



ZERO AIR GENERATOR

LZA SERIES

USER MANUAL

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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

- 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 has cooled down 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.
- Care must be taken as burns can occur from touching hot parts.
- Do not operate equipment with a damaged cord or if the equipment has been dropped or damaged until it has been examined by a qualified service technician.
- Let the equipment cool completely before moving it or packing it in a box
- To reduce the risk of fire, do not operate equipment in the vicinity of open containers of flammable liquids.



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 Intended use

The zero air generator is designed to produce a source of hydrocarbon-free air 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. 2.4* Technical specifications)
- Inlet air 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
- Only use the original spare parts specified in this manual.

1.4 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.

1.5 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).

1.6 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

Zero air generators replace the use of inconvenient high pressure gas cylinders as a source of hydrocarbon-free air. Eliminating the use of gas cylinders reduces annual operating costs and the risk of possible injury to workers. Zero air generators can be used as a source of fuel air for Flame Ionization Detectors (FIDs) or as a zero reference for any instrument which measures hydrocarbon concentration. The zero air generator will remove HC pollutants to less than 0.1 ppm. This system is engineered to be easy to install, and requires only minimal annual maintenance.

2.2 Engineered system

The system features 3 stages of filtration:

First Stage: high efficiency coalescing pre-filtration, removes liquids and particulate matter from the incoming air supply, down to 5 microns.

These filters are equipped with float drains which automatically open to empty any liquids from inside the filter housing. The drains are threaded ISO M5 which can be added a fitting and a tube which discharge into the atmosphere.

Second Stage: the catalytic module is a stainless steel vessel filled with catalyst and assembled with a cartridge heater controlled by temperature sensor, operating the catalyst bed at the required temperature for optimal oxidation. During operation, hydrocarbons are oxidized into carbon dioxide and water vapour.

Third Stage: a high-grade filter is used to remove 99.99% of particulates with size greater than 0.01 microns.

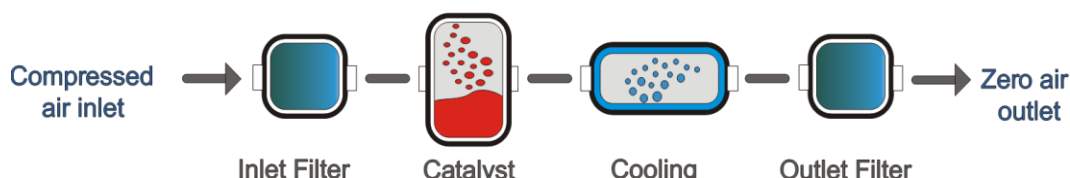


Figure 1: Basic operating diagram

2.3 Identification of the models

This manual refers to the following models of appliance:
ZERO AIR GENERATOR

Models:
LZA1000 – LZA2000 – LZA3000 – LZA6000

The model is identified on the product label applied to the rear of the appliance.

2.4 Technical specifications

Model	LZA1000	LZA2000	LZA3000	LZA6000
Air outlet				
Flow rate (max)	1l/min	2l/min	3l/min	6l/min
Outlet pressure (min)	Inlet pressure – 0.5bars (8psi) at maximum flow			
Outlet pressure (max)	6.5bars (94psi)			
Total hydrocarbon content	< 0.1ppm			
Start-up time	40min	45min		
Air inlet				
Max inlet hydrocarbon content	50ppm			
Min supply pressure	3bars (43psi)			
Max supply pressure	10bars (145psi)			
Dew point	< -20°C			
Min temperature	1°C (34°F)			
Max temperature	35°C(95°F)			
Communication				
RS485	X			
General data				
Supply voltage	90-240Vac 50/60Hz			
Connection type	IEC320-C13			
Installation power (max)	240W (280VA)			
Fuse rating (5x20mm)	4A			
Dimensions	Standard			
Net weight	< 13 kg			
Connections				
Outlet port	1/8" female			
Inlet port	1/8" female			
Water purge	ISO M5 female pipe thread			
Health connector	max 5A, 40VDC MAX / 24VAC MAX (normally closed)			
Operating conditions				
Temperature	5-35°C (41-95°F)			
Humidity (max, non condensing)	80% at 25°C (77°F)			
Noise	<25dB(A)			
IP rating	IP20			

Table 1: Technical specifications

2.5 Weight and dimensions

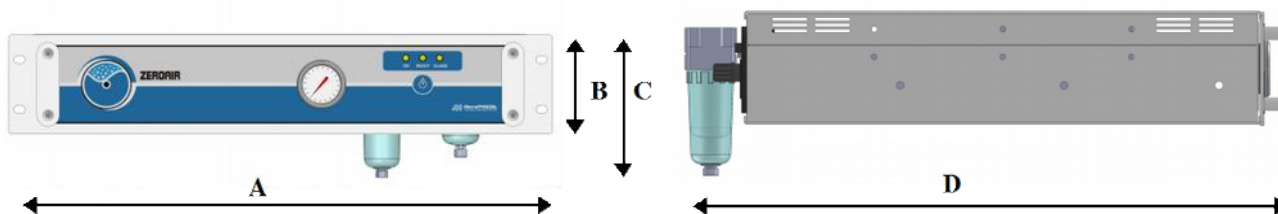
2.5.1 Weight

Model	Net weight (kg)
LZA1000/2000/3000/6000	<13

Table 2: Weight of the different models

2.5.1 Dimensions

LZA1000/2000/3000/6000



	ZA.1500 / 3000 / 6000
A	48 cm (19")
B	8,8 cm (3,5")
C	12,5 cm (5")
D	47 cm (18,5")

Figure 3: Dimensions of the appliance

3 Receiving the appliance

On 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 eight (8) days from the date of receipt of the goods.

3.1 Packing list

The zero air generator is shipped together with the following material:

- 1 user manual on CD
- 1 power cable

IMPORTANT: 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 Warnings

- 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 *par. 2.4* Technical specifications).
- **In case of installation on rack-mount sliding rails, unscrew the two polycarbonate bowls of filters (1) - (2) before inserting/extracting the device (Figure 4).**

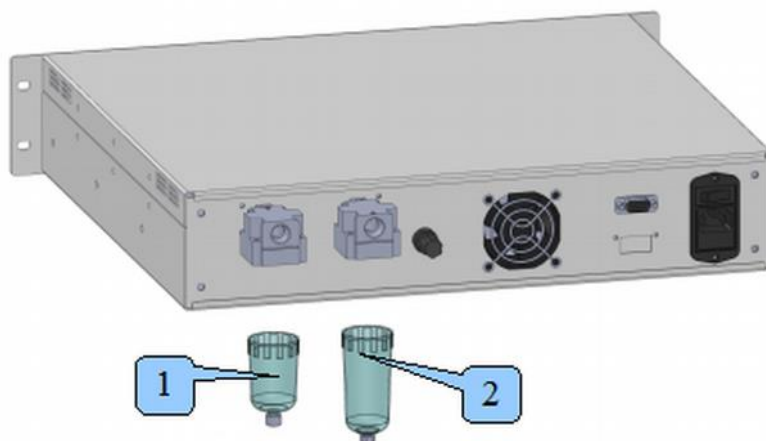


Figure 4

4.2 Positioning

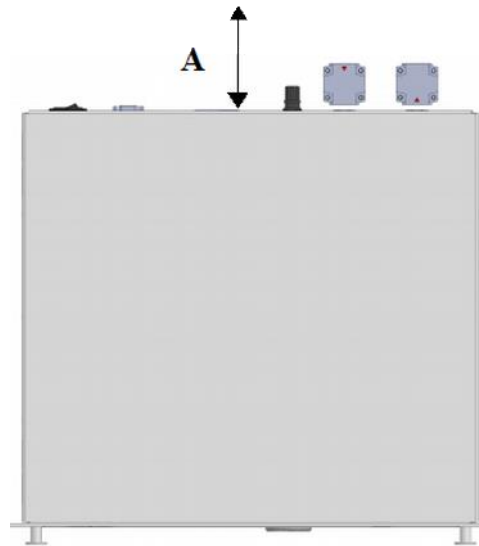


Figure 5: Clearance

A > 15cm (6")

In order to ensure safe operation of the unit, the following steps must be taken prior to installation:

1. At least 6" (150 mm) clearance at the back for proper fan operation.
2. Adequate support for the weight (>15 kg.).
3. Access at the rear for making the air and electrical connections.

4.3 Overview of connections

All connections, electric and air, are made at the back panel. Refer to the figure below.

Front view

Rear view

LZA1000/2000/3000/6000

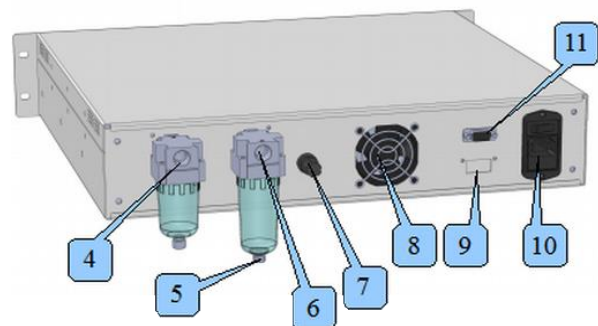
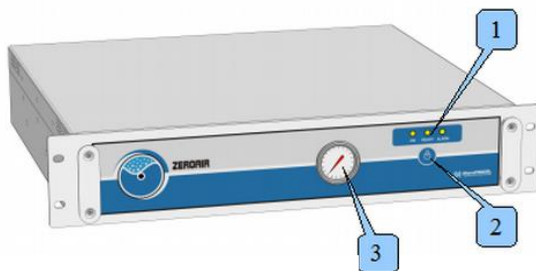


Figure 6: Overview of the appliance

	Description
1	Status LEDs
2	START/STOP button
3	Outlet pressure gauge
4	AIR Outlet
5	WATER DRAIN purge
6	Compressed AIR Inlet
7	Pressure regulator
8	Cooling fan air (<i>intake</i>)
9	Potential-free contact for remote alarm signal (<i>optional</i>) technical data: max 5A, 40VDC MAX / 24VAC MAX.
10	Power switch and power socket
11	RS 485

Table 3: Connections on the appliance

4.4 Electrical connections

4.4.1 Warnings

- 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
- 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 earthed
- The manufacturer is not liable for any damage caused by failure to earth the appliance.

4.4.1 Connections

Make the following electrical connections

- POWER: Connect the power cord to the mains power supply.
- COMMUNICATION: connect the communication cable to the control unit (if needed)

4.5 Air supply and connections

4.5.1 Air supply requirements

The zero air generator requires a source of clean, dry compressed air (3 to 8 bars) for optimal operation. The air should be as close to instrument quality as possible and supplied at a flow rate and pressure above those required at the point of use.

Air supplied to the generator must be between 35°C (95°F) and 1°C (34°F) at dew point <-20°C. Air at temperatures higher or lower or too much wet than this may cause damage not covered by warranty.

The air should be relatively free of compressor oil, hydrocarbons, and particulate matter max 100 ppm. Contamination of the catalyst bed may occur if it is exposed to certain compounds.

4.5.1 Air/fluid connections

Make the following fluid connections:

- AIR INLET: (1/8" female pipe thread)
- AIR OUTLET: (1/8" female pipe thread)
Keep this line as short as possible to minimise pressure drop
- WATER DRAIN: Connect a tubing to the water outlet to avoid the occasional spurts of water underneath the instrument underlying. Connect the other end of the tubing to a drain or, alternatively, the water can be collected in a tray or bucket and carried away by normal evaporation.

5 Commissioning

5.1 Starting the appliance the first time

Before operating the zero air generator the first time, proceed as follows, with reference to the figures below:

- Connect the hose to the AIR inlet fitting.
- Connect the hose to the AIR outlet fitting.
- Connect the power cable to the power socket (1).
- Turn on the power switch (2), the green LED (3) will be ON.
- Start internal oven heating by pressing START/STOP button (4).
- Wait until the yellow LED is on steady (5).

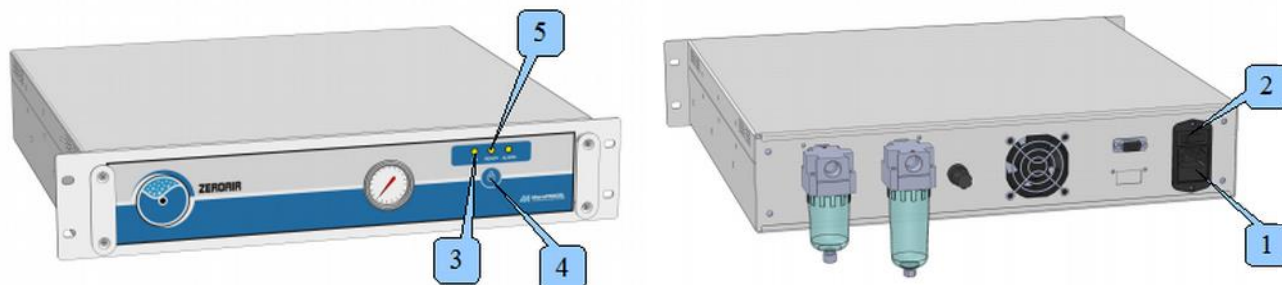


Figure 7: Start-up operations

5.2 Shutting down

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

- Press the Start / Stop button (4) to switch off the internal oven.
- Turn off the power switch (2).

5.3 Returning the appliance for service and/or repairs

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

- Press the Start / Stop button (4) to switch off the internal oven.
- Wait until the green LED is on steady (3).
- Turn off the power switch (2).
- Unplug the power cable (1).
- Disconnect the air lines.
- Place the generator in its original packaging.



The generator contain hot elements. Make sure it has fully cooled down before packing and sending it.

6 Operation

6.1 User interface

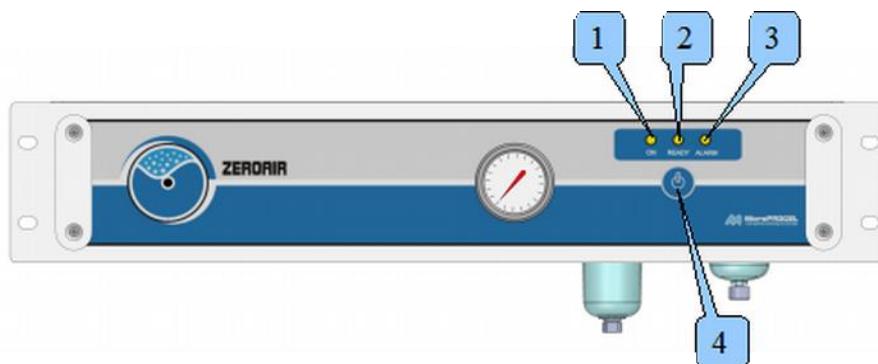


figure 8: User interface

The front panel has three LEDs: GREEN (1), YELLOW (2), RED(3) and one button (4).

Press the START/STOP button (4) to turn ON/OFF the heat oven catalyst.

The following table shows the link between LED status and unit status.

Status	Green LED (1)	Yellow LED (2)	Red LED (3)
STOP	ON	OFF	-
COOLING DOWN	FLASHING	OFF	-
WARMING UP	ON	FLASHING	-
READY	ON	ON	-
ALARM	X	X	See Table 5: Alarm and pre-alarm signals

Table 4: Unit status signals

6.2 Remote alarm signal

The electric contact is normally closed and will be opened only in alarm conditions.

6.3 Alarms and signals

In normal operation, the red LED (3) is off.

When an alarm or pre-alarm (warning) is activated, the red LED comes on in the following sequence:

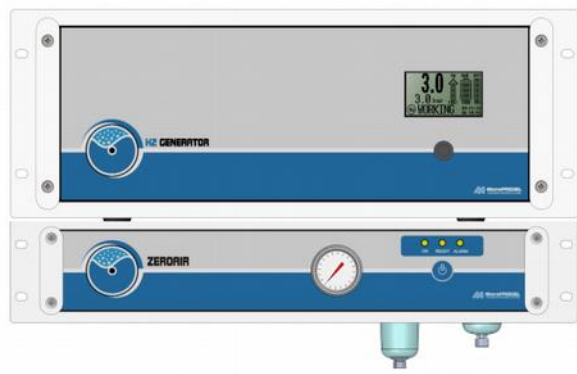
Flashes – Off – On for 4 seconds.

The signal depends on the number of flashes, as shown in the table below:

Flashes	Description	Alarm	Pre-alarm
2	Temperature sensor fault	x	
3	Temperature measurement below operating range	x	
4	Temperature measurement above operating range	x	
5	Set temperature not reached	x	
6	Not used		
7	Internal memory failure	x	
8	Error reading stored parameters	x	
9	Catalytic heater depleted	x	
10	Incorrect type of thermocouple selected	x	
11	Not used		
12	Not used		
13	Catalytic heater nearing depletion		x
14	Internal fan fault		x

Table 5: Alarm and pre-alarm signals

7 Zero air FID applications



The ZEROAIR unit can be placed underneath the hydrogen generator of the same product line.

Once the special cable is connected between both units, the control of the ZEROAIR unit is transferred to the hydrogen generator. The operator can control the ZEROAIR unit from the hydrogen generator interface.

8 Maintenance

All maintenance procedures should be performed by suitable personnel using reasonable care.

Prior to servicing the zero air generator, turn off the compressed air and power supplies to the generator, and ensure that the system is de-pressurized.

To ensure consistent product performance and reliability use only genuine replacement parts and filter cartridges.

The primary maintenance tasks required are:

Operation	Interval
Change the high efficiency coalescing pre-filter cartridges (INLET - OUTLET)	Every year
Replace the catalytic furnace heater	When the red LED is on steady

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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