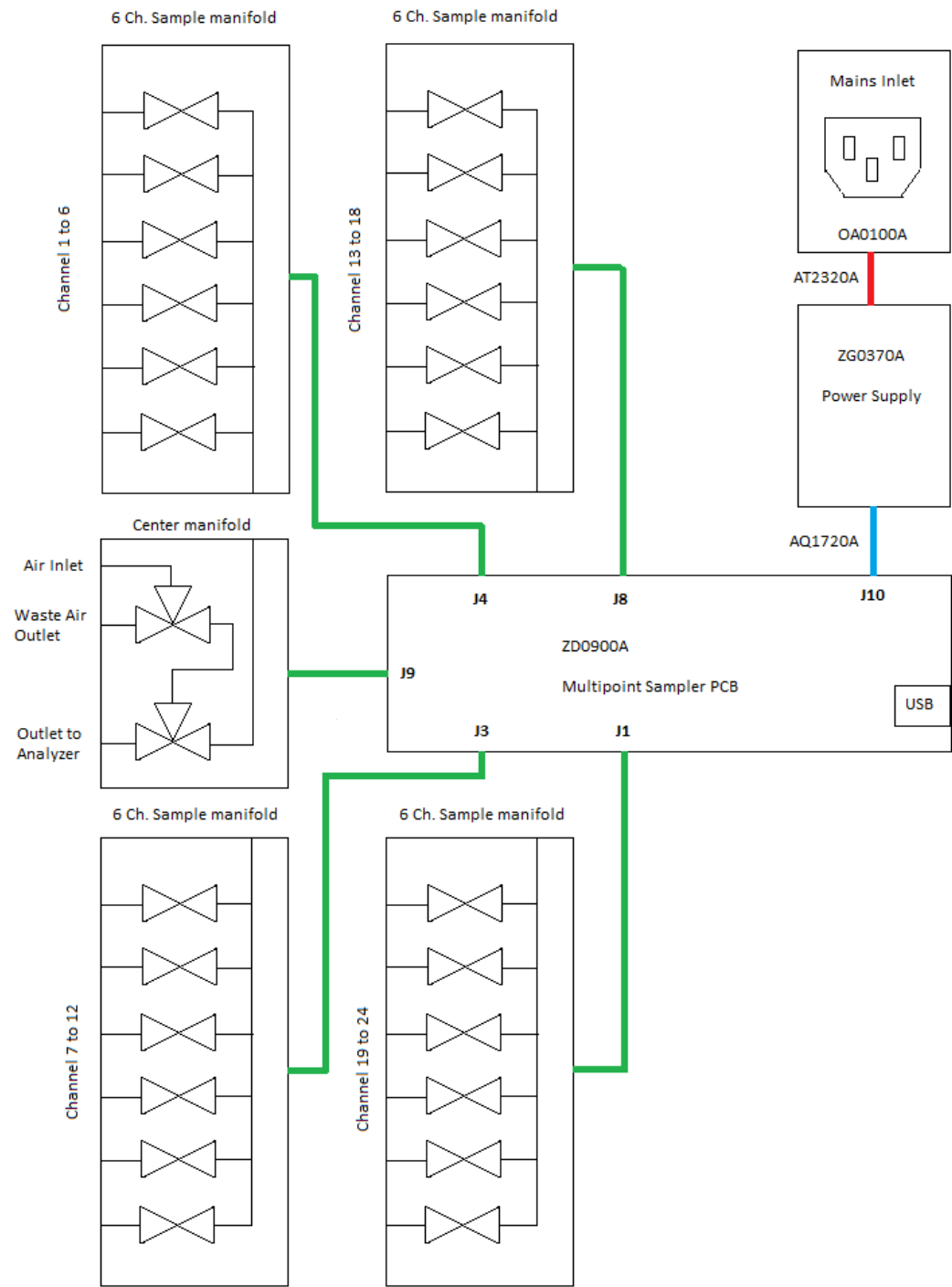
### 1.2.3 Back Panel

*Fig.1.3 The back panel of the 1409*



- Sampler:** From 6 to 24 mounting stubs depended on the 1409 version for connection of tubing to sampling points. Each stub is numbered, and has a correspondingly numbered lamp on the Front Plate. When the lamp is lit, it indicates that the corresponding sampling valve is open.
- AC Mains:** A 3-pin connector accepting Power Cable for connection to a single phase AC mains supply with protective Earth.
- Mains Voltage:** Connect 1409 to mains supply with 100-240 Vac, 50/60 Hz.
- Outlet to Analyzer:** Mounting stub for connecting the sampler system of the 1409 to the inlet of an INNOVA Gas Monitor via tubing. Usable models are 1412i, 1314i, 3434i and 3436i. In the following referred to as "Gas Monitor". Please contact LumaSense Technologies A/S for available models.
- Waste Air Outlet:** Mounting stub for connecting the external pump to the 1409's sampler system.
- Interface:** USB 2.0 Standard
- Air Inlet:** The Air Filter is used for an external pump to flush Air when it does not flush a Sample Channel.

1.2.4 Interconnection diagram



# **Chapter 2**

## **Service Software BZ7006**

July 2015

## 2.1 Installation of the Service software BZ7006

### 2.1.1 System requirements

The Software is targeted to work on a Desktop/Laptop PC running a Microsoft Windows Operating System.

Before installing the Software the PC must meet the following minimum requirements:

<b>BZ7006 Software</b>	<b>Computer requirements</b>
Processor	Minimum: 1 gigahertz (GHz) Pentium processor
Operating System	Windows 7 32 bit or above
RAM	Minimum: 512 MB
Hard Disk	Up to 500 MB of available space may be required.
Display	Minimum: 1024 x 768 high colour, 32-bit
Port connections	1 USB port

### 2.1.2 Installation of the program

Run the BZ7006 Installer and follow the BZ7006 installation setup.

After the installation is successfully completed, a BZ7006 icon

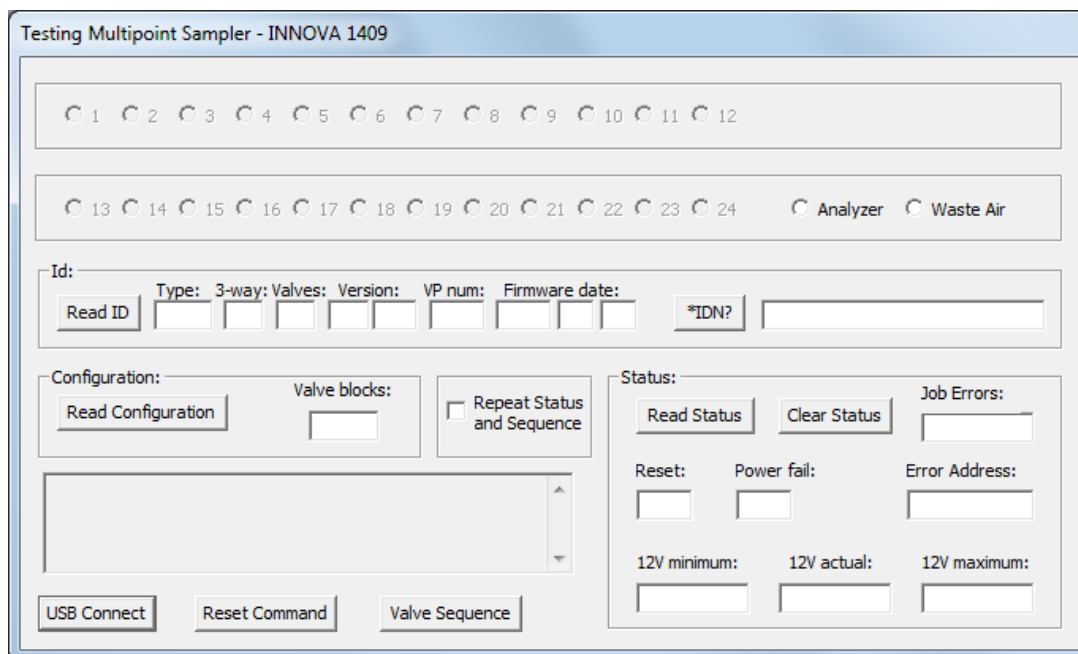


is placed on the desktop.

## 2.2 Testing procedure

### 2.2.1 Starting the program

Double click on the BZ7006 icon on your desktop, to start the BZ7006 Service software.



The following buttons and functions are available

**"USB Connect"** Connects the attached 1409 to the program

**"Reset Command"** Resets the 1409 and close all open valves

**"Valve Sequence"** start an automatic test of the sample valves

**"Read Configuration"** Reads the numbers of valve blocks connected in the 1409

**"Read ID"** Reads out the detailed Identification of the 1409

**"\*IDN?"** Reads out the Identity of the 1409 in short form

**"Read Status"** Reads the status flag from the 1409

**"Clear Status"** Clear the status flags in the 1409

### 2.2.2 Connection of the 1409

Connect the 1409 Multipoint Sampler directly to the computer using a USB cable, INNOVA Part NO. AS0001B

Now click on the **USB Connect** button, to connect to the attached 1409.

### 2.2.3 1409 Multipoint Sampler Id identification:

The **Read ID:** button, will give you information regarding the 1409 type and firmware configuration.

Testing Multipoint Sampler - INNOVA 1409

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12  
☐ 13 ☐ 14 ☐ 15 ☐ 16 ☐ 17 ☐ 18 ☐ 19 ☐ 20 ☐ 21 ☐ 22 ☐ 23 ☐ 24 ☐ Analyzer ☐ Waste Air

Id:

Type: 3-way: Valves: Version: VP num: Firmware date:  
 Read ID 1409 1 12 1 0 9498 2015 2 11 \*IDN? INNOVA,1409,12,VP9498

Configuration:

Read Configuration Valve blocks:  ☐ Repeat Status and Sequence

Status:

Read Status Clear Status Job Errors:   
 Reset:  Power fail:  Error Address:   
 12V minimum:  12V actual:  12V maximum:

USB Connect Reset Command Valve Sequence

Type: is 1409  
 3-way: is 1 when the Center Manifold is connected  
 Valves: is the no. of sample channel in the actual 1409  
 Version: is the 1409 firmware version  
 VP num: is the firmware VP no.  
 Firmware date is the firmware build date

The **\*IDN?** Button will give a text line with Name, Type, Channels and Firmware information.

### 2.2.4 1409 Multipoint Sampler Configuration:

The **Read Configuration** button show the numbers of Valve blocks mounted in the 1409. It also makes it possible manually to activate the valves of the 1409.

### 2.2.5 Testing the Sample valves

Each Sample valve can be activated or deactivated by clicking on the corresponding number in the BZ7006.

The Analyzer 3-way valves can be activated and deactivated by clicking on the **Analyzer** button

The Waste air outlet 3-way valve can be activated or deactivated by clicking on the **Waste Air** button

The **Valve Sequence** button will start a single test of the valves, including the Analyzer and Waste Air Valves.

The valve sequence test will continue if the **Repeat Status and Sequence** is marked before activating the **Valve sequence**.

Stop the test by removing the mark of the **Repeat Status and Sequence**.



### 2.2.6 Reset 1409

The **Reset Command** button will close all open Sample valves, set the 3-way valves in Waste Air and reboot the firmware.

### 2.2.7 1409 Multipoint Sampler Status:

The **Read Status** button, will give a read out of the status / error log and 12V power status.

The **Clear Status** button will reset the error log data.

Reset: indicates if the 1409 has been reset

Power fail: indicates if the 12 Vdc power is outside the specifications.

Job Errors: Indicates if an unknown interface command has been send to the 1409.

Error Adress: Indicates if the 1409 firmware watch dog function has rebooted the  
Firmware due to a runtime error.

## 2.3 Closing the program

Press the Esc button to exit the BZ7006 service software.

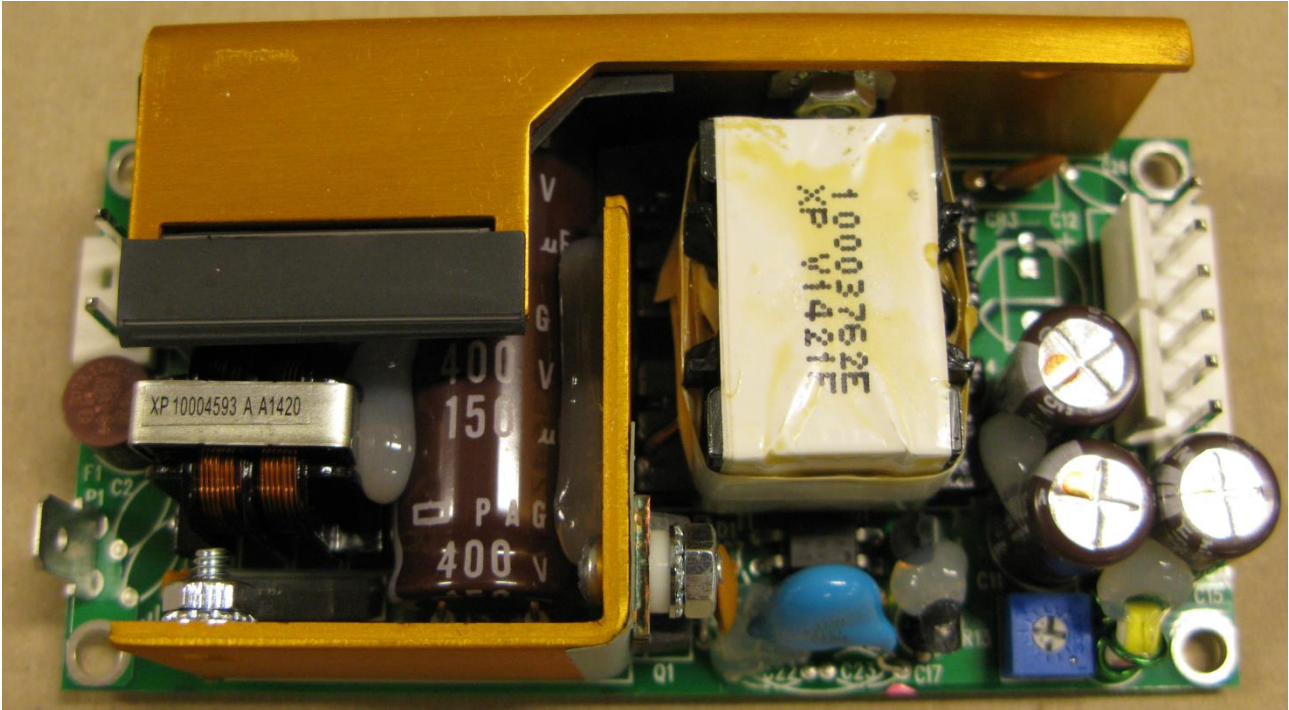
# **Chapter 3**

## **Mechanical parts and PCB's**

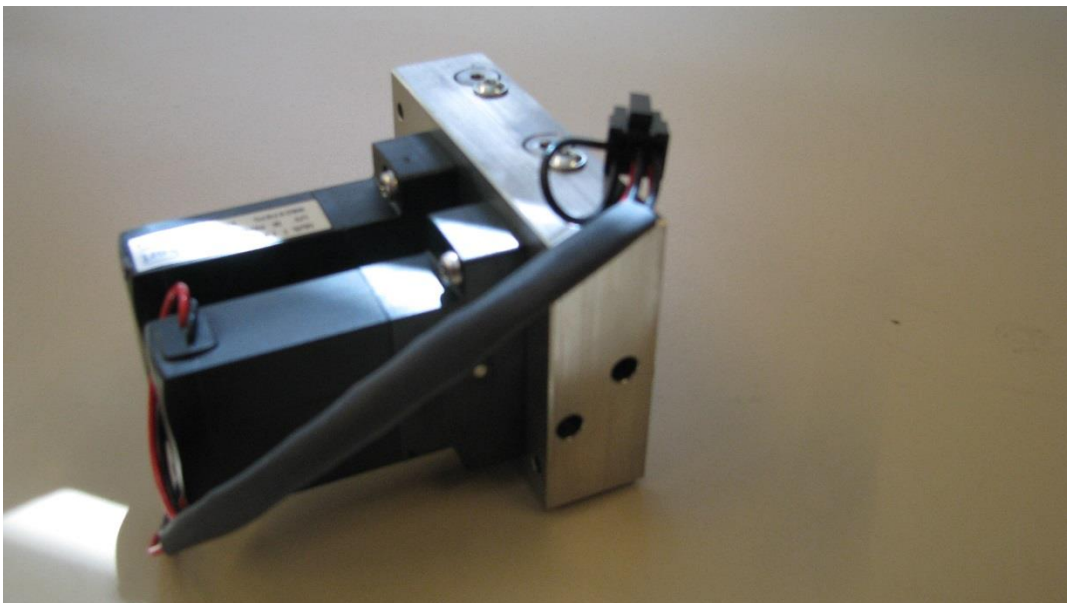
July 2015

## 3.1 Mechanical parts and PCB

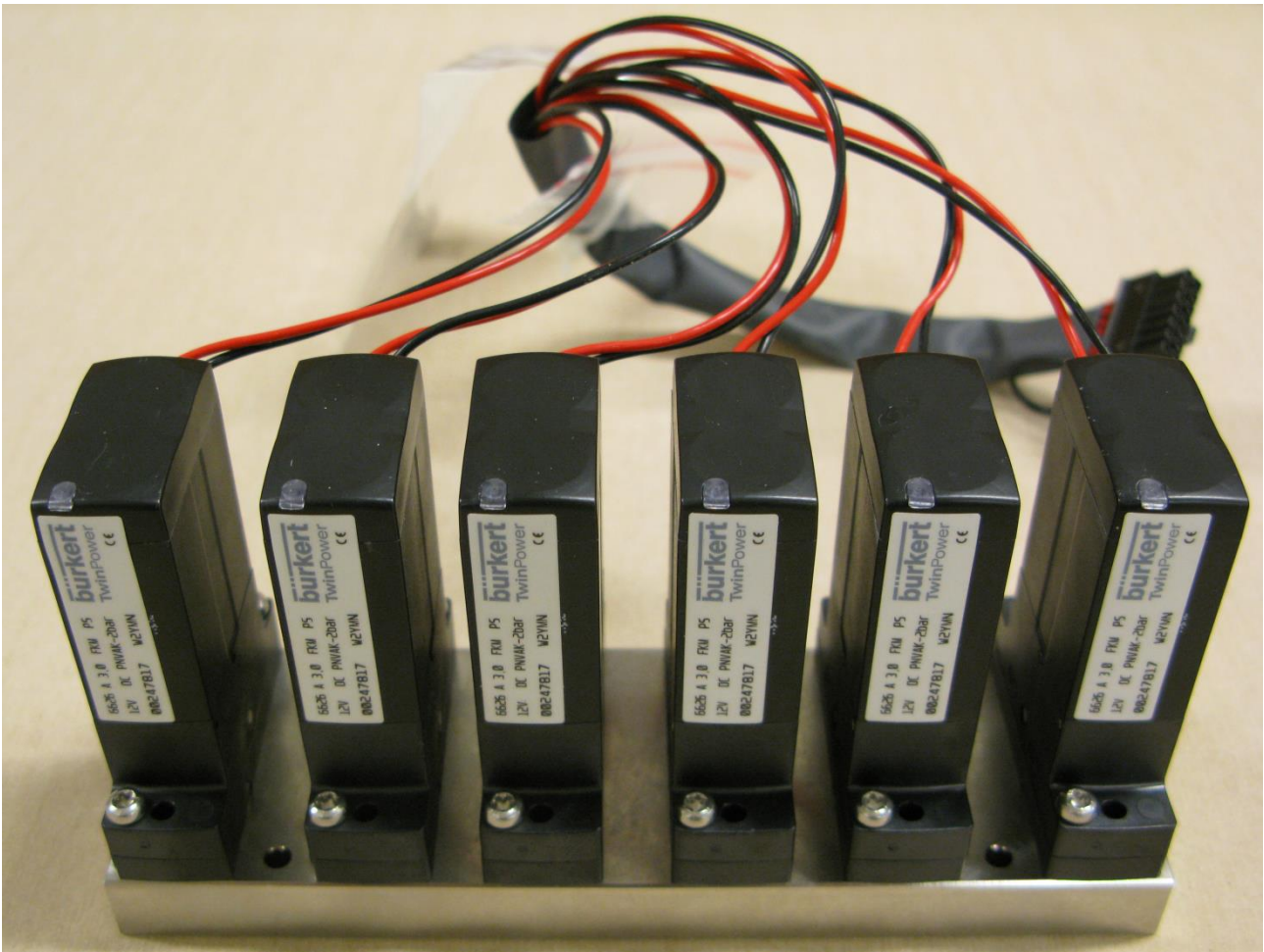
### 3.1.1 Power supply ZG0370A



### 3.1.2 Center manifold UM1119A

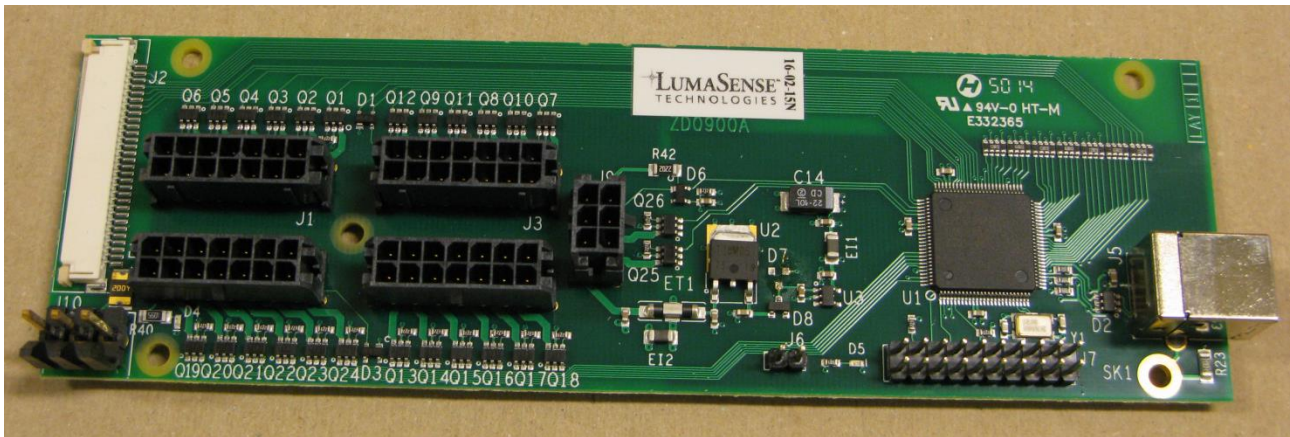


### 3.1.3 6 channels Sample manifold UM1120A





### 3.1.4 Multipoint Sampler PCB ZD0900A



Connector:	Connection
J4	Sample manifold Ch. 1 - 6
J3	Sample manifold Ch. 7 - 12
J8	Sample manifold Ch. 13 - 18
J1	Sample manifold Ch. 19 - 24
J9	Center manifold
J10	12 Vdc Power
J2	Front panel

# **Chapter 4**

## **Parts replacements**

July 2015

## 4.1 Parts replacements

Follow these instructions to disassembly the cabinet and gain access to individual parts.

Remove the cover caps DD0605A on the left front and back corner.



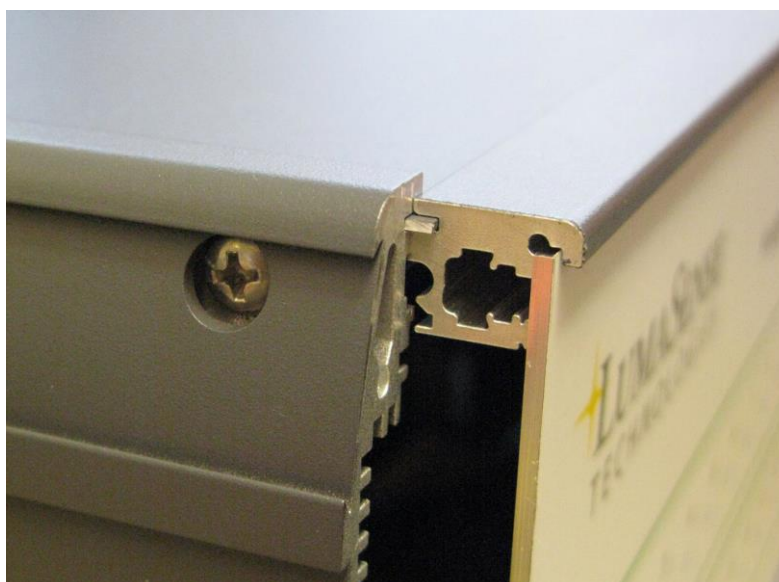
Undo the 2 screws (Torx T10) and remove the left corner.



Remove the decoration strips on the left panel

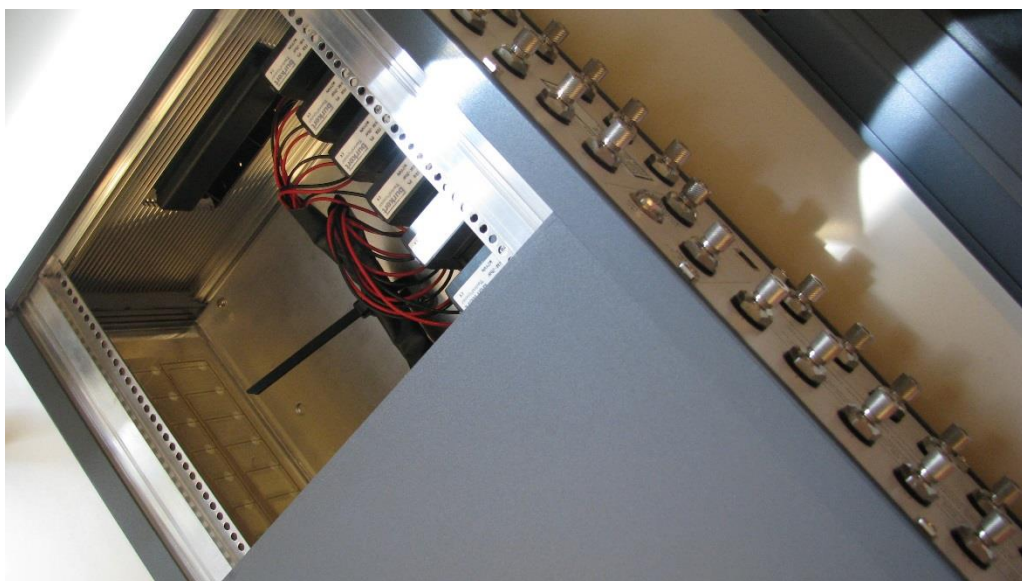


Undo the 4 screws.





Remove the Left panel and gently slide the top cover plate off.



The 1409 is now ready for Service.

## 4.2 Fields replaceable parts.

Part no.	Description
AQ1720A	Power Cable
DB2974	Tube fitting
DD0605A	Cover cap for Torx T10 screw
DF0238A	Decoration strips, kit with 4 pcs
DF7076A	Feet for 1409 kit with 4 pcs
DS0894A	Filter for Air inlet
YJ0767	Seals for tube fitting
YJ0906A	O-ring for connection pipe and plug
YJ0907A	Connection pipe
YJ0908A	Plug for manifold
YK2210A	M2.5 x 12 Screw for the back panel
YM0652	Milled nut
YO2210A	Metal screw holder for the back panel
ZD0900A	Multipoint sample PCB
ZG0370A	Switchmode Power Supply 12Vdc

## 4.3 Electrical drawing of ZD0900A

