



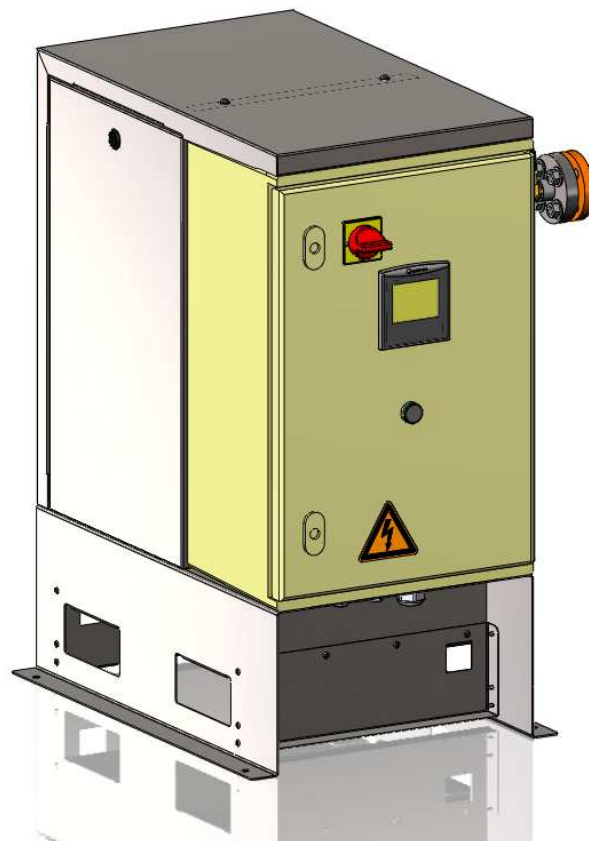
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ELECTRICAL CO2 VAPORISER

EQUIPMENT

INSTRUCTIONS FOR USE
CO2 VAPORISER WITHOUT
HEATING FLUID
4 kW / 8 kW / 16 kW / 24 kW



4/8/16/24- VCO2

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1 **DESCRIPTION:**

Electric CO2 vaporisers are used to vaporise a fixed or variable CO2 flow, from zero to the nominal flow rate indicated in the corresponding commercial specification, with a nominal liquid phase CO2 inlet temperature varying from -20°C to -30°C and a minimum desired gaseous CO2 outlet temperature of +5°C.

The CO2 circulates in a stainless steel coil that is moulded onto an aluminium block. This block is fitted with pockets accepting monotube removable electric heating elements.

An aluminium heating block is fitted with 5 or 9 electric monotubes of 890W each and dissipates 4 or 8 kW power under 400V Three Phase. For the 16 and 24 kW vaporisers, two and three 8 kW heating blocks are hydraulically connected in series.

On the basic version the outlet CO2 temperature is indirectly controlled by the temperature of the aluminium heater blocks.

These CO2 vaporisers have been designed and manufactured in accordance with the requirements of the PED 97/23/EC.

This vaporiser range comprises several options:

- Basic version: Please refer to the commercial specification.
- Option 09/03: Liquid invasion prevention sleeve.
- Option 011/04: Flange connection.
- Option 04/01: Remote measurement.
- Option 08/02: Degreasing for O2 supply
- Option 12/05: Controller in unit

For a more detailed description of the options, please refer to the commercial specification.

NOTE: It is possible to combine several options in the same machine.

1.1 **DESCRIPTION OF THE TSSL ALARM OPERATION**

If the temperature falls below the very low fluid temperature threshold for more than 10 seconds:

1.1.1 FOR EQUIPMENT NOT FITTED WITH OPTION 09/03 "LIQUID INVASION PREVENTION SLEEVE"

- The "TSSL very low temperature" light comes on
- The low temperature fault contact opens
- The light goes out and the contact is closed after a manual reset and if the fluid temperature has moved above the TSSL alarm threshold. This fault does not stop the heating

1.1.2 FOR EQUIPMENT FITTED WITH OPTION 09/03 "LIQUID INVASION PREVENTION SLEEVE"

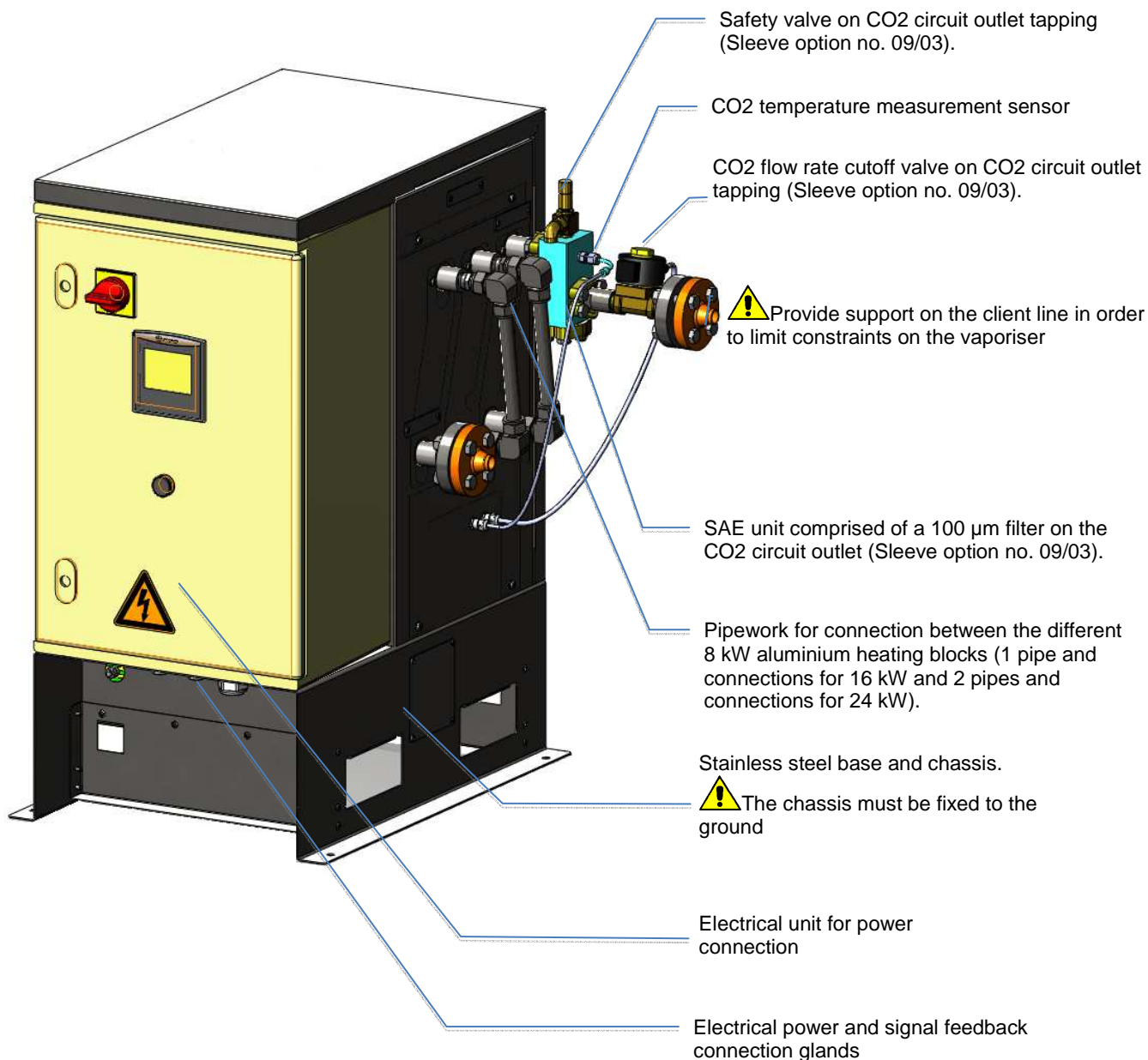
- The solenoid valve closes each time the fluid temperature falls below -10°C for more than 4 seconds (value modifiable on screen C5, see chapter 3.7.6).
- If the solenoid valve closes more than 3 times in 5 minutes (value modifiable on screen C5 - see chapter 3.7.6), or if it remains closed for more than 100 consecutive seconds (value modifiable on screen C4 - see chapter 3.7.5), the TSSL light comes on, the TSSL fault report opens and the solenoid valve remains closed until manual reset. This fault does not stop the heating

In all cases, the factory setting for the TSSL threshold is -10°C.

1.2 VAPORISER COMPOSITION

The vaporisers comprise:

- One or more heater blocks with inlet and outlet tapplings equipped with a connector defined in the commercial specification.
- 5 or 9 heating elements (cylindrical cartridges) per heating block.
- A heat regulation device measuring the temperature of the heating block (TCK probe connected to a programmable Unitronics V350 controller).
- A thermal safety device measuring the temperature of the heating block (TSHH thermostat for very high CO2 safety and a TCK probe connected to a programmable controller for the TSSL fault).
- An external electrical unit in polyester.



1.3 CHARACTERISTICS

Please refer to the commercial specification for all characteristics not provided in this paragraph.

- Pressure, fluid and flow rate

Fluid to be vaporised	: CO2.
Fluid group	: 2.
Fluid state on entry	: Liquid.
Fluid state at outlet	: Gas.
Nominal CO2 flow rate to be vaporised	: See specification.
Min. fluid flow rate to be vaporised	: See specification.
Max. fluid flow rate to be vaporised	: See specification.
Operating pressure	: 13 to 25 barg.

- Inlet and outlet temperature

Min. Inlet temperature:	: - 29 °C if the liquid invasion prevention sleeve option is selected, otherwise the min. inlet temperature is - 40°C.
Inlet temperature of liquid CO2	: approximately - 25°C to - 15°C.

Minimum required gaseous CO2 temperature at outlet
: 5°C at maximum flow rate and with CO2 at -20°C at the inlet.

- TS and PS

Max allowable pressure PS	: 34 bars g if option No. 9 (liquid invasion prevention sleeve) is selected, otherwise the maximum allowable pressure is 100 bars g.
Min. allowable surface T° TS	: -40 °C (-29°C if option No. 09 is selected).
Max. allowable surface T° TS	: 130 °C.

- Electrical characteristics

Power	: 4 kW / 8 kW / 16 kW / 24 kW.
Voltage	: See rating plate.
Frequency	: 50/60 Hz.
Phase(s)	: 3.
Max. absorbed current	: See electrical diagram and rating plate.

- General information

Weight	: See rating plate.
Min. allowable ambient temperature	: - 29 °C if the liquid invasion prevention sleeve option is selected, otherwise the temperature is - 40°C.
Max. allowable ambient temperature	: 40°C.

1.4 DIMENSIONS

Refer to the interface drawing associated with the specification to find the vaporiser dimensions.

1.5 HANDLING

The vaporiser can be handled by fork lift truck.

2 ASSEMBLY AND CONNECTION

2.1 BEFORE INSTALLATION:

Check that:

- The maximum pressure that could occur in the air circuit is not greater than the pressure PS stated on the rating plate.
- The pressure loss created by the heater is compatible with the pressure of the flow generator and with the resistance of the aeraulic circuit.
- The nominal diameter and the inlet and outlet tapping sealing system are correctly matched to the installation pipework.
- A sufficient clearance will allow removal of the monotubes.
- The vaporiser is placed in an external environment compatible with its protection rating and with the quality of the materials making it up.
- The power supply voltage correctly matches the value given on the nameplate.

2.2 ASSEMBLY

- The heater must only be handled using the attachment or lifting arrangements provided for this.
- The vaporiser must rest on its feet and be fixed to the ground.
- When making aeraulic connections precautions must be taken so that the stress inflicted by the pipework on the vaporiser tappings is compatible with the characteristics of the materials used, taking account of their dimensions, the pressure and the temperature. Distortion compensators may have to be installed according to standard practice (bellows, expansion loop, hose, etc.).
- **Provide the safety devices required by the legislation** and intended to deal with overpressure phenomena in the event of overheating.
- The inlet/outlet piping support is the responsibility of the owner.

2.3 ELECTRICAL CONNECTION:

**WARNING DANGER:**

Connection of the power supply must be carried out according to good engineering practices and applicable regulations, particularly for the cable diameter used. The power supply line must be able to withstand, in steady state, the maximum current given on the electrical diagram and the rating plate. It must be properly protected upstream, with distributed earthing.

Please obtain and familiarise yourself with the electrical diagram before any electrical connections

**IMPORTANT:**

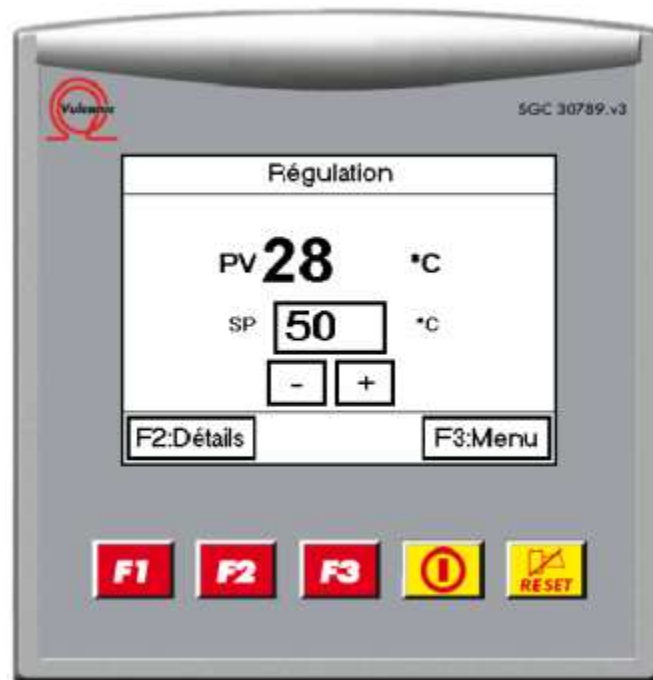
Connect the connecting cables between the vaporiser and the automated controller or remote control: **See electric diagram.**

Note that the connections depend on the options for your vaporiser.





After having checked that there is appropriate voltage on the power supply terminal, close the door of the electrical cabinet.

3 DESCRIPTION OF THE CONTROLLER

3.1 NAVIGATION IN THE PROGRAM



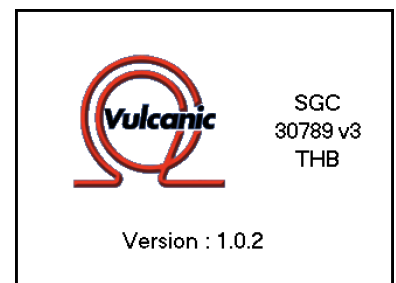
The interface is made up of:

- An ON/OFF key : temperature control unit On/Off.
- A Horn Reset/Off button : to turn off the horn and reset faults.
- Keys  to : Navigation keys

On certain screens these 5 keys are completed by touch keys that appear on the screen as needed. For example, in the screen above, the – and + keys used to reduce or increase the value of the set point (SP).

3.2 ENERGISING

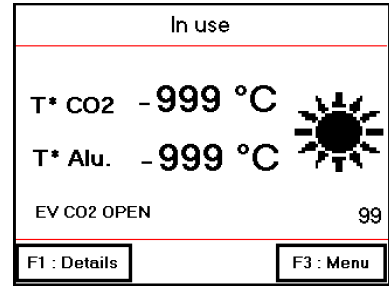
The first page, displayed about ten seconds after switching on the machine, indicates the software version.



3.3 DESCRIPTION OF THE OPERATOR SCREEN

This page shows, from top to bottom:

- The vaporiser status messages and alerts
- The current CO2 temperature at the vaporiser outlet.
- The current temperature of then aluminium heating block.
- Valve closure counter (if option 09 is installed, see chapter 1.1).

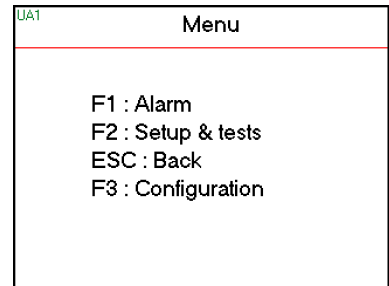


3.4 OPERATING MODE AND MENU ACCESS:

3.4.1 UA1 CHANGE OF MENU:

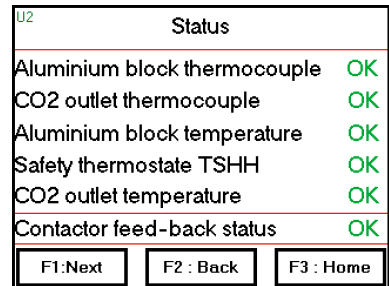
This page gives access to three available menu levels:

- **[F1] : Alarm menu:** Displays a log of past alarms.
- **[F2] : Settings and tests menu:** Settings and autotest menu (if option 12 activated).
- **[ESC] : Back:** back to the user menu.
- **[+/-] : Configuration:** Enables the configuration of the vaporiser. This menu can only be accessed with a password. If you do not have the password, please consult the Vulcanic assistance service.



3.4.2 U2 STATUSES

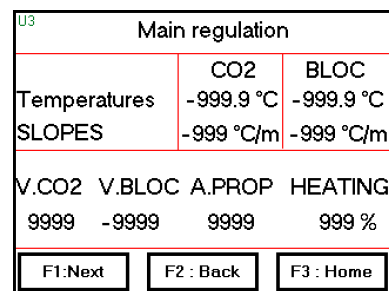
This page displays the various fault sources for the vaporiser.



3.4.3 U3 MAIN ADJUSTMENT

This page displays the vaporiser settings - from top to bottom:

- **CO2 setting:**
 - **Temperature:** Current CO2 temperature at the vaporiser outlet.
 - **Gradient:** Current gradient of the CO2 temperature at the vaporiser outlet.
- **BLOCK setting:**
 - **Temperature:** Current temperature of the vaporiser heating block.
 - **Gradient:** Current gradient of the vaporiser heating block.
- **V. CO2 :** Action on the CO2 temperature variation.
- **V. BLOCK:** Heating block temperature variation action.
- **A.PROP.:** Regulator proportional action.
- **HEATING:** Percentage of heating necessary arising from the above conditions.



3.4.4 U4 ELEMENT ADJUSTMENT

This page displays the vaporiser settings for adjusting the heating element - from top to bottom:

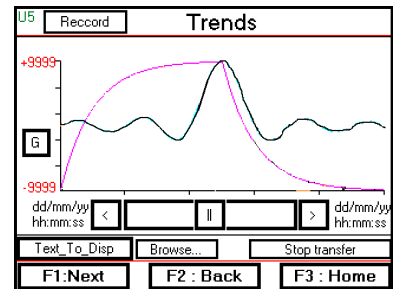
- **POWER**: Power of current heating.
- **T° DEMAN.**: Temperature demanded by the heating elements.
- **T° MAX**: maximum authorised temperature.
- **T° PVElem** : Current temperature of the heating elements.
- **CH DEMANDE** : lights up if the demanded temperature is less than the T° PVElem.
- **FORCE** : lights up if the heat is forced.
- **HEATING** : Shows that heating is ongoing.
- Indication of probe temperature:
 - Vir. Probe: Indicates the temperature of the virtual probe.
 - Physical Probe: Indicates the temperature of the physical probe, if present.
- Selecting the type of probe:
 - Active Physical probe: Indicates that the physical probe is activated.
 - Active Virtual probe: Indicates that the virtual probe is activated.

U4 Heating element regulation			
POWER	NEED.T*	MAX.T*	Elem.PV
999.9 %	-999.9 °C	999.9 °C	999.9 °C
HEAT.NEED	FORCAGE	HEATING	
Heating element probe			
Virtual	Physical	Virtual probe	
-999.9 °C	-999.9 °C	ACTIVE	
F1:Next	F2: Back	F3: Home	

3.4.5 U5 GRAPH RECORDINGS

This page enables all the graphs for the variables given below to be viewed:

- **Switch**: Displays the switch status - the graph is black.
- **Max SP element**: Displays the maximum temperature record of the heating elements - the graph is white.
- **PV T° element**: Displays the estimated temperature of the heating elements - the graph is blue.
- **SP T° element**: Displays the temperature record of the heating elements - the graph is violet.
- **T° CO2**: Displays the CO2 temperature at the vaporiser outlet - the graph is red.
- **T° alu**: Displays the aluminium block temperature - the graph is green.
- **Power**: Displays the applied power - the graph is yellow



The screen buttons are:

- a. **Save/Stop recording**: Enables graphs to be viewed.



PLEASE NOTE: This button ONLY enables graphs to be viewed. Graphs are not recorded on the SD card and it will not be possible to recover them at a later date.

- b. **Start/Stop transfer**: Enables graphs to be recorded on the SD card
 c. **Scan...:** Opens the browser to display the stored files (number of files limited to 64).

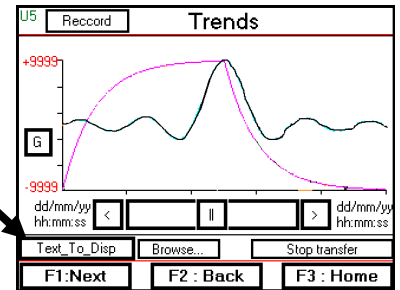


PLEASE NOTE: To save graphs, please follow the procedure provided in Chapter 3.4.6.

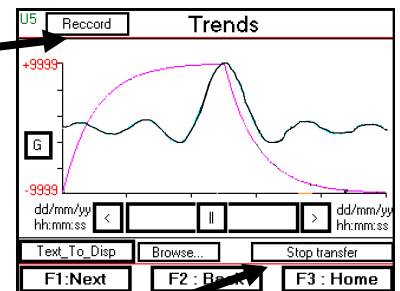
3.4.6 PROCEDURE FOR SAVING GRAPHS ON AN SD CARD.

1) Insert a formatted micro SD card in the SGC. Chapter 10 will show you how to format the card if it has not been properly configured.

2) Enter a name in the field opposite

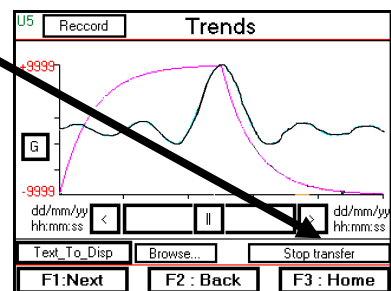


3) Press the record button



4) Press the Start transfer button. The graphs will begin to be saved on the SD card

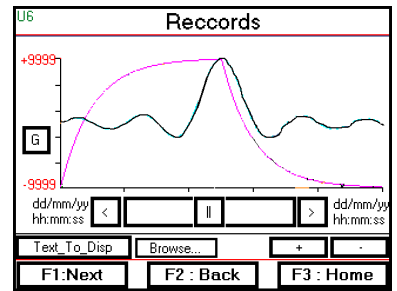
5) Press the Stop transfer button as soon as you have finished your reading. The graph saving process is finished



PLEASE NOTE: Do not remove the SD card during the graph transfer process

3.4.7 U6 GRAPH DISPLAY

If graphs have been saved, this screen enables the different graphs to be viewed.



The Scan button... Opens a browser enabling the saved files to be displayed (number of files limited to 64).

3.5 ADJUSTER MENU

3.5.1 R1 LANGUAGE AND TIME COUNTER

This screen is made up of:

- **The language selector** This allows the user to select the display language of the operator and settings menus from:
 - **French** (default).
 - **English**.
- **Time counter:** Indicates the number of running hours of the vaporiser

F1 Language & time counter

Select a language :

English - +

Compteur horaire 999999 H

F1:Next F3 : Home

3.5.2 R2 DATE AND TIME

This screen is used to set the date and time of the internal timer.

The automatic switch to summertime can be activated or deactivated.

F2 Date & Time

99/99/99

99:99:99

F1:Next F2 : Safeties tests F3 : Home

3.6 AUTOTEST MENU

The autotest function (option no. 09/03) enables the TSHH and TSLI safety thermostats to be tested.

This autotest procedure is made up of 6 stages:

- 1- **Password** (1902) to access the option.
- 2- **Check on vaporiser status:** that the vaporiser is under pressure, with no faults and no CO2 consumption.
- 3- **TSHH thermostat test:** The vaporiser heats up until the TSHH thermostat is triggered.
- 4- **End of TSHH test:** There are two possible solutions:
 - Either the TSHH thermostat is triggered and the procedure can continue
 - Or the TSHH thermostat did not trigger - an error message is displayed and indicates the nature of the fault.
- 5- **TSLI test:** The vaporiser cools down using the CO2.
- 6- **End of TSLI test:** There are two possible solutions:
 - Either the TSLI limit has been reached and the vaporiser is safe - this means that the vaporiser safety measures are operating.
 - Or the TSLI limit has not been reached and the vaporiser displays an error message

3.7 CONFIGURATION MENU

The screen pages shown in this chapter are reserved exclusively to users having all the skills needed for setting up a temperature control unit. The input of an incorrect parameter can cause serious injury and extensive damage to property.



PLEASE NOTE: This menu is exclusively bilingual in French and English.

Access is granted with a password. Please consult Vulcanic assistance if you do not know the password.

3.7.1 CO CONFIGURATION

This page enables the user to choose the vaporiser configuration (1 power stage for the 4/8 kW vaporiser and 2 power stages for the 16/24 kW vaporiser).
This page also enables the user to activate the autotest option (See paragraph 3.6).

C0 Configuration	
2 étages (16 ou 24 kW) 2 stages (16 or 24 kW)	
-	+
Auto-test disponible / available	
-	+
EV CO2 Disponible / Available	
F1:Next	F2 : Back
F3 : Home	

3.7.2 C1 VIRTUAL PROBE

This page enables the user to configure the virtual probe.

C1 Virtual probe	
Virtual probe only	
-	+
Incremen. constant	999 °C/100°C/s
Decremen. constant	-99 °C/100°C/s
Maximum diff.	999 °C
F1:Next	F2 : Back
F3 : Home	

3.7.3 C2 BLOCK ADJUSTMENT

This page enables the user to configure and adjust the temperature of the heating block - from top to bottom.

- **Top of proport. band:** Upper limit of proportional band.
- **Bottom of proport. band:** Lower limit of proportional band.
- **Maximum target block T°:** Maximum temperature of the heating block used to limit the temperature of the heating elements.
- **Extreme target block T°:** To ensure a minimal drop in C02 temperature in the event of a large flow increase (from 0% to 100%, for example). The system temporarily authorises the **maximum target temperature** in the event that the difference in the aluminium block temperature and CO2 temperature is large.
In this case, the **maximum target temperature** can increase up to the **extreme target temperature**.
- **Block/elem. coupling:** Setting enabling the user to determine the maximum temperature of the heating elements based on the temperature of the block, along with various external elements.

C2 Block régulation	
Prop.band higher limit:	999 °C
Prop.band lower limit:	999 °C
Block maximal target T°	999 °C
Block absolute target T°	999 °C
Block/he.elem.coupling	99.9 °C/°C
F1:Next	F2 : Back
F3 : Home	

3.7.4

C3 GRADIENT GAIN

This page enables the user to configure the various settings of the regulator derivative.

C3 Slope gain (Rate)	
Block, positive slope	99 %/°C/min
Block, negative slope	99 %/°C/min
CO2, negative slope	99 %/°C/min
Dead band	99.9 °C/min
<input type="button" value="F1:Next"/> <input type="button" value="F2 : Back"/> <input type="button" value="F3 : Home"/>	

3.7.5

C4 FORCING ON CO2 T°

This page enables the forced heating temperature of the CO2 to be set.

- **If T° elem < 350°C:** Forces heating if the temperature of the heating element is less than 350°C and if the CO2 outlet temperature is less than the threshold
- **In all cases:** Forces heating if the CO2 outlet temperature is less than the threshold
- **Inh der T°Bloc >0:** Inhibits the positive drift on the aluminium block gradient if the CO2 temperature is less than the threshold
- **Max. EV closure duration:** Defines the consecutive closure duration of the valve before going to TSL fault (see chapter 1.1)

C4 Forcage from CO2 Temperature	
If He.Elem T° <350°C	-999 °C
In all cases	-999 °C
Inh.positive bloc T°slope	999 °C
Max time EV closed	999 sec.
<input type="button" value="F1:Next"/> <input type="button" value="F2 : Back"/> <input type="button" value="F3 : Home"/>	

3.7.6

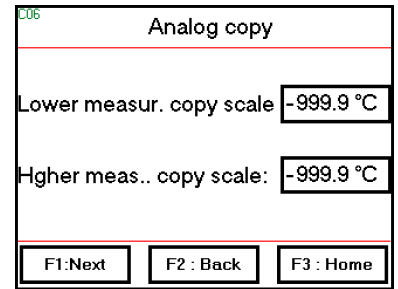
C5 SOLENOID VALVE AND CO2 SAFETY

This page enables the TSL and TSL thresholds to be set, along with the CO2 valve management (see chapter 1.1):

- **TSL safety threshold:** TSL fault threshold
- **TSL closure threshold:** TSL fault threshold
- **Period before closure:** Period before the closure of the valve when the CO2 temperature crosses the TSL threshold (see chapter 1.1)
- **Number of closures before fault:** Number of valve closures (over the period defined below) before the TSL fault is activated (see chapter 1.1)
- **Over a period of:** Duration used as the basis for the TSL fault

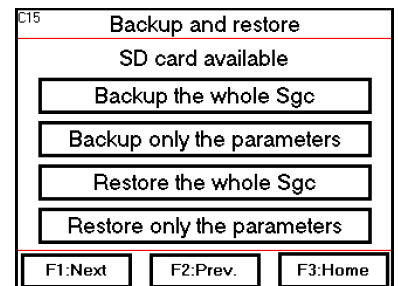
C5 CO2 valve & safety	
Safety threshold (TSL)	-999 °C
Closing threshold (TSL)	-999 °C
Delay before closing (mm:ss)	99:99
# of closing before fault	99
On a period of (mm:ss)	99:99
<input type="button" value="F1:Next"/> <input type="button" value="F2 : Back"/> <input type="button" value="F3 : Home"/>	

3.7.7 C6 ANALOGUE COPY
 This page enables the user to configure the scale of the temperature copy.



3.8 C15 BACKUP AND RECOVERY

3.8.1 BACKUP AND RECOVERY
 This screen enables the user to create a backup or recovery of the SGC or the SGC settings on an SD card
 PLEASE NOTE: a microSD card previously configured by the SD card suite software must be used to make a backup (See chapter 10).
 An SD card with a SGC backup and settings is provided with the vaporiser



In the central zone, the display is:

- **SD card information:**
 - SD card available: A micro SD card is inserted into the SGC reader and is ready for use
 - No SD card: There is no SD card in the SGC reader or the card is not formatted by the SD card software
 - SD card locked for write:
- **Clone the SGC:** Enables all SGC and settings to be saved to the micro SD card. The screen in paragraph 12.8.2 appears
- **Clone settings:** Enables the SGC settings only to be saved. The screen in paragraph 12.8.3 appears
- **Restore full SGC:** Enables the whole SGC programme and settings to be recovered from the micro SD card. The screen in paragraph 12.8.4 appears
- **Restore settings:** Enables SGC settings to be recovered from the micro SD card. The screen in paragraph 12.8.5 appears

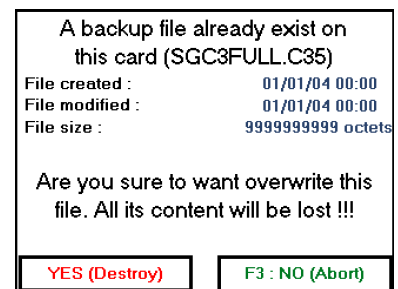
3.8.2 SGC BACKUP
 This screen enables the SGC programme and settings to be saved on the SD card inserted in the SGC.

It is still possible to cancel the backup by pressing F3

Otherwise, press "yes (delete)".



PLEASE NOTE: Saving leads to the loss of the settings initially stored on the SD card (If the file already existed).



3.8.3 SAVING SETTINGS

This screen saves the SGC settings on the SD card inserted in the SGC.

It is still possible to cancel the backup by pressing F3 Otherwise, press "yes (delete)".



PLEASE NOTE: Saving leads to the loss of the settings initially stored on the SD card (If the file already existed).

A backup file already exist on this card (SGC3DATA.D35)	
File created :	01/01/04 00:00
File modified :	01/01/04 00:00
File size :	999999999 octets
Are you sure to want overwrite this file. All its content will be lost !!!	
YES (Destroy)	F3 : NO (Abort)

3.8.4 SGC RECOVERY

This screen enables the SGC programme and settings to be restored from an SD card inserted in the SGC.

It is still possible to cancel the restore by pressing F3 Otherwise, press "yes (restore)".



PLEASE NOTE: Restoring a programme leads to the loss of the programme and settings originally stored on the SGC

Are you sure to want restore the sgc at the below state ?	
File created :	01/01/04 00:00
File modified :	01/01/04 00:00
File size :	999999999 octets
All the previous data (program and parameters) will be lost.	
YES (Restore)	F3 : NO (Abort)

3.8.5 RECOVERY OF SETTINGS

This screen enables the SGC settings to be restored from an SD card inserted in the SGC.

It is still possible to cancel the restore by pressing F3 Otherwise, press "yes (restore)".



PLEASE NOTE: Restoring the settings leads to the loss of the settings originally stored in the SGC

Are you sure to want restore the parameters at the below state ?	
File created :	01/01/04 00:00
File modified :	01/01/04 00:00
File size :	999999999 octets
All the previous parameters will be lost.	
YES (Restore)	F3 : NO (Abort)

3.8.6 CHECKING SETTINGS



PLEASE NOTE:

After restoring the programme and/or settings from a micro SD card, you are recommended to check that the settings saved in the "control menu" and "configuration" are the same as the settings specifications and the test sheet supplied with the vaporiser.

Failure to follow this recommendation may lead to a malfunction of the vaporiser or even its destruction.

If there is any difference between the settings saved and the settings specifications, please consult Vulcanic before restarting the vaporiser.

4 COMMISSIONING PROCEDURE:

4.1 PRECAUTIONS TO BE TAKEN BEFORE COMMISSIONING:

- Verify the temperature setting of the thermostats and the controller configuration.

4.2 COMMISSIONING:

- Switch on the vaporiser. Immediately check that the line current complies with the expected value.
- Measure the CO2 outlet temperature, checking that it is actually compatible with your needs. If this is not so, slightly increase or lower the temperature setting value, taking care always to be at least 5°C below the set value of the overheating thermostat TSHH.

4.3 STOPPING THE INSTALLATION:

- Switch off the vaporiser.

5 CORRECTIVE ACTIONS IN THE EVENT OF A FAULT

This chapter gives some suggestions for corrective actions in the event of a fault. Important - corrective actions must be performed by a qualified technician

- **Tck CO2 fault:**

- Check the thermocouple positioned at the CO2 outlet
- Check its connection on the terminals in the electrical cabinet

- **Tck block fault:**

- Check the thermocouple positioned in the aluminium block
- Check its connection on the terminals in the electrical cabinet

- **CO2 temperature fault:** The outlet temperature has moved beyond the TSL threshold more than 3 times in 5 minutes or for more than 100 seconds in 5 minutes:

- Check that the CO2 flow is not exceeding the vaporiser capacity
- Check that all heating elements are properly active (with a current clamp)

- **Block temperature fault:** The aluminium block temperature has exceeded 120°C:

- Check that the safety thermostat is not set at over 100°C.

- **Thermostat fault:** The block temperature has exceeded 100°C or the TSHH thermostat is defective

- Check the TSHH setting (100°C)
- Check that the TSHH contact is properly closed when the block temperature is less than 85°C

6 SETTING PARAMETERS:

- Thermostat: see commercial specification.
- Programmable controller: See the relevant parameter setting booklet

7 MAINTENANCE:

This equipment is solely intended for the vaporisation of liquid CO2

After 10 hours operation, then every year:

- Check the tightness of all the electric connections and the status of the relay contacts.
- Monitor the correct operation of the regulation.
- Monitor the status of joints and thermal insulation, so as to act preventively to avoid the risk of burns to the personnel.
- Test the operation of other safety devices and their setting value.
- It is recommended to check each heating element (with a current clamp) when testing the TSHH (all heating elements are active during the test)

If necessary, replace the defective component

Any repair must be subject to an evaluation by an approved body, which will decide on the necessary inspection measures. It will be done under the entire responsibility of the user.

8 REPLACING A DEFECTIVE MONOTUBE:

If a monotube is judged defective by checking the ohmic value or absorbed current, it can be replaced individually by a new monotube heater. The description of these operations follows:

- 1) **Switch the equipment off.**
- 2) **Remove the removable plate on the front panel.**
- 3) **Disconnect the cables from the defective monotube.**
- 4) **Unscrew the monotube mechanical retention screw.**
- 5) **Remove the defective monotube from its housing.**
- 6) **Remove the solidified thermal grease residues attached to the internal walls of the pocket. If necessary use a reamer of the external diameter of the heating monotube to fully clean the internal walls of the pocket.**
- 7) **Insert the new heating monotube. Carefully check that the retaining lug is pushed against the lagging jacket.**
- 8) **Retighten the monotube retaining screw on the lagging jacket.**
- 9) **Reconnect the heating monotube electrical cable in accordance with the diagram.**
- 10) **Switch on the equipment. Verify that the vaporiser is heating (heating indicator lamp lit). Check the correct operation of the monotube by measuring the current.**
- 11) **Refix the removable plate on the front panel.**

9 WARRANTY:

The guarantee is compliant with the Electric Construction inter-trade association agreements and our general sales conditions. We guarantee the compliance of the materials and surface treatments, as defined in our documents. On the other hand premature wear or deterioration caused by:

- an electrical supply more than 10% greater than the nominal voltage,
- lack of maintenance, shocks, clumsiness or the inexperience of the user,
- corrosion or clogging phenomena, non-compliance with the present manual, the rules of the art and legislation, will not engage our responsibility due to the diversity of the parameters that cause them and that are outside our control.

10 SD CARD FORMATTING

To be able to use an SD card in SGC.v3, the SD card must be formatted using the free "SD Card Suite" software

This appendix details the formatting procedure for an SD card

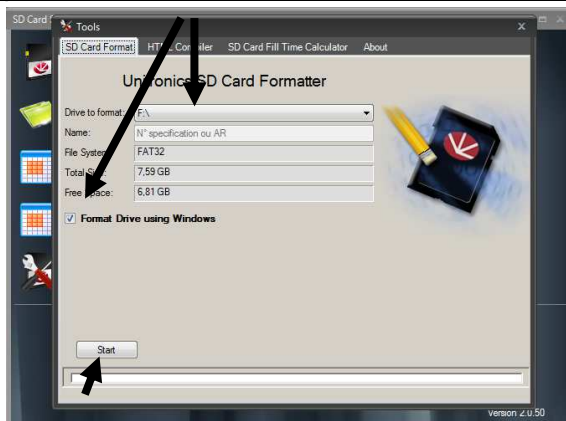
- 1) Download and install the "SD Card Suite" software on your PC computer fitted with an SD card reader
(www.unitronics.com/support/downloads)
- 2) Insert the SD card in the PC reader.
- 3) Run the SD card suite software.
- 4) Choose the "Tools" menu.



- 5) Tick "Format driver using Windows".

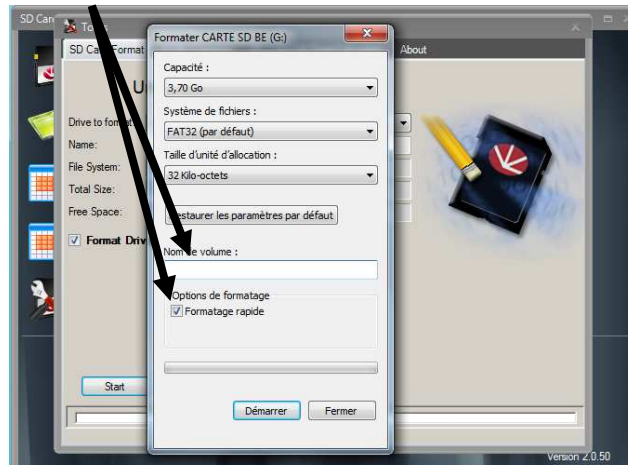


Important - check the location of the SD card (In this case F:)



- 6) Press Start
- 7) Press "OK" if the message "Please select allocation unit size = 4096 if possible" is displayed.

- 8) Tick the quick format box and insert the order number for your Vaporiser in the "Volume name" fields



- 9) Click on start, then on OK to the next message.
10) The card will be ready when the "Formatting ended" message appears.