OENOFRANCE

OENO 2

User manual

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Contents

OENO$_2$: what is it?

OENO$_2$ is a system that manages the micro/macro-oxygenation of wine in vats while measuring effective oxygen supply in mg/s. It does not require particularly high input pressures and compensates for any variations in output pressure (independently of the input pressure) in order to stabilise the oxygen supply throughout the distribution period. Equipped with an efficient self-diagnosis system and specific safety systems, it immediately halts distribution in case of any dysfunction.

OENO$_2$ allows the user to carry out three kinds of oxygenation:

- **MICRO** micro-oxygenation lasting one month (in mg/l/month)
- **MACRO** macro-oxygenation lasting one day (in mg/l/day)
- **PERS** oxygenation for a personalised period (in mg/l/desired time, with a minimum possible)

The user must determine the **dose of oxygen to be diffused by weight.** Indeed, defining doses by volume is not very appropriate, since the number of chemical reactions occurring depends on the number of oxygen molecules supplied, and so the weight of the quantity of oxygen distributed. There can be more or fewer molecules in the same volume of oxygen (so the weight will be different), depending on temperature and pressure.

The user then identifies the number of litres of product to be oxygenated. The system automatically calculates the total weight of oxygen to be supplied and controls distribution according to the type of oxygenation selected (micro, macro, personalised) and according to the desired length of time.

The OENO$_2$ system ensures regular, continuous distribution. **It does not use dosing chambers, but sensors that measure gas flow in real time.** The powerful microprocessor and extremely sophisticated software perform the calculations needed to make sure the system maintains oxygen flow in weight at the required value.

There are many advantages to this type of technology:

- Greater regularity of distribution.
- Elimination of mechanical elements in the system.
- Reduction in the value of input pressure needed for the proper operation of the system.
- Minimal working pressure on the diffuser: the oxygen is distributed at the lowest pressure needed in order to minimise the size of the bubbles and improve oxygenation yield.
- Immediate automatic compensation of variations in pressure: the system adapts automatically to variations in output pressure (for instance due to clogging of the diffuser or atmospheric pressure), by consequently varying the flow of gas in volume to stabilise flow in weight. In addition, it can also compensate for variations in input pressure while ensuring continuously stable output diffusion. If the system is unable to compensate, diffusion is immediately interrupted and the type of error is displayed on the screen.
- It is possible to use any kind of diffuser (changing the diffuser has an impact on the diameter of the oxygen bubbles).
- The scale of dosing depends on the version of the apparatus: from 0.1 mg/l – min. dose 1 mg/l/month for 200 l; max. dose 9 mg/l/d for 500,000 l.

OENO$_2$ installation

To install the standalone OENO$_2$ system, follow the procedure below (see the connection diagram Fig. 1):

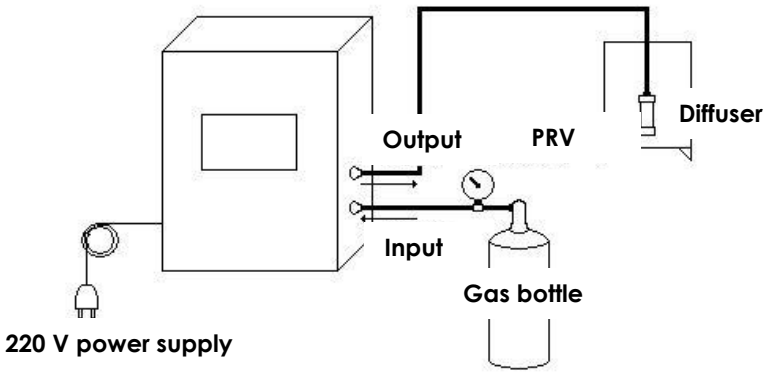


Fig. 1

1. Locate the apparatus in a vertical position in an appropriate area, generally near the vat to be oxygenated.

2. Connect the gas input to an oxygen bottle with a pressure-reducing valve (PRV).

3. Regulate the output pressure of the bottle to around 5 bars – the pressure that ensures optimum operation. The system halts distribution if it detects an input pressure lower than 4 bars or higher than 5.5 bars. (The input pressure is shown on the touch screen once dosing has begun.)

4. Connect the gas output to the diffuser with the special tube.

5. It is advisable to place a check valve between the Oeno2 output and the diffuser to avoid the contents of the vat leaking through the gas tube and damaging the apparatus in case of malfunction.

6. Insert the diffuser into the vat to be oxygenated.

7. Plug into the 220 V network.

Accessories

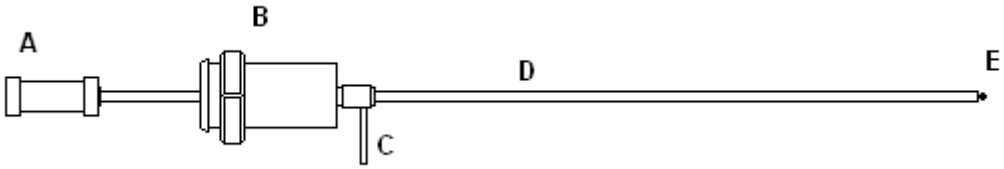
Standard diffuser:
Medium volume up to 300 hl –
Stainless steel (ceramic on request)

Large volume diffuser:
300 hl and up to 2500 hl
Macro-vinification for large volumes -
Stainless steel

Cask diffuser
Small volumes, from 150 Litres to 1000 litres
Titanium – 35 mm diameter

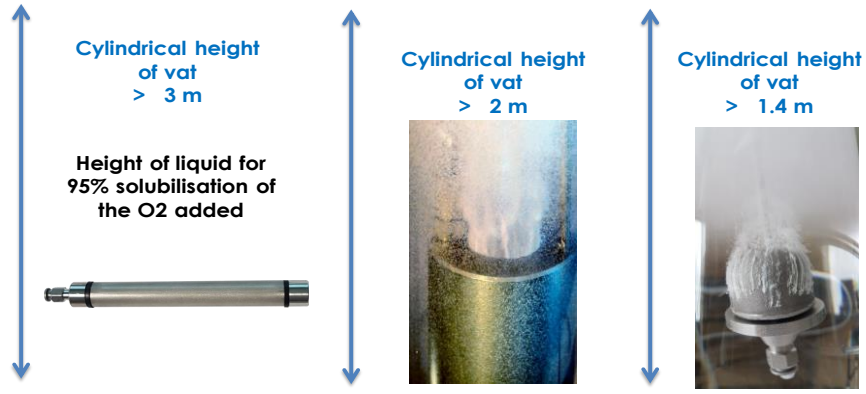
Injection pipe
Pipe for injection into the vat by butterfly valve and ball
Length 130 cm – Macon 50

Injection pipe assembly



1. Lightly tighten **C**
2. Extract the tube **D**
3. Connect the tube from $OENO_2$ to end **E**
4. Insert and screw part **B** to the vat and tighten
5. Open the vat valve
6. Insert the tube in the vat over the required length (the best position for the diffuser is in the centre of the vat)
7. Tighten **C**

Quality of the bubbles



Use of OENO$_2$

Install the OENO$_2$ system as described in the paragraph above.

The system is controlled by touch screen. Using the screen, it is possible to control a number of dosing outputs or units present (up to a maximum of 30 OENO$_2$ systems on a single frame).

Fig. 2 illustrates the pattern of connection with OENO$_2$ connectors mounted on a single frame and linked to a touch screen. Each distribution point is controlled independently, so it is possible to simultaneously regulate and apply different dosing values for the vats in the cellar.

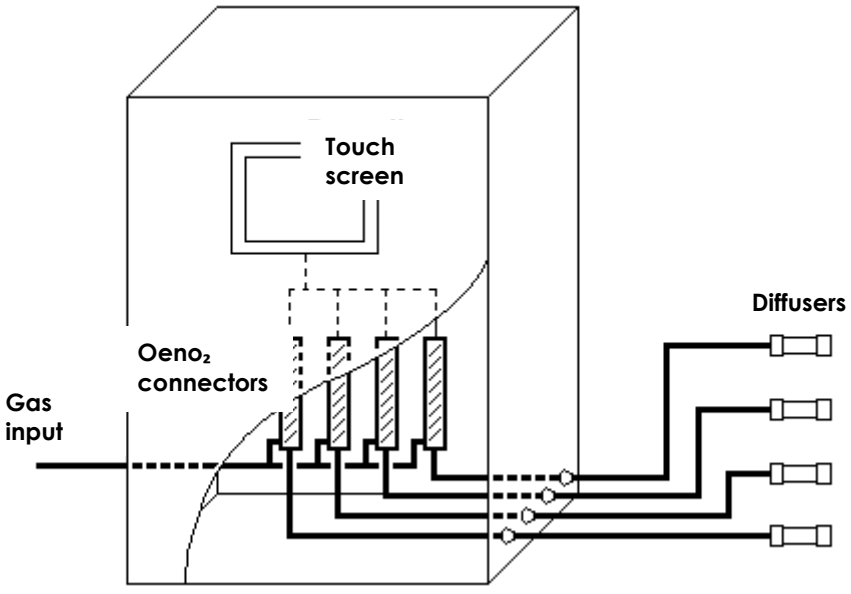


Fig. 2

Description of the control pages displayed on the screen and their function.

1) General visualisation page

When the screen is turned on, data related to the apparatuses in the network are read and a page is displayed that illustrates the state of each one (Fig. 3). Each Oeno2 is represented by a tank pictogram. The icon changes according to the state of the apparatus: oxygenation in progress is represented by bubbles; oxygenation on hold by the pause symbol; an alert by a red triangle. The type of operation in progress or programmed is shown:

- 'MICRO' for micro-oxygenation,
- 'MACRO' for macro-oxygenation,
- 'PERS' for personalised oxygenation.

Top right: the code of the apparatus (number from 1 to 9999). By clicking on the pictogram of one of the apparatuses, the user can access the page related to its operation.
Top right: a pictogram provides access to the general parameter page.

If the system runs more than 10 Oeno2 systems, each page enables the control of 10 apparatuses at most. In that case, bottom right, there will be 2 pictograms with arrows pointing left and right to move through the pages.

Fig. 3

2) Operation page

This page is used to set the operational parameters for one of the Oeno2 systems (Fig. 4).
Top left: a status bar appears. It shows the state of the apparatus. On the right is the output number. The icon below changes according to status: inactive, distribution in progress, paused, etc.
Under the status bar, there is information related to the type of operation selected, dosing and litres of product. Below is the total duration of oxygenation programmed, time since the start (0 if the apparatus is inactive), the total dose programmed and that supplied since the start of oxygenation (0 if the apparatus is inactive). Below are displayed the temperature and input and output pressure of the apparatus. At the bottom are pictograms to control the operation of the Oeno2 system:

- **Filling the tube**

  The filling function injects oxygen into the tube to fill it. Clicking the pictogram once starts the distribution, clicking a second time blocks it. After 30 seconds, distribution will be interrupted.

- **Emptying the tube**

  Clicking on this pictogram empties the apparatus of any oxygen present in the internal pipes. The emptying operation lasts about 1 second and can be repeated a number of times, simply by clicking on the pictogram.
  WARNING: BEFORE EMPTYING, DISCONNECT THE APPARATUS'S INPUT AND OUTPUT TUBES.

- **Oxygenation parameters**

  Clicking on this pictogram takes the user to the operational parameter page (see the paragraph concerned for more details). If the system is paused, clicking on this pictogram takes the user to the intermediate personalised operational parameter page.

- **Start**

  Clicking on this pictogram will begin the programmed oxygenation if the Oeno$_2$ is inactive. If the Oeno$_2$ is paused, oxygenation will begin again.

- **Pause**

  Clicking on this pictogram interrupts the oxygenation in progress.

- **Stop**

  Clicking on this pictogram cancels the paused oxygenation and deactivates the apparatus. To cancel oxygenation, first interrupt it by selecting the 'Pause' pictogram and then press 'Stop'. This two-stage procedure is a safety measure to prevent cancellation of the operation by accidental selection of the pictogram.

- **Exit**

  Clicking on this pictogram takes the user to the general page.

- **Graphics**

  Clicking on this pictogram takes the user to the graphics page.

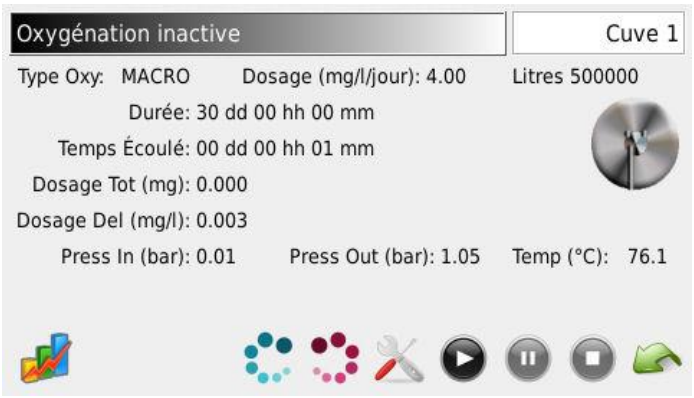


Fig. 4

3) Parameter page

On this page (Fig. 5), the user can programme oxygenation via the selected output.
Top right is the output number. Below, there are three pictograms to select the type of operation to be carried out:

- **MICRO** micro-oxygenation lasting one month in mg/l/month
- **MACRO** macro-oxygenation lasting one day in mg/l/day
- **PERS** oxygenation with a maximum duration of one day, with personalised dosing in mg/l

According to the type of operation chosen, the display of the unit of measurement (in the 'DOSE' box) will be different. Clicking on this box gives access to the keyboard. Then the dose to be used can be entered. The system accepts doses from 0.50 minimum to 99.00 maximum. Next, the litres of product to be oxygenated must be chosen by clicking on the 'Litres' box and entering the required value; the system accepts a value of 200 litres minimum; the maximum varies according to the programmed dose, but will never be higher than 500,000 litres. Next, the duration of oxygenation must be chosen: for micro or macro, the maximum duration is 60 days and 1 day for personalised operation.

Clicking on the **'Start'** pictogram starts oxygenation and the user returns to the control screen.

Clicking on the **'Exit'** pictogram takes the user to the control screen without starting oxygenation.

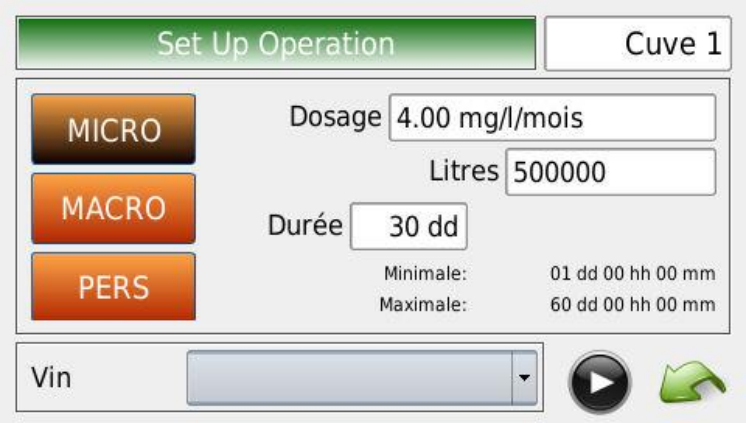


Fig. 5

4) Parameter page for intermediate personalised dosing

This page (Fig. 6) is used to programme personalised oxygenation to be carried out during an interruption of the oxygenation already begun.
Top right is the number of the output controlled. Below are the boxes to select the dose, number of litres and duration of the operation:

- **Dose**: the system accepts values from a minimum of 0.50 to a maximum of 99.00
- **Litres**: the system accepts values from a minimum of 200 to a maximum that varies according to the chosen dose, in no case higher than 500,000.
- **Duration**: the maximum duration is one day; the minimum varies according to the dose and litres entered so as not to exceed the maximum flow of OENO2 distribution.

Then the **'Automatic resumption'** control must be chosen. If **'False'** (empty circle) value is chosen, at the end of intermediate oxygenation, the system will return to the interruption phase of the previous, paused operation. If **'True'** (full circle) is chosen, at the end of oxygenation, the system will return to the previous, paused operation. For more details on personalised intermediate operation, read the relevant paragraph of this manual.

Bottom right are two pictograms:

- clicking on **'Start'** begins oxygenation and the user returns to the control page,
- clicking on **'Exit'** takes the user back to the control page without starting oxygenation.

Fig. 6

5) General parameter page

This page (Fig. 7) displays two screens; two system configurations can be handled:

- **General**: this screen is used to set system management parameters.
- **Batches**: this screen is used to enter, modify and delete batches of wine.

With the **'General'** screen, the following parameters can be set:

- **Number of outputs**: the value set must correspond to the number of connectors present in the system. **WARNING: NEVER MODIFY THIS VALUE WITHOUT HAVING EXPANDED THE SYSTEM BY PHYSICALLY ADDING OTHER CONNECTORS TO THOSE INITIALLY PRESENT.** Entering a lower value than the number of connectors present will not cause the system problems, but the user will only be able to control some of the connectors. Entering a higher value than the number of connectors present could lead to system control problems.

- **Time between two recordings**: in a database, the system memorises the state of the connectors at regular intervals, corresponding to the value of this parameter (minimum 10 minutes).

- **Language:** click on this box to select the desired language.

- **Date/Time**: when the user clicks on the date, a calendar allows it to be modified. To change the system time, click on the hours and use the arrows to change them; to modify the minutes, click on the minutes and use the arrows to change them.

The **'Batches'** screen displays the list of batches of wine entered. At the bottom are the following pictograms:

- **ADD**: click on this pictogram to add a new batch of wine; a window is displayed where the batch code, type and litres can be added. After adding this information, confirm it by clicking on the **Ok** pictogram or cancel the operation by clicking on the **Cancel** pictogram.

- **MOD**: by clicking on this pictogram, the batch of wine selected can be modified (first, select a batch in the list by clicking on it to highlight it in blue); a window comes up in which the batch code, type and/or litres can be modified. When these modifications are complete, click on the **Ok** pictogram to confirm, or cancel the operation by clicking on the **Cancel** pictogram.

- **DEL**: click on this pictogram to remove the batch of wine selected (first, select a batch in the list by clicking on it to highlight it in blue).

Bottom right, the 'Exit' pictogram takes the user to the general visualisation page.

Fig. 7

6) Graph page

This page (Fig. 8) displays graphs corresponding to the operations carried out.
The start date of the operation to be visualised must be selected. A batch of wine can be selected to limit the choice to only operations carried out on this batch; to select a batch, first click on the bullet before **'Batch'**, then click on the scrolling menu of the list of batches.
Once the required operation has been selected, the system extracts the data corresponding to the operation (wait a few seconds). On the graph page, a caption appears that displays the system parameters: input pressure, output pressure, temperature, flow. Clicking on one or more terms in the caption will display the graphs.

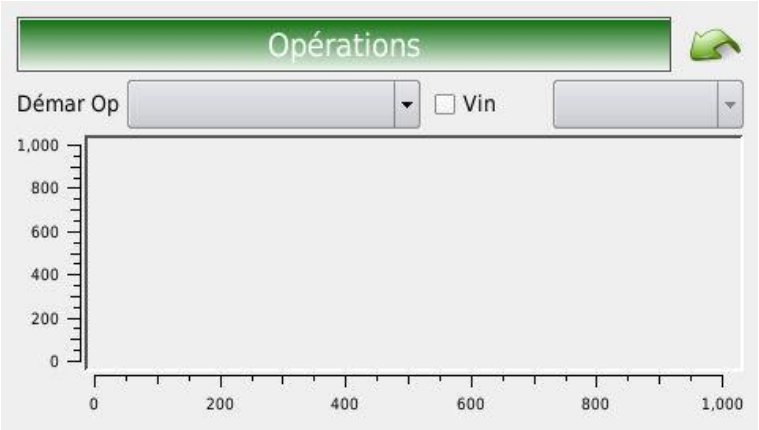


Fig. 8

7) Error management

Should an error occur during oxygenation, oxygen distribution stops and the screen displays an error page. The **'CONT'** option can be selected to attempt to restart the paused oxygenation, or the **'EXIT'** option to end the job.

The error page also displays the type of error encountered:
- **HI TEMP**: the gas temperature is too high (max. 50°C)
- **LO TEMP**: the gas temperature is too low
- **LO IP**: the input pressure is too low
- **HI IP**: the input pressure is too high
- **LO OP**: the output pressure is too low
- **HIGH OP**: the output pressure is too high
- **PRESS JUMP**: there has been a sudden variation in pressure

During oxygenation, if the apparatus is accidentally turned off or if there is a power cut, when the apparatus comes back on, the page for the suspension of oxygenation in progress before the halt will appear, to enable a restart from the point at which it was paused.

Cleaning the diffusers
(Clean the diffusers thoroughly before long-term storage)

1) Stainless-steel diffusers

- Prewash with water
- Immersion for 30 to 45 minutes in 2-4% NaOH
- Rinse with water
- Buffer with a citric-acid solution at 2-3%

2) Ceramic diffusers

- Prewash with water
- Immersion for 60 to 90 minutes in 0.5-1% KOH
- Rinse with water
- Buffer with a citric-acid solution at 2-3%

Remark: for blocked diffusers that are very hard to clean, use an ultrasonic bath (there is a charge for the diffuser cleaning service) or replace only the porous part.

Technical notes on oxygenation

Over the last few years, the use of micro/macro-oxygenation techniques has become customary in winemaking. It results from an understanding of the positive action of oxygen in improving the characteristics of wine. Already in 1866, Pasteur recognised oxygen's ability to refine wine, particularly by modifying sour aromas and alleviating unpleasant tastes. Among their other advantages, permeable casks release very small quantities of oxygen into wine with slow diffusion over time. In casks, oxygen supply occurs during racking, which – depending on the method – can enable limited or large quantities of oxygen to dissolve. These techniques cannot be used to supply wine with a predetermined quantity of oxygen, but that is possible with modern micro/macro-oxygenation systems.

The oxygen supplied is measured in milligrams per litre of wine over a unit of time. The two processes of micro and macro-oxygenation essentially differ in the length of operation and the scale of the volume of oxygen supplied to the wine.

Macro-oxygenation

In general, macro-oxygenation lasts for a day. During that time, it supplies a considerable

quantity of oxygen measured in mg/l/day. It is generally done during the final phase of fermentation or to replace aeration.
During this phase, the oxygen enables the yeast to complete alcoholic fermentation evenly, avoiding the formation of sulphur compounds which could cause unpleasant odours and tastes. Also, the presence of oxygen increases the production of acetic aldehyde or acetaldehyde. The compounds plays a very important part in developing colour, since it bonds to the phenolic anthocyanin-tannin complex; once the bond is formed, the normally colourless complex recovers its positive charge, restoring stability and the original colour.

Micro-oxygenation

Generally, micro-oxygenation lasts for a month, supplying a small quantity measured in mg/l/month.
During the production of very high-quality wines, the use of oxygen can be crucial. Oxygenation during the phases immediately following the end of fermentation improves the stability of the colouring matter, avoids the formation of sulphur compounds and encourages polymerisation and the condensation of tannins. During the élevage phase in casks or oak barrels, oxygenation softens and rounds off wine that has not matured in terms of tannin (astringency and bitterness). Before bottling, oxygenation helps a wine to achieve balance and makes the tannins more flexible.

To carry out oxygenation operations, it is necessary to consider the following aspects:

- Wine rapidly consumes dissolved oxygen; if the quantity of oxygen supplied is no greater than the wine's capacity to consume it, there is improved stability of the colouring matter and development of the taste, as described above. If, on the contrary, the quantity of oxygen supplied per unit of time is excessive, the gas will accumulate in the container and could cause violent, harmful oxidation.
- The temperature of the wine to be treated must not be lower than 10°C or the speed of the chemical reactions will be too slow and the solubility of the oxygen too high.
- Distribution must be continuous and the bubbles very small in order to allow them to dissolve completely in the wine.
- To control the process efficiently, certain physicochemical parameters of the wine must be periodically checked. It is possible to directly verify the quantity of oxygen dissolved in the vat, but the equipment needed is not yet easily available in cellars. On the other hand, it is possible to check other parameters that are more easily determined, such as acetaldehyde or volatile acidity. Indeed, a higher concentration of acetaldehyde than 30 mg/l may be due to an excess of oxygen, which may contribute to the development of a musty odour. The verification of volatile acidity can be useful in controlling the formation of acetic bacteria, particularly on the diffuser or the surface of the wine – a sign of oxygen overdosing. The criteria that enable simpler monitoring of the development of the process are those of colour, especially absorbance at 620 nm, which reveals the formation of purplish pigments. They result – as has already been underlined – from the formation of more stable complexes among the molecules of colouring matter.
- The wine's development is appreciable in organoleptic terms – as already stressed – for greater opening up of the aromas towards fruity notes and a general softening of the flavour. So frequent tasting is needed to assess evolving changes in the wine.

Remarks

1. Do not use the OENO2 system in a hermetically enclosed space; enable air circulation and the possible dispersal of oxygen in case of a leak.
2. Do not use products and materials that are incompatible with oxygen, particularly grease or lubricants.
3. In contact with oxygen, grease can catch fire. Consequently, be very careful not to have greasy hands or other greasy objects present when handling oxygen.

4. Oeno2 is designed and tested to work optimally with an input oxygen pressure of 5 bars; distribution will be halted if the input pressure is lower than 4 bars or higher than 5.5 bars. In no case should the pressure exceed 6.5 bars.
5. Never use the system in a place where there is a risk of fire or explosion. Always use the system in a managed area.
6. In case of functional anomalies, do not use the system and disconnect it from the oxygen supply and power network.
7. The oxygen contained in high-pressure bottles can cause explosions if not handled with care. The final user must read the instructions and explain the use and maintenance of the bottles containing the gas to the relevant staff.
8. Oxygen is a gas that can very quickly fuel fires, so the user must be extremely attentive during the installation of the appropriate pipes to carry the gas to either the doser or the dosing tube.
9. The continuous inhalation of a concentration of oxygen greater than 75% can cause nausea, dizziness, breathing difficulties and convulsions. If such symptoms are experienced, take the necessary steps in the area and put the operation on hold until conditions are safe again.
10. Compliance with regulations pertaining to the handling and storage of oxygen in any form is the exclusive responsibility of the user, as is the relevant staff training.
11. Mono-dose and bi-dose machines are equipped with a safety system to handle any excess pressure that may occur inside the vat. Be very careful to check the proper state of the membrane and free it of any obstructions.
12. The output pressure is the minimum one for distribution; it depends on atmospheric pressure, the height of the liquid in the vat and the type of diffuser. So before beginning diffusion, the system's output circuit must reach that pressure. If the dosing is low, that phase may require a long wait; to limit the delay, the tube can be filled preventatively.
13. Since oxygen dosing is continuous, the system is sensitive to variations in input and output pressure. In case of slow variation – for instance the progressive blockage of the diffuser – Oeno2 automatically compensates within certain limits by maintaining a constant distribution rate.
14. Variations in output pressure – for instance an increase in atmospheric pressure – can result in very low dosing and the momentary interruption of distribution until the tube pressure returns to the proper level.
15. If the pressure variation is very rapid – for example because of irregular supply – the system automatically blocks distribution to avoid risks of malfunction (if the input pressure is rapidly increased during distribution or if the valves that regulate flow detect significant vibration, etc.) In all such cases, the error is displayed as **'System failure'**. To avoid Oeno2 remaining stopped because of accidental vibration, an automatic restart system is built in. This system restarts distribution after a minute of stoppage; if the same error occurs again in the minute following the restart, distribution will again be halted and begin again. In case of a third consecutive error, following a restart attempt, Oeno2 will permanently stop distribution until the user takes action, and report the error. However, if after a restart, the system continues its normal distribution for at least a minute, that means the problem was momentary and operation will continue as normal (the error will not be reported).
16. If apparatuses are on trolleys, the user is advised to avoid moving them during operation as excessive vibration could prevent regular dosing; in addition, care must be taken when moving them because excessive or frequent knocks could damage the regulation systems.
17. The system does not operate if the input pressure exceeds 6.5 bars, whatever the reason.
18. Oeno2 has been calibrated for doses of 2 mg/l/month for 10,000 litres
19. NEVER REVERSE oxygen input and output; that could damage the apparatus.
20. We recommend checking the diffuser periodically and cleaning it if necessary. It should be cleaned with food-grade ethanol before use and left immersed in a 25% solution of alcohol in water for at least 24 hours.
21. We advise installing a check valve between the diffuser output and the dosing input to ensure that, in case of malfunction, the contents of the vat cannot leak through the gas tube and damage the apparatus.

22. If there are a number of distribution points, they are all completely independent of each other. Because of the tolerances of the internal clocks of the microprocessors that control the apparatuses, the execution time of oxygenation operations can show differences, but in no case will that make the system less effective.
23. Possible difficulties with spikes in the power supply can cause dysfunctions and/or system problems that may be difficult to identify. Consequently, in case of abnormal conditions, use a UPS-type voltage regulator (see computer systems) which will power the apparatus directly. The voltage regulator should have the right power output (VA – volt ampere) corresponding to the apparatus's consumption. Finally, it should have the appropriate voltage and phase, while producing the power-supply voltage required by the doser, the frequency and also the correct sinusoidal signal form.
24. To ensure optimum distribution of oxygen bubbles, the air-passage pores in the dosing input (passage diameter from 1 to 5 microns) should be clean and free of any obstructive particles (e.g. grease from incomplete cleaning with soap or contact with dirty hands). Cleaning of the diffusion surface is advised before dosing begins. That operation must be done using substances acceptable for food-grade contact (e.g. a solution of water and food-grade ethanol) so as to remove any traces of grease (which is incompatible with oxygen because it can catch fire). It should be remembered that even small particles of dirt can compromise the system's efficacy, since in case of blockage, the pores of the dosing output cause increased pressure and so an increase in the diameter of the oxygen bubbles diffused, leading to less solubility in the liquid and possible accumulation on the surface, which, depending on the concentration, could cause oxidation of the wine. Cleaning could even be necessary when the diffuser is in use. Oenofrance declines all responsibility for the use or possession of the substances used.
25. If the user anticipates not using the OENO2 for a prolonged period, it is advisable to disconnect the gas input and output tubes and start oxygenation for a short time (the system will report a low input pressure error) or alternatively, if available, activation of the draining function. The procedure is needed to empty the apparatus of any volumes of gas at operational pressure. If there are a number of stations, the recommended action should be repeated for each output left inactive.

Technical characteristics of the dosing connector

1000CM VERSION

Dimensions:	120x107 (mm)
Weight:	350 (gr), 2 x 16 screens included
Minimum input working pressure:	4.5 (bars)
Maximum input working pressure:	5.5 (bars)
Nominal input working pressure:	5 (bars)
Maximum input pressure:	6 (bars)
Maximum distribution distance:	60 (m) approx.
Maximum possible dose:	2000 g/day
Minimum possible dose:	100 mg/month
Maximum output working pressure:	3.5 (bars)
Type of gas usable:	oxygen
Maximum compensable pressure spike:	0.5 (bars)
Gas input connector:	4x2.7 woven
Gas output connector:	4x2.7 woven
Minimum dosing interval:	0.1 mg
Minimum selectable dose:	0.1 mg/l
Maximum selectable dose:	99 mg/l
Minimum selectable value in litres:	200
Maximum selectable value in litres:	500,000
Dosing functions available:	micro (mg/l/month), macro (mg/l/day), personalised (mg/l for a limited period)
Flow control:	continuous
Input power supply:	min 15V AC, max 24V AC
Average current absorbed	400 mA
Maximum working temperature:	40°Cbsorbed a
Minimum working temperature:	5°C
Maximum storage temperature:	60°C
Minimum storage temperature:	5°C
Communication port:	1
Type of communication port:	RS-485 standards
Communication protocol:	MODBUS RTU

HP VERSION

Dimensions:	120x107 mm
Weight:	350 g
Minimum input working pressure:	5.5 bars
Maximum input working pressure:	9.5 bars
Nominal input working pressure:	8.0 bars
Maximum input pressure:	10.0 bars
Maximum distribution distance:	60 m approx.
Maximum possible dose:	2000 g/day
Minimum possible dose:	100 mg/month
Maximum output working pressure:	7.5 bars
Type of gas usable:	oxygen
Gas input connector:	4x2.7 woven
Gas output connector:	4x2.7 woven

Minimum dosing interval:	0.1 mg
Minimum possible dose:	0.1 mg/l
Maximum possible dose:	99 mg/l
Minimum possible value in litres:	200
Maximum possible value in litres:	500,000
Selectable dosing functions:	micro (mg/l/month), macro (mg/l/day), personalised (mg/l for a limited period)

Input power supply:	min 15V AC, max 24V AC
Power supply with buffer battery:	12V DC
Average current absorbed	400 mA
Maximum working temperature:	40°C
Minimum working temperature:	5°C
Maximum storage temperature:	60°C
Minimum storage temperature:	5°C
Communication port:	1
Type of communication port:	RS-485 standards
Communication protocol:	MODBUS RTU

Important notes

Coverage

1. The apparatus has been designed and constructed exclusively for the dosing of oxygen in winemaking, subject to testing for input pressures no higher than 7 bars. Before connecting the apparatus, check that the pressure supplied corresponds to the one indicated (about 5 bars).
2. NEVER USE the apparatus to dose gases other than oxygen; they could be corrosive and harm parts of the system or persons.
3. Should the apparatus malfunction, disconnect it from the oxygen supply and power network.

Protection of the gas bottle

1. Fix the bottle in a stable place to prevent it from slipping.
2. Check that the valve of the bottle shows no signs of damage or defects, or dirt, dust, oil or grease (if present, remove them). DO NOT CONNECT IT if it shows signs of the presence of oil or grease, or if the pressure-reducing valve is damaged; inform the gas supplier of any problems. In the presence of high-pressure oxygen, oil or grease can be an explosive mix.

Oxygen

1. Pure oxygen burns quickly, like any other inflammable material or gas.
2. NEVER USE the oxygen to blow-clean parts or dust down clothing.
3. NEVER GREASE the oxygen or connector equipment.
4. Follow the instructions supplied by the constructors of the bottle and pressure-reducing valve.
5. NEVER USE pressure-reducing valves for air on oxygen bottles.
6. It is advisable to use flow-check and flame-blocking valves on all oxygen pressure-reducing valves.

Conservation, storage and transport

1. Keep in a clean, safe place at a temperature between 5° and 45°C and with an air-humidity level no higher than 65%.
2. Avoid exposing the apparatus to excessive vibrations or knocks, since they could harm the mechanisms.
3. Transport should take the above points into account.

Maintenance

1. Before use, check the state of the valves and for any leaks.
2. Each month, check or recharge the battery.
3. The outside of the apparatus should be cleaned with a detergent not containing solvents, since they could damage the screen or other parts.
4. Any repairs should only be carried out by qualified technicians using exclusively original parts (see Oenofrance).

Guarantee

1. Before use, check the presence of all accessories and the proper condition of the apparatus.
2. Keep the packaging in case the product requires repair under guarantee.
3. The guarantee is only valid if the apparatus has been used for the purposes described and according to the methods stipulated.