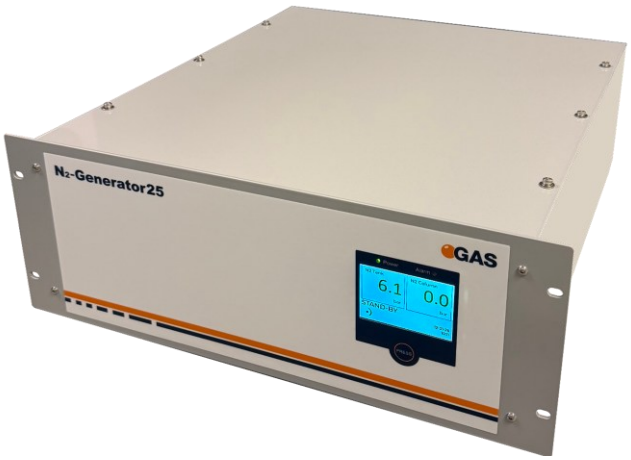
N_2-Generator25



USER MANUAL

G.A.S. Gesellschaft für
analytische Sensorsysteme mbH

CE-Marking according to:

International Standard EN ISO 17050-1:2004
Directive 2014/35/EU (Low voltage directive);
Directive 2014/30/EU (Electromagnetic compatibility);
Directive 2011/65/EU (RoHS);
Directive 2012/19/EU on waste disposal (Waste Electrical and Electronic Equipment – WEEE)

G.A.S. Gesellschaft für analytische Sensorsysteme mbH

44227 Dortmund - Germany

Table of Content

1 General Information

1.1 Information about the Manual

This manual describes a safe and adequate handling of the device. Following the instructions of the indicated safety aspects and instructions as well as the national and/or local rules and general safety regulations concerning the prevention of accidents are absolutely imperative.

Before starting to work with the device read the manual completely and thoroughly particularly the chapter security and respective safety references. Assure that you/the operator comprehend the terms described.

The manual is part of the device. It must be stored together with and next to the device at any time.

INFORMATION!

The graphics in this user manual are schematic and may differ from the actual conditions. The firmware and PC software screenshots in this user manual may differ from the actual conditions.

1.2 Explanation of Symbols

Important and safety-relevant references in this manual are characterized by symbols. These indications which are in-line with industrial safety must be respected and followed at any time.

INFORMATION

This symbol calls information, which are to be considered for efficient and perfect handling of the equipment.

WARNING

This symbol indicates references, which can lead to damages, malfunctioning and/or loss of the device.

DANGER

This symbol marks references, which can lead to health impairments, injuries, lasting body damages or to death due to electric current.

1.3 Notation for dialogs, elements and references

Example Dialog:

System › Connections › LAN File Transfer › Settings… › Test Connection

Example Elements:

Gas Out, Sample gas in

Example: References

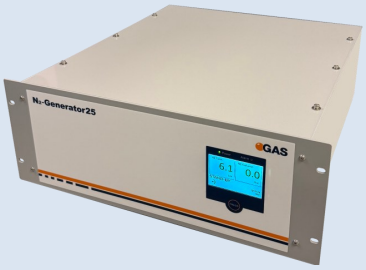
Advanced User Manual, Chapter 5.1 Installation Reguirements

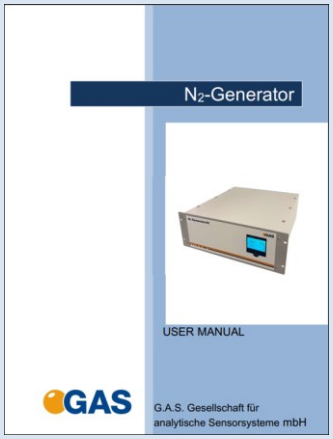
Example: Information

keep the transport box

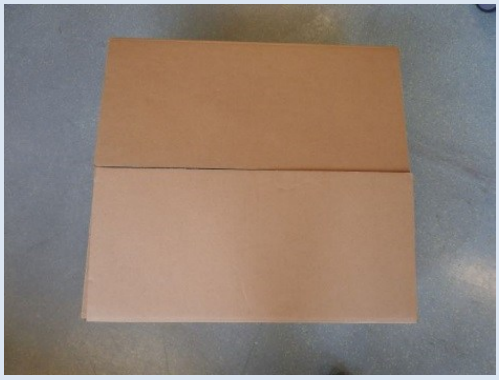
1.4 Scope of Supply

Assure that you have received the full scope of supply. If there is any part missing, please contact the GAS-hotline immediately.

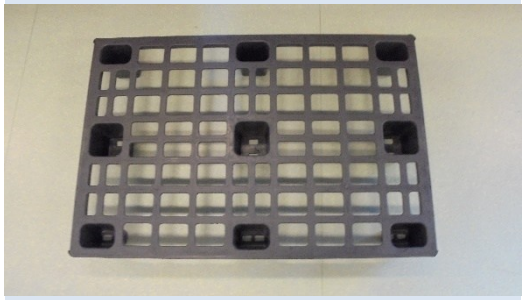
Standard Scope of Supply	
	**N2 Generator** (1 piece)
	**Power plug** (1 piece)
	**USB-Stick Box** with Documents (1 piece)



User Manual (1 piece)



Transport box (1 piece)



Transport palett (60 x 80 cm)

INFORMATION!

It is recommended to **keep the transport box** for a safety return transport.

1.5 Liability and Guarantee

This user manual describes the safe and proper handling of the device.

All data and reference within this manual are compiled under the valid regulations, the state-of-the-art as well as G.A.S. experiences of several years.

This user manual must be stored together with and close to the device at any time and accessible to all persons, who operate or handle the device at any time.

This user manual must be read carefully before starting to work with the device. G.A.S. does not assume any liability for damage and disturbances, resulting from disregard of the instructions contained in this user manual. All claims of any kind related to damage from a not intended use of the device will be rejected.

G.A.S. reserves the right to realize technical changes of the product due to improvements without explicitly mentioning them.

1.6 Copyright

1.7 Return and Disposal

For an adequate disposal, the device or/and its equipment must be returned to the G.A.S. or to a third party authorized by the G.A.S.! For questions please contact G.A.S.

1.8 Customer Service

For questions concerning G.A.S. products a customer service is available:

G.A.S. Gesellschaft für analytische Sensorsysteme mbH

Otto-Hahn-Straße 15

44227 Dortmund

Germany

Phone: +49 (0) 231 / 97 42 - 65 50

Fax: +49 (0) 231 / 97 42 - 65 55

support@gas-dortmund.de

The telephone hotline is available from monday to friday from 9:00 to 16:00 hours. In urgent cases or if you use fax or email please provide a telephone number for callbacks.

2 Safety

2.1 Intended Use Only

WARNING!

Usage other than described in this manual may damage the device and/or harm persons involved.

Do not use the device for other purposes. Damages due to misuse are not covered by the guarantee. Such damage claims will be rejected.

The device and its equipment are not certified for the employment in areas with explosive gas air mixtures.

All claims or requirements of any kind against the manufacturer and/or its authorized persons that arise due to damages from a not intended use of the device will be rejected. All damages that arise from a not intended use are of the operator's responsibility.

The intended use of the equipment and its correct handling according are described in the operating instructions of this manual. Other parts than the parts belonging to the scope of supply, may only be used after G.A.S. approval.

2.2 Responsibility of Operator

The device may only be operated in a perfect technical condition. Before putting the device into operation the condition of the device and its equipment must be checked. The information and instructions provided in this manual have to be followed at any time.

Besides the instructions provided in this manual the local rules for the prevention of accidents, general safety regulations - valid for the area of application of the device - as well as the valid environmental-protection regulations must be considered and respected.

The responsible technicians and operators have to make sure a failure-free use of the device. Responsibilities among the involved persons regarding installation, operation, maintenance and cleaning must be made clear.

2.3 Requirements of Personnel

Only authorized and trained technical personnel may work with the instruments. The operator must have received an instruction over existing and all possible dangers and should be regularly instructed in safety procedures and environmental protection. The personnel must be fully aware of the complete operating instructions and particularly the safety notes. Personnel that might be under the influence of drugs or alcohol are to be kept off the device at any time.

Technical personnel in this context are defined as skilled employees who are knowledgeable due to their educational background. In case the foreseen personnel do not have the necessary qualifications to operate the instrument, it must be trained. Further to that non-authorized personnel should not operate the device.

The competencies for the work on and with the device must be specified and kept undoubtedly at any time so that with respect to security issues no unclear situation might come up.

Any changes of the equipment, which impair security of the personnel, must immediately be reported to the operator and every person dealing with it.

2.4 Dangers

The device and its equipment is subject to an endangerment analysis. The construction and execution of the device corresponds to the today's state-of-the-art. The device is reliable in service when operated according to its intended use.

DANGER

Exercise great care in handling current-carrying parts like the power supply cord. Do not get directly in touch with current-carrying parts. Do not open the housing. Do not use damaged parts.

INFORMATION!

If the housing of the device is damaged, the device must not be used anymore and must be returned to the G.A.S. by using the original transportation case.

DANGER

Exercise great care in handling current-carrying parts like the power supply cord. Do not get directly in touch with current-carrying parts. Do not open the housing. Do not use damaged parts.

3 Transport, Packing and Storage

3.1 Inspection after Transport

Check the supply immediately after delivery concerning its completeness and/or transport damages. If you detect externally visible transport damage, do not receive the supply, or only under reservation. State the extent of the damage on the provided delivery note and/or the transportation documents of the feeder. Generate a complaint. Lodge a complaint of covered defect immediately after recognizing, as claims due to transport damages can only be made valid within the complaint periods (usually 7 days).

3.2 Packing

If no return agreement regarding the packing was agreed upon dispose the packaging material always in an environmentally friendly way and according to valid local regulations. If necessary, ask a recycling company.

INFORMATION!

It is recommended to **keep the transport box** for a safety return transport.

3.3 Storage and Transport

Store the device only under the following conditions:

- **When not in use, store the equipment in the supplied casing**
- **Prevent unauthorized access**
- **Do not store outside**
- **Protect the equipment from moisture and dust**
- **Put protective caps on all gas sockets**
- **Avoid mechanical vibrations**
- **Do not expose the equipment to aggressive substances**
- **Protect the equipment from direct sun light**
- **Storage temperature: 5 to 35 °C**
- **Relative Air Humidity: <80%Rh, non condensing**
- **Instrument's position: Horizontal**

The equipment should be moved only within the provided carrying case. By this means, transport damages can be avoided. The above mentioned values are considered for an instrument transported in its original new packing.

WARNING!

Protective caps should be put on gas sockets in case the device is stored or transported.

4 Cleaning and Maintenance

Natural aging and the wear of certain components of the equipment require a regular cleaning and maintenance.

4.1 Cleaning

Clean the device only with a dry or easily damp cloth.

WARNING!

Do not use cleaning agents, which contain solvents, acids or bases.

4.2 Maintenance

INFORMATION!

Maintenance of the device should only be carried out at G.A.S. or through specially trained and by G.A.S. authorized personnel.

For more detailed information on the maintenance intervals, see chapter 9.

5 Description of the N_2-Generator unit

5.1 Purpose of the device

The purpose of the N_2-Generator is generating high purified nitrogen for supply of G.A.S. measuring devices used typically in positive ion mode.

Nitrogen generators replace the use of inconvenient cumbersome high pressure gas cylinders as a source of hydrocarbon-free air. Eliminating the use of gas cylinders allows to reduce annual operating costs.

This system is engineered to be easy to install, requires only little annual maintenance and can be used in laboratories and/or light industrial environments.

INFORMATION

Any use of the device, that differs from the intended purpose will be regarded as “out of purpose”. Any claims of any kind against G.A.S. or her associates that are related to damages from use not covered by the aforesaid will be rejected.

5.2 Technical Data

Model: N_2-Generator NG RACK 4U 500C	
N_2-Outlet	
Flow rate (Max)	200 ml/min
Outlet pressure (Min)	1.0 bar (14.5 psi)
Outlet pressure (Max)	4 bar (58 psi)
Nitrogen purity *1	>99.999%

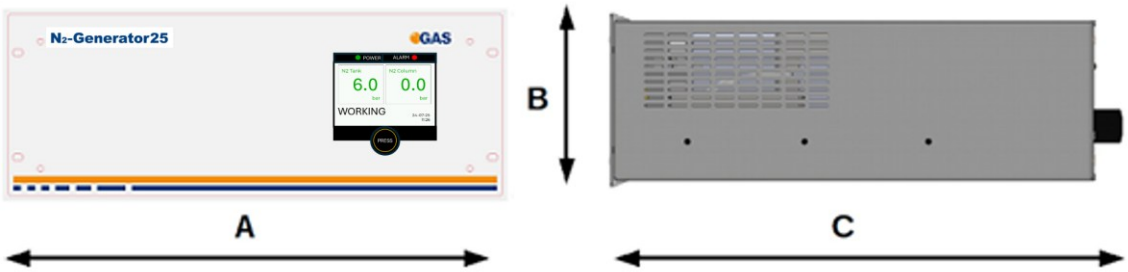
Outlet Dew-point *2	<-60°C (-76°F)
Communication	
LED interface	Standard
RS232	Standard
RS485	Standard
General data	
Supply rating	100-240VAC (±10%) 50/60Hz
Connection type	IEC320-C14
Power (Max)	200 W (320 W)
Fuse rating (5x20mm)	4A (250V (AC) – T) 5 x 20 mm
Net weight	27 kg
Dimensions	Standard 19” Rack 4U-deep 54 cm
Connections	
Outlet port	1/8" female BSPP
Operating conditions	
Temperature	5-35°C (41-95°F)

Humidity (max, non condensing)	80 % at 25°C (77°F)
Noise	<55dB(A)
IP rating	IP20
Pollution degree rating	2 (with no aromatic compounds)
Altitude	< 2000m

*1 The purity refers to the residual oxygen
*2 Atmospheric Dew-point (ADP)

5.3 Dimensions

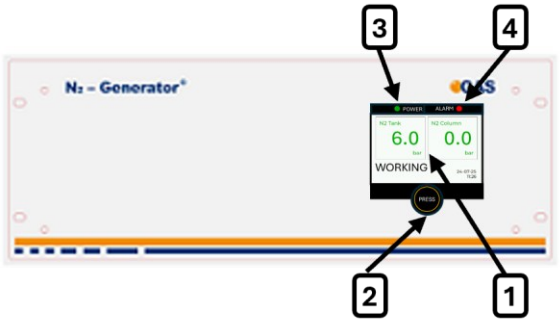
Model	Net weight (kg)	Gross weight (kg)
N2-Generator NG RACK 4U 500 C	27	30

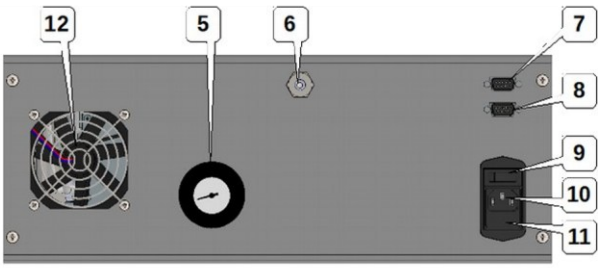


A	48 cm	19”
B	18 cm	7.1”
C	54cm	21.2”
	56 cm with front handles	22”

5.4 Overview of the appliance

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





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#		Description
1	Front panel	LCD touch-screen display
2		START/STOP button (Press)
3		Status LED
4		Alarm LED
5	Rear panel	N2 Outlet pressure regulator with gauge
6		N_2 Outlet
7		RS485
8		RS 232

9		Power switch
10		Power connector
11		Fuse
12		Cooling fan air

5.5 Installation and operation requirements

WARNING!

Considering the weight of the unit, it is advisable to have the generator transported by a minimum of two people or to transport it with suitable systems (e.g. pallet truck).

- Remove the packaging and the supplied material;
- With someone on either side of the unit, place your hands under the unit ready for lifting;
- Making sure your knees are bent and your back straight, lift the unit to the desired position

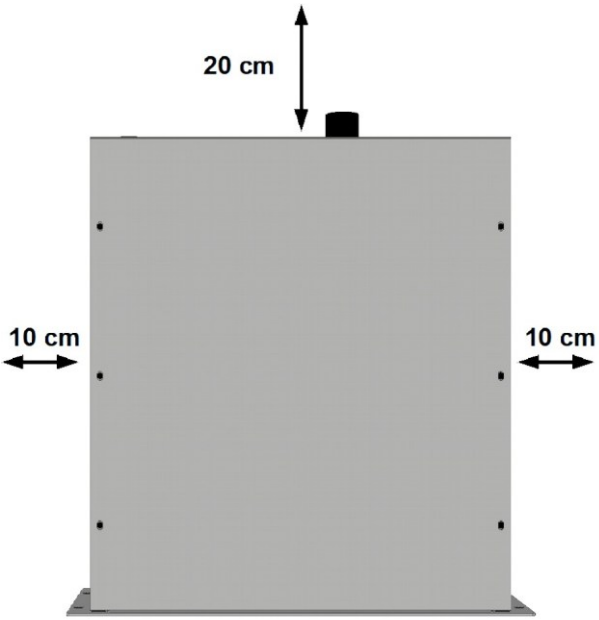
- Do not try to lift the generator yourself.
- Adopt safe lifting practices.
- Risk of injury and damage to people and things.

INFORMATION!

- The generator must be stored, installed and used only indoor
- The nitrogen generator should be positioned on a flat surface that is not exposed to vibrations and able to withstand a weight greater than 50 kg

WARNING!

- Do not position the generator near flames or other heat sources
- Always leave sufficient clearance for the circulation of air around the appliance (about 10 cm), above all at the rear (about 20 cm), where the ventilation air intake is located (as shown in the picture below).
- Place the unit in a position that allows a comfortable access to the mains plug or the mains connector placed at the back side of the unit in order to easily disconnect the unit from the supply mains
- 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



5.6 Electrical connections

WARNING

- All operations involving the electrical parts must only be performed with the unit disconnected and electrically isolated from the power supply. These operations must only be carried out by trained personnel in full compliance with all safety standards.
- Attention: Every external device connected to the generator must respect the SELV[1] directives.

DANGER

- 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

[1]SELV - Safety (Separated) Extra-Low-Voltage

Extra-Low-Voltage system (i.e. normally not exceeding 50 Vac or 120 V ripple-free d.c.) which is electrically separated from earth and from other systems in such a way that a single fault cannot give rise to an electric shock.

- Use cables with double insulation, in accordance with the standards in force in the country concerned
- The appliance must be earthed.

INFORMATION!

- The manufacturer is not liable for any damage caused by failure to earth the appliance.
- Attention: Every external device connected to the generator must respect the SELV[1] directives.
- The appliance must only be powered on once it has been placed in position and the required connections have been completed.

5.7 Comunication ports

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

- **RS-485** used for operation in combination with other gas generation modules.
- **RS-232** used for local control via PC or for service operations.

Serial ports PIN/OUT overview:

The following is the pinout of the connectors available on the back of the unit. View from the outside (user side).

RS-485		RS-232	
5 **4** **3** 2 1 9 8 7 6	**3.** A (+) **4.** B (-) **5.** GND	**5** 4 **3** **2** 1 9 8 7 6	**2.** Tx **3.** Rx **5.** GND

6 Commissioning

6.1 Starting the operation the first time

INFORMATION!

Before operating the N_2-Generator for the first time, proceed as follows:

- Remove the cap on the N_2 outlet on the rear of the generator **(3)**
- Connect the power cable to the power socket **(5)**
- Turn the appliance on at the power switch **(4)**
- Start N_2-production by pressing the Start/Stop button **(1)**.
- Purge the unit for at least 48 hours (to allow a proper cleaning of the internal pneumatic circuits)
- Stop the N_2-production pressing the Start / Stop button **(1)**.
- Connect the nitrogen outlet **(3)** to a device**.**
- Start the N_2-production pressing the Start / Stop button **(1)**.
- If necessary, set the outlet pressure at the outlet pressure regulator **(2)**

6.2 Shutting down and depressurization

INFORMATION!

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

- Press the Start / Stop button **(1)** to switch off the unit.
- Wait the compressor discharge time
- Activate the depressurize function to fully empty the internal tank(s)/internal pneumatic circuit **(see chapter 9.5)**
- Turn off the power switch and disconnect the power cable **(4)** and **(5).**

6.3 Returning the appliance for service and/or repairs

INFORMATION!

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

- Switch the generator OFF pressing the START/STOP button **(1)**
- Wait the compressor discharge time (shows the OFF status)
- Activate the depressurize function to fully empty the internal tank(s)/internal pneumatic circuit **(see chapter 9.5)**
- Wait at least 40 minutes *(the Generator is powered-on but it does not produce nitrogen)* to allow the complete cooling of the internal oven *(where expected)*
- Turn off the power switch **(4)**
- Unplug the power cable **(5)**
- Disconnect the nitrogen tubing **(3)**
- Insert the cap **(3)**
- Place the generator in the original packaging

WARNING!

- The generator may contain pressurised Nitrogen and hot elements. Make sure it is depressurised and has cooled completely before packing and shipping it.

7 Operation

7.1 User Interface

Users can interact with the system using the 480x320 pixel resistive touch-screen display.

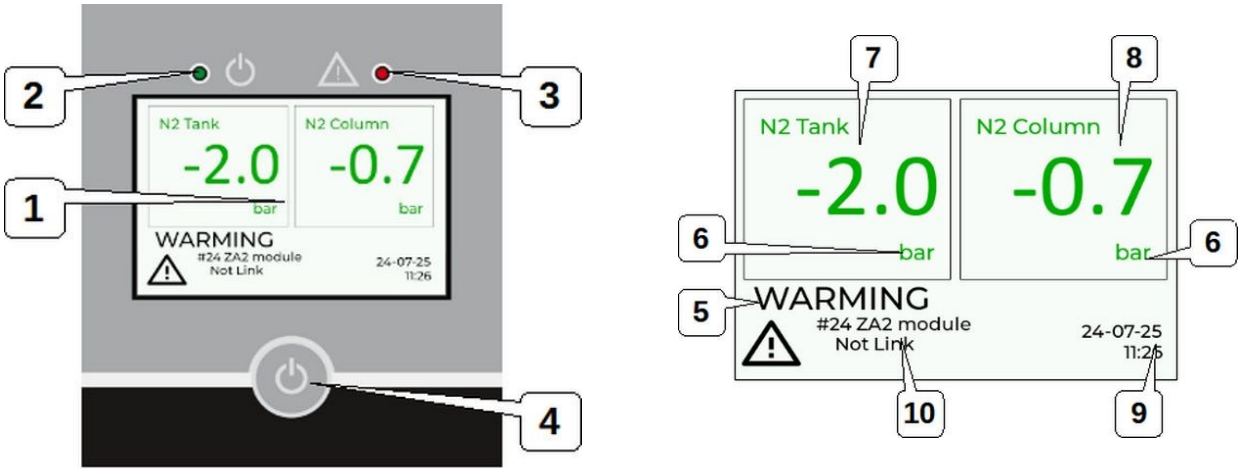
Users can scroll the various menus displayed on the touch-screen as follows:

- 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 display and LEDs lighting may change, depending on operating status:
  - when **OFF** (no production) the **STATUS LED** (green) is off
  - in normal operation **WORKING** (production) the **STATUS LED** (green) is on steady
  - when an **alarm** is in progress (the production is stopped), the **display and the ALARM LED** (red) flash quickly
  - when a pre-alarm is signaled (production continues), the **display and the ALARM LED** (red) flash slowly

WARNING!

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

7.2 Summery screen



#	Description
1	LCD touch-screen display
2	Status LED (green)
3	Pre-alarm / alarm signal LED (red)
4	START/STOP button
5	System status and pre-alarm messages
6	Unit of measure
7	N_2-tank pressure
8	N_2-column pressure

9	Date-time
10	Alarm / Pre-alarm messages

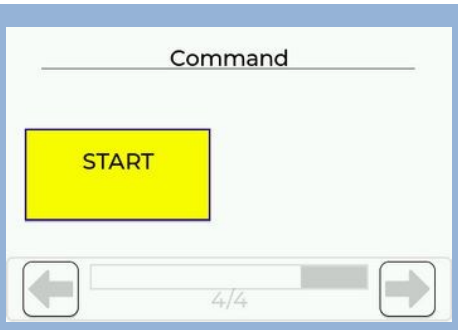
7.2.1 System status

Flashes	Description
OFF	The system is off and is not producing N_2
STARTING	The system internal compressor is charging the N_2 column.
WORKING	The system is generating nitrogen
STAND-BY	The system has reached the required working pressure and it is in STAND-BY status
STOPPING	The system is waiting the compressor discharge time
ALARM	The system has detected an operating error and has stopped nitrogen generation
PRE-ALARM	The system has detected an error that does not affect gas generation, and the generator continues to produce nitrogen

7.3 Starting and stopping the N_2-production

When display shows the summary screen, pressing **START/STOP** displays the following control screen.

To access the screen, swipe to the right or left.

Control screen	Description
	Press **START** to begin the production and set the generator to **WORKING**
	Press **STOP** to stop the production and set the generator to **OFF**

8 Menu

The touch-screen offers the possibility to access some of the parameters that manage appliance operation via a series of menus. For more information on how to use the touch-screen **(see chapter 7.2)**.

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:

Setup

History

Diagnostics

Counters

Maintenances

- 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

8.1 Setup

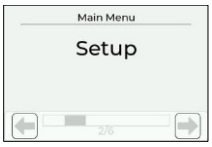
8.1.1 Parameter

From the **Setup** submenu, a series of system parameters can be accessed (swiping to the right or left).

Name	Description	Value 1	Default value	UOM
Identifier	Identifies the logical address if connecting the generator via an RS485 communication bus	1 : 255	240	-
Auto Run	Set to "**Yes**", when power is restored after a blackout, the system restarts and goes into the same operating mode as prior to the blackout (**OFF** or **WORKING**). Set to "No", when power is restored after a blackout, the system stays OFF	Yes No	Yes	-
Pressure Unit	Defines the pressure unit of measure	-	Bar	Bar Psi
Temperature Unit	Defines the temperature unit of measure	-	°C	°C °F
Enable beeper	Allows to enable/disable the LCD beeper	Yes No	Yes	-
Remote contact	***OPTIONAL*** Defines the working mode of the remote contact related to the unit status. **(see chapter 8.1.1.4)**	On/Ready : ON Alarm : INT Alarm : INT	On/Ready : ON Alarm : INT	-

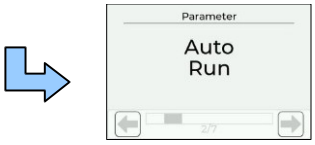
	Note: *The contacts are placed to the pin 6 and 7 of the RS-485 connector.*	On/Ready : ON On : ON Ready : OFF		
Energy save	Set to YES, air consumption will be proportional to the flow of nitrogen consumed	Yes No	Yes	-

8.1.1.1 Auto Run

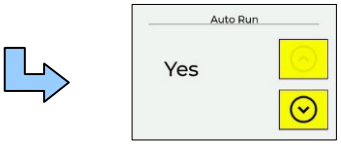


From the main menu, scroll the screens to the left or right until displaying the Setup submenu. Press the touch-screen for half a second. The **Parameter** submenu will be displayed.

From the Parameter submenu, press the touch-screen for half a second to access the individual parameters **(see chapter 8.1.1.)**.

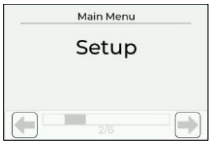


Swipe to the right or left to select the desired parameter. Press the screen for half a second to set the parameter.



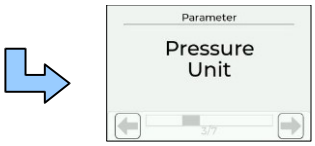
Touch the arrow keys to modify the value. To confirm, press the centre of the screen for at least half a second. To cancel the changes and go back up a level, swipe the screen from top to bottom.

8.1.1.2 Pressure Unit

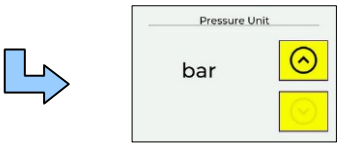


From the main menu, scroll the screens to the left or right until displaying the Setup submenu. Press the touch-screen for half a second. The **Parameter** submenu will be displayed.

From the Parameter submenu, press the touch-screen for half a second to access the individual parameters **(see chapter 8.1.1.)**.

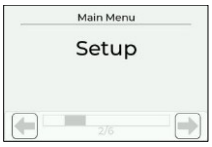


Swipe to the right or left to select the desired parameter. Press the screen for half a second to set the parameter.



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.

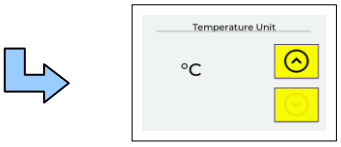
8.1.1.3 Temperature Unit



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 chapter 8.1.1.)**.

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

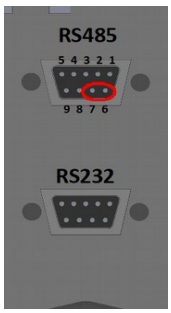


Touch the arrow keys to modify the value. To confirm, press the centre of the screen for at least half a second. To cancel the changes and go back up a level, swipe the screen from top to bottom.

8.1.1.4 Remote contact

The following table shows the operation of the contact based on the working status of the generator

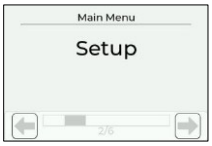
Setted parameter	Generator status ON	Generator status Pre-Alarm	Generator status Alarm
On/Ready : ON Alarm : INT	ON	-	Intermittent
Alarm : INT	-	-	Intermittent
On/Ready : ON	ON	-	-
On : ON Ready : OFF	ON	-	-



Note:
The contacts are placed to the pin 6 and 7 of the RS-485 connector.

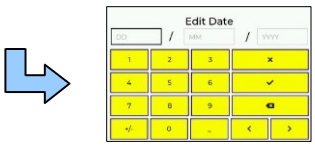
Pins **6** and **7** are voltage-free contacts normally open.
(max 1A, 48Vdc)

8.1.2 Date/Time Setting



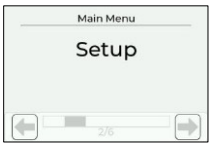
From the main menu, scroll the screens to the left or right until displaying the Setup submenu. Press the touch-screen for half a second. Scroll to the right or left until the Date/Time Setting submenu is displayed.

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

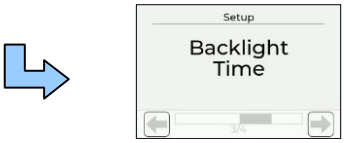


Tap for half a second on the desired field to change the corresponding setting by typing the value on the keyboard.
To delete an entry, press the "⌫" key.
To confirm the settings, press the "✓" key.
To cancel changes and go back one level, press the "**x**" key.

8.1.3 Backlight Time



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.

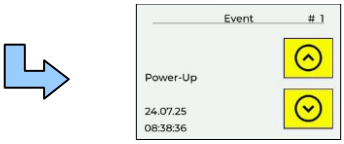


Touching this item for half a second accesses the screen for setting the display backlight time

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.

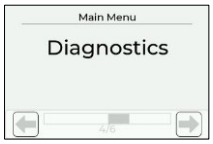
8.2 History

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 pages that showing all the events of the system.

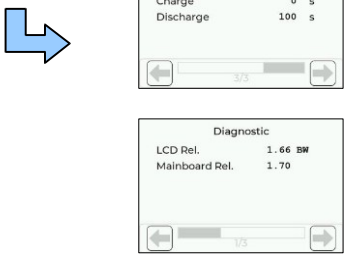


Press the arrows to view the pages with the events of the system.

8.3 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



N_2-Column: Pressure measured at the internal tank outlet (bar, psi)

N_2-Tank: Pressure measured at the internal column outlet (bar, psi)

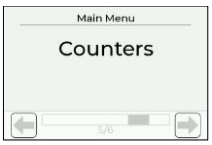
Cabinet: Temperature measured inside the generator (°C, °F)

Charge: Internal N_2-column charging pressure time (seconds)

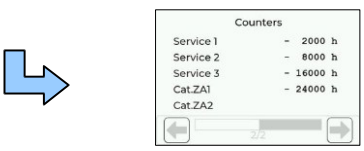
Discharge: Internal N_2-column discharging pressure time (seconds)

- Firmware version of the LCD
- Firmware version of the main board

8.4 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



Service 1: number of hours remaining until the next service 1

Service 2: number of hours remaining until the next service 2

Service 3: number of hours remaining until the next service 3

Catalyst: number of hours remaining until the Catalyst oven expiration

9 Maintenance

Natural aging and the wear of certain components of the equipment require regular cleaning and maintenance. With proper care and maintenance, the nitrogen N2-Generator should provide years of trouble-free operation. There are no adjustments to be made to the generator. There are routine service operations as described below.

Regardless the above mentioned, the generator should be inspected every 6 months.

INFORMATION!

Other maintenance of the equipment than mentioned in this manual must be carried out by G.A.S. or personnel authorized by G.A.S.

Please contact G.A.S. 6-8 weeks in advance to optimize the turn-around time!

The following section describes the maintenance operations required for the correct operation of the nitrogen generator.

The fluidics of the generator are mainly composed of fittings, filters, electro-valves, transducer, and pressure regulator. These components do not need any adjustment by the user. It is nevertheless recommended to regularly proceed a check-up of the functionalities of the instrument.

We recommend that users purchase tested original spare parts and consumables directly from G.A.S. or its distribution partners. We accept no responsibility for malfunctions or damage caused by spare parts and consumables that have not been tested or do not meet G.A.S. standards.

DANGER

All maintenance work that requires touching parts of the device may only be carried out by appropriately trained personnel and in full compliance with all safety standards. Furthermore, this work may only be carried out when the device is switched off, disconnected from the mains and electrically isolated.

INFORMATION!

The generator may contain pressurised Nitrogen and/or hot elements. Make sure it is depressurised and has cooled down completely before carrying out any maintenance work inside it. Always follow the maintenances intervals described in this manual. To ensure consistent product performance and reliability only use genuine replacement parts and filter cartridges.

This section describes some checks, cleaning and maintenance operations required to ensure correct operation of the appliance. For any other maintenance and/or service operations, contact the reseller and/or manufacturer.

List of checks to performed at regular intervals to ensure an optimal operation of the compressor and all of internal components. In these cases, the system activates pre-alarm messages (N_2-production still continues) to remind the user to complete the maintenance operation

9.1 Primary maintenance

Operation	Decription	Interval
Check	Check for abnormal noise and vibrations	24 hours
Maintenance Service 1	Replace the inlet filter cartridge. Replace the internal filter cartridge. Replace the outlet filter cartridge. Replace the discharge silencer. Replace the compressor internal components.	Every 3000 operating hours / 6 months

INFORMATION!

Every 6 months perform a check on the correct functioning of the unit and its materials. If they are not working properly at their maximum potential, please replace them (e.g compressor elastic bands).

INFORMATION!

To protect the compressor, we recommend setting the connected G.A.S. measuring device to standby mode. The standby mode should be switched off at least 2 hours before starting a new measurement.

9.2 Preventive maintenance

Required Operation	Decription	Interval
Maintenance Service 2	Replace the internal compressor	Every 9000 operating hours / 2 years
Maintenance Service 3	Replace catalyst oven	Every 24000 operation hours / 3 years

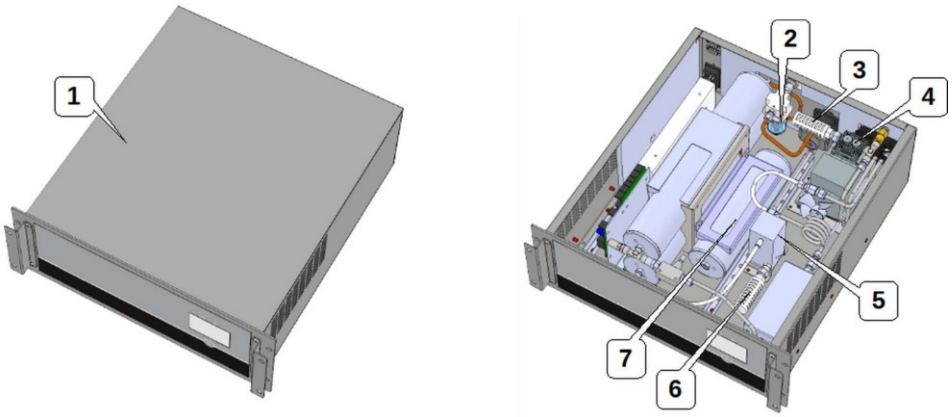
INFORMATION!

Every 6 months perform a check on the correct functioning of the unit and its materials. If they are not working properly at their maximum potential, please replace them (e.g compressor elastic bands).

9.3 Perform maintenance operation

WARNING!

All of the maintenance operations that involve handling parts of the unit must only be carried out by suitably trained personnel and in full compliance with all safety standards. Furthermore, this work may only be carried out when the device is switched off, disconnected from the mains and electrically isolated. The generator may contain pressurised Nitrogen and/or hot elements. Make sure it is depressurised and has cooled down completely before carrying out any maintenance work inside it.
Contact service to perform every operation that involve internal parts of the appliance and to perform the relative service reset.



To perform the required maintenance remove the top panel **(1).**
The items contained to be replaced during Service 1 operations are**:**

- N_2-outlet filter cartridge **(2)**
- Compressor inlet filter **(3)**
- Internal compressor components **(4)**
- Internal air filter cartridge **(5)**
- Discharge silencer **(6)**
- Desiccant column **(7)** *(optional)*

After maintenance, reassemble all parts in reverse order (protective plates, side or top panel etc.)

9.4 Reset pre-alarm #1-Service 1

INFORMATION!

The service reset for every maintenance operations that involve handling parts into the unit, must only be carried out by suitably trained personnel.

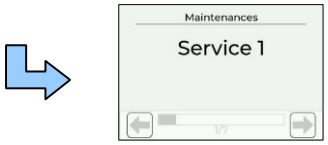
The service reset must be done exclusively after every occurred service operation to ensure the correct
operation of the unit.

The manufacturer and/or reseller are in no way liable for any damage due to improper use of the appliance, service and service reset not performed and operations performed incorrectly and not by qualified personnel.

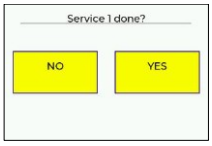
Contact service to perform every operation that involve internal parts of the appliance and to perform the relative service reset.

Once all of the operations have been completed**,** proceed as follows to confirm maintenance ***(Service 1)***:
This operation resets the corresponding pre-alarm and counter for future service warnings.

From the main menu, scroll to the right or left until the **Maintenances** submenu is displayed. Press the touch-screen for half a second. Scroll the screens to the left or right until displaying the Service 1 submenu



Touching this item for half a second accesses the confirmation screen



Press YES to confirm that service has been completed

*Follow the same operations described to reset the pre-alarm for **Service 2** and **Service 3**.*

9.5 Depressurize function

This depressurisation function allows the internal tanks of the unit to be depressurised, which is useful for relieving internal pressure in case of maintenance, unit handling, for a safe shutdown of the unit or any operation that requires the unit to be fully depressurised.

This function is only available if the unit is in the OFF state.

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 to access this function

Touching this item for half a second accesses the screen and activate the function.

If the unit is not in the OFF status, the function appears as ***NOT AVAILABLE***.

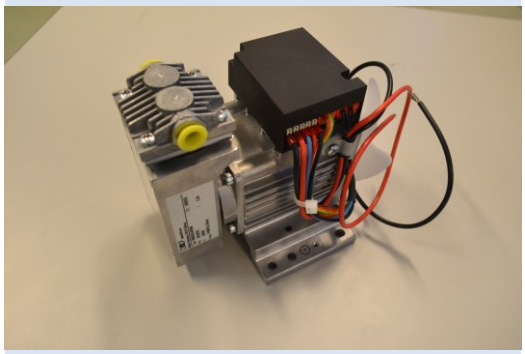
Touching this item for half a second activates the depressurizing function. Depressurisation remains active until a scroll of the touch screen from top to bottom.

WARNING: Allow the unit time for a complete tank drainage (check from display)

9.6 Service Menu

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

9.7 Spare parts

Spare parts	
	**Compressor** Item number:100002827
	**Filter elements with compressor parts** Item number:100002827

10 Alarms and pre-alarms

During operation, the system carries out several automatic checks. In the event of serious anomalies, the display and the red LED flash quickly, the buzzer sounds rapidly and intermittently, an alarm message is displayed that identifies the problem, and nitrogen production is suspended. In the event of minor anomalies, the display and the red LED flash slowly, the buzzer emits a sound every 5 seconds, and pre-alarm messages are displayed.

10.1 Pre-alarms

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

#	Message displayed	Cause	Solution
1	**Service 1**	Routine maintenance operation Service 1 reminder	Carry out required maintenance
2	**Service 2**	Routine maintenance operation Service 2 reminder	Carry out required maintenance
3	**Service 3**	Routine maintenance operation Service 3 reminder	Carry out required maintenance
4	**Internal Temp. Too High**	The internal temperature value of the unit over the allowed limit.	If the pre-alarm persists, contact service
5	**Air Column Charge**	Air column charging time over the maximum allowed	Try restarting the system, **ONCE ONLY**, if the problem persists contact service
6	**Air Min Time Charge**	Air column charging time under the minimum allowed	Try restarting the system, **ONCE ONLY**, if the problem persists contact service
7	**Air Column Discharge**	Air column discharging time over the maximum allowed	Try restarting the system, **ONCE ONLY**, if the problem persists contact service
8	**Air too Low**	Air pressure after the internal column under the optimal threshold	Try restarting the system, **ONCE ONLY**, if the problem persists contact service
9	**N2 Column Charge**	N2 column charging time over the maximum allowed	Try restarting the system, **ONCE ONLY**, if the problem persists contact service
10	**N2 Min Time Charge**	N2 column charging time under the minimum allowed	Try restarting the system, **ONCE ONLY**, if the problem persists contact service
11	**N2 Column Discharge**	N2 column discharging time over the maximum allowed	Try restarting the system, **ONCE ONLY**, if the problem persists contact service
12	**N2 Too Low**	N2 pressure after the internal column under the optimal threshold	Try restarting the system, **ONCE ONLY**, if the problem persists contact service

#	Message displayed	Cause	Solution
17	**ZA1 module Not Link**	Communication error with the CH4 scrubber module #1	Check the correct connection of the RS485
18	**ZA1 Cat. Expired**	Catalyst module #1 life expired	Contact service to replace the catalyst oven module
19	**ZA1 Temp. S. Damage**	Fault reading the temperature value of the CH4 scrubber module #1	Try restarting the system, **ONCE ONLY**, if the problem persists contact service
20	**ZA1 Temp. UdR**	CH4 scrubber module #1 temperature measured under the allowed threshold	If the pre-alarm persists, contact service
21	**ZA1 Temp. OvR**	CH4 scrubber module #1 temperature measured over the allowed threshold	If the pre-alarm persists, contact service
22	**ZA1 Loop Break**	Catalytic oven #1 temperature control error	Try restarting the system, **ONCE ONLY**, if the problem persists contact service
23	**N2 not link**	Communication error with the N2 module	Check the correct connection of the RS485
24	**ZA2 module Not Link**	Communication error with the CH4 scrubber module #2	Check the correct connection of the RS485
25	**ZA2 Cat. Expired**	Catalyst module #2 life expired	Contact service to replace the catalyst oven module
26	**ZA2 Temp. S. Damage**	Fault reading the temperature value of the CH4 scrubber module #2	Try restarting the system, **ONCE ONLY**, if the problem persists contact service
27	**ZA2 Temp. UdR**	CH4 scrubber module #2 temperature measured under the allowed threshold	If the pre-alarm persists, contact service
28	**ZA2 Temp. OvR**	CH4 scrubber module #2 temperature measured over the allowed threshold	If the pre-alarm persists, contact service

#	Message displayed	Cause	Solution
29	**ZA2 Loop Break**	Catalytic oven #2 temperature control error	Try restarting the system, **ONCE ONLY**, if the problem persists contact service

10.2 Alarms

In the event of serious anomalies, nitrogen production stops, the display and the ALARM LED (red) flash quickly and the buzzer sounds intermittently until the alarm is acknowledged by the user.
To mute the buzzer, simply swipe the touch-screen from the top down, or press the START/STOP button

#	Message displayed	Cause	Solution
1	**Memory data**	Error reading the user parameters	Check the user parameters and try restarting the system, **ONCE ONLY**, if the problem persists contact service
2	**Memory damage**	Error reading the configuration parameters	Try restarting the system, **ONCE ONLY**, if the problem persists contact service
3	**Air Col.Pres. Sensor Damage**	Fault reading the pressure value of the compressor	Try restarting the system **ONCE ONLY**, if the problem persists contact service
4	**Air Tank Pres. Sensor Damage**	Fault reading the internal Air pressure	Try restarting the system **ONCE ONLY**, if the problem persists contact service
5	**Over Pressure**	Internal pressure value over the allowed limit.	Try restarting the system **ONCE ONLY**, if the problem persists contact service
6	**Air Column Discharge**	Air column discharging time over the maximum allowed	Try restarting the system **ONCE ONLY**, if the problem persists contact service
7	**N_2 Column Discharge**	N2 column discharging time over the maximum allowed	Try restarting the system **ONCE ONLY**, if the problem persists contact service
8	**Air Comp.Pres. Sensor Damage**	Fault reading the internal Air pressure	Try restarting the system **ONCE ONLY**, if the problem persists contact service
9	**N_2 Col.Pres. Sensor Damage**	Fault reading the N2 column pressure	Try restarting the system **ONCE ONLY**, if the problem persists contact service
10	**N_2 Tank Pres. Sensor Damage**	Fault reading the N2 tank pressure	Try restarting the system **ONCE ONLY**, if the problem persists contact service