MyVAP User Manual

Automatic LPG Vaporizer

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CONTENTS

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1 Safety instructions

1.1 Safety instructions

For clarity reasons, this manual does not contain all detailed information and cannot describe every possible case in connection with installation, operation or maintenance.

Should you require further information on this device, or should particular problems occur which are not handled in sufficient depth in this manual, help can be requested through your local SRA INSTRUMENTS office or representative.

The contents of this manual are not part of a previous or existing agreement, commitment or statutory right and do not change the latter. All commitments on the part of SRA INSTRUMENTS are contained in the respective sales contract which also contains the complete and solely applicable warranty conditions. These warranty conditions in the contract are neither extended nor limited by the contents of this manual.

Safety information

A Liquefied Petroleum Gas can be hazardous. The following general warnings apply to the instrument as a whole. Specific warnings are provided throughout this document when a possibly hazardous operation is discussed.

Warning : Shock hazard.

Do not replace components with the power cable connected. To avoid injuries, always disconnect power before touching them or opening the chassis.

Warning : Hot surfaces.

Some parts of MyVAP operate at temperatures high enough to cause serious burns. These parts include, but are not limited to:

- The vaporization chamber
- The expansion volume
- The heated transfer line (optional)

Extreme care should be taken to avoid these heated surfaces. Vaporizer can be maintained as high as 200ºC. Do not operate the instrument with the vaporizer disassembled.

Warning: Electrostatic discharge is a threat to electronics.

Electrostatic discharge (ESD) can damage the printed circuit boards. If you must handle a board, wear a grounded wrist strap and handle the board only by its edges.

1.2 Conditions of use

This MyVAP Sample conditioner is used for vaporizing automatically a LPG (C3 – C4 type) and connect the outlet to a analyzer (mainly a Gas Chromatograph) for quantitative determination of the LPG composition.

This instrument requires a web browser. For optimal display, use:

- Internet Explorer revision 10 or higher.

- Chrome revision 28 or higher

1.3 Electro statically sensitive device!

Before touching such components or modules:

- Switch MyVAP off.
- Discharge all static from yourself by touching a grounded object or by wearing an ESD wrist band.
- Only use tools which are free of static charges.
- Do not touch any pins or printed conductors. Only hold modules on their edges.

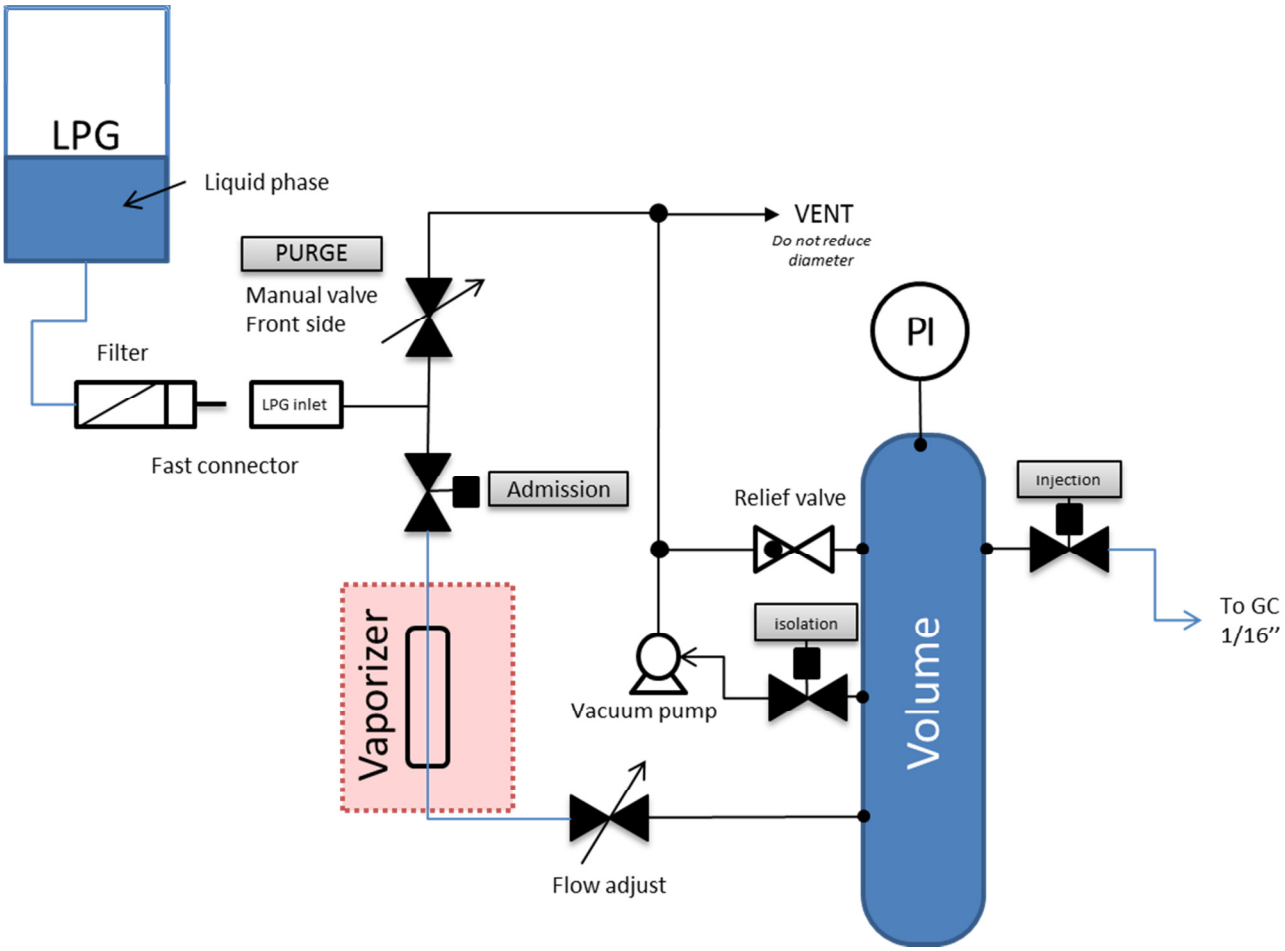
1.4 Exclusion from liability for external accessories

If you use or wish to connect accessories to your MyGC which we have not expressly recommended, please ask us to first confirm that the operational safety of the Vaporizer will not be influenced by these external accessories. Without this confirmation we will accept no liability for the operational safety.

2 Principe of operation

2.1 Fluidic schematics

MyVAP is a LPG vaporizer for C3 or C4 LPG mixtures. The fluidic diagram I the following:



MyVAP Self-check:

Directly after putting ON the device, MyVAP launch a self-check:

- Controlling the Pressure sensor at atmospheric pressure. This control is made by recompressing the chamber under vacuum opening the Sample out (to GC) valve. Never connect the sample out to a restrictor or liquid; Vacuum could suck this liquid back to the MyVAP and damage it.
- Controlling the vacuum pump trying to reach the pressure lower limit
- Heating the Vaporizer to the setpoint. The Volume zone is heated, but not critical.

If the Start-up test is failing: MyVAP blocks in critical error mode; Re-start the self-test from the browser. If the problem persists, try powering down and up the instrument and check again. If this error remains, contact SRA Instruments.

Done by the operator:

- Check the main vent (1/4 bulkhead on the back panel of the vaporizer is connected to a safe ventilated area)
- Connect the LPG Cylinder to the MyVAP inlet. Always use the inline filter provided with the instrument. Filtering the sample will prevent particles to enter the vaporizer and damage it.
- Open the purge valve to flush liquefied gas to the sample transfer line close to the vaporizer. It depends on the length of you transfer tube but 10-15 sec should be enough. Close the purge valve (clockwise)
- Check if your GC is ready to perform a run at the end of the MyVAP cycle. MyVAP will start the GC at the end of the cycle. Depending on your Agilent Chemstation version the GC need to be in “Prep run” and the injection source by “External device”
- Start the vaporizer sequence by pressing the front panel button or via the web interface on your computer
- Then to switch for another LPG Cylinder, close your cylinder and open the purge valve to empty your line before any disconnection.

After the start, MyVAP will progress automatically trough the different steps:

- Empty the volume with the sampling pump under the method setpoint
- Open the admission valve to vaporize LPG into the chamber. The vaporized gas will fill slowly the chamber. You can tune the flow speed with the needle valve on the left side of MyVAP using a screwdriver flat head. We do recommend approx. 30-45 sec to fill the volume
- As soon as the Max pressure is reached, MyVAP close the admission valve and open the Injection valve to the GC to flush the Gas Sampling Valve. The pressure decrease. MyVAP check that the pressure decrease properly of the preset value; if not, the cycle will stop and enter a recovery sequence.
- Then the cycle start again to reach the number of cycle programmed in the method.
- **The last cycle** (minimum number of cycle is 2) MyVAP will open the Injection valve to the GC to flush the Gas Sampling Valve AND start the GC at the end of this period.

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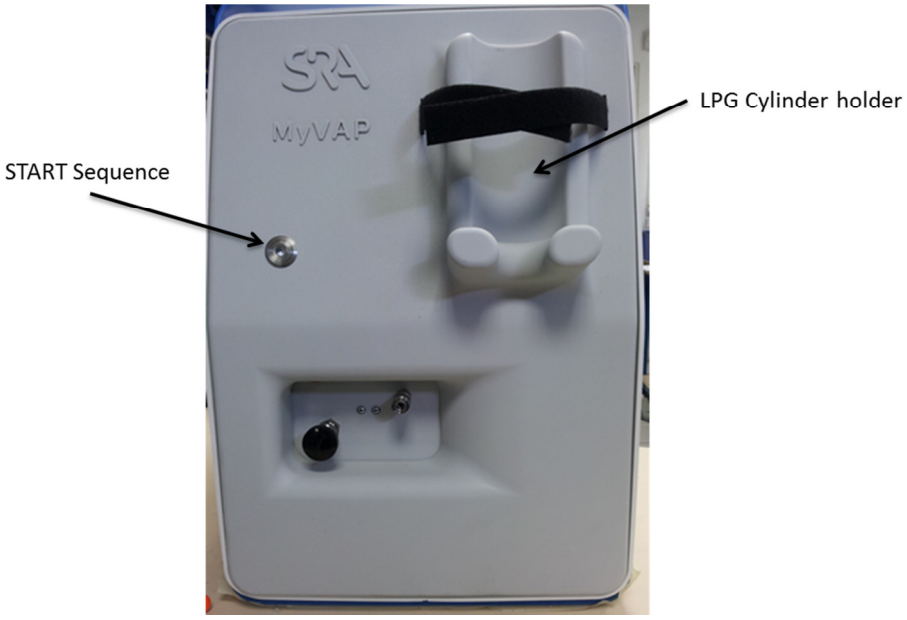
2.2 MyVAP view

2.2.1 Font side



2.2.2 Led Status

The LED on the front panel indicates the status of MyVAP :

off	MyVAP is OFF
▬▬▬	ON : idle state & ready
▬ ▬	Slow blinking : Running / equilibrating
▬▬ ▬▬ ▬	Fast blinking : ERROR / Not Ready

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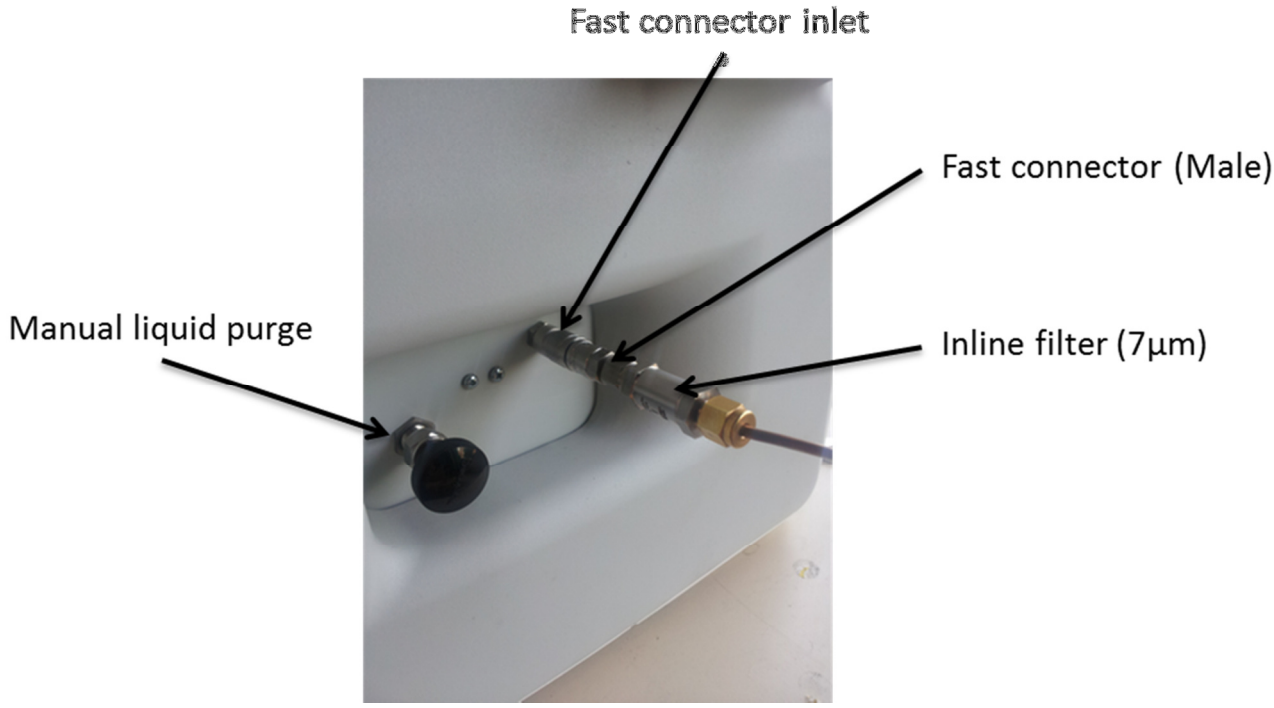
2.2.3 Sample inlet and manifold



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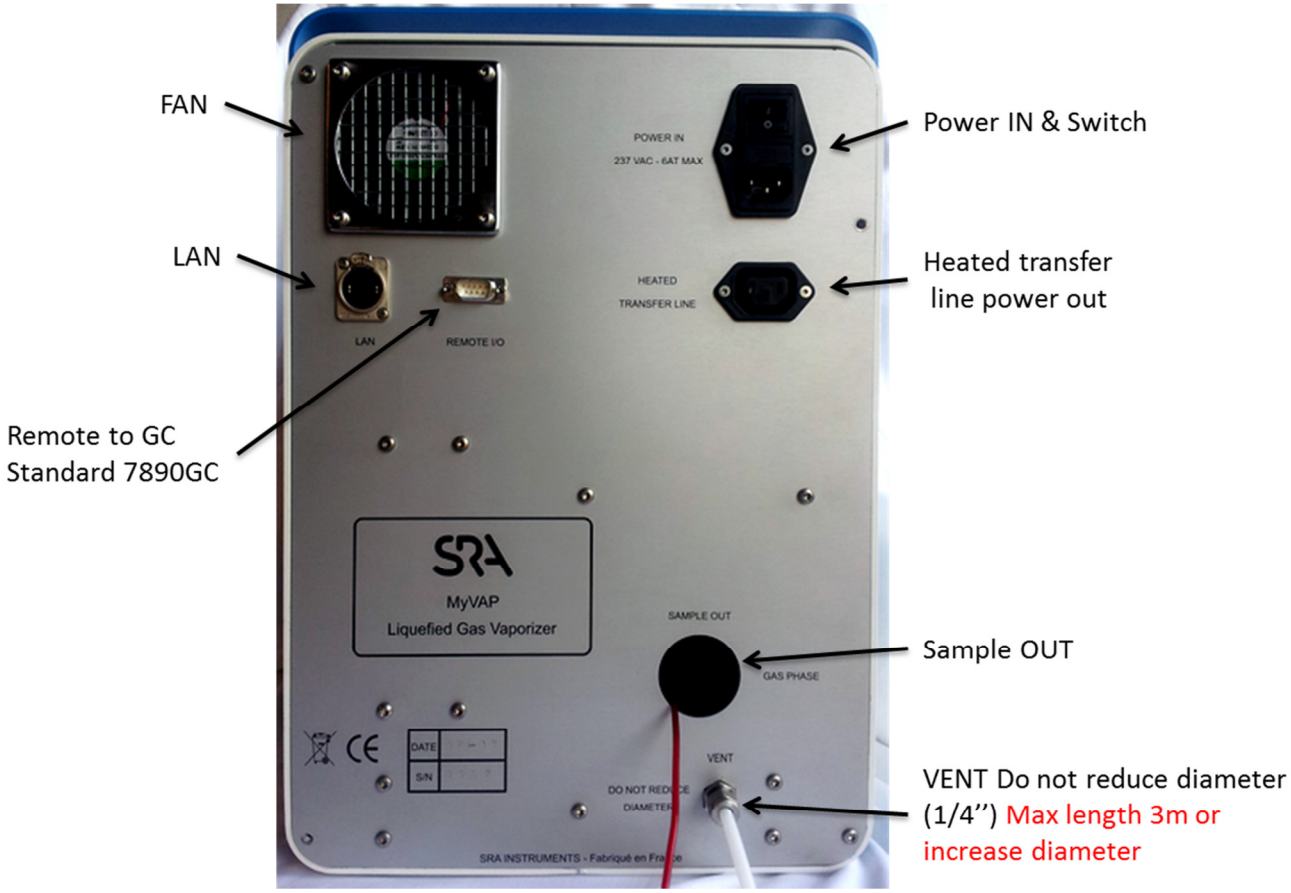
2.2.4 Back side



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3 First Start

3.1 Tools and items needed for installation

3.1.1 Hardware

- 1/16-inch stainless steel tubing for sample gas connection to the analyzer
- 1/4-inch Swagelok nuts, and front and back ferrules for the Vent connection
- 1/16-inch Swagelok nuts, and front and back ferrules
- 5/16-inch wrench
- 9/16-inch wrench
- 1/4-inch wrench
- Tork T-20 screwdriver

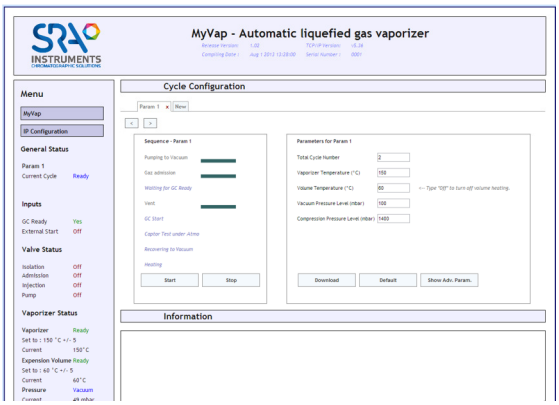
3.1.2 Other items

Electronic leak detector (optional). We recommend to not use liquid leak detector that can pollute the tubes if liquid penetrates inside. This could damage the instrument.

3.2 Electrical Connection

Your MyVAP requires 237VAV power supply.

1. Connect the power supply cable
2. Connect your lan cable to your computer (an intermediate router is recommended). The default IP configuration of MyVAP is :
    - IP = 10.1.1.113
    - SM =255.255.255.0
    - GW= 10.1.1.1
3. If MyVAP is used in a network with DHCP, you need to fix your IP address in the same range to initialize the communication. IP address can be changed from the web interface at 10.1.1.113/SRA_IP_Config.htm.
4. Start MyVAP
5. Start your web browser and go to : http://10.1.1.113
   This page should be accessible:

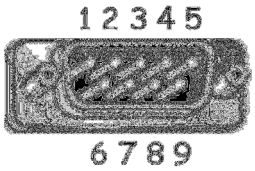


You control the entire MyVAP operative parameters through this web interface.

3.3 Cabling Remote

MyGC provides a REMOTE I/O connector on the back panel.

The pin out of the remote is the following:



1 – COM
2 –
3 – START GC (out)
4 –
5 – START MyVAP (in)
6 –
7 – READY GC (in)
8 –
9 – READY MyVAP (out)

The remote DB9 is designed to be cabled to an Agilent 7890GC with a standard DB9 M/F straight cable. It provides the connection to the GC to synchronize MyGC with the analyzer:

- MyGC reads the Ready State of the 7890GC before flushing the gas to the sampling valve during the last cycle.
- Starting the GC run by the remote start

From factory the remote input for Ready IN is configured for a voltage signal, compatible with Agilent 7890GC. For a dry contact configuration, please contact SRA Instrument office.

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3.4 Start-up Self-Test

When MyVAP starts after a power failure, it's automatically performing a self-check:

- Controlling the Pressure sensor at atmospheric pressure. This control is made by recompressing the chamber under vacuum opening the Sample out (to GC) valve. Never connect the sample out to a restrictor or liquid; Vacuum could suck this liquid back to the MyVAP and damage it.
- Controlling the vacuum pump trying to reach the pressure lower limit
- Heating the 2 heated zones (Vaporizer & Volume) to the setpoint.

If the Start-up test is failing: MyVAP blocks in critical error mode; Try to power cycle the instrument and check again. If this error remains, contact SRA Instruments.

4 Installation

4.1 Compressed gas cylinder safety

- Securely fasten all compressed gas cylinders to an immovable structure or permanent wall. Store and handle compressed gases in accordance with relevant safety codes.
- Do not store gas cylinders in the path of heated oven exhausts or other sources of heat.
- To avoid possible eye injury, wear eye protection when using compressed gas.

4.2 Installation of fluidics

4.2.1 Connect the vent

The main output vent is located on the back panel (1/4 bulkhead) of the vaporizer and must be connected to a safe ventilated area.

LPG will be vented by this exhaust!

Tubing

Do not use ordinary copper tubing which contains oils and contaminants.

Do not use plastic tubing for supplying inlet gases to MyVAP. Plastic tube can be used on the exhaust

Do not use pipe dope to seal the threads; it contains volatile materials that will contaminate the tubing.

Do not use liquid leak detector. It can contaminate the tubing with liquids. Prefer the electronic leak detector.

4.2.2 Connect the sample out to GC

MyVAP is delivered with a 1*16 tubing connected to the sample out valve. This tube has to be connected to your GC gas sampling valve. We do recommend stainless steel (1/16"). Only use extremely clean gas lines. Clean them if necessary prior to assembly or use new tubing pre-cleaned.

- Don't use a shut-off valve in the line to the chromatograph. The Gas sampling valve vent has to remain at atmospheric pressure.

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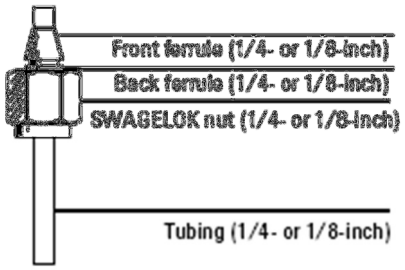
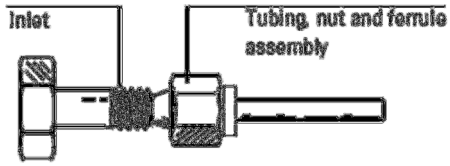
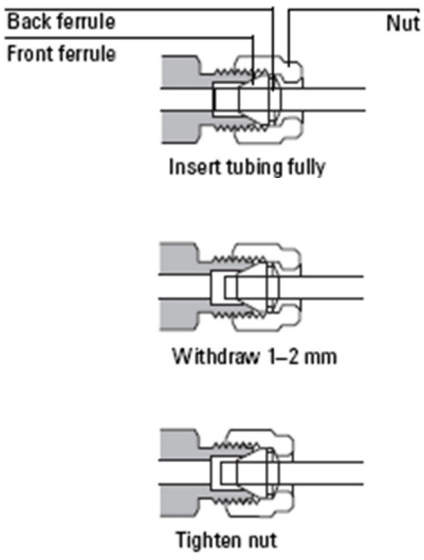
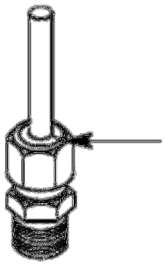
4.2.3 Swagelok connections

The gas supply tubing is attached with Swagelok fittings. If you are not familiar with making Swagelok connections, review the following procedure. The procedure explains how to connect tubing to a fitting, such as inlet and detector manifolds or the gas supply tank.

Attach a 1/8-inch Swagelok nut, back ferrule, and front ferrule to the tubing.	
Make sure that the front ferrule is touching the inlet, and then slide the Swagelok nut over the ferrule and tighten it finger-tight.	
Push the tube fully into the female fitting, then withdraw it approximately 1–2 mm.	
Mark the Swagelok fitting with a pencil line.	

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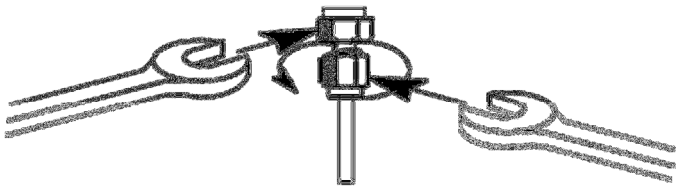
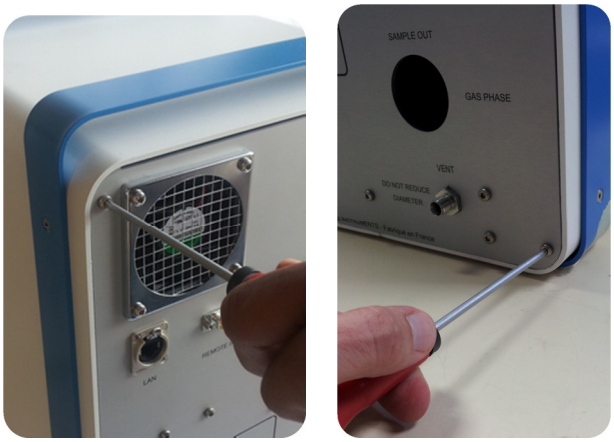
If you are using 1/8-inch Swagelok fittings, while holding the fitting steady with the other 7/16-inch wrench, tighten the fitting 3/4 of a turn. If you are using 1/4-inch fittings, tighten them 1 1/4 turn.	

4.3 Connect or change the sample tubing

If you need to change the sample out tube or install a heated transfer line, you need to open the MyVAP by the back panel. Switch OFF the instrument and remove the power cord.

Remove the 4 screws (torx T20) on the back side. Slide the chassis out of the MyVAP envelope. Take care of the short cables.	
Keep the 4 screws.	
Remove the ground cable	

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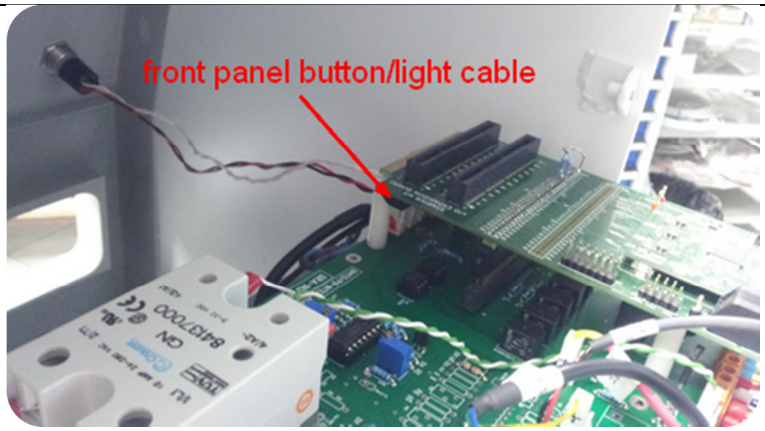
Slide the chassis slowly. Short cable of the front panel led button have to be disconnected to remove the chassis totally	
To open totally the chassis, short cables of the front panel led button have to be disconnected from the main board	

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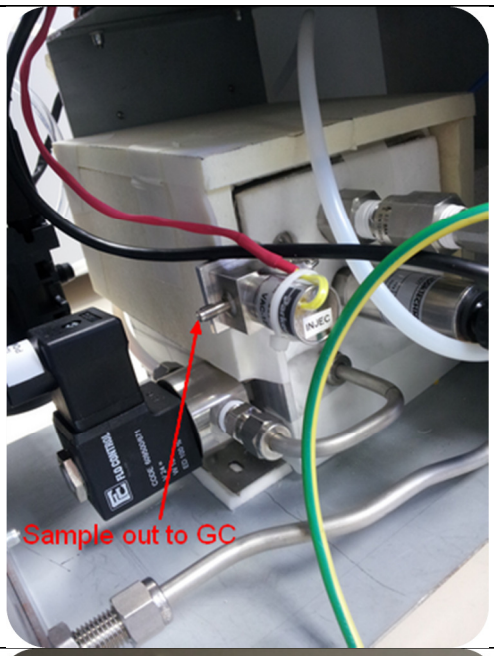
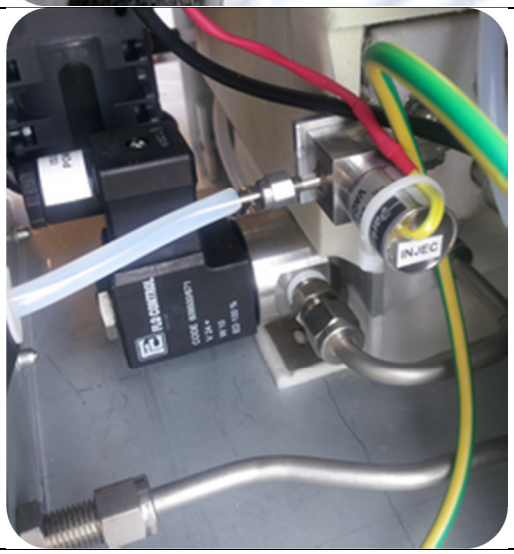
Connect the 1/16 tube on the Sample out valve	
OPTIONNAL Heated transfer line can be connected to the vaporizer outlet	 

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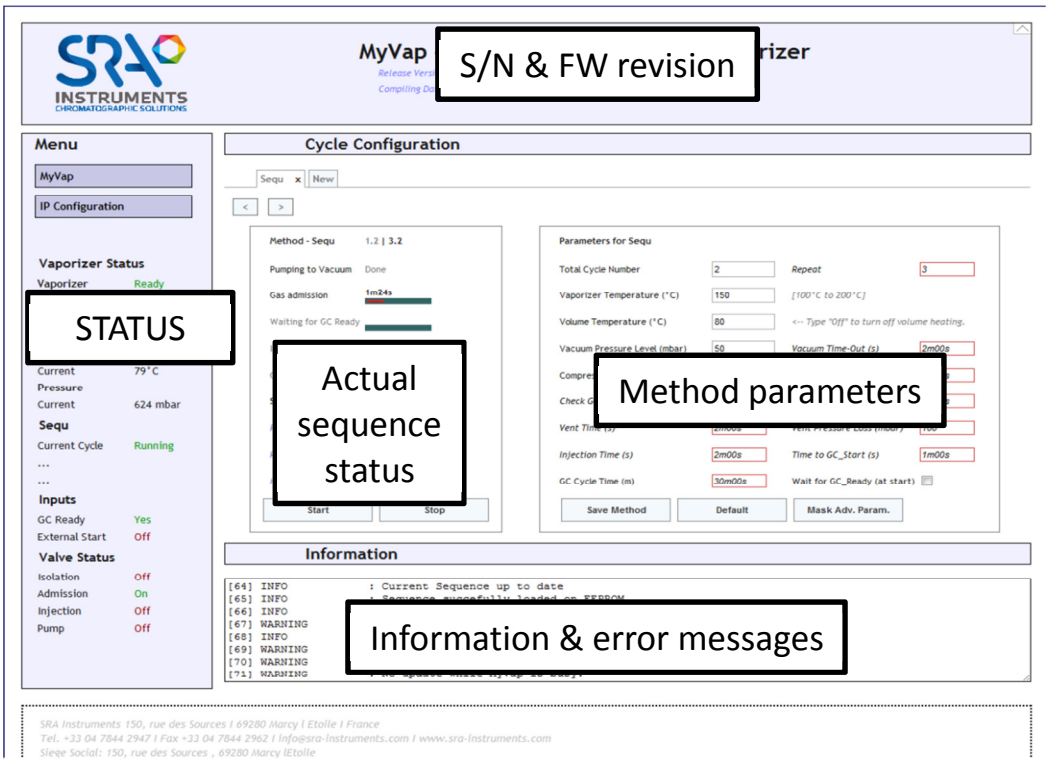
5 Method parameters

5.1 Web interface - Status

The web interface shows all values from status and method parameters.

Basic rules:

- MyVAP will always start a self-check after a power cycle
- MyVAP will not start a vaporization sequence if the initial self-check is not passed
- MyVAP will never start a vaporization sequence if the vaporizer heated zone is not READY. The secondary heated zone (expansion volume) is not blocking the start and the sequence can be started even if the expansion volume temperature is not equilibrated.
- If any error occurs during the sequence, the vaporizer will stop immediately the sequence and try to pump the expansion volume down to the lower pressure setpoint. We do recommend checking the vent connection, the LPG connection and power cycle the instrument after this kind of problem. An error message will be displayed in the sequence status, the general status, and the information box.



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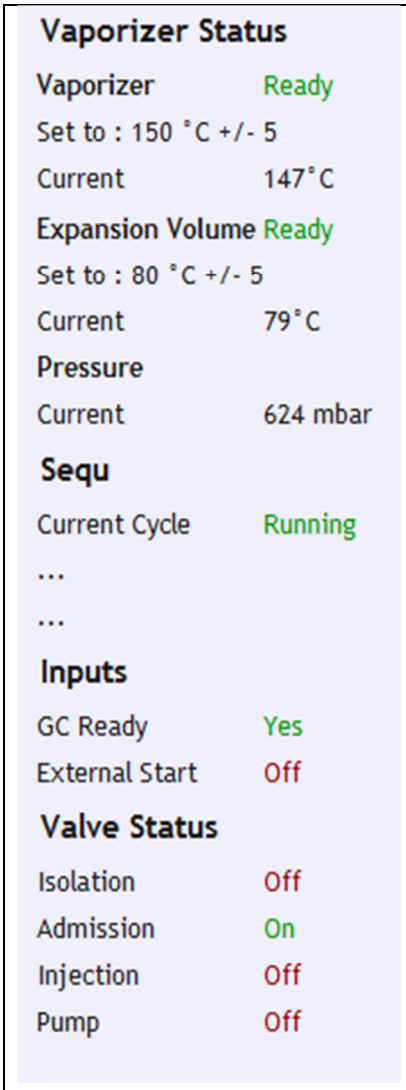
Status zone:

This zone shows the status of the vaporizer:



Vaporizer Status

Temperature of the vaporizer. This zone must be ready before a vaporization sequence start

Temperature of the expansion volume. The ready of the zone is not mandatory for the vaporization sequence. This zone is long to stabilize because of the low power and mass to heat. It's not necessary to heat if the analysis of LPG don't require heavy hydrocarbons measurements.

Pressure: shows the actual pressure inside the expansion chamber in mbar.

Cycle status: Ready, running, error. Shows the state of the cycle

Contextual information is also displayed .

Inputs :

- GC Ready: is the connected GC ready for an injection?
- External Start : front panel button or remote start input state

Valves status

- Insulation = electrovalve on the vacuum pump inlet
- Admission : LPG inlet
- Injection : Vaporized LPG to GC (sample out)
- Pump : vacuum pump state

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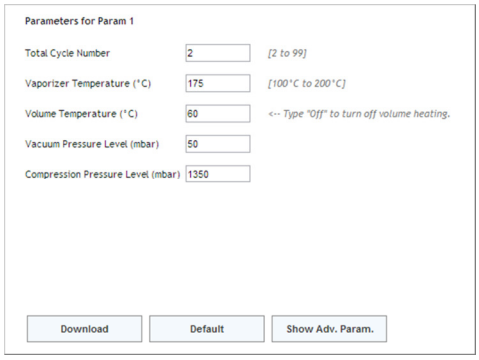
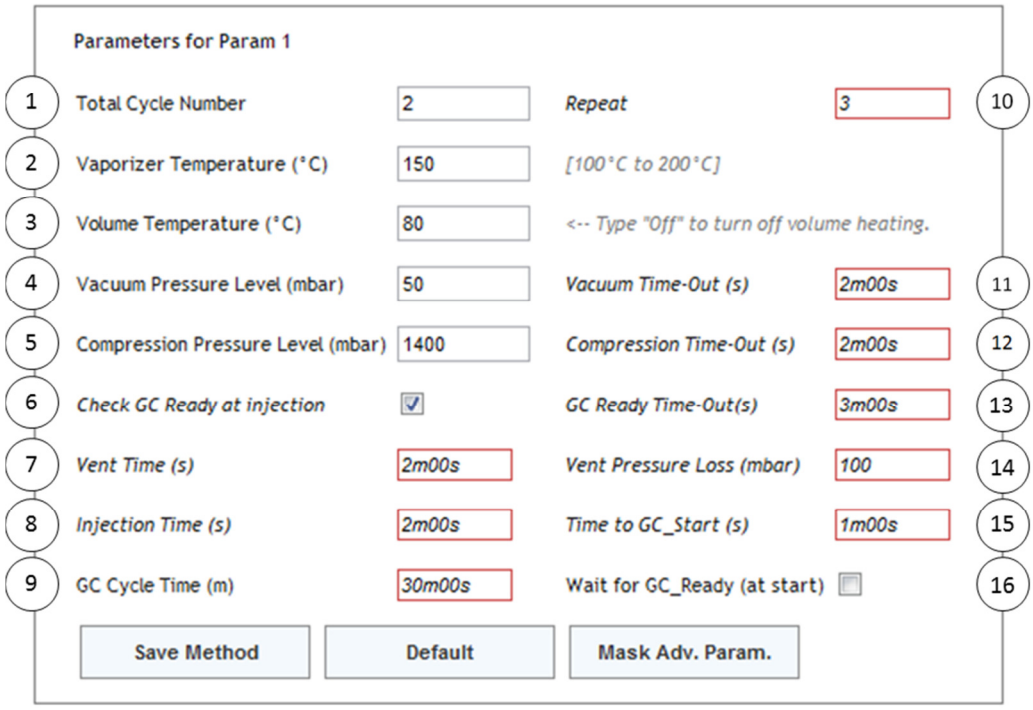
5.2 Method

The basic parameters are:



To access to the advanced parameters, click on

show Adv.Param.



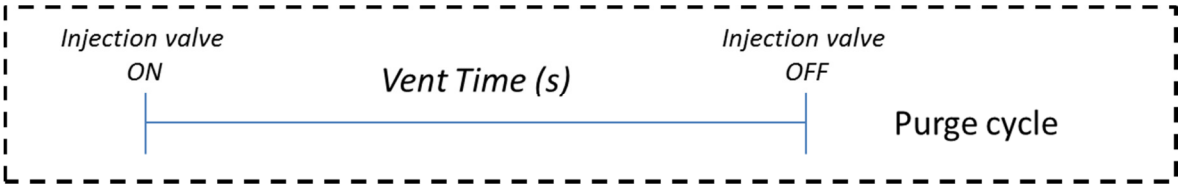
1. Number of cycles before the injection. Increase the number of cycles to prevent memory effect in case of different nature of samples. More cycles will require more LPG sample. The minimum of cycles is 2 : one for initial purging and the second to inject.
2. Temperature of the vaporizer
3. Temperature of the expansion volume; the heating of this zone is optional. It's not necessary to heat if the analysis of LPG don't require heavy hydrocarbons measurements.

4. Vacuum pressure level: the pump will empty the volume down to this pressure. A lower level will prevent for memory effect but will increase a little bit the LPG consumed for the sequence.
5. Compression pressure: when LPG is vaporized into the expansion chamber, the pressure will increase. The admission will be controlled by MyVAP until the pressure exceeds this limit. Increase this value if you need higher volume to purge your transfer line and GC valve (+ the injection time)
6. Check GC ready before the injection step (last cycle) If not checked, MyVAP will start the analyzer by remote with not control of ready state.
7. See the diagram below
8. See the diagram below
9. In the case of chained analysis, copy your GC cycle time: After the first Vaporization, MyVap will schedule a sequence whose injection step shall occur just after GC get ready. Make sure the GC will always be ready by overestimating GC Cycle time, or by increasing ***GC Ready Time-out*** (would the vaporization take a shorter time than expected : see diagram below).
10. Repeat is the number of consecutives analysis (and vaporizations) you're performing. When doing more than one sequence, check the <***GC Cycle time***> and <***Wait for GC_Ready at Start***> fields.
11. Vacuum timeout: time MyVAP try to reach the low pressure setpoint. After this time, if not possible to go to the low setpoint, an error will occur and the sequence will stop. This error could reveal a vacuum pump problem or a leakage in the system.
12. Compression timeout: time MyVAP try to reach the high pressure setpoint. After this time, if not possible to reach the setpoint, the sequence will stop and the system tries a recovery sequence. If this error occurs, check if your LPG sample is open and properly connected (liquid phase) to MyVAP inlet. Check the admission valve is ON. Change the inline filter.
13. GC Ready Time-out is the maximum span MyVap will wait for the GC to get Ready just before injecting. In case of a Time-out, MyVap enter a recovery cycle.
14. Vent pressure loss : to prevent you transfer line is not blocked and that the sample can flush properly though the gas sampling valve, MyVAP will control that the pressure decrease during the venting or injection phase. The pressure can decrease more than this value but a lower decrease in the duration period will stop the sequence and try a recovery. Check your transfer line is connected properly to the gas sampling valve and to atmospheric pressure. Try to replace the tubing if the error remain, contact SRA office. A recovery cycle always try to reach vacuum pressure, then to close all valves.
15. See the diagram below
16. With this box checked, MyVap waits for GC_Ready at the beginning of each sequence. Stopping the sequence cancel the postponed cycle. If a **<GC_cycle time>** is set, MyVap will first delay the sequence, and then wait for the GC Ready.

5.3 GC Injection mode

5.3.1 Vent Time

After having filled the expansion volume, MyVAP will open the sample out valve and flush the vaporized gas to the GC analyzer



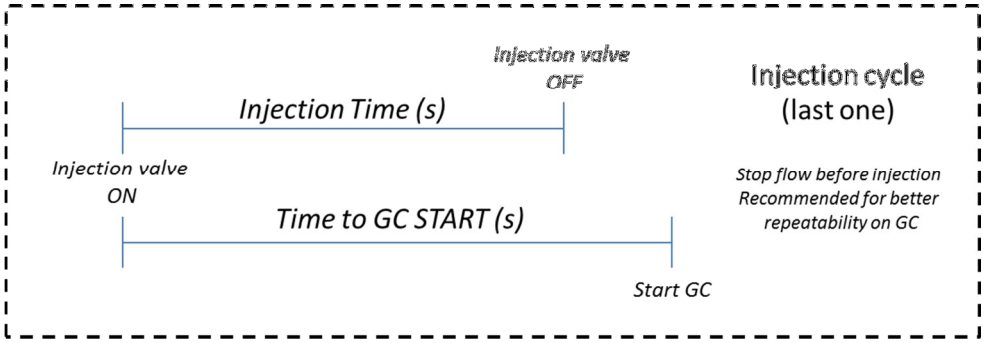
NB: the pressure decrease is tested during this step

This will occur in all cycles except the last one of the sequence

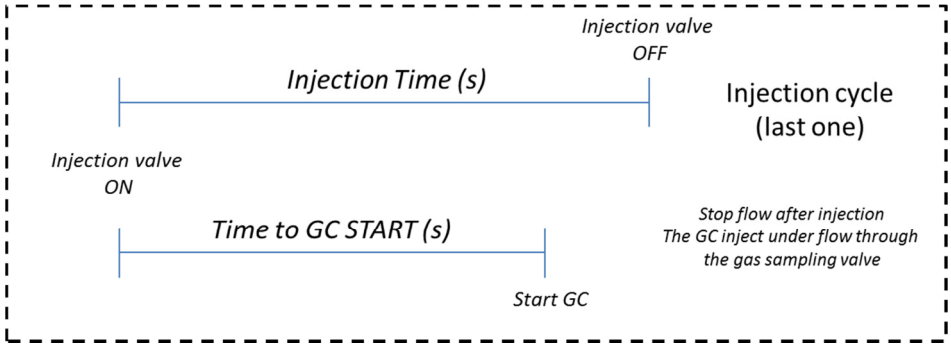
5.3.2 Inject Time

For the last cycle, MyVAP will start the GC analysis. You can set when you want to start the GC. There are 2 possibilities:

Stop the flow, equilibrate in the gas sampling valve and inject



Inject under flow sampling through the gas sampling valve



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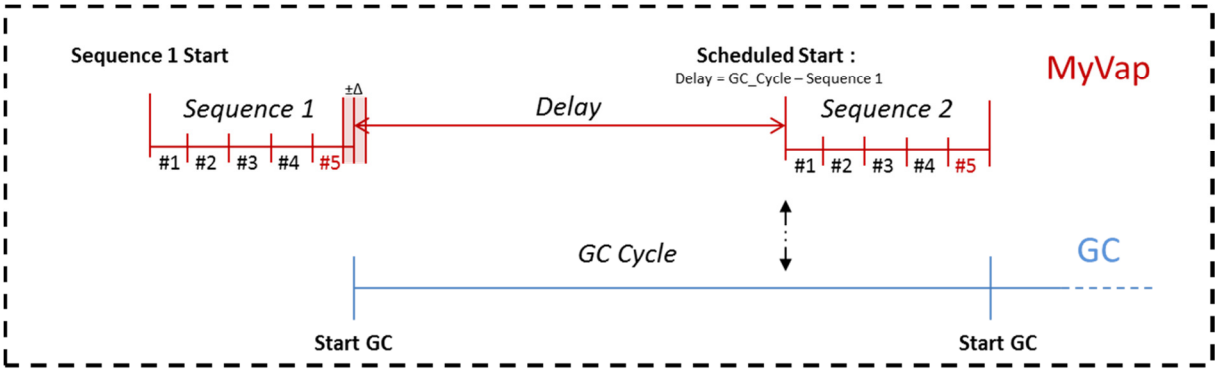
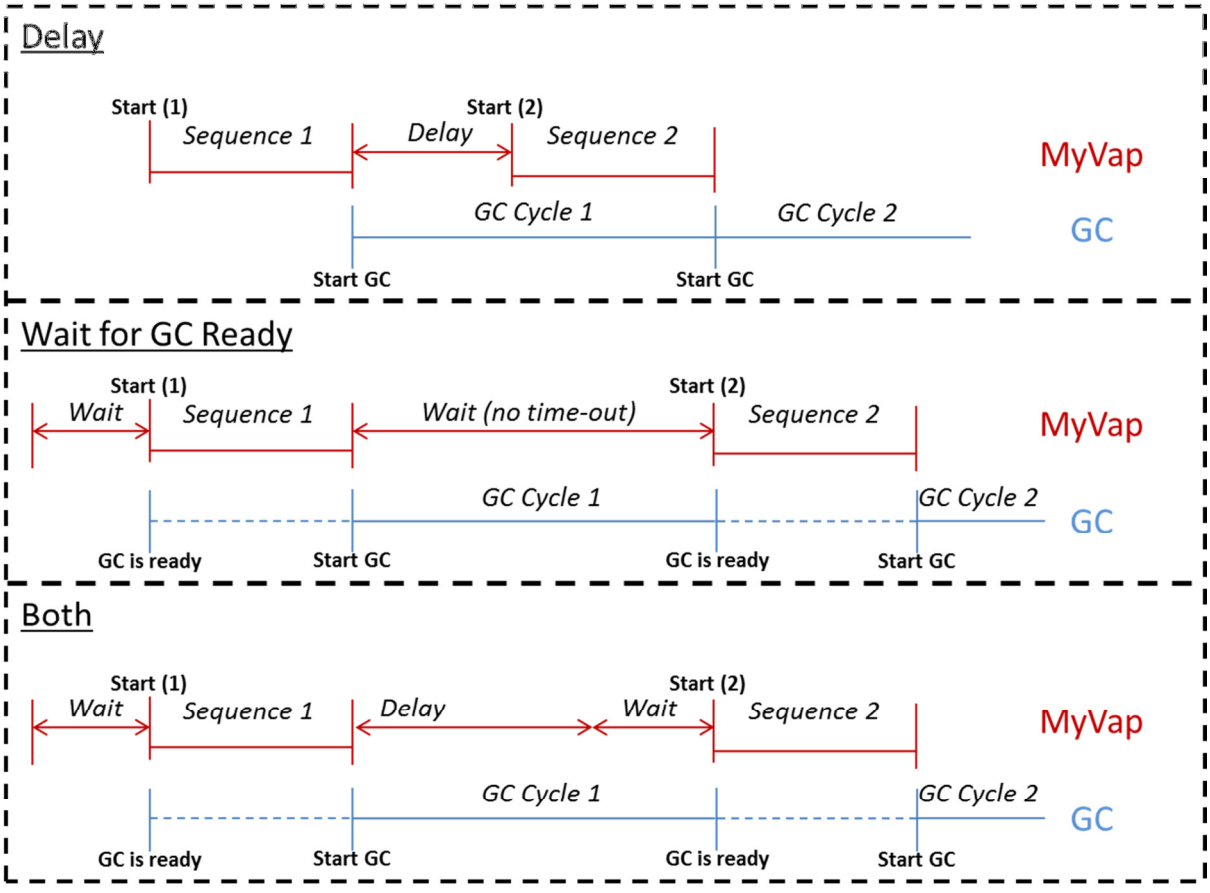
5.4 Repeat Sequence



When a GC Cycle Time is specified, the delay between sequences is estimated by assuming each sequence lasts the same time (Δ << Sequence and Δ << GC_Cycle_Time). By anticipating when the GC gets back ready, we reduce the time lost between analysis, at the risk of entering a GC Ready Time-out would MyVap be too much in advance. If a sequence is longer than GC_Cycle Time, MyVap runs continuously and the GC waits between runs. On the other hand, the <Wait for GC Ready> checkbox ensure a GC is present and ready before starting to prepare LPG.



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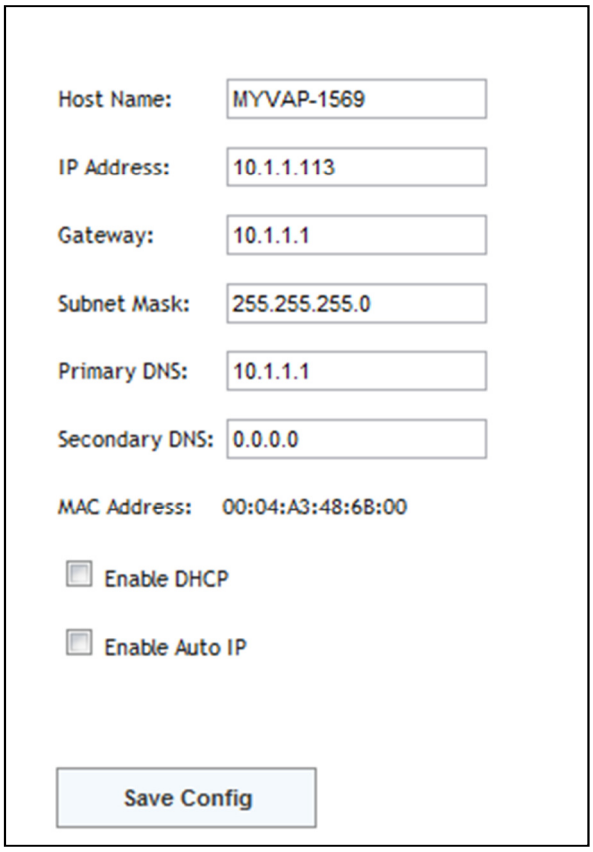
6 Communicate with MyVap

6.1 Change IP address

Access the IpConfig Page by typing 10.1.1.113\SRA_IP_Config.htm in your browser, or via the Menu tab (IP configuration). Changing the IP config is an advanced function, a password will be required.

USER ipconfig

PASSWORD ipconfig



You will stay logged-in until you close the browser AND clic on the 'logout' link.

Before integration to you network, set either a valid fixed address or a HostName for your DHCP server. In case of problem, contact your local IT. Saving IP Config will reboot the device.

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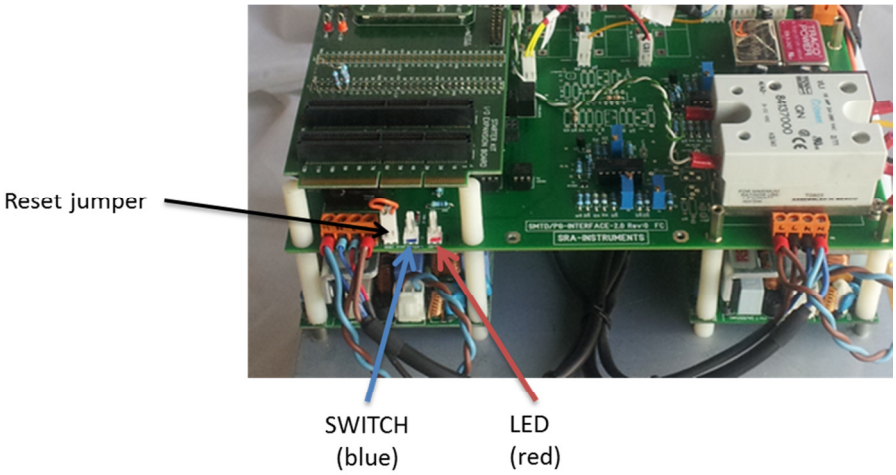
6.2 Reset Procedure (no communication)

If no communication is possible with MyVAP, you can reset the UIP address configuration to the factory settings. All methods will be lost after the reset. To reset MyVAP:

- Open the chassis removing the 4 screws
- Remove the front panel led & button cable.
- Close to these 2 cables is located a reset jumper. Remove the jumper and start the MyVAP for 30 sec; MyVAP will re-initialize the IP address to the factory settings: 10.1.1.113



- Switch off MyVAP. Put the jumper again.
- Connect the front panel led & button connectors (don't mix it !)
- Fix the ground line again
- Slide the chassis inside the cover,
- Close the chassis and start again.

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7 : The SRA Embedded Web interface.

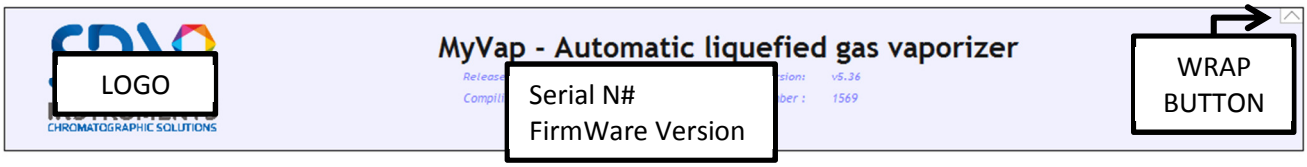
The SRA Embedded Web Interface (*SEW Interface*) is a generic set of webpages with a structure established on several devices since January 2011. The same design has been followed to help users getting familiar on our products.

7.1 Web Server Architecture.

The server consists of 2 to 3 html pages: at least one for control of the device, and one for IP config. A page can be dedicated to advanced parameters (not the case on MyVap). The menu on the left margin enables navigation between pages. The main page is also situated at the root of the server's arborescence, and will be returned when the IP address is typed in the url of your browser. Up to 5 clients can connect at any time.

7.1.1 Header and Footer.

The header display useful information: Firmware version and serial number. Note them down for any call to our assistance. In the upper right corner is a 'Wrap Button', which reduce the header and footer to gain space on small screens. You can also, with any good browser, zoom out your page to fit your screen with CTRL and +, -, or 0.



When the header and footer are wrapped, the button enables to get them back.

7.1.2 Time Input formatting.

With times inputs, a default unit is always specified (s,m,h). You can however choose to force your own unit by typing:

25 s **14 h** **32 m**

You can also combine units intuitively:

1 h 25 m **25 m** **14 s 28** **15 . 21**

Be careful nevertheless:

1h25 is 1 hour 25 seconds.

A coma or point is followed by decimal fraction down to 1/1000 (even if the default unit is m or h).

7.1.3 Tabs.

The SEW enables different methods organized with tabs.

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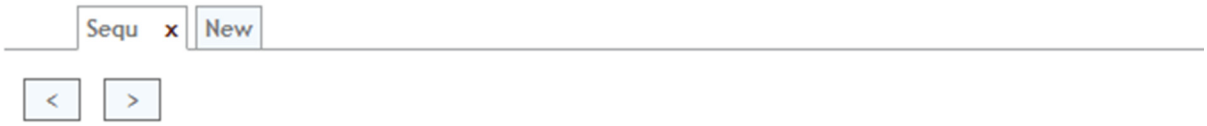

Each tab can be:

Selected, to watch and change parameters. (Clic on the designed tab).

Deleted. If the tab is the last one standing, default parameters are restored. (clic on the red cross of the tab).

Created with default parameters (Clic on 'New').

Organized within other tab : the right and left arrow move the current tab.

Renamed : double clic on a tab turns in into a text field. Type your new name and ENTER.

7.2 Error, information, and warning.

Information is displayed in the corresponding window. Each message is timed (if your network enabled an access to a NTS server), and given a number (to set apart repeated message). Each message has a type: Error (a critical operation occurred, MyVap can no longer work in good conditions, and an intervention might be needed.), Warning (an unexpected operation has been recorded, the user shall be careful but the system is not compromised), and information (everything is ok).

```
[64] INFO            : Current Sequence up to date
[65] INFO            : Sequence succefully loaded on EEPROM
[66] INFO            : Current method updated at cycle start
[67] WARNING         : No update while MyVap is busy.
[68] INFO            : End Of Method 1.1 | 3.2
[69] WARNING         : No update while MyVap is busy.
[70] WARNING         : No update while MyVap is busy.
[71] WARNING         : No update while MyVap is busy.
```

7.2.1 Warnings

"Tab reset due to general error 1." & *"Tab reset due to general error 2."* : An unexpected error occurred while manipulating sequence tabs. The disposition is reset.

"No update while MyVap is busy.", *"No start while running"*, *"MyVap is in process and can't be updated"* and *"Current Method is running and can't be updated"*: several operations are forbidden during a run, in order to avoid troubleshooting.

"Delete Impossible: reset to default setting", *"Maximum sequence number"*, *"Move is not possible"*: An impossible operation occurred while editing tabs.

"Retrying Self-Check." : the first self-check ended in error, a new one has been set with a start (the start didn't start a sequence).

"GC Ready Time-Out at 1.2|3.6","Pressure didn't drop enough from compression at 1.2 | 3.6", "Compression Time-Out at 1.2|3.6". A time-out error occurred during chained sequences. <1.2|3.6> indicates the time-out occurred during the second cycle of the first sequence on a schedule of 3 sequences of 6 cycles each.

7.2.2 Errors

"EEPROM Failure. Changes won't be reloaded at power-on-reset.","EEPROM down","EEPROM not available" : The non-volatile external memory is down. This is a hardware problem. It is no longer possible to store and load configuration at power-on-reset The device's MAC Address from the IP protocol is also in jeopardy.

"Vaporizer has encountered a critical error. Restart your vaporizer": shows MyVap is in error mode and can't start a sequence.

"Pressure Sensor Failure.", "Didn't get to required temperature.", "Self-test cycle failed.", "Recovery cycle failed." Show an error during the self-check.

"Vacuum Time-Out at 2.1|4.3 " : MyVap didn't reach vacuum pressure on the first cycle of the 2nd sequence. Contrary to compression or wait for GC Ready, there is no recovery after a Vacuum time out (the recovery consists in a vacuum pumping).

7.2.3 Significant Information

"Cycle Initialized","Current Sequence up to date": When you start or stop a sequence, the running parameters are updated from the different methods available.

"Sequence succefully loaded on EEPROM": External non-volatile memory is all right.

"#PARAMETER must be between #VALUE and #VALUE." You input an invalid value in the formulary.

"Booting Sequences in Reset mode" (at power on reset): the reset jumper is out (hardware), the system has been set to factory settings.

"Booting Sequences in Normal mode": On the contrary, the jumper is on, normal start, previous parameters are loaded.

"Booting Sequences in Init mode", this is a normal starting, but the external memory is empty, missing, or corrupted.

"No previous IP config": the IP config is set by default. The IP address is 10.1.1.113.

"Pressure too low. Pumping step by-passed": the pump can fail to activate under 500 mBar. If a step requires vacuum, we considers the value of 500 mBar is enough. Practically, this occurs only in the first Cycle of the first sequence of an experiment. Also, pumping always keeps the vacuum lower than 150 mBar.

"Not waiting for postponed start anymore." A 'stop' issued while MyVap waited for a Gc_Ready or a delay, in order to restart a sequence. Even if this event occurs, the MyVap is idle again.

"Stopping Cycle : Temperature out of boundaries." The temperature of the vaporizer dropped to low during a sequence. MyVap enters a recovery cycle.

"GC Start Ok." : indicates a start has been send to the GC (doesn't figure on the run window).

8 Technical Data

8.1 Power supply

External Power Supply = 237 VAC, 50 to 60 Hz

Power consumption, max. 6 A /220VAC

8.2 Dimensions and weights

- H 450; D 430; W 300mm
- 15Kg

8.3 Gas

Designed for LPG vaporization only C3 or C4 type
CE Safety valve 30 PSI

Max inlet pressure = 50 bars
For LPG ONLY

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9 Accessories (ship kit)

MyGC is delivered with:

Description	Photo	Check before shipment
User Manual		
In line filter and quick-connect male fitting		
Power cable		
LAN cable		
Remote cable for Agilent 7890GC		
1/16 sample transfer line with nuts and ferules		

Date:

Controlled by:

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