New Hy-PEM XP Rack

Hydrogen made simple

User Manual

Index

1 Important warnings

Before using the appliance, users must read and understand the contents of every section of this manual

1.1 General warnings

- The descriptions, drawings and photographs contained in this manual are purely indicative and in some cases may not reflect the actual appliance purchased
- The transfer to third parties and reproduction of all or part of this manual is prohibited without the written authorisation of the manufacturer and/or the reseller
- The manufacturer and/or the reseller accepts no liability for injuries, production downtime or other expenses due to errors or omissions in this manual
- This manual is an integral part of the appliance; consequently, it must be kept throughout the life of the appliance in a safe place that is accessible and known to all users of the appliance
- The manufacturer reserves the right to make any modifications that it considers useful for the improvement of its products at any time
- Failure to heed the warnings given in this manual may cause severe personal injuries and material damage
- Contact the manufacturer and/or the reseller if you find a problem that you cannot solve with this manual. For further details, see the last chapter of this manual.

1.2 Safety information

Hydrogen is a highly flammable gas. Keep the generator away from heat and flames. The accumulation of hydrogen will displace oxygen, thereby creating a risk of asphyxiation. Always make sure the generator is used in a well-ventilated environment and all the fan ports on the back of the generator are kept clean and free of obstructions.

- Do not use the appliance until the safety information and instructions in this manual have been read and understood
- Using the appliance in a manner not specified in this document may compromise the protection provided by the generator and could lead to an unexpected release of pressure, which may cause serious personal injury or damage
- When handling, installing or operating this appliance, personnel should adopt correct procedures and comply with all local health and safety regulations and legal safety requirements
- Only competent and suitably trained people may carry out the commissioning, maintenance and repair of the appliance
- Ensure equipment is electrically isolated and de-pressurised before performing any routine maintenance specified inside this user manual. Most accidents that occur during the operation and maintenance of machines are the result of failure to comply with basic safety procedures
- Never alter the AC plug. Only suitably rated and approved mains cord sets should be used as per the country of use. Use only the proper type of MAIN power supply cord set provided with the unit.

It is impossible to anticipate every possible circumstance that may constitute a potential danger. The warnings in this manual cover the most known potential dangers.

1.3 Terminology

This manual contains technical terminology. The meaning of specific terms that may not be commonly understood are described below.

- **Set point** defines a certain value that the system aims to reach
- **Dryer** drying system operating by absorption of moisture

1.4 Legend of symbols

Used to indicate important warning or notice.

1.5 Intended use

The hydrogen generator is designed to produce hydrogen for laboratory use. The appliance must only be used for this purpose, in compliance with the specifications and instructions described in this manual. In particular, special attention must be paid to the following warnings:

- Do not use the appliance outdoors
- Do not use the appliance in temperature and humidity conditions outside of the limits specified for operation (*see par.2.3 Technical specifications*)
- Use only deionized water
- Do not use the appliance in rooms with aggressive and polluting atmospheres. **The presence of pollutants (e.g. aromatic compounds) will affect water quality and may cause malfunctions**. In any case, water quality must always meet the values indicated in the technical specifications
- Make sure that the room where the appliance will be installed has suitable ventilation
- Unplug the appliance from the mains power supply before accessing the inside of the appliance
- Use only the original spare parts specified in this manual.

1.6 Improper use

- Improper use of the appliance is considered as the failure to observe the data on the rating plate, the technical and safety specifications indicated in this manual, and the general standards in force
- Improper use of the appliance may involve risks for the user
- The appliance must only be repaired or serviced by the manufacturer and/or reseller's Technical Service
- The appliance must under no circumstances be modified or tampered with, to avoid creating situations of danger, in which case the manufacturer declines all liability for any resulting damage
- The manufacturer and/or reseller are in no way liable for any damage due to improper use of the appliance.

1.7 Reference directives

The requirements of the following directives and technical standards have been applied during the design and construction of the appliance described in this manual:

- Directive 73/23/EEC, replaced by 2006/95/EC (Low voltage directive);
- Directive 89/336/EEC, replaced by 2004/108/EC (Electromagnetic compatibility);
- Directive 2002/96/EC on waste disposal (Waste Electrical and Electronic Equipment - WEEE).

1.8 Disposal

In relation to European Directive 2002/96/CE (WEEE), disposal of the appliance is regulated by the following requirements:

- Waste Electrical and Electronic Equipment (WEEE) cannot be disposed of as municipal waste. Public or private waste collection systems must be used, in accordance with local regulations
- The appliance can be returned to the reseller at the end of its working life when buying a new appliance
- The appliance may contain dangerous substances: improper use or incorrect disposal of such substances may cause damage to human health and the environment
- In the event of illegal disposal of waste electrical and electronic equipment, the penalties are defined by local waste disposal regulations.

2 Description of the appliance

2.1 Operating principle

The gas generators described in this manual produce hydrogen at the working pressure set on the display, when connected to the mains power supply and filled with suitable-quality deionized water. The appliances can be used in laboratories or light industrial environments.

2.2 Identification of the models

This manual refers to the following models of the appliance:
RACK VERSION
Models: Hy-PEM XP 480-1000-2000-3300

Some parts of this manual refer to just one or some of these models. The model is identified on one of the product labels applied to the rear of the appliance.

2.3 Technical specifications

2.3.1 Common Technical specifications for all models

Technical specifications	
Operating temperature	5-35 °C (41-95 °F)
Storage temperature	1-40°C (33.8-104°F)
Operating humidity (non-condensing)	80% at 25 °C (7 7°F)
Noise	<39 dB(A)
Ingress protection	IP20
Pollution degree rating	2 (with no aromatic compounds)
Altitude	< 2000m

Chart 1: General technical specifications

2.3.2 Technical Specifications, Hy-PEM XP Series up to 3300 cc/min

Models	Hy-PEM XP Rack 480	Hy-PEM XP Rack 1000	Hy-PEM XP Rack 2000	Hy-PEM XP Rack 3300
General information				
Electrolytic cell	PEM technology			
H2 purity	>99.99999% (rifers to O_2) , dew point < -70°C			
Output pressure (max)	16 Bar (232 psi)			
H2 flow rate cc/min (max)	480	1000	2000	3300
Dimensions	Standard 19” Rack 4U – depth 40cm			
Net weight (empty water tank)	20 kg	22 kg	23 kg	25 kg
Communication				
RS232	X			
RS485	X			
USB	X			
LAN	Optional			
Software functions				
Parallel mode capability	X			
Automatic tank filling	X			
Canister filling	X			
Water				
Quality	Deionized, ASTM II, <0,1uS			
Supply pressure (min)	0.2 Bar (1.4 psi)			
Supply pressure (max)	1 Bar (14 psi)			
Psupply flow rate (min, max)	0.2 l/min, 1.5 l/min			
Internal tank capacity	2.3 l			
External tank capacity	5 o 10 l			
Electrical data				
Connection type	IC320-C13			
Supply voltage	100-240 Vac 50/60Hz oppure 24VDC			
Power (max)	280 W (AC)	450 W	560 W	1200 W
Fuse rating (5x20 mm)	4A 250 VAC	6.3A 250VAC		6.3A 250VAC

Collegamenti	
Hydrogen output	Compression fitting 1/8” (Hy-PEM XP connection kit escluso)
Water	Quick release push in fitting

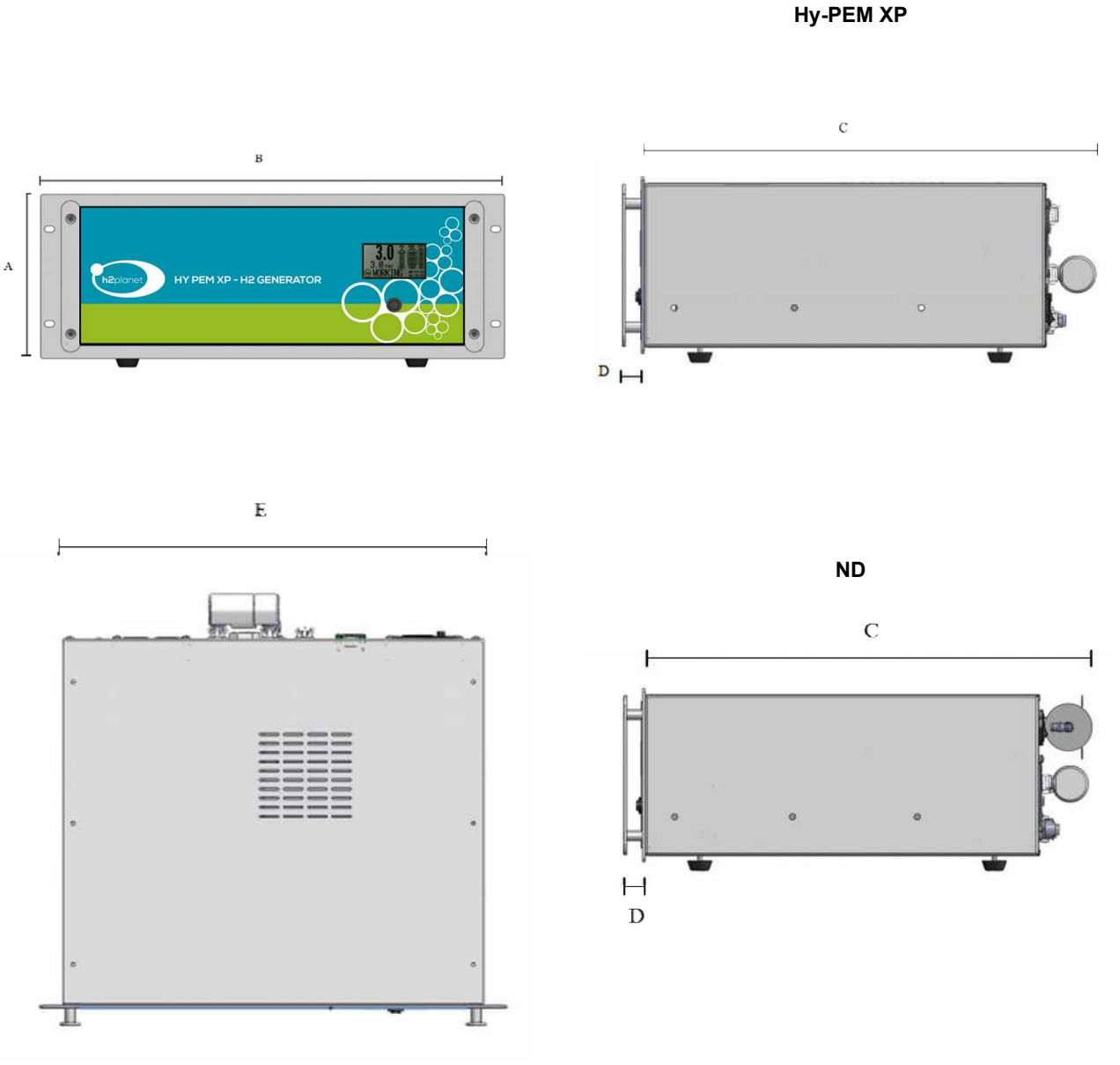
Chart 2: Technical specifications, Hy-PEM XP Rack Series

2.3.2 Weight

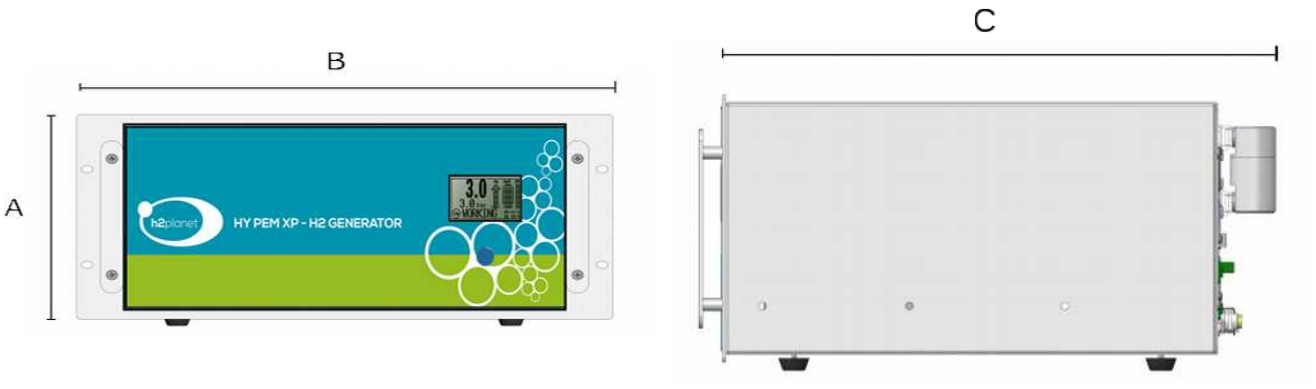
Model	Flow	Net weight (kg)	Gross weight (kg)
Hy-PEM XP	Up to 480 cc/min	20	21,1
Hy-PEM XP	Up to 1000 cc/min	22	23,1
Hy-PEM XP	Up to 2000 cc/min	25	26,1
Hy-PEM XP	Up to 3300 cc/min	29	32

Chart 3: weight of different models

2.3.3 Dimensions



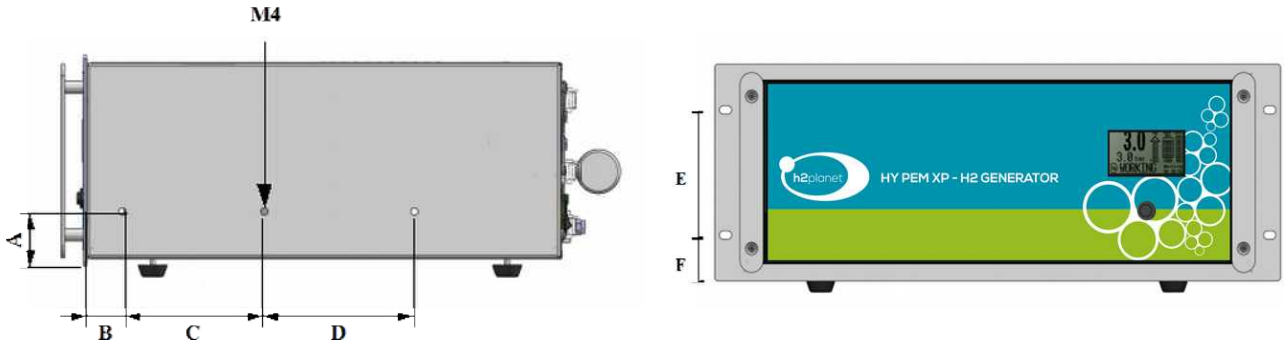
Picture 1: Hy-PEM XP up to 1000 cc/min



Picture 2: Hy-PEM XP 3300 cc/min

A	17,7	cm	(6,9”)
B	48,5	cm	(19”)
C	41	cm	(16,1”)
D	2,3	cm	(0,9”)
E	43,4	cm	(17”)

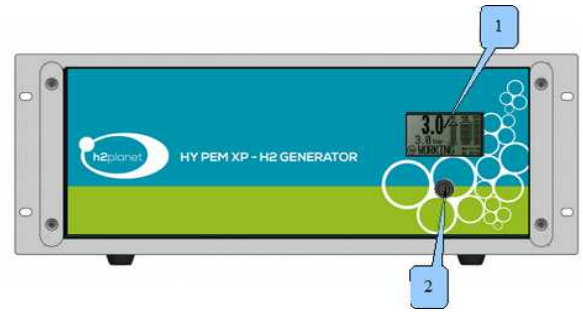
2.3.4 Rackmount sliding rails set-up



A	4,59	cm	(1,81”)
B	3	cm	(1,18”)
C	12	cm	(4,73”)
D	12,7	cm	(5”)
E	10,2	cm	(4,02”)
F	3,75	cm	(1,48”) (2,29”)

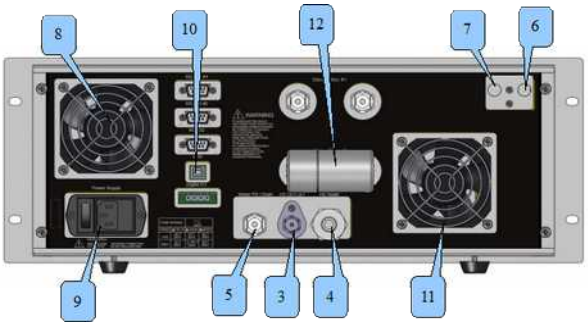
2.4 Overview of the unit

Front view

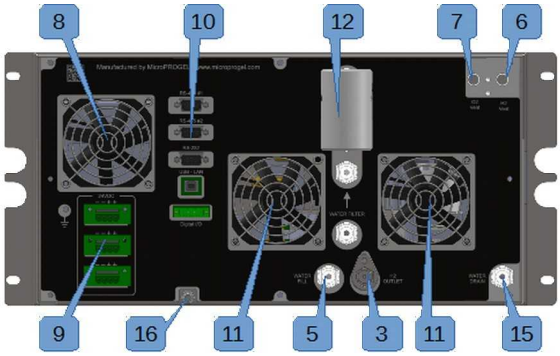


Back view

Hy PEM XP up to 2000 cc/min



Hy PEM XP up to 3300 cc/min



Picture 3: View of the unit

#	Description
1	128x64 pixel LCD touch-screen
2	START/STOP button
3	Hydrogen outlet
4	Hydrogen purge
5	Water feed connector for filling/emptying the tank *(only for filling in **Hy PEM XP 3300 cc/min**)*
6	Hydrogen vent
7	Oxygen vent
8	Cooling fan air outlet
9	Power connector and switch
10	I/O connectors: **Hy PEM XP:** RS485 – RS232 – USB – Digital I/O **ND:** RS232
11	Cooling fan air intake
12	Water filter
13	Remote control connector **(**Optional **ND)**
14	Desiccant cartridge **(ND)**
15	Water feed connector for emptying the tank *(only in **Hy PEM XP 3300 cc/min**)*
16	Water fitting for eventual internal waste water

3 Receiving the appliance

Once receiving the appliance, carefully check all the parts to ensure that no damage has occurred during transport.
Any damage found must be reported to the carrier, specifying the type of damage on the delivery documents.
Any claims must be received in writing within 8 days from the date of receipt of the goods.

3.1 Packing list

The hydrogen generator is shipped together with the following material:

- 1 user manual on CD
- 1 water deionizer filter
- 1 water drain hose
- 1 power cable (*Hy-PEM XP Rack DC not included*)
- 1 demi-water tank 5l
- 1 water tank purification filter
- 1 output filter-electrolyser connection hose

MPORTANT: Keep the original packaging used to deliver the generator. This may be useful if needing to transport the appliance at a later date (e.g. return for service).

4 Installation

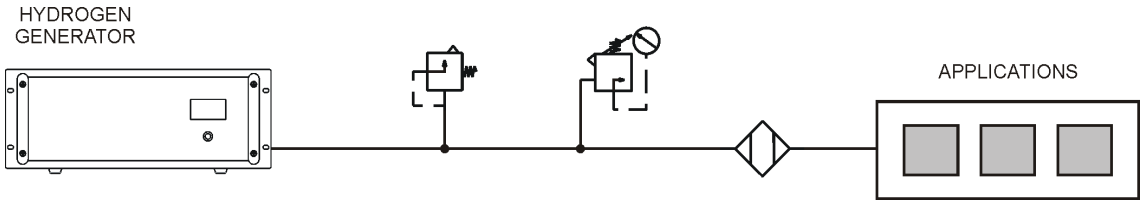
4.1 Installation layout

The generator has been designed to avoid excess pressure being created at the outlet and the generation of small droplets of water in the hydrogen line. Despite this, no absolute guarantee can be given that such situations will never arise.

As a result, always adopt the installation layout shown below.

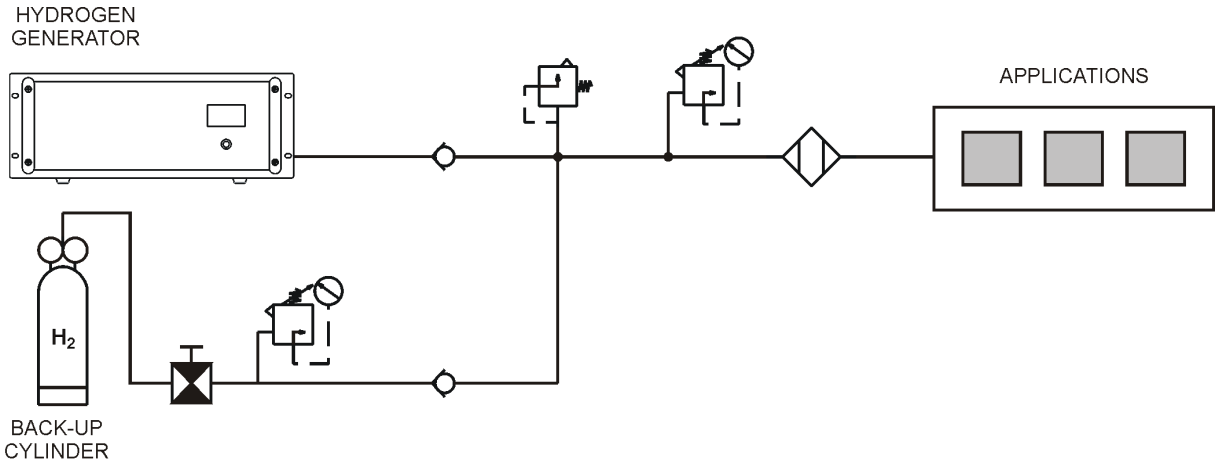
WARNING: pipelines, fittings, valves, and pressure regulator must be suitable for a pressure of 16 bars.

4.1.1 Basic installation



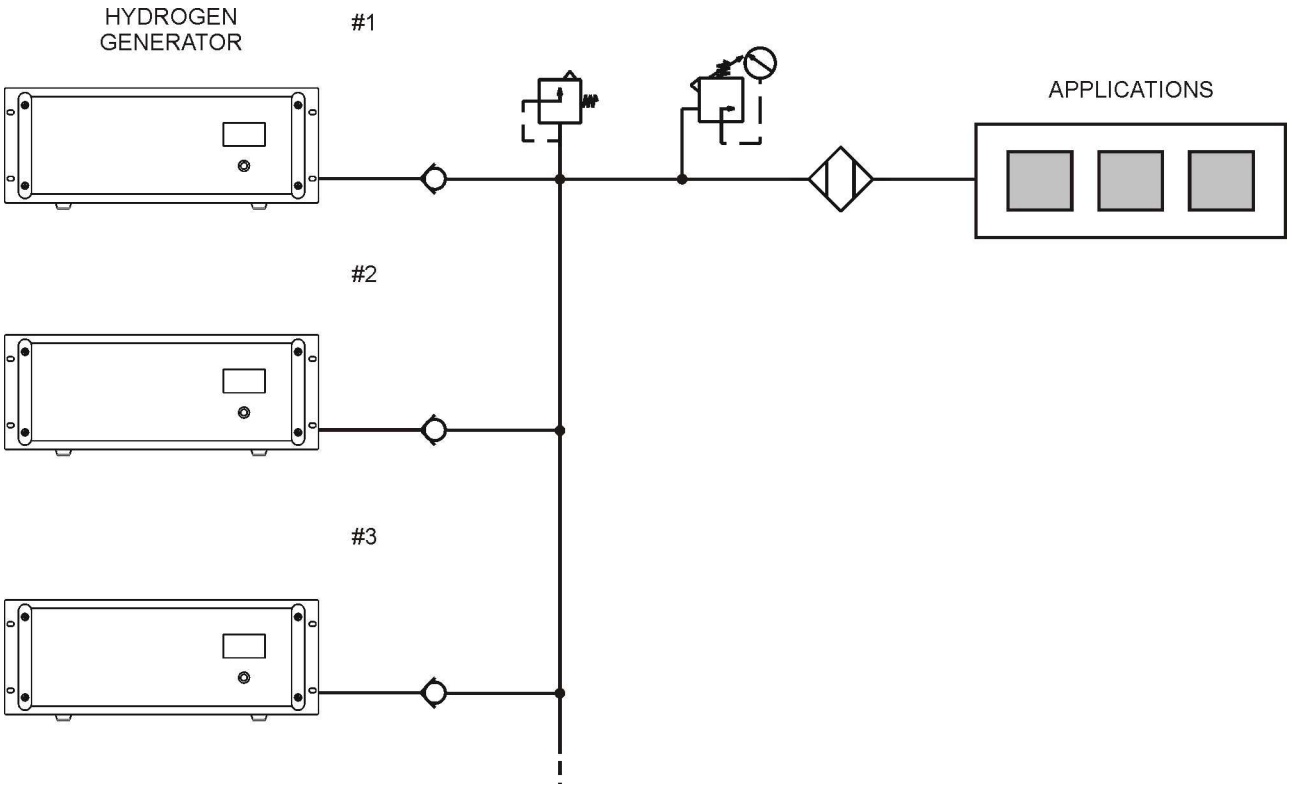
Picture 4: Basic installation

4.1.2 Installation with backup storage



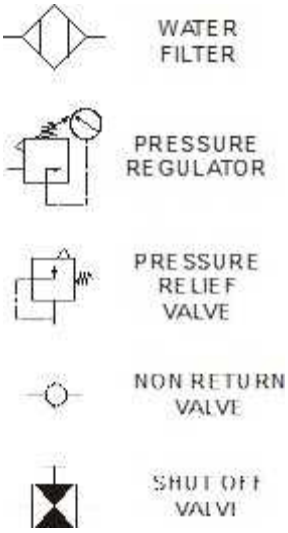
Picture 5: Installation with backup storage

4.1.3 Installation with multiple generators



Picture 6: Installation with multiple generators

Key:



4.2 Positioning

Hydrogen is a highly flammable gas. Keep the generator away from heat and flames. The accumulation of hydrogen will displace oxygen, thereby creating a risk of asphyxiation. Always make sure the generator is used in a well-ventilated environment and all the fan ports on the back of the generator are kept clean and free of obstructions.

Hydrogen is potentially explosive in air between concentrations of 4 and 76% by volume in air.
LFL (Lower Flammability Limit) and LEL (Lower Explosive Limit) are now considered to be the same thing by the ASTM (American Society for Testing and Materials committee).
To avoid any risk of accumulation, use the simplified formula below indicated:

Flow-Max (scc/min) = Air-Replacement (scm/h) * 667

Where
Flow-Max represents the maximum flow can be installed in a room (cubic centimetres / minute)
Air-Replacement represents the ambient air exchange (cubic meters / hour) *
**Typical minimum acceptable ventilation rate in a laboratory is 5 complete air replacements per hour (ASHRAE Standard 62-2004 Ventilation for Acceptable Indoor Air Quality)*

- Hydrogen is a highly flammable gas. Keep the generator away from heat and flames.
- The generator should be positioned on a flat surface that is not exposed to vibrations
- Do not position the generator near naked flames or other sources of heat
- Always leave sufficient clearance for the circulation of air around the appliance, above all at the rear, where the ventilation air intake is located
- Do not use the generator in a sealed environment or without suitable ventilation
- Do not use the appliance in temperature and humidity conditions outside of the limits specified for operation *(see Chart 1: General technical specifications)*

The appliance contains water. In the unlikely event of breakage, a small amount of water may leak from the bottom. Consequently, do not install the appliance on top of other objects/equipment in situations where water leaks may create safety problems.

4.3 Gas connections

The generator produces pure hydrogen at the set working pressure through the hydrogen outlet located at the rear of the appliance. Outlet pressure is displayed and set on the touch-screen.

- The hydrogen outlet should be connected to 1/8" diameter tubing, using a stainless steel or copper Swagelok connector. Do not use Teflon connectors.
- The hydrogen vent, also at the rear of the appliance, can be connected to an extractor or other exhaust system.
- The gas installations shall comply with National and Local Installations requirements

4.4 Electrical connection

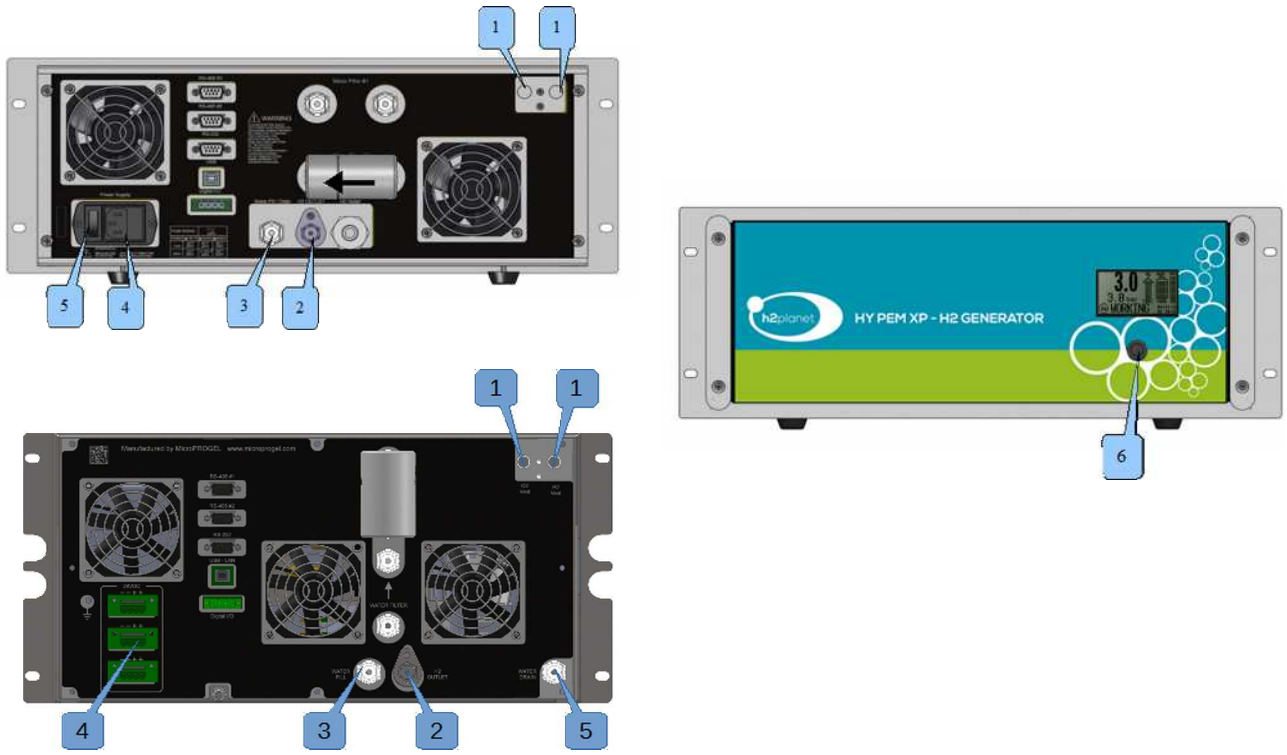
- Make sure that the characteristics of the mains power supply are adequate for the power ratings indicated in the table of technical specifications
- Power to the appliance must be turned on only after installation work has been completed (gas connections)
- The power line should be fitted upstream with a suitable device to protect against short-circuits and earth leakage and isolate the appliance from other equipment
- Use cables with double insulation, in accordance with the standards in force in the country concerned
- The appliance must be grounded

The manufacturer is not liable for any damage caused by failure in grounding.

5 Commissioning

The hydrogen generator should be put in service no more than 90 days from the date of construction, to ensure maximum efficiency of the PEM cell. Otherwise, the warranty on the PEM cell may be void.

5.1 Starting the appliance the first time



Picture 7: First start-up

Before operating the hydrogen generator the first time, proceed as follows:

- Remove the caps on the outlets at the rear of the generator (1)
- Connect the gas line to the hydrogen outlet (2)
- Connect the water feed tubing ***(not longer than 2 meters)***, if featured (3)
- Connect the power cable to the power socket (4)
- Turn the appliance **ON** using the power switch (5) (***not present on Hy PEM XP 3300***)
- Reset the display by holding the Start / Stop button (6)
- Fill the water tank manually or using the automatic procedure (*see par.5.2 and 7.9*)
- Set the working pressure (*see 7.1*)
- Start production by holding the Start / Stop button until the display shows **STARTING** (6)

5.2 Filling the deionized water tank

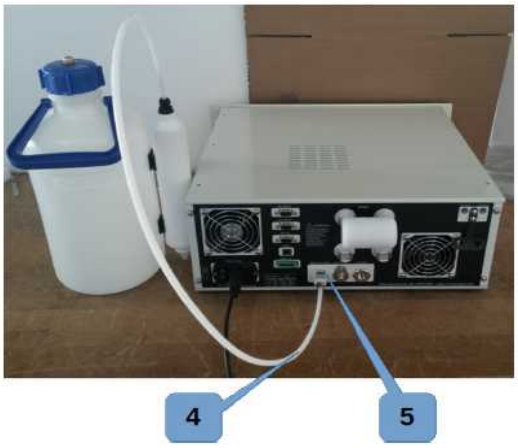
Before starting the appliance, the tank needs to be filled with deionized water. Based on the model, this may can done automatically or manually (see 7.9) using the installation kit of external tank with purification filter provided with Hy-PEM XP Rack.This allows to increase the life of the hydrogen generator due to the filter for the air in the top of the tank and the active carbon filter that provides a further step of demineralized water purification before loading in the inner tank with a final conductivity next to 0US / m.
The water charging in the inner tank should therefore be made exclusively using the external tank with supplied filter.

To avoid damage to the electrolytic cell, ONLY use deionized water. Water containing impurities may cause irreversible damage to the cell. In this case, the warranty on the cell will be void.

Demineralized or distilled water is recommended maximum electrical conductivity 1 or 2u S / m.

5.3 External water tank installation

In the RACK series there is, as the default accessory, a tank-filter system to purify the demi water to further by impurities that may be present in commercial demineralised water or in all cases in which the conductivity is in any case more than 1uS/m.
Moreover, the system has a filter on top of the tank which contrasts the accumulation of impurities and external powders inside the tank. This kit has the primary function of allowing the water load in the inner tank of the electrolyzer.
The kit with tank also allows the function AUTOREFILL **(see: 7.2)**.



Picture 8: Connection of external tank for water filling and auto refill function

Detailed operations of the external tank connection kit + filter:
- Connect the activated carbon filter in a vertical position using Velcro
- Connect the tube 1 to the quick connection of the tank 2
- Connect the tube 3 to the upper top of the activated carbon filter through quick connection 4 on the back of the electrolyzer
- Fill the tank of demineralized water possibly with conductivity lower than 1uS
- Proceed to the water load in the inner tank through what is described in section 7.9

Is suggested to change the active carbon filter every 6-12 months depending on the use of the device and the quantities of hydrogen produced.

5.4 Shutting down and de-pressurisation

List of operations to be performed before powering off the generator:

- Hold the Start / Stop button until the display shows OFF (6)
- **Wait at least 60 seconds to allow de-pressurisation**
- Turn off the power switch (5)

5.5 Returning the appliance for service and/or repairs

List of operations to be performed before packaging the appliance and sending it to service:

- Hold the Start / Stop button until the display shows OFF (6)
- **Wait 60 seconds to allow de-pressurisation**
- Activate the block procedure (*see par.7.7.6*)
- Turn off the power switch (5)
- Unplug the power cable from power socket (4)
- Disconnect the hydrogen line from the gas outlet (2)
- Disconnect any water supply line from the feed connector (3)
- Insert the caps (1)
- Place the generator in its original packaging.

The generator may contain hydrogen under pressure. Make sure it is de-pressurised before packing and sending it.

6 Operation

The following descriptions may refer to just one or some of the models specified in this manual. In such cases, the applicable model/models are indicated in brackets. To identify your model of generator, see the identification label affixed to the rear of the appliance.

6.1 User interface

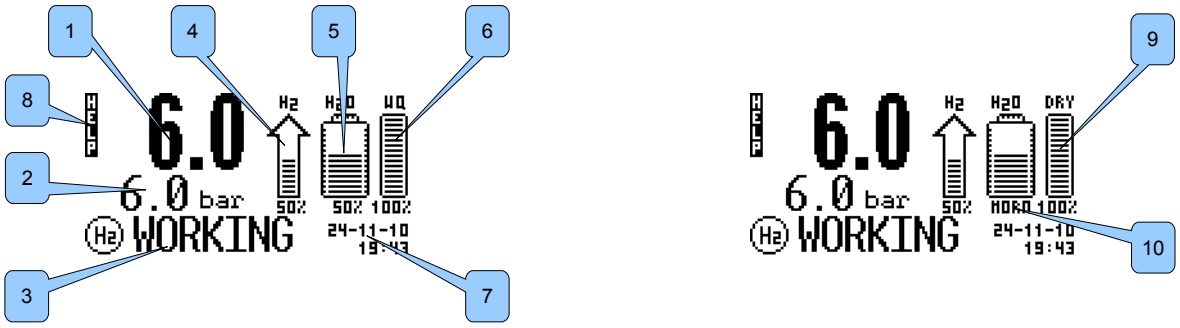
Users can interact with the system using the 128x64 pixel resistive touch-screen display. There is also a button on the front of the appliance, used to start or stop hydrogen production at any time.
Users can scroll the various menus displayed on the touch-screen as follows:

- swipe to the right or left to select the various options in the current menu level
- press any point (half a second) to access the current menu or set a value
- swipe down to go back up one menu level, or exit a setting without saving the changes
- at the bottom of each menu there is a bar highlighting the position of the selected item with reference to all of the items in the current menu
- the colour of the display or the status of LEDs may change, depending on operating status:
    1. In **normal** operation the display is **white and the status LED flashing**
    2. when an **alarm** is in progress (hydrogen production stopped), the **red alarm LED and the display flashing quickly**
    3. when a **pre-alarm** is signalled (production continues), the **alarm LED and the display flashing slowly**
    4. if dryer regeneration has been scheduled, the display flashing 24 hours before the procedure starts.

Do not use tools or other objects (e.g. screwdrivers) to operate the touch-screen

6.2 Summary Screen

Normally, the display shows the Main screen, where users can monitor the most important system values: system status, working pressure, water level, water quality and residual dryer life (**ND** model only).
Swiping to the right or left directly accesses the two diagnostics screens.
Pressing any point on the screen for at least half a second accesses the main menu.



Hy-PEM XP **ND Model**

Picture 9: Main screen

#	Descrizione
1	Effective outlet pressure
2	Working pressure set point
3	System status and pre-alarm messages
4	% of H2 production flow
5	Water level in the tank
6 (Hy-PEM XP)	Water quality as a percentage (100% good, 0% bad)
7	Date-time
8	Touching HELP displays the help screens
9 (ND)	Residual dryer life
10 (ND)	Water quality: GOOD, NORMAL, BAD

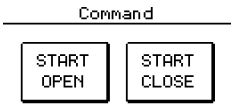
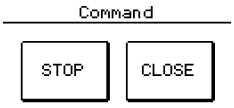
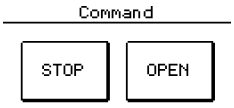
6.2.1 System status

Signal	Description
OFF	The system is off and not producing H2
STARTING	The system is generating the required internal pressure before opening the outlet valve
CHECKING	The system is running an automatic check for any internal leaks
FILLING	The system is filling the line connected to the outlet at the maximum flow-rate available
WORKING	The system is on and line pressure has reached the set point
STANDBY	The system is internally pressurised and ready, but the outlet valve is closed

Chart 4: System status

6.3 Starting and stopping hydrogen production

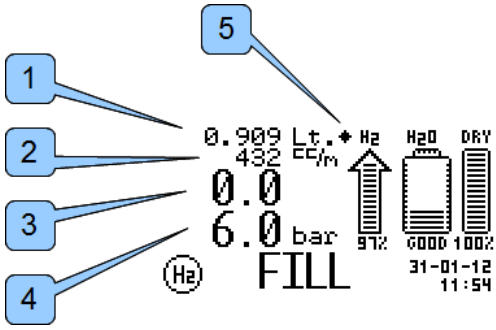
When display shows the summary screen, pressing the START/STOP button on the front panel will display one of the following control screens. The table below shows the "control screen" corresponding to each "system status".
To scroll between the screens, swipe to the right or left.

System status	Control screen	Description
OFF		When the appliance is OFF (no production), to START operation and open the valve as soon as the system is pressurised, press START/OPEN, while to simply activate pressurisation press START/CLOSE
STARTING **WORKING** **FILLING**		During normal operation, to stop production press STOP, or to close the outlet valve press CLOSE.
STANDBY		If the system is in STANDBY (pressurised with the valve closed), to stop production press STOP, or to open the valve press OPEN

6.4 Auxiliary functions and accessories

6.4.1 Hy PEM XP H2 production counter

If the Hydrogenation parameter is enabled, the generator will automatically go into FILL CANISTER mode, and the display will shows the page illustrated below. This page displays the amount of hydrogen produced since the last reset (see the following paragraph). To access this page, see par.Errore: sorgente del riferimento non trovata.



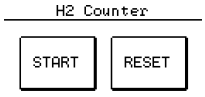
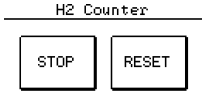
Picture 10: H2 production counter page

Key:

#	Description
1	Amount of hydrogen produced
2	Flow-rate
3	Effective outlet pressure
4	Working pressure set point
5	Counter status indicator: stop, standby, running

START/STOP and RESET H2 production counter

To access the page to start/stop the production counter or reset the total, swipe to the right or left (more than once if necessary).

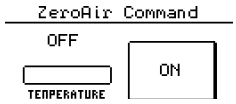
Control screen	Description
	START starts the counter
	STOP stops the counter. RESET resets the counter

6.4.2 ZEROAIR Module

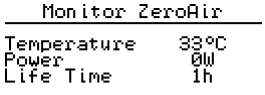
The hydrogen generator can be connected to module that generates pure “zero” air; for the technical specifications, see the corresponding manual. Once the module has been enabled by setting the Zero-air Module parameter (*see par.List of user parameters*), the main page shows the status of the module. A further two specific control screens are available to START/STOP the module and check its status.

ZEROAIR module control screen

To access this page, swipe the screen from right to left or in reverse direction (more than once if necessary).

ZEROAIR status	Control screen	Description
OFF		ZEROAIR module off and cold
WARMING		ZEROAIR module heating up. The status bar shows the increase in temperature inside the catalytic furnace.
READY		ZEROAIR module ready. The operating temperature has been reached.
COOLING		ZEROAIR module cooling down
ALARM		ZEROAIR module alarm.

Status windows module ZEROAIR



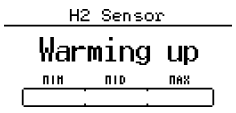
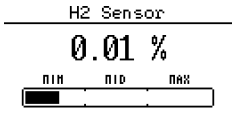
In this window you can view:
- The temperature of the oven catalyst
- The power supplied to the heating element
- The lifetime of the catalyst

6.4.3 H2 sensor option

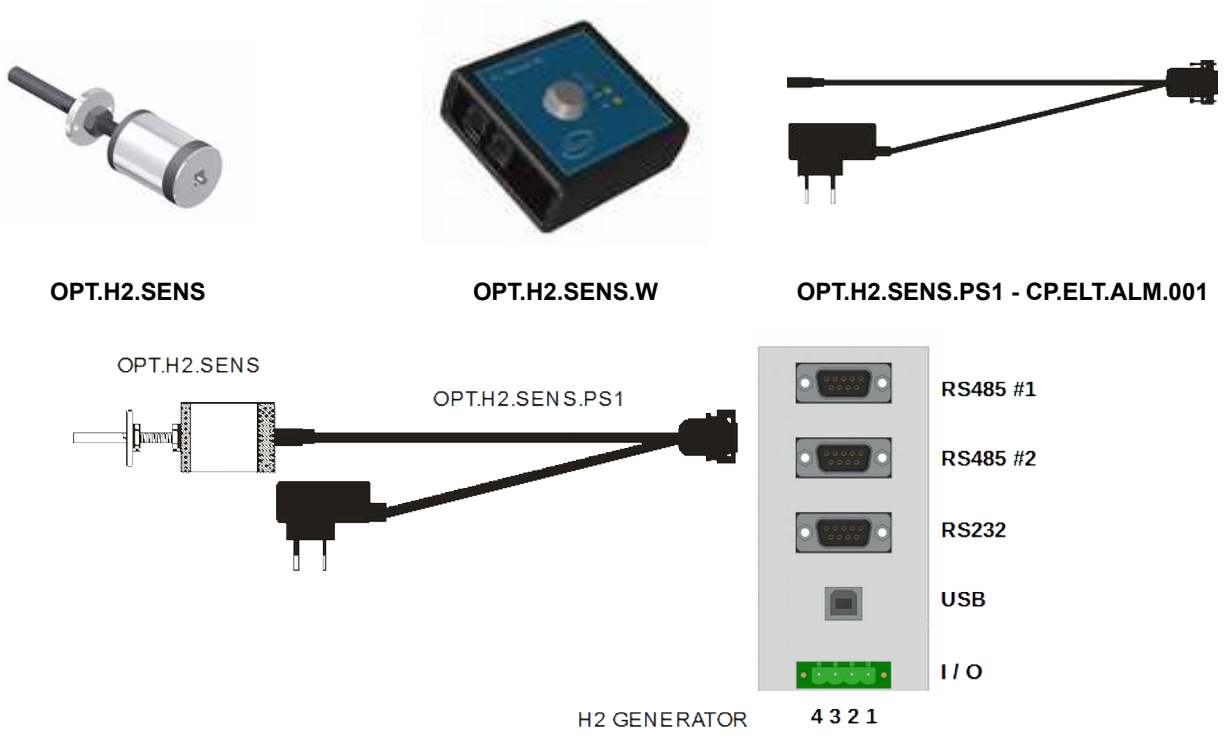
The H2 sensor is an option that measures the percentage of hydrogen in the environment where the sensor is installed, such as a GC chamber. After having connected the sensor to the generator and activated the function by enabling the **H2 Sensor** user parameter (*see Parameter settings*), any hydrogen leaks detected in the environment can be shown on the screen.
When the percentage measured is greater than 0.05%, a specific pre-alarm is activated: audible and visual signal. If on the other hand the percentage of hydrogen exceeds 1%, an alarm is activated: audible/visual signal and hydrogen production stops.

Measurement of hydrogen concentration in the air

To access this screen, see Parameter settings.

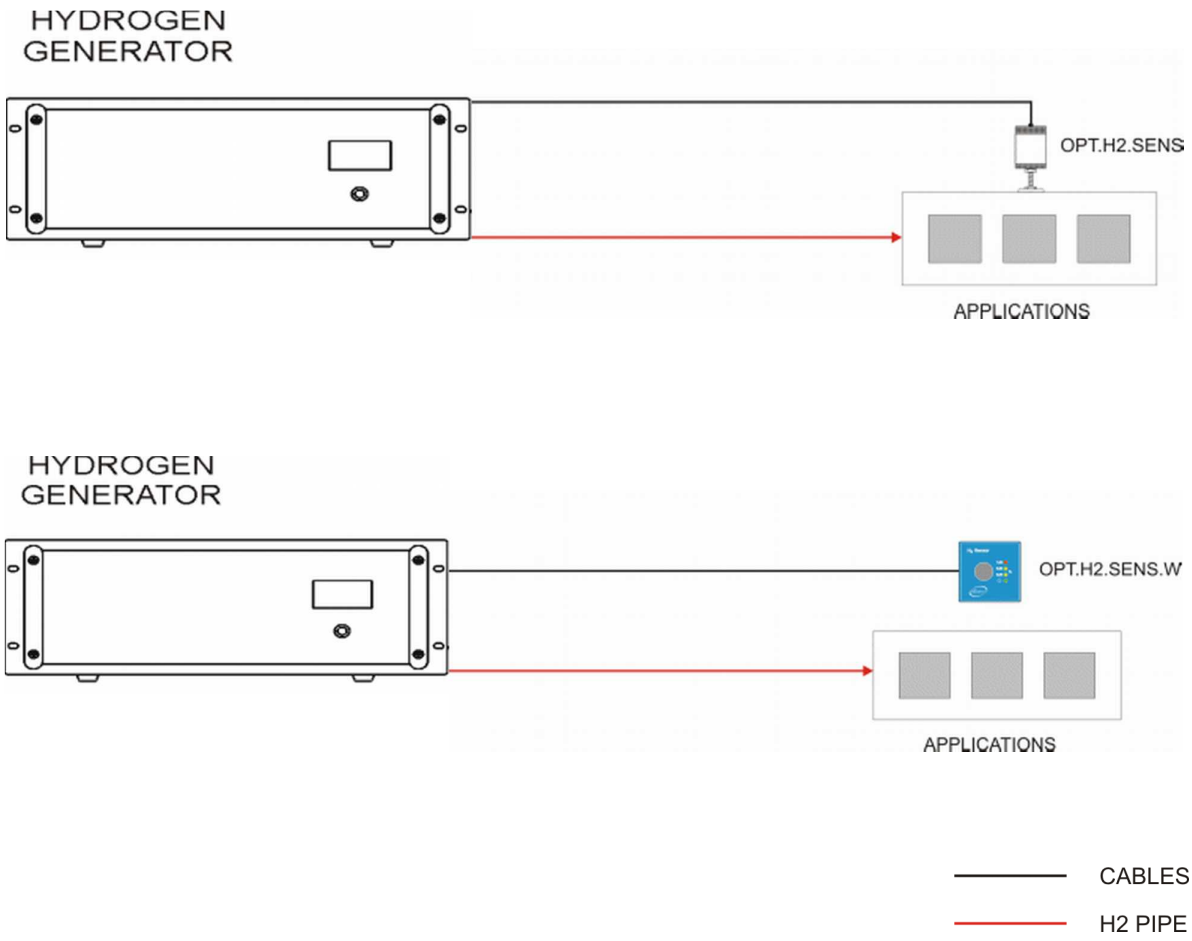
Screen	Description
	On starting up the sensor runs an internal heating procedure before making the measurements. This screen is displayed during the procedure.
	% of H2 measured: less than 0.02% -> minimum range between 0.02% and 1.00% -> medium range greater than 1.00% → maximum range

Collegamento dei sensori H2



Picture 11: H2 sensor connections

H2 sensor installation layout



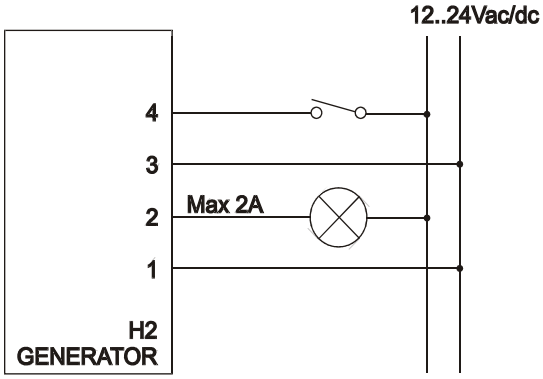
6.4.4 Digital I/Os (where featured)

The appliance can be managed and/or monitored via a remote connection. Several connectors are available on the rear of the appliance, with the following functions:

- RS485 #1 and #2: are used for operation in “PARALLEL MODE” (*see Parallel Mode*)
- USB and RS232: are used for local control via PC or for service operations.

Contact the reseller and/or the manufacturer for further information.

Connection diagram



Key:

Pin	Description
1	Voltage-free contact (max 2A, 24Vac/dc) N.C.
2	Voltage-free contact (max 2A, 24Vac/dc) N.C.
3	Digital input, Optoisolated (12...24Vac/dc)
4	Digital input, Optoisolated (12...24Vac/dc)

Picture 12: Layout of the connectors and connection example

I/O operating logic

On the I/O card, in addition to the RS485/RS232 and USB communication ports that can be used for debug, remote control and to connect several generators in parallel, a terminal block is available for connecting to a PLC and controlling the generator without needing specific protocols:
The generator provides:

- a voltage-free contact (terminals 1 and 2, see the figure above) that is normally closed, and opens if production stops due to an alarm;
- An optically-isolated digital input that can be used to start/stop hydrogen production. When this input (terminals 3 and 4) is powered on, the generator starts production, when it is powered off the generator stops and switches OFF.

6.5 Parallel Mode

6.5.1 Introduction

Parallel Mode is a function used to combine the flow from multiple generators on a single line, in which each appliance contributes in proportion to its capacity. A maximum of 20 appliances can be connected together.

6.5.2 Master BOX controller (P/N OPT.H2.PBOX)

The Master BOX controller acts as the master and controls all the generators connected to it.

The Master BOX controller features 3 LEDs and one button.

The meaning of the LEDs is specified in the following table.

Green LED PRODUCTION	Yellow LED LINK	Red LED ALARM	Description
OFF	OFF	OFF	OFF (no power supply)
OFF	OFF	ON	Communications failure or no generators connected
OFF	ON	OFF	Configuration procedure running
	ON	ON	No Master flow
	Regular FLASHING		Normal communication
	Random FLASHING		Noisy communication
		Fast FLASHING	One or more generators has an alarm or is offline
		Slow FLASHING	One or more generators has a pre-alarm or is offline
ON			Production in progress
FLASHING			System ready (pressurised with outlet valve closed)

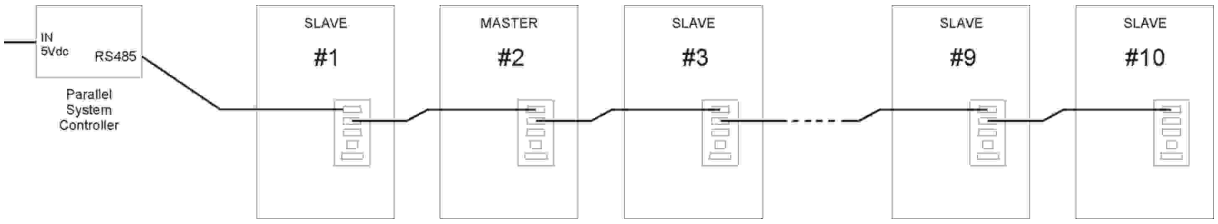
Chart 5: Meaning of LEDs on the Master BOX controller

All LEDs blink when the Master BOX controller cannot communicate with the generators connected to it (Slaves)

Pressing the start / stop button activates or stops production.

6.5.3 Electrical Connection diagram

Power up the Master BOX controller with its power supply adapter. Connect the RS485 port on the BOX controller with RS485 # 1 on the first generator and RS485 # 2 on this generator to RS485 # 1 on the second and so on, until the last generator.



6.5.4 Schema of pneumatic connection

Connect the outlet of all generators to a desiccant column via a non-return valve. At the outlet of the column, before entering the laboratory gas line, install a pressure regulator where necessary.

WARNING: pipelines, fittings, valves, and pressure regulator must be suitable for a pressure of 16 bars.

Installation with multiple generators

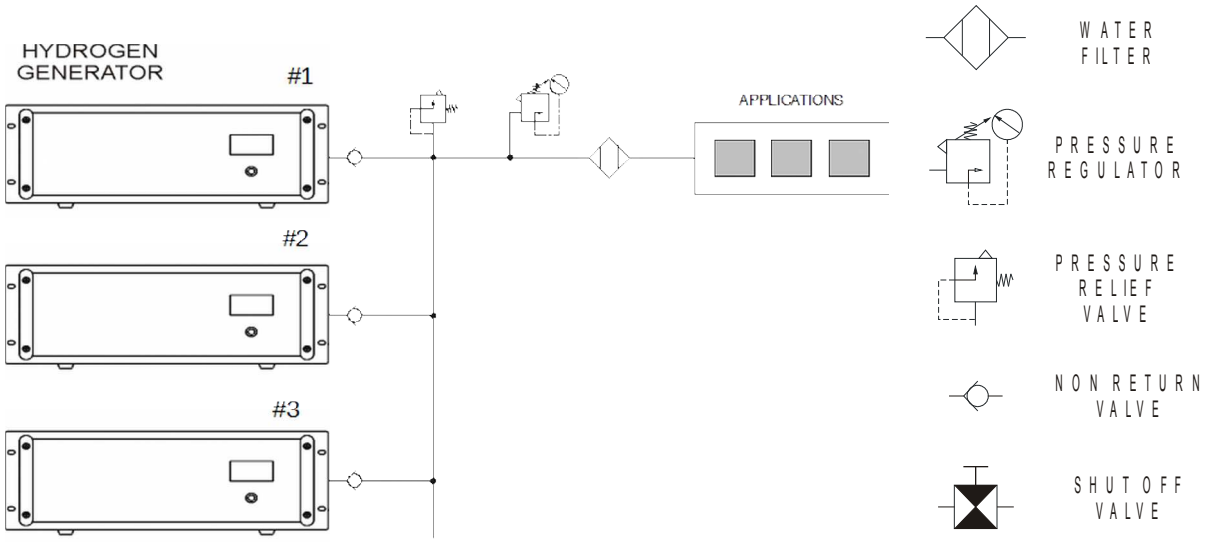
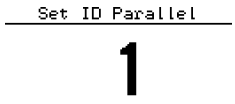
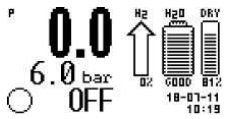


Figure 3: Gas connection diagram between multiple generators

6.5.5 System ID settings

In order for the system to work correctly, a unique number (ID) must be assigned to each generator.
To do this, proceed as follows:

Screen	Procedure
	Turn on the parallel BOX. It is not important that the red LED flashes or is on but the green light should be off, otherwise press the button once (for 1 sec.) to turn off it. At this point hold the button on the BOX controller for more than 10 seconds to start the search procedure for the generators connected to it Once completed, the display on all of the connected generators shows the number “1”. Then: 1. press the centre button on one of the generators for about half a second 2. the generator will "beep" and all the other generators will now display the number “2” 3. repeat step 1 for all the remaining generators 4. press the button on the parallel BOX, 2 seconds, a beep will confirm the procedure is completed
	If the procedure is completed successfully, the yellow LED on the controller starts flashing, and the display on all of the connected generators shows the letter “P”. P If the “P” is “negative”, it means that the system is controlling this generator to read and manage line pressure (master flow controller) P If the “P” is normal, the generator is working in "slave" mode

6.5.6 System status

The following functions are available on all of the connected generators:

- start/stop production
- open or close the outlet valve
- set working pressure
- monitor the status of each generator connected to the system

To access the status screen, simply scroll the touch screen from right to left or vice-versa.

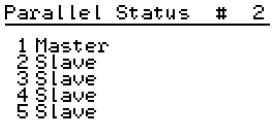
The following data are displayed for each of the generators:

Master	Generator that reads and controls line pressure (Master flow controller)
Slave	Generator connected to the system as slave
Out line	Generator offline: communication with controller interrupted
Alarm	Generator alarm
Pre-Alarm	Generator pre-alarm

NOTE: the slave generators may display different pressures; if this difference is less than 1 bar, the situation is normal.

6.5.7 Master flow controller

Normally, the system chooses the generator with ID 1 as the "master flow controller", that is, the appliance designated to read and control line pressure.
To force the system to use a different generator, press the touch screen for half a second to display the status screen.



Press the touch screen for half a second

To confirm, press the touch screen for half a second again

7 Menus

The touch-screen offers the possibility to access some of the parameters that manage appliance operation via a series of menus. For a detailed description on how to use the touch-screen, see par. 6.1 User interface.

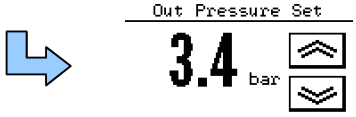
To access the main menu, simply touch any point on the touch-screen for half a second when the summary screen is displayed. The main menu includes the following options:

Adjust Pressure
Setup
History
Diagnostics
Counters
Tests
Maintenances
Function
Water Tank

- To scroll between the various options, simply swipe the screen to the right or left
- To access the selected menu, press the screen (half a second)
- To return up a menu level, simply swipe the screen from top to bottom.

7.1 Setting the working pressure

The first item in the menu is **Adjust Pressure**. Touching the screen for at least half a second accesses the screen for setting the working pressure.



Touch the arrow keys to modify the value. To confirm the settings, simply press the centre of the screen for at least half a second. To cancel the changes, swipe the screen from the top down

7.2 Parameter settings

From the **Setup** submenu, swipe the screen to the right or left to access a series of system parameters.

7.2.1 List of user parameters

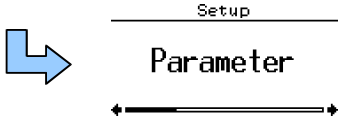
Name	Description	Min (list)	Max	Default value	UOM
Pressure Drop Delay	If the system cannot bring the H2 line to the set pressure, after having waited the time set for this parameter production stops, the buzzer sounds and a visual alarm is displayed (“Out Pressure error”)	2	10	10	min
Pressure Rise	When filling the line connected to the H2 outlet, if the pressure does not rise with a minimum gradient defined by this parameter, production stops, the buzzer sounds and a visual alarm is displayed (“Low Out Press”). When the value is set to 0.0, this function is disabled	0	100	0.3	psi/min
Autostart	Enabled: when power is restored after a blackout, the system restarts and goes into operating mode. Disabled, when power is restored after a blackout, the system stays OFF	No	Yes	Yes	
Pressure Unit	Defines the pressure unit of measure: psi, bar	Psi	bars	bars	
Temperature Unit	Defines the temperature unit of measure: °F, °C	°C	°F	°C	
Canister Capacity	Defines the capacity of the optional canister connected to the outlet. This parameter is used a determine the minimum gradient when the generator is used to fill a high capacity tank	0	2000	10	l
Auto Refill Water	Enable the automatic tank filling function. If Enabled, when the level in the water tank falls below 15%, auto fill starts, and ends when the level reaches 90%.	Disabled	Enabled	Disabled	
Start Mode	Defines the method used to pressurise the line: Normal: the outlet valve is opened only after the internal circuit has been pressurised and after having automatically performed an “internal leak test” Fast: the valve is opened when the internal pressure is greater than the set point and no "internal leak test" is carried out”	Normal	Fast	Normal	
ID Address	Logical address if connecting the appliance to a communication bus	1	1	31	
Baud Rate RS485	RS485 baud rate	2400	38400	38400	bps
ZeroAir Module	Enables/disables remote control of the ZEROAIR module	No	Yes	No	
H2 Sensor Module	Enables communication with the optional hydrogen sensor (OPT.H2.SENS)	Disabled	Enabled	Disabled	

Name	Description	Min (list)	Max	Default value	UOM
N2 Module	Enables/disables remote control of the N2 module	No	Yes	No	
Module COM port	This parameter permit to choice the serial port used to communicate with the modules AIR/N2	RS485	RS232	RS485	
Hydrogenation	This parameter enables the hydrogen production counter for hydrogenation applications, see the corresponding paragraph (*6.4.1 H2 production counter)*	Disabled Filling Continuous		Disabled	
User Flow Limit	Limit to hydrogen outlet flow-rate	50	100	100	%
Automatic Internal Check	This parameter enables internal leak testing whenever starting production	Disabled	Enabled	Enabled	
Remote Contact Mode	This parameter permit to choice the logic of the internal contact	Health	Buzzer	Health	
Quite Fan Control	Enable/disable a logic to reduce the fan speed	No	Yes	No	
Default Parameter	Selecting YES sets all the parameters to the corresponding default values	No	Yes		

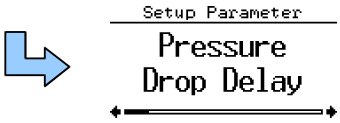
Chart 6: User parameters

7.2.2 Setting the user parameters

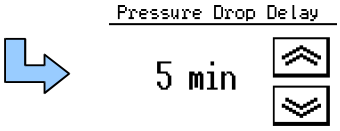
From the main menu, scroll the screens to the left or right until displaying the **Setup** submenu. Press the touch-screen for half a second. The **Parameter** submenu will be displayed**.**



From the **Parameter** submenu, press the touch-screen for half a second to access the individual parameters (see).



Swipe to the right or left to select the desired parameter. Press the screen for half a second to set the parameter.

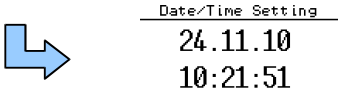


Touch the arrow keys to modify the value. To confirm, press the centre of the screen for at least half a second. To cancel the changes and go back up a level, swipe the screen from top to bottom.

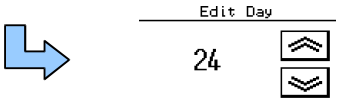
7.2.3 System date/time setting

From the main menu, scroll the screens to the left or right until displaying the **Setup** submenu. Press the touch-screen for half a second. Scroll to the right or left until the **Date/Time Setting** submenu is displayed

Touching this item for half a second accesses the screen for setting the system date/time



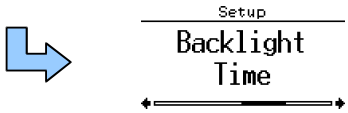
Touch the required field for half a second to access the corresponding setting.



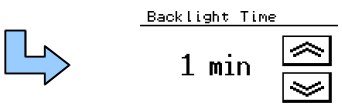
Touch the arrow keys to modify the value. To confirm the settings, simply press the centre of the screen for at least half a second. To cancel the changes and go back up a level, swipe the screen from top to bottom.

7.2.4 Backlight timer

From the main menu, scroll the screens to the left or right until displaying the **Setup** submenu. Press the touch-screen for half a second. Scroll to the right or left until the **Backlight Time** submenu is displayed



Touching this item for half a second accesses the screen for setting the display backlight time

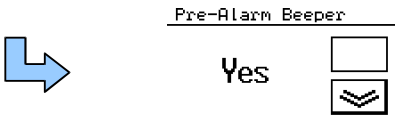


The time is expressed in minutes. Touch the arrow keys to modify the value. To confirm the settings, simply press the centre of the screen for at least half a second. To cancel the changes and go back up a level, swipe the screen from top to bottom.

7.2.5 Pre-Alarm Beeper

From the main menu, scroll the screens to the left or right until displaying the **Setup** submenu. Press the touch-screen for half a second. Scroll to the right or left until the **Backlight Time** submenu is displayed

Touching this item for half a second accesses the screen for setting the display backlight time



Tapping the arrow keys you can change the value.

The value of *Yes* enables intermittent acoustic signal during the intervention of an early warning. The value *No* disables definitively the buzzer.

To confirm, simply touch the screen to the centre while maintaining the pressure for at least 0.5 seconds. To cancel the changes and return up one level, scroll from top to bottom.

7.2.6 Password

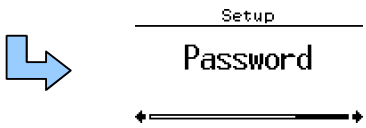
Two passwords are available to protect against unwanted settings:

- L1 protects against access to the parameters and to the **Function** page
- L2 blocks the touch-screen, and consequently all operations, when the back-light timer expires

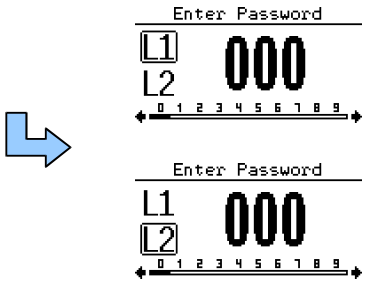
The protection can only be reset after entering the corresponding password. To set the password, see the sequence described below. Setting the password 000 deactivates the function.

WARNING: store the password in a safe place, as if lost or forgotten you will need to contact service to reset this function.

From the main menu, scroll the screens to the left or right until displaying the **Setup** submenu. Press the touch-screen for half a second. Scroll to the right or left until the **Password** submenu is displayed



Touching this item for half a second accesses the screen for setting the password



Press L1 or L2, depending on the type of protection required.

Set the required password, scrolling right/left and then confirming each digit by pressing the screen for half a second. Set 000 to deactivate the function.

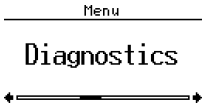
7.3 History

From the main menu, scroll the screens to the left or right until displaying the **History** submenu. Press the touch-screen for half a second to access the alarm log.

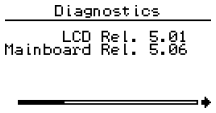
Touch the arrows to scroll the list of events stored in the log: alarms, pre-alarms, generator starts and stops.

To exit, swipe the screen from the top down.

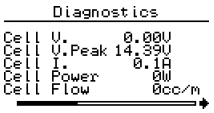
7.4 Diagnostics



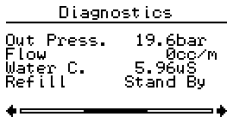
From the main menu, scroll the screens to the left or right until displaying the **Diagnostics** submenu. Press the touch-screen for half a second to access the 3 diagnostics pages, showing all the values controlled/acquired by the system



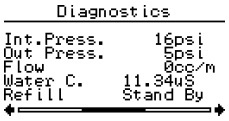
LCD and main-board firmware release



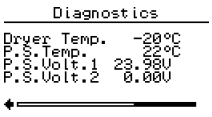
- PEM cell voltage
- Peak PEM cell voltage
- PEM current
- PEM cell power supply
- H2 Cell flow produced



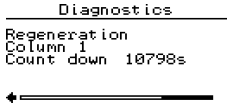
Models: PAR, WM
- Internal pressure
- External pressure
- Current H2 Flow produced cc/min
- Water conductibility uS
- Autorefill logical status



Model: ND
- Pressure
- Current H2 Flow produced cc/min
- Water conductibility uS
- Autorefill logical status



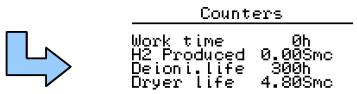
- Column temperature
- Power Supply temperature
- Power supply voltage no. 1
- Power supply voltage no. 2 (only models with flow rates over 400 cc/min)



Model: WM
Status system desiccant (Dryer)

7.5 Counters

From the main menu, scroll the screens to the left or right until displaying the **Counters** submenu. Press the touch-screen for half a second to access a page displaying the system counters

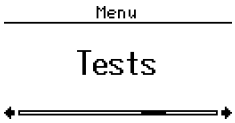


- Operating time (hours)
- H2 produced (scm)
- Remaining life of the deionizer filter (hours)
- Remaining life of the dryer (scm)

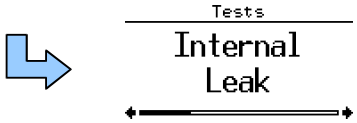
7.6 Tests

7.6.1 Internal leak test

This test checks for leaks inside the generator.



From the main menu, scroll the screens to the left or right until displaying the **Tests** submenu. Press the touch-screen for half a second. The **Internal Leak** page will be displayed.

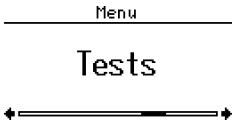


Touching this item for half a second activates an automatic test that identifies any leaks inside the circuit.

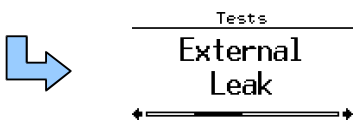
WARNING: If the test fails, contact the reseller and/or the manufacturer to request service.

7.6.2 External leak test

This test checks for leaks in the gas line outside of the generator. It should be performed AFTER having completed the **Internal leak test**, described above.



From the main menu, scroll the screens to the left or right until displaying the **Tests** submenu. Press the touch-screen for half a second. Scroll the screens to the left or right until displaying the **External Leak** page.



Touching this item for half a second activates an automatic test that identifies any leaks in the external circuit. **In this case, the line connected to the outlet must be closed.**

7.7 Maintenance

This section describes some maintenance operations required to ensure correct operation of the appliance. In these cases, the system activates pre-alarm messages (production still continues) to remind the user to complete the maintenance operation.

7.7.1 Routine maintenance

Operation	Interval	Spare part codes
Change water deionizer filter	4000 operating hours or 6 months	**SP.H2.DBFILTER.E**
Change desiccant column (ND model)	Every 6/12 months, depending on the quality of hydrogen produced	**SP.H2.ND.COLUMN** **SP.H2.ND.COLUMN.R**
Verify pressure sensors	8000 operating hours or 24 months	
Verify the water quality	15 days	

Chart 7: Routine Maintenance

In this cases the system activates a pre-alarm messages (not block the machine) to remember that proceed with the possible maintenance.

Verification methods

The verification of the pressure sensors must be done using a pressure gauge.

The verification of the water quality and must be done by a visual check by the display, verifying the water quality shown.

7.7.2 Preventive maintenance:

For any other maintenance and/or service operations, such as those shown in the table below, contact reseller and/or manufacturer

Operation	Interval	Spare part codes
Change pump / fans	Every 3 years	**SP.H2.MPUMP** **SP.H2.FAN**
Condition Dryer Columns	Every 4 years	**SP.DRYER.WM.R**
Change autorefill-pump	Every 5 years	**SP.H2.ARMPUMP**

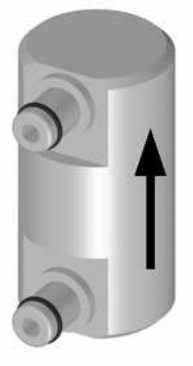
Chart 8: Preventive maintenances

7.7.3 Cleaning

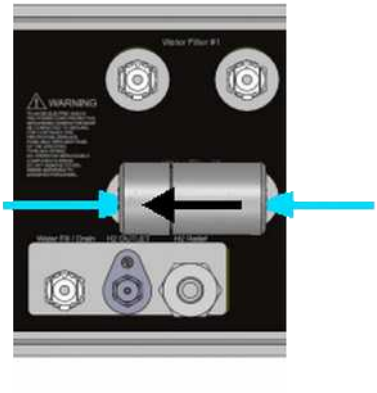
Clean the equipment with a damp cloth only and avoid excessive moisture around any electrical sockets. If required you may use a mild detergent, however do not use abrasives or solvents as they may damage the warning labels on the equipment.

7.7.4 Changing the water deionizer filter

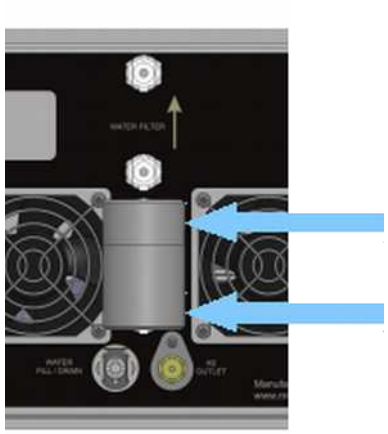
The materials required for this operation are shown in the photo below, together with the spare part numbers.



SP.H2.DBFILTER.E



Change water filter Hy PEM XP up to 1000 cc/min and ND models



Change water filter Hy PEM XP 3300 cc/min model

The filter is located on the rear of the system. Press simultaneously on the two quick-fit-tabs as indicated by blue arrows shown in, and then pull out the filter, tilting it slightly downwards to prevent spillage of water. Insert the new filter by pushing the connectors until you hear the double click of the deduction.

Once having completed the procedure, reset the filter hour counter, used to manage the pre-alarm (see 7.7.5)

All filters are bidirectional but it is present an arrow situated on them that indicates a conventional sense of filters to avoid potential pollution problems in case of used filters.

*In **ND** and **Hy PEM XP 3300** models the filter replacements should be made **ONLY** with the generator in **OFF** status.*

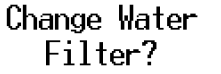
*In **Hy PEM XP up to 2000cc/min** models (two filter per generator) it is possible to change one of the two filters also with the generator in H2 **WORKING** status **ONLY** if the second one filter in the machine is installed.*

If this recommendation will not be followed, the tubes into the generator may break and damage the generator.

7.7.5 Resetting the filter hour counter

From the main menu, scroll the screens to the left or right until displaying the **Maintenances** submenu. Press the touch-screen for half a second. The **Change Water Filter** submenu will be displayed.

This function must be activated after changing the water deionizer filter, so as to reset the filter life hour counter and any pre-alarm messages.



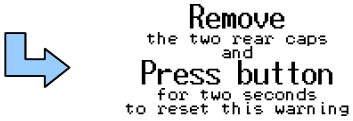
Confirm again by pressing the touch-screen for half a second.

7.7.6 Blocking the machine for handling operations and transport

Whenever you need to transport the appliance, it needs to be switched **OFF**, then wait until the inside circuits have de-pressurised, place the caps on the **O2 VENT** and **H2 VENT** at the rear and then activate the following procedure to block operation. Once these operations have been completed, the appliance can be disconnected and is ready for transport.

From the main menu, scroll the screens to the left or right until displaying the **Maintenances** submenu. Press the touch-screen for half a second. Scroll the screens to the left or right until displaying the **Set Block Machine** page

To activate the procedure, press the touch-screen for half a second.



Once the block for transport procedure has been completed, the display will show this screen when the appliance is started the next time. To cancel this screen, hold the START/STOP button for 2 seconds.

7.7.7 Service Menu

The **Service** submenu is reserved for authorised personnel only. Access to the menu is password-protected.

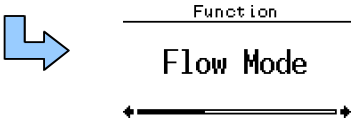
7.8 Functions Menu

The **Function** menu pages refer to **Hy PEM XP**

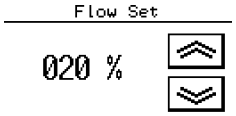
7.8.1 Constant flow generation mode

Activating this mode generates a constant flow of hydrogen, irrespective of line pressure.
The flow-rate generated, expressed as a % respect of maximum flow, can be adjusted at any time.

From the main menu, scroll the screens to the left or right until displaying the **Function** submenu. Press the touch-screen for half a second. The **Flow Mode** page will be displayed



This mode sets the generator to deliver a constant flow-rate of hydrogen.



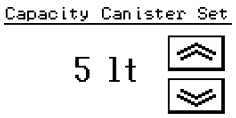
Touch the arrow keys to modify the value. To start the function, simply press the centre of the screen for at least half a second.
To exit without starting the function, simply swipe the screen from the top down.

7.8.2 Fill canister mode

This function is useful if needing to fill a metal hydride canister MyH2 with gas.
The tank will be filled at the maximum flow-rate available.

From the main menu, scroll the screens to the left or right until displaying the **Function** submenu. Press the touch-screen for half a second. Scroll the screens to the left or right until displaying the **Fill Canister** page

This mode sets the generator to fill an external tank at maximum flow-rate.



Touch the arrow keys to modify the value. To start the function, simply press the centre of the screen for at least half a second.
To exit without starting the function, simply swipe the screen from the top down.

7.9 Management of internal water tank

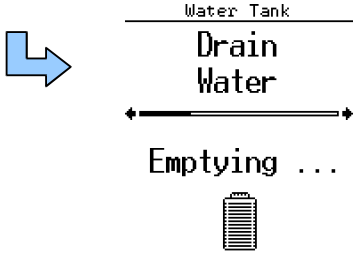
If enabled by parameters (7.2, the internal tank may be automatically filled **“Auto Refill Water”** by taking water from an external source (not under pressure and no more distant than 2 meters) through the special "fitting" on the back of the system.

7.10 Drain Water

If needing to empty the water tank (for example, to change the water):

- connect the drain hose provided to the special quick connector on the rear of the appliance
- activate the drain function from the **Water Tank** menu.

From the main menu, scroll the screens to the left or right until displaying the **Water Tank** submenu. Press the touch-screen for half a second. The **Drain Water** page will be displayed



Selecting this item activates the function to drain the water tank. Special valves are activated to drain the water through the special connector located on the rear of the appliance

The display will be show a symbol that represents the amount of water in the tank. Once the tank is empty, the procedure ends automatically.

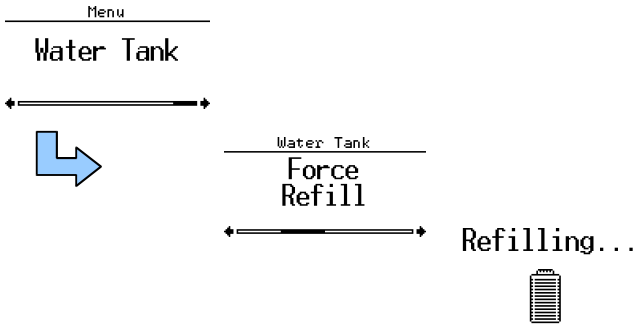
7.10.1 Drain water in Hy PEM XP 3300

To drain the internal tank in **Hy PEM XP 3300** series you simply need to connect the drain hose provided to the special quick connector *(15)* on the rear of the appliance, see Overview of the unit.

This special quick connector (15) must be connect only to drain the water in the internal tank and must be disconnected once ended the drain operation.

7.11 Force Auto Refill

The inner tank can be filled automatically taking the water from an external source (not under pressure and not more distant than 2 meters) through the special "connector" on the back of the system.

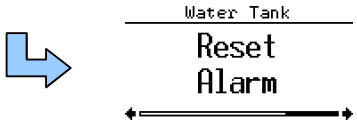


Select this option to force automatic filling of the internal tank. The valves will be enabled which allow the water to be taken in from the special “fitting” on the back of the machine. A symbol will be shown on the display which represents the quantity of water in the tank. Once filled, the procedure automatically ends.

Fill the water tank using deionized water (Deionized, ASTM II, <0,1uS).

7.12 Reset water tank alarm

From the main menu, scroll the screens to the left or right until displaying the **Water Tank** submenu. Press the touch-screen for half a second. Scroll the screens to the left or right until displaying the **Reset Alarm** page



Selecting this item cancels the “Check A. Refill” pre-alarm that is shown when the automatic filling procedure fails.

8 Alarm and pre-alarm signals

During operation, the system carries out several automatic checks. In the event case of serious anomalies, the display becomes RED and flashes, the buzzer sounds rapidly and intermittently, a message identifying the problem is displayed and hydrogen production stops immediately. In the event of minor anomalies, the display becomes YELLOW and flashes, the buzzer sounds every 5 seconds and pre-alarm messages are displayed.

8.1 Pre-alarm signals

Pre-alarm messages help the operator to try to solve any problems before an alarm is activated and hydrogen production stops.
To mute the buzzer, simply swipe the touch-screen from top to down.

Message displayed	Cause	Solution
Power Supply T. Too High	Temperature of electronic power supply too high	Make sure that room temperature where the system is operating is less than 35°C Make sure that the intake/ventilation ports are open and that the corresponding filters are clean
Bad Water Quality	Poor quality of the water in the tank	Change the water with higher quality water. Replace the deionizer bag + water filter (*see 7.7.4*)
Water Tank Level Low	Water level less than 5% of tank capacity	Top up the tank or activate automatic filling, if available (*see par. 7.2.1*)
Dryer Saturated	Dryer saturated. This alarm continues until a dryer regeneration cycle is completed	Start a dryer regeneration cycle
Clock Not Setted	Internal clock not set or not working properly	Reset the system date and time
Check A. Refill	Failed attempt to automatically fill the water tank	Make sure that the external tank is connected correctly
Check Power Supply	Input power voltage not correct	Try switching the system off and on again. If the problem persists, contact service
Change Deionizer	Water deionizer filter saturated	Replace the deionizer bag + water filter and reset the filer life hour counter (*see 7.7.4 and 7.7.5)*

Message displayed	Cause	Solution
Int. Flow Error	Small internal hydrogen leak detected	Try stopping and starting production again, if the problem persists run the internal leak test (*see 7.6.1*) and/or contact service
Fan Damage	Internal fans blocked or broken	Check that the fans are not blocked by foreign matter at the rear
H2 Leak Detected	The H2 sensor (optional) has measured a hydrogen concentration greater than 0.05%	Stop hydrogen production, ventilate the room and check the gas line outside of the generator Run the external leak test (*see 7.6.2*)
H2 Sensor Com.Error	Communication error with OPT.H2.SENS module	Check correct connection of the RS485 cable between the generator and the OPT.H2.SENS module
Parallel Mode Failure	Communication error with OPT.H2.PBOX controller	Try switching the system off and on again. If the problem persists, contact service
Over Int. Pres2	The Security Pressure Switch intervenes 3 times in 10 seconds	Try switching the system off and on again. If the problem persists, contact service
Column 1 Flow Error	Non-optimal internal pressurization	Try reset the pre-alarm, switching the system off and on again. If the problem persists, contact service
Column 2 Flow Error	Non-optimal internal pressurization	Try reset the pre-alarm, switching the system off and on again. If the problem persists, contact service

Chart 9: Pre-alarms

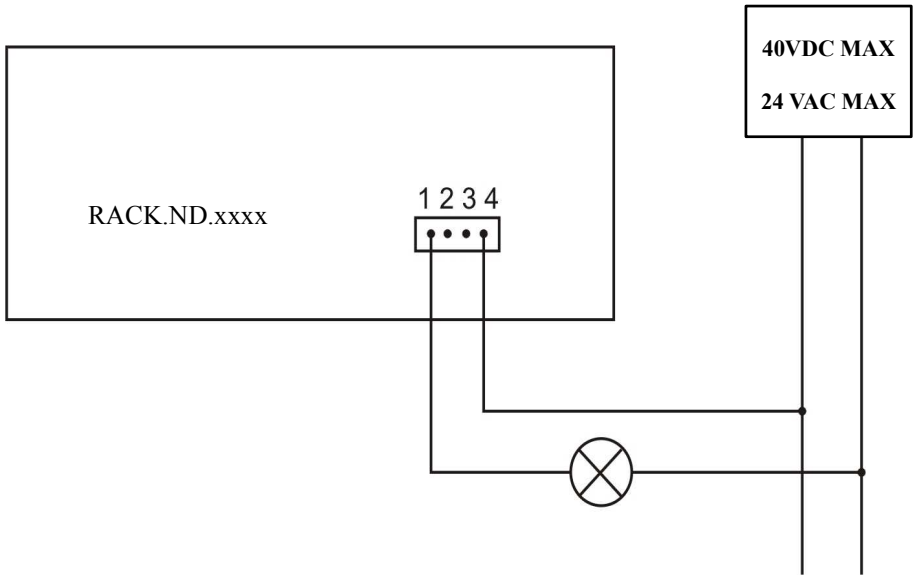
8.1.1 ZEROAIR module Pre-alarm list

Message displayed	Cause	Solution
ZeroAir Com.Error	Communication error with the ZEROAIR module	Check correct connection of the RS485 cable between the generator and the ZEROAIR module
ZeroAir Temp.Probe	Catalytic furnace temperature out of range	Try switching the system off and on again. If the problem persists, contact service
ZeroAir Loop Break	Catalytic furnace temperature control error	Try switching the system off and on again. If the problem persists, contact service
ZeroAir Damage	Internal ZEROAIR module error	Try switching the system off and on again. If the problem persists, contact service
ZeroAir Catalist	Catalyst life expired	Contact service to replace the catalytic furnace in the ZEROAIR module

Chart 10: ZeroAir module pre-alarms

8.2 Remote alarm signal

In this configuration the electric contact is normally closed and will be opened in alarm conditions.



8.3 Alarm signals

In the event case of serious anomalies, hydrogen production stops immediately, the display flashing and become RED, and the buzzer sounds rapidly until the alarm is acknowledged by the user.
To mute the buzzer, simply swipe the touch-screen from the top down.

#	Message displayed	Cause	Solution
1	**Low Int.Press.**	The internal pressure cannot reach the value set by the manufacturer	Try starting the system again **ONCE ONLY**, if the problem persists contact service
2	**Low Out Press.**	External pressure cannot reach the set point in the set time	Check the line connected to the outlet Perform the test of the leaks external (*see 7.6.2*)
3	**Low Water**	Water level in the tank is below the minimum level	Top up the tank or activate automatic filling, if available (*see par. 7.2.1)*
4	**Bad Water Q.**	Poor quality of the water in the tank	Completely replace the water in the tank Replace the deionizer filter (*see 7.7.4)*
5	**High Cell V.**	Cell voltage has exceeded the alarm threshold	Try restarting the system **ONCE ONLY**. If the problem persists, contact service
6	**Over Current**	Cell current has exceeded the alarm threshold	Try restarting the system **ONCE ONLY**. If the problem persists, contact service
7	**P.S. Temp.**	Temperature of electronic power supply too high	Check that room temperature is less than 35°C Make sure that the cooling fan filters are not blocked and that the intake ports are free
8	**Heater damage**	Dryer heater malfunction	Try restarting the system **ONCE ONLY**. If the problem persists, contact service
9	**Memory data**	Error reading the saved parameters.	Try restarting the system **ONCE ONLY**. If the problem persists, contact service
10	**Memory damage**	The device that stores the parameters and the alarm log is faulty	Try restarting the system **ONCE ONLY**. If the problem persists, contact service
11	**G.L.S. Failure**	Hydrogen-water separator malfunction	Try starting the system again **ONCE ONLY**, if the problem persists contact service
12	**G.L.S. Failure 1**	Hydrogen-water separator malfunction	Try starting the system again **ONCE ONLY**, if the problem persists contact service
13	**GLS Ir failure**	Hydrogen-water separator malfunction	 Do not attempt to restart the system without contacting service. Only the service can reset this alarm.
14	**Power Supply**	Input power supply voltage to the electronics is incorrect	Try starting the system again **ONCE ONLY**, if the problem persists contact service
15	**P.S. Damage 1**	Power supply voltage failure	Try restarting the system **ONCE ONLY**. If the problem persists, contact service

#	Message displayed	Cause	Solution
16	**Pump failure**	Internal water pump blocked	Try restarting the system **ONCE ONLY**. If the problem persists, contact service
17	**Int. Flow Error**	Internal pressure loss	Try restarting the system **ONCE ONLY**. If the problem persists, contact service
18	**Over Int.Press**	Internal pressure has exceeded the alarm threshold	Try restarting the system **ONCE ONLY**. If the problem persists, contact service
19	**Over Int.Press 2**	Internal pressure has exceeded the alarm threshold	Try restarting the system **ONCE ONLY**. If the problem persists, contact service
20	**Leak Out Press.**	External pressure loss	Check the gas line connected to the outlet
21	**H2 Leak Detect**	The H2 sensor (optional) has measured a hydrogen concentration greater than 1%	Stop hydrogen production, ventilate the room and check the gas line outside of the generator Run the external leak test (*see 7.6.2*)
22	**P.S. damage 2**	The generator has been reset (or switch ON/OFF) more than 5 times in 5 minutes. This may be due to an internal fault or possible power surges.	Contact service
23	**Over out press.**	External pressure exceeds the set point	Contact service

Chart 11: Alarms

9 How to request service

To request service and/or for any further information on operation of the appliance, please contact your local reseller.

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