

# Gastro<sup>+</sup>™ Gastrolyzer<sup>®</sup>

## User Manual



*Helping to detect gastrointestinal disorders, one breath at a time.*

## Definitions

**WARNING:** indicates a potentially hazardous situation, which, if not avoided, may result in minor or moderate injury.

**CAUTION:** indicates a potentially hazardous situation, which, if not avoided, may result in damage to the device.

**NOTE:** used to call attention to notable information that should be followed during use.

## Important Information/Reminders

**NOTE:** Only technical data and no patient data is collected by Bedfont®.

**WARNING:** Please read the manual before use.

**WARNING:** Never use alcohol or cleaning agents containing alcohol or other organic solvents as these vapours will damage the electrochemical sensor inside.

**WARNING:** Under no circumstances should the instrument be immersed or splashed with liquid.

**WARNING:** Breath tests must only be carried out with Bedfont® accessories. Failure to do so may cause incorrect readings.

**WARNING:** The mouthpieces are single patient use only and can be used for a maximum of 3 tests. Further re-use could cause incorrect readings and could increase the risk of cross infection. The mouthpiece should be disposed of after use, in accordance with local waste disposal guidance.

**WARNING:** Patients should hold their breath for the duration of time indicated by the device during a breath test. Failure to do so may cause incorrect readings.

**WARNING:** To ensure a breath sample is taken at the correct flow rate, the device must be held upright at all times during a breath test.

**WARNING:** Do not block the exhaust ports on the device at any time. Blocking the exhaust ports may cause erroneous readings.

**CAUTION:** Ensure the device is used within the stated operating temperature and humidity ranges. Operating temperature is 15-35°C. Operating humidity is 25-80% RH (non-condensing).

**CAUTION:** Portable and mobile RF communications equipment can affect the Gastro<sup>+</sup>™ Gastrolyzer® devices.

**NOTE:** When selecting an accessory for the Gastro<sup>+</sup>™ Gastrolyzer® device, please be advised that an accessory not recommended by Bedfont® may result in loss of performance and damage to your Gastro<sup>+</sup>™ Gastrolyzer® device. The product warranty does not cover product failure or damage resulting from use with non-approved accessories.

**NOTE:** See Bedfont’s infection control and maintenance guidelines for further information on infection control.

**NOTE:** Please do not attempt to modify the equipment in any way or use accessories not specified by the manufacturer. Any attempt to do so, will invalidate the warranty and may compromise the safety of the device.

**NOTE:** Bedfont® will make available on request service training to appropriately qualified personnel.

## Contents

Definitions .....	1
Important Information/Reminders .....	1
Introduction .....	4
Compliance .....	4
Intended Use.....	4
Contraindications .....	4
Instrument Layout.....	5
User Interface .....	6
Taking a breath test .....	7
Taking a face mask test .....	11
Conducting multi-patient breath tests .....	13
Patient Profiles.....	18
Protocol pre-set timings.....	19
Edit protocol timings.....	20
Edit protocol names .....	21
Protocol pre-set thresholds .....	23
Edit protocol pre-set positive thresholds .....	24
Reviewing history .....	26
Changing date and time .....	27
Technical Specification.....	28
Safety Information .....	29
Environment .....	30
Display symbols.....	32
Maintenance .....	34
Calibration.....	35
Troubleshooting.....	38
GastroCHART™ software – connecting to the PC .....	38
Returns procedure .....	39
Warranty .....	40
References .....	40
Responsible Manufacturer and Contacts.....	41

## Introduction

H<sub>2</sub> is generated in the intestinal lumen by bacterial action on carbohydrates in the small or large intestine. Once the resultant H<sub>2</sub> is diffused into the bloodstream it is transported to the alveoli and then can be detected in expiratory air. Levitt<sup>1</sup> demonstrated the correlation between intestinal lumen H<sub>2</sub> production and H<sub>2</sub> excretion in expiratory air. Accurate measurement of H<sub>2</sub> in parts per million (ppm) in expiratory air reveals intolerance and/or malabsorption of carbohydrates; or bacterial overgrowth.

Operation of the device is straightforward. A D-piece™ sampling system enables end-expired breath to be sampled easily and hygienically, using single-use disposable SteriBreath™ Eco mouthpieces and disposable face masks.

The Gastro<sup>+™</sup> can be used to aid in the diagnosis of the following disorders:

- Carbohydrate intolerance
- Carbohydrate malabsorption
- Intestinal bacterial overgrowth
- Investigation of intestinal transit time

## Compliance

The Gastro<sup>+™</sup> Gastrolyzer® device is CE marked according to the Medical Device Directive 93/42/EEC.

Please refer to the 'Safety Information' section of this manual for more information on the compliance of the Gastro<sup>+™</sup> Gastrolyzer® device.

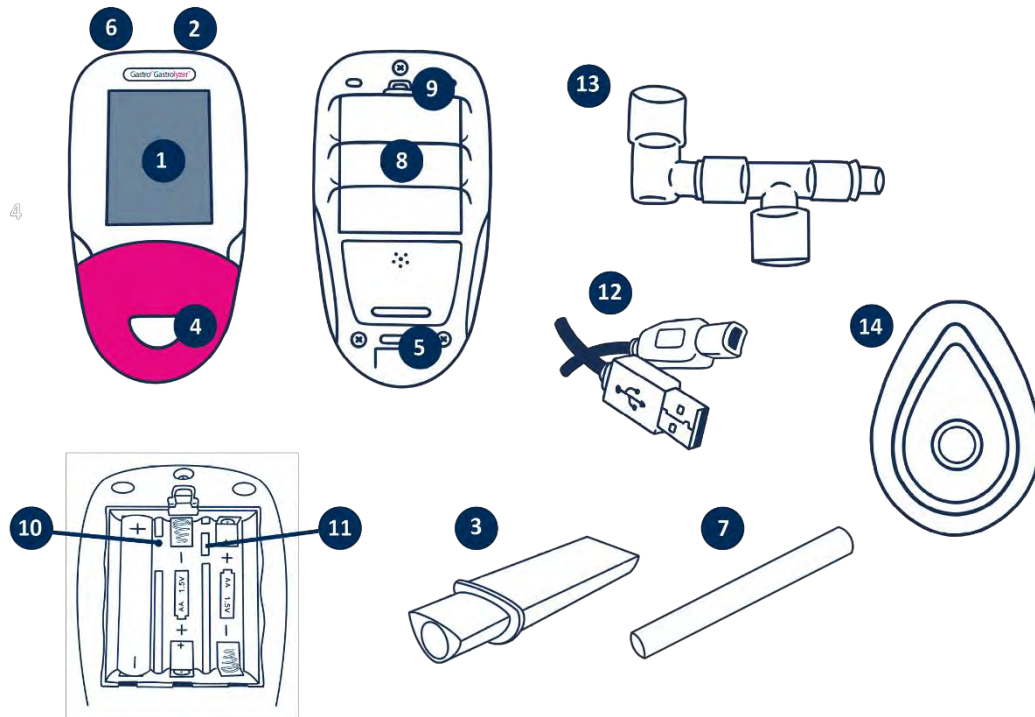
## Intended Use

The Gastro<sup>+™</sup> Gastrolyzer® is a breath hydrogen (H<sub>2</sub>) device used to measure hydrogen levels in expired breath. It is intended for multi-patient use by healthcare professionals in a clinical environment.

## Contraindications

There are no known contraindications.

## Instrument Layout



- |   |                               |
|---|-------------------------------|
| 1. Display  | 8. Battery compartment        |
| 2. Power button                                       | 9. Battery compartment clip   |
| 3. Breath sampling D-piece™                           | 10. Reset button              |
| 4. D-piece™ aperture                                  | 11. Programming switch        |
| 5. Exhaust port for breath sample                     | 12. USB cable (1.0m)          |
| 6. USB connector (for use with GastroCHART™ software) | 13. Face mask sampling system |
| 7. Single-use SteriBreath™ Eco mouthpiece             | 14. Face mask                 |

## User Interface



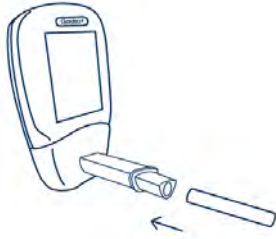
### Home Screen

1. Battery status
2. Face mask breath test
3. Normal breath test
4. Multi-patient air test
5. Patient profiles
6. Settings

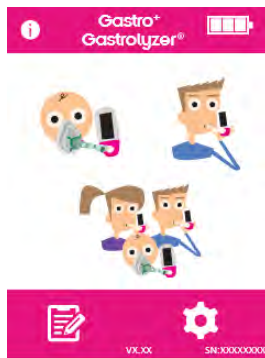


The information screen displays information about the device and sensor.

## Taking a breath test



Attach a breath sampling D-piece™ and SteriBreath™ Eco mouthpiece.



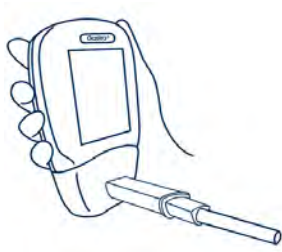
Turn on the device by pressing the power button once.

Press the breath test icon on screen.



If the timer is shown, the sensor is stabilising.





Inhale and hold breath for the pre-set 15 second countdown as shown on screen. If unable to hold breath for full 15 seconds, the timer can be adjusted in the settings.



Press the home button at any time to cancel the breath test.



A beep will sound during the last three seconds of the countdown.





Blow slowly into mouthpiece, aiming to empty lungs completely.



**15**  
ppm H<sub>2</sub>

The ppm will rise and hold onscreen.



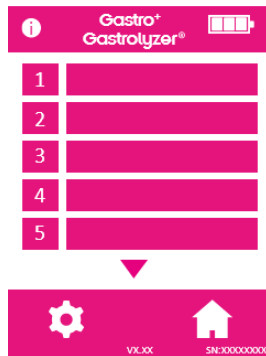
**15**  
ppm H<sub>2</sub>

When the test is finished, the breath test, home and save icons will appear at the bottom of the screen.

To repeat breath test, press the breath test icon and repeat steps.

To return to the home screen, press the home icon.



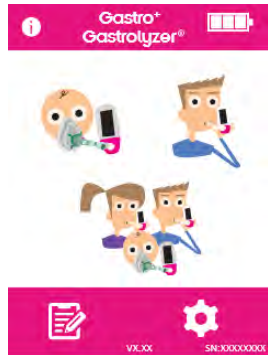


To save the reading, press the save icon and select the relevant patient profile.

Remove the D-piece™ between tests to purge sensor with fresh air.

To switch off, press and hold the power button for 3 seconds, unit will also power off after 45 minutes of inactivity to save power.

## Taking a face mask test



Attach a new face mask sampling system.

Turn on the device by pressing the power button once.

Press the face mask breath test option.



If the timer is shown, the sensor is stabilising.



Inhale and exhale into the face mask, the device will take the reading in real-time.



The ppm levels will rise and hold at the peak level, when this has stopped rising for a period of 5 consecutive seconds the test result can be recorded and the test stopped.



When the test is finished, the face mask breath test, home and save icons will appear at the bottom of the screen.

To repeat breath test, press the face mask breath test icon and repeat steps.

To return to the home screen, press the home icon.

Remove the face mask sampling system between tests to purge sensor with fresh air.

To switch off, press and hold the power button for 3 seconds, unit will also power off after 45 minutes of inactivity to save power.

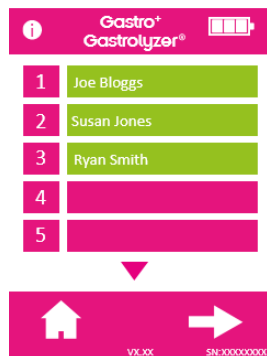
## Conducting multi-patient breath tests

**WARNING:** Ensure batteries are full or device is connected to computer USB port (it will be powered by the USB). If the device loses power during the automatic testing mode only saved results will remain on the device and the protocol timings will be lost.

The Gastro<sup>+</sup>™ Gastrolyzer<sup>®</sup> allows automatic testing for up to 10 patients in one session to be set up, which can be very time-saving in a busy clinic. This can be done by following these steps:



Press the multi-patient icon on the main screen; this will go to the patient database screen, where patients can be selected that have been previously added. To add patients follows instructions in ‘adding a patient profile’ section of this manual.



Up to 10 patients can be selected for testing simply by pressing their name slot. Selected patients will change from pink to green when selected, to deselect them press the name slot again and it will return to pink.

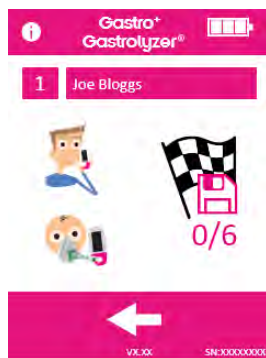
Once the desired patients have been selected, press the right arrow at the bottom of the screen to progress to the protocol screen.



Select the protocol for each patient; their name will be shown at the top of the screen.

Select the protocol by pressing the protocol name, for example 'lactose', when selected the protocol will change to green. To edit the protocol timings please see 'edit testing Protocols' section of this manual.

Press the right arrow at the bottom of the screen to progress to the next patient.



When the final protocol has been selected and when selecting a patient during testing, three options will appear for the first patient. Their name will be shown at the top of the screen.

To perform a breath test (please note: if this is the base sample no substrate/sugar should be given to patient before this point) press and follow steps 4-8 of the 'taking a breath test' section of this manual.

To perform a face mask test (please note: if this is the base sample no substrate/sugar should be given to patient before this point) press and follow steps 3-6 of the 'taking a face mask test' section of this manual.



If the test is unsuccessful in any way, take the test again by pressing the back arrow on the result screen, this will overwrite the previous result.

To save this reading to the patient profile, press the save icon.

This is the base sample; once the result has been saved, a prompt will appear to give the patient the relevant substrate/sugar.

Once the patient has done this, press the right arrow to continue with the next patient, this will also start the next breath test timer for the previous patient.

The device will prompt the next patient, tested in the same way.

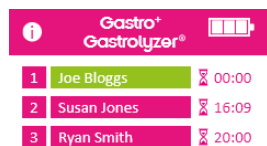


When the final patient has provided a sample and taken the substrate/sugar, a screen will show all the patients in the testing session with countdown timings for each patient until their next test.

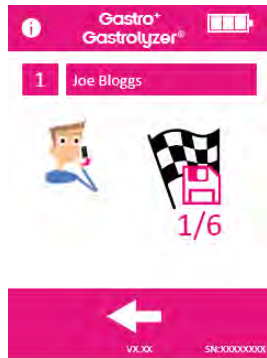
When the timer for a patient reaches zero, an alarm will sound indicating the next test is ready to be taken and the patient name will turn green.

Take the next reading for that patient by pressing their name and following above instructions.

Once each patient has finished their testing protocol, their name slot will turn green and the readings will be saved in the profile.

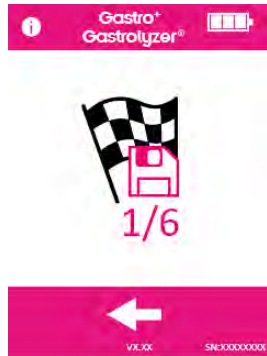




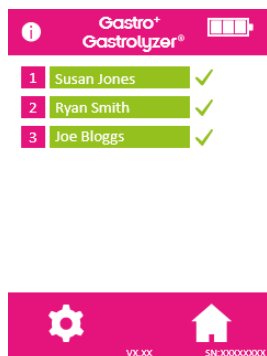


The amount of tests performed and how many are left for any given patient can be viewed by selecting the profile in the session screen.

If the results are satisfactory before the protocol session has finished, the session can be ended early by selecting the profile in the session screen and pressing the number of tests icon.



Confirm the action by pressing the same icon on the next screen.



Once the complete patient session has finished, all name slots will show as green.

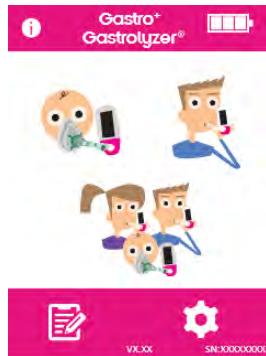


Return to the home screen in order to view results by pressing the profile icon.

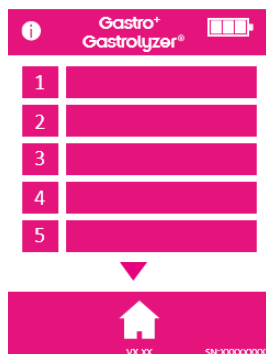
Results can be downloaded to GastroCHART™ for future reference or printing, follow instructions in 'GastroCHART™ software' section of this manual.

## Patient Profiles

The Gastro<sup>+</sup>™ Gastrolyzer<sup>®</sup> allows up to 10 patient profiles to be set-up on the device in order to record readings to a specific patient profile and then downloaded later using GastroCHART™. This can be done by following the steps below:



Press the patient profile icon on the home screen.



Press a patient profile to go to the edit screen.



Press the patient profile slot again to enter the name for the patient using the keyboard provided.

Once name or ID has been edited, press the save icon.



The patient profile has now been successfully set-up. More patient profiles can be set-up by pressing the back arrow and repeating steps.

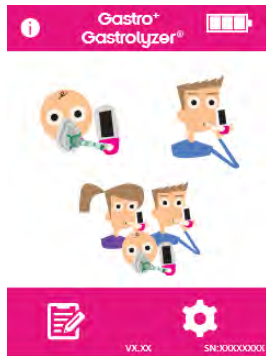
Return to the home screen by pressing the home icon.

## Protocol pre-set timings

The Gastro<sup>+</sup> Gastrolyzer<sup>®</sup> is pre-set with testing protocols that follow time intervals recommended by clinical research.

Test	Dosage	Test frequency (minutes)	Samples
Lactose <sup>3</sup>	25g of Lactose in 250ml of water	0, 15, 30, 60, 90, 120	6
Lactulose <sup>2</sup>	10g of Lactulose in 200ml of water	0, 20, 40, 60, 80, 100, 120, 140, 160, 180	10
Fructose <sup>3</sup>	25g of Fructose in 250ml of water	0, 15, 30, 60, 90, 120	6
Sorbitol <sup>3</sup>	12.5g of Sorbitol in 250ml of water	0, 15, 30, 60, 90, 120	6
Xylitol <sup>3</sup>	25g of Xylitol in 250ml of water	0, 15, 30, 60, 90, 120	6
Glucose <sup>3</sup>	50g of glucose in 250ml of water	0, 15, 30, 45, 60	5

## Edit protocol timings



The testing protocols timings can be edited with different timings. Press the settings icon on the home screen.



Press the protocol icon.



Select the protocol to be changed; this will change to green when selected. Press the right arrow to continue.

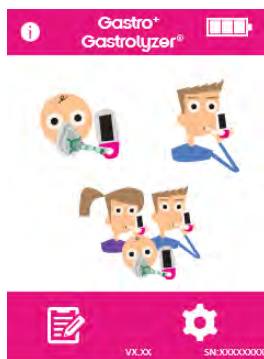


Select up to 10 time intervals by pressing the interval slot and increasing/decreasing the up or down arrows.

The base sample cannot be changed and will show as 'base', active intervals will show in green.

Once the protocol has been edited, press the save icon to save. Return to the settings screen.

## Edit protocol names



The testing protocols names can be edited. Press the settings icon on the home screen.



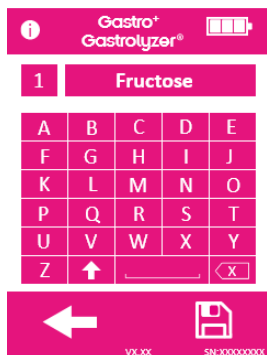
Press the protocol icon.



Select the protocol to be changed; this will change to green when selected. Press the right arrow to continue.



Press the protocol name at the top of the screen.



Enter the new or preferred protocol name using the keyboard provided.

Press the save icon to save.

## Protocol pre-set thresholds

Below is an interpretation table for general guidance on interpreting the H<sub>2</sub> values for supporting a diagnosis of conditions. Other factors through qualified judgement need to be taken in account by looking at the patient history, on-going symptoms and symptoms during test. H<sub>2</sub> readings can be interpreted as positive or negative using the following pre-set thresholds (this is the increase in reading compared to the base sample):

Test	Positive interpretation
Lactose <sup>2,3</sup>	H <sub>2</sub> ≥20ppm CH <sub>4</sub> ≥12ppm compared to base sample
Lactulose <sup>4</sup>	H <sub>2</sub> & CH <sub>4</sub> >20ppm compared to base sample within 90 minutes of lactulose ingestion
Lactulose <sup>2</sup> SIBO*	a) Early increase of at least 20ppm for the sum of the two gases b) Increase >20ppm corresponding to the appearance of lactulose in the colon
Lactulose <sup>2</sup> IITT**	Fast ≥20ppm peak is detected at 60 minutes Normal ≥20ppm peak is detected at 80 minutes Slow ≥20ppm peak is detected 100 minutes or later
Fructose <sup>2</sup>	H <sub>2</sub> ≥20ppm CH <sub>4</sub> ≥12ppm compared to base sample
Sorbitol <sup>3</sup>	H <sub>2</sub> ≥20ppm compared to base sample
Xylitol <sup>3</sup>	H <sub>2</sub> ≥20ppm compared to base sample
Glucose <sup>3</sup>	H <sub>2</sub> ≥10ppm CH <sub>4</sub> ≥10ppm compared with base sample

\*SIBO = Small Intestinal Bacterial Overgrowth

\*\*IITT = Impaired Intestinal Transit Time



## Edit protocol pre-set positive thresholds



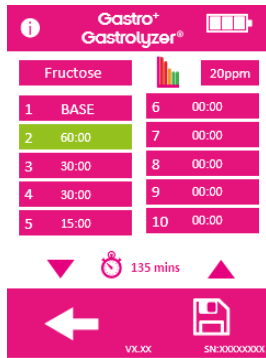
The testing protocols names can be edited. Press the settings icon on the home screen.



Press the protocol icon.



Select the protocol to be changed; this will change to green when selected. Press the right arrow to continue.



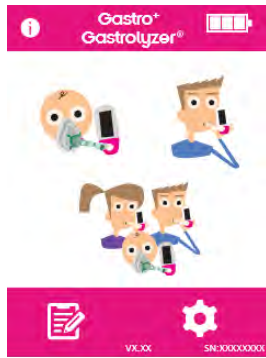
Press the graph and ppm icon.



Press the up or down arrow to increase or decrease the threshold.

Press the save icon to save.

## Reviewing history

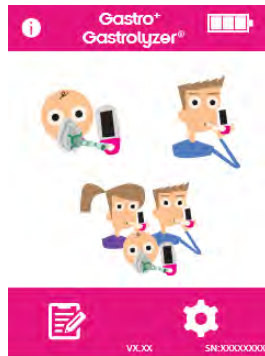


The Gastro<sup>+</sup> Gastrolyzer<sup>®</sup> will record every reading taken in its history up to 150 readings. To access this, press the settings icon.



Press the history icon.

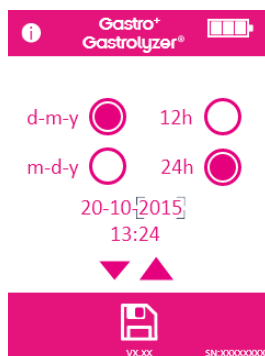
## Changing date and time



To change the date and time on the Gastro+™ Gastrolyzer®, press the settings icon.



Press the date & time icon.



Select either d-m-y or m-d-y for the date format and 12h or 24h for the time format.

Dates and times are then adjusted by selecting the number and pressing the up or down arrows to increase and decrease.













Save the settings by pressing the save icon.

## Technical Specification

<b>Concentration range</b>	0-500ppm
<b>Display</b>	Full colour touchscreen
<b>Detection principle</b>	Electrochemical Sensor
<b>Repeatability</b>	<5%
<b>Accuracy</b>	≤±3ppm/10% - whichever is greater*
<b>Power</b>	3 x AA (LR6 or equivalent) – up to 1000 minutes 1 x CR2032 Lithium coin cell
<b>T<sub>90</sub> response time</b>	<40 seconds
<b>Operating temperature</b>	15-35°C
<b>Storage/transport temperature</b>	0-50°C
<b>Operating/transport/storage pressure</b>	Atmospheric ±10%
<b>Operating humidity</b>	15-90% non-condensing
<b>Storage/transport humidity</b>	0-95%
<b>Expected sensor operating life</b>	2 years
<b>Sensor sensitivity</b>	1ppm
<b>Sensor drift</b>	<2% per month
<b>Dimensions</b>	Approx. 37 x 77 x 140 mm
<b>Weight</b>	Approx. 215g (including batteries)
<b>Materials</b>	Case: polycarbonate/ABS blend Integrated anti-microbial additive D-piece™: polypropylene SteriBreath™ Eco: paper OneBreath™ Mouthpiece: polypropylene
<b>CO cross interference</b>	<4%

\*Readings of >200ppm at temperature between 26-35°C can decrease accuracy to 15%.


## Safety Information

Degree of protection against electric shock	Type BF applied part
Type of protection against electric shock	Internally powered equipment
Degree of protection against ingress of liquid	IPX0 - not protected against water ingress
Degree of safety application in the presence of a flammable anaesthetic mixture with air, oxygen or nitrous oxide	Equipment not suitable for use in the presence of flammable mixtures.
Direct current	
CE mark	
EC-REP	
Type BF applied part	
Dispose of according to WEEE	
Serial number	
Consult instructions for use	
Unique device identification	
Manufactured by	
Manufacture date	
Indicator of Medical Device	
Bedfont® logo	

## Environment

The Gastro<sup>+</sup>™ Gastrolyzer<sup>®</sup> product complies with the Medical Device Directive 93/42/EEC as amended by 2007/47/EC and the Medical Device Electromagnetic Compatibility standard EN 60601-1-2.



















**WARNING:** Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 inches) to any part of the Gastro<sup>+</sup>™ Gastrolyzer<sup>®</sup>, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result. This equipment should be moved if necessary to avoid interference.




















<b>Guidance and manufacturer's declaration: Electromagnetic Immunity (IEC 60601-1-2)</b>			
<b>The Gastro<sup>+</sup>™ Gastrolyzer<sup>®</sup> is intended for the use in the electromagnetic environment specified below. The customer or the user of the Gastro<sup>+</sup>™ Gastrolyzer<sup>®</sup> should assure that it is used in such an environment.</b>			
<b>Test</b>	<b>IEC 60601 Test level</b>	<b>Compliance level</b>	<b>Electromagnetic environment – guidance</b>
Radiated Emissions: FCC part 15 Subpart B Class A & EN55011:2016 + A1:2017 Class A	30MHz to 1GHz	Met or exceeded	Portable and mobile RF communications equipment should be used no closer to any part of the Gastro <sup>+</sup> ™ Gastrolyzer <sup>®</sup> including cables, than the recommended separation distance calculated from the equation appropriate to the frequency of the transmitter.
Conducted Emissions: FCC part 15 Subpart B Class A & EN55011:2016 + A1:2017 Class A	150KHz to 30 MHz	Met or exceeded	
Radiated Immunity : IEC 61000-4-3:2006 + A1 2007 + A2:2010 & EN61000-4-3:2006 + A1:2008 + A2:2010	3V/m (1kHz 80%) 80MHz – 2.7GHz Spot Frequencies: 385MHz 27 V/m PM 18 Hz 450MHz 28 V/m FM 1 kHz sine 710MHz 9 V/m PM 217 Hz 745MHz 9 V/m PM 217 Hz 780MHz 9 V/m PM 217 Hz 810MHz 28 V/m PM 18 Hz 870MHz 28 V/m PM 18 Hz 930MHz 28 V/m PM 18 Hz 1720MHz 28 V/m PM 217 Hz 1845MHz 28 V/m PM 217 Hz 1970MHz 28 V/m PM 217 Hz 2450MHz 28 V/m PM 217 Hz 5240MHz 9 V/m PM 217 Hz	Met or exceeded	Interference may occur in the vicinity of equipment marked with the following symbol: 




	5500MHz 9 V/m PM 217 Hz 5785MHz 9 V/m PM 217 Hz		
Conducted Immunity: IEC 61000-4-6:2015 & EN61000-4-6:2014	6V rms ISM and amateur radio bands	Met or exceeded	
Voltage Dips and Interrupts: IEC 61000-4-11:2005 & EN61000-4-11:2004	240VAC 500mS (50/60Hz) 70% @ 0° 240VAC 20mS (50/60Hz) 100% @ 0° 240VAC 10mS (50/60Hz) 100% 240VAC 5S (50/60Hz) 100% 100VAC 500mS (50/60Hz) 70% @ 0° 100VAC 20mS (50/60Hz) 100% @ 0° 100VAC 10mS (50/60Hz) 100% @ 0°, 45°, 90°, 135°, 180°, 225°, 270°, 315° 100VAC 5S (50/60Hz) 100%	Met or exceeded	
Power Frequency Magnetic Field: IEC 61000-4-8:2012 & EN61000-4-8:2010	30 A/m (50Hz and 60Hz)	Met or exceeded	
Fast Transient Burst: IEC 61000-4-4:2016 & EN61000-4-4:2012	± 2kV	Met or exceeded	
Surges: IEC 61000-4-5:2008 & EN61000-4-5:2006	± 0.5, 1.0 kV L-L ± 0.5, 1.0, 2.0 kV L-E 20s	Met or exceeded	
ESD: IEC 61000-4-2:2012 & EN61000-4-2:2009	+/- 8kV contact +/- 2, 4, 8,15kV air	Met or exceeded	



## Display symbols

Description	Gastro <sup>+</sup> ™ Gastrolyzer®
Battery condition: full	
Battery condition: low	
Battery condition: empty	
Breath test	
Face mask test	
Automatic patient breath test	
Inhale	
Hold breath	
Edit countdown (breath hold) timer	
Countdown (breath hold)	
Exhale	
ppm reading	
Save	
Settings	
Home	
Patient profiles	
Patient profile slot	
Patient results chart	

Delete patient record	
Time until next breath sample	 00:00  16:09  20:00
Finish and save	 0/6
Change D-piece™	
Next step	
Previous step	
Sensor change due soon	 15/03/20
Sensor change overdue	 15/03/20
Calibration due date	 12/03/2015
Calibrate device	
Attach flow meter to gas canister	
Attach calibration adaptor to D-piece™	
Attach D-piece™ to device and turn on gas flow	
System processing	
Calibration successful	
Calibration failed	
Retry calibration	

3 month calibration reminder	
Device reading history	
Edit date/time	
Firmware version	V2.23
Serial number	SN: HG000001

## Maintenance

### *Routine maintenance*

1. The mouthpieces are single patient use only and can be used for a maximum of 3 tests.
2. Hands should be washed regularly in accordance with infection control practice.
3. Please do not attempt to modify the equipment in any way or use accessories not specified by the manufacturer. Any attempt to do so will invalidate the warranty and may compromise the safety of the device.
4. Bedfont® will make available upon request service training to appropriately qualified persons.
5. Holding the reset button down for 30 seconds will perform complete device reset, **this will clear any saved data and revert all settings to the factory defaults**. After performing a reset the device will need to have the date/time set and be calibrated before it can be used.
6. Replace batteries when indicated by the empty symbol.
7. Bedfont® recommend removal of the batteries when the device is not used for prolonged periods of time to prevent leakage.
8. Replace breath sampling D-piece™ every 30 days or if visibly soiled or contaminated. The Gastro+™ Gastrolyzer® products will give a reminder during start-up when the D-piece™ should be replaced, see 'change D-piece™' symbol.
9. The sensor should be replaced every 2 years, 60 days prior to the sensor change 'countdown to sensor change' symbol will be shown with the date on which the sensor should be changed. This can be ignored by pressing the home icon until the date at which the sensor should be changed arrives, at this point the 'change sensor' symbol will be shown. Change sensor if trained to by an approved Bedfont® engineer or send to Bedfont® or the local representative.

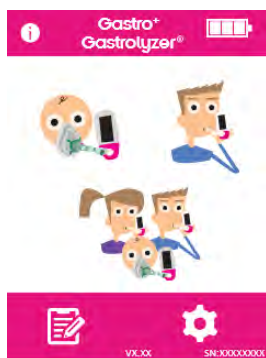
## Cleaning

1. The Gastro<sup>+</sup>™ Gastrolyzer<sup>®</sup> is integrated with antimicrobial technology for optimum infection control and has proven bacterial protection efficacy. Bedfont<sup>®</sup> recommends wiping the instrument and D-piece<sup>™</sup> external surfaces between each patient with an alcohol-free wipe specifically designed for this purpose. A list of approved wipes can be found here: <https://www.bedfont.com/cleaning-bedfont-devices>. The D-piece<sup>™</sup> cannot be sterilised.
2. NEVER use alcohol or cleaning agents containing alcohol or other organic solvents as long term exposure to these vapours will damage the H<sub>2</sub> sensor inside.
3. Under no circumstances should the instrument be immersed in liquid or splashed with liquid.

## Calibration

The Gastro<sup>+</sup>™ Gastrolyzer<sup>®</sup> is calibrated at 21°C (±4°C) before leaving Bedfont<sup>®</sup>. The instrument should be calibrated at 21°C (±4°C) as this is the temperature at which we recommend it is to be used.

The Gastro<sup>+</sup>™ Gastrolyzer<sup>®</sup> should be calibrated every three months and will give a reminder during start-up when calibration is due. The calibration gas required is 100ppm hydrogen in air.



Turn on the device by pressing the power button once.

Press the settings icon.



Press the cylinder icon once to proceed.



The device must be zeroed, this will happen automatically.

**Do not connect the gas at this stage.**



Ensure the fine control valve is in the off position.



Screw the fine control valve and flow indicator assembly to the gas can. This is best done by screwing the gas can into the valve.

Once this has been successfully carried out, the first step of the calibration process will be shown onscreen.



Allow the gas to flow at 0.5 litres per minute.



Allow the gas to flow through the instrument for the duration of the test, again monitoring the rate of flow.



A successful calibration will be indicated by the tick icon, press the home icon to return to the home screen.

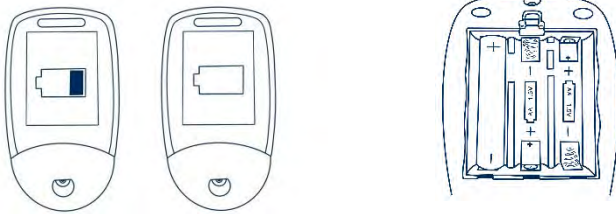




A failed calibration will be indicated by the red cross icon, press the rotating arrow icon to attempt calibration again – if the problem persists see ‘troubleshooting’ or call the local supplier of Bedfont® products.

Return to the home screen by pressing the home icon.

## Troubleshooting



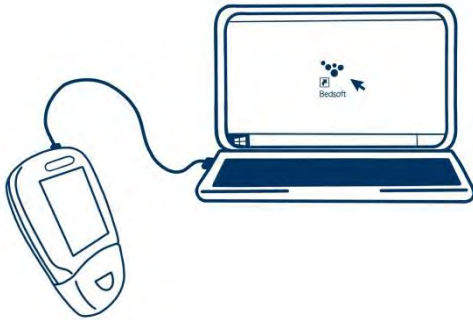
### *The unit fails to turn on*

If the unit fails to turn on properly, check if the low or empty battery symbols are shown or replace the batteries. Ensure that the batteries are inserted the correct way around, matching the symbols moulded into the plastic.

## GastroCHART™ software – connecting to the PC



Place one end of the connection lead into the USB socket on the top of the Gastro+™ Gastrolyzer® product.



Connect the other end to the USB port on the PC.

Before starting the software, ensure that the Gastro<sup>+</sup>™ Gastrolyzer<sup>®</sup> is connected to the PC and switched on. Double click the GastroCHART™ icon on the PC to start the programme. Refer to the supplied documentation for how to operate GastroCHART™. GastroCHART™ is available to download for FREE at <https://www.gastrolyzer.com>.

## Returns procedure

If the Gastro<sup>+</sup>™ Gastrolyzer<sup>®</sup> requires servicing, please contact the local Bedfont<sup>®</sup> Customer Service Department, distributor or supplier before returning any goods.

1. The customer repairs department will need to be supplied with the device serial number and description of the fault. Once this information has been received, a returns/ ticket number will be issued. Please state the returns/ticket number on the outside of the box when returning the device, and ensure that a telephone number, fax number, and full return address are clearly stated
2. The product must also be decontaminated before it is returned according to the local regulations. Bedfont<sup>®</sup> can provide a decontamination certificate to complete, which also needs to be attached to the outside of the box. Failure to do so will result in the product being subject to Bedfont<sup>®</sup> decontamination procedure and will delay the service/repair and may incur costs.
3. Bedfont<sup>®</sup> advises that a courier service is used when returning devices. This enables goods to be insured for loss or damage in transit. When the goods are received, an email stating so will be sent.
4. If the device has been returned for repair it will then be examined and an 'engineer's report' and quotation for the repair will be sent, which will also include an authorisation form. Complete the authorisation form, and ensure that an 'official purchase order number' is included. Please contact the customer repairs department if an 'official purchase order number' cannot be provided.
5. If the device is still in warranty and the fault is covered by warranty, see 'warranty' section of this manual, Bedfont<sup>®</sup> will repair it and return it with an 'engineer's report', free of charge.



6. If the repair is not carried out, a handling fee will be charged. Ensure that a completed authorisation form with an 'official purchase order number' is returned.
7. The equipment will be returned as soon as Bedfont® has received all relevant paperwork. A carriage fee will be charged if the device is no longer in warranty.

## Warranty

Bedfont® Scientific Limited warrants the Gastro<sup>+</sup>™ Gastrolyzer® product and the H<sub>2</sub> sensor (excluding batteries) to be free of defects in materials and workmanship for a period of 2 years from the date of shipment. Bedfont's sole obligation under this warranty is limited to repairing or replacing, at its choice, any item covered under this warranty when such an item is returned, intact and prepaid, to Bedfont® or the local representative.

This warranty is automatically invalidated if the products are repaired; altered, void labels removed or otherwise tampered with by unauthorised personnel, or have been subject to misuse, neglect or accident.



Never dispose of any electronic instrument or batteries in domestic waste. At the end of the product's life, contact Bedfont® or its distributor for disposal instructions.

## References

1. Levitt, M.D. (1969): Production and excretion of hydrogen gas in man. *New Engl. J.Med.* 281:122-127
2. Biolab Medical Unit; Nutritional and Environmental Medicine; London England. *Breath Hydrogen and Methane* February 2012. Available at <http://www.biolab.co.uk/docs/bhydro.pdf>
3. Ledochowski M. Ledochowski E. *Hydrogen Breath Tests 2008*; Available from Bedfont® Scientific Ltd
4. Pimental M. et al *Methane Production during Lactulose Breath Test is Associated with Gastrointestinal Disease Presentation. Digestive Diseases and Sciences.* Vol. 48 No. 1 2003
5. Health Protection Agency (HPA). Porton Down, Report No. 43/06. Pp. 10-11
6. Public Health England (PHE). Report No. 17/001.
7. Public Health England (PHE). Report No. 20/045C.

## Responsible Manufacturer and Contacts

Bedfont® Scientific Ltd.  
Station Yard, Station Road,  
Harrietsham,  
Maidstone, Kent,  
ME17 1JA  
United Kingdom

[www.gastrolyzer.com](http://www.gastrolyzer.com)  
[ask@bedfont.com](mailto:ask@bedfont.com)  
0044 1622 851122



***Our family, innovating health, for yours.***

Visit [www.bedfont.com/resources](http://www.bedfont.com/resources) to view this document in other languages.



Bedfont® Scientific Ltd.  
Station Road, Harrietsham, Maidstone,  
Kent, ME17 1JA England  
Tel: +44 (0)1622 851122 Fax: +44 (0)1622 854860  
Email: [ask@bedfont.com](mailto:ask@bedfont.com) Web: [www.bedfont.com](http://www.bedfont.com)



Stephen Rowe  
Cristimar E4-1  
Ave Juan Carlos I  
Los Cristianos, Arona, 38650  
Santa Cruz de Tenerife, Spain

© Bedfont® Scientific Limited 2023

Issue 13 - December 2023, Part No: LAB678  
Bedfont® Scientific Limited reserves the right to change or update his literature without prior notice.  
Registered in: England and Wales. Registered No: 1289798

