

Read this manual before using the analyzer. For personal and system safety, and for optimum product performance, make sure you thoroughly understand the contents before installing, using, or maintaining this analyzer.

Please visit our website www.phymetrix.ca for other products that may be applicable to your needs. Every effort has been made to ensure accuracy in the contents of this manual. Should there be any doubts to the accuracy of the content please contact the manufacturer. The contents of this manual are subject to change without notice.

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Warranty

While the Phymetrix's instrument has no problem in materials and workmanship, the manufacturer shall have the right to make the decision to repair or replace the analyzer. The battery is not within the scope of this quality assurance. This warranty is effective from the

date of delivery to the original purchaser. If Phymetrix determines that the equipment was defective, the warranty period is:

- one year from delivery for electronic or mechanical failures

If Phymetrix determines that the equipment was damaged by misuse, improper installation, the use of unauthorized replacement parts, or operating conditions outside the guidelines specified, the repairs are not covered under this warranty.

Normal wear and tear, parts damaged by abuse, misuse, negligence or accidents are specifically excluded from the warranty. Purchaser acknowledges that in accepting and using this analyzer, notwithstanding any contrary term or provision in the purchaser's purchase order or otherwise, the only warranty extended by Phymetrix is the express warranty contained herein. Purchaser further acknowledges that there are no other warranties expressed or implied, including without limitation, the warranty of merchantability or fitness for a particular purpose; that there are no warranties which extend beyond the description of the face hereof; that no oral warranties, representations, or guarantees of any kind have been made by Phymetrix, its distributors or the agents of either of them, that in any way alter the terms of this warranty; that Phymetrix and its distributors shall in no event be liable for any consequential or incidental damages, including but not limited to injury to the person or

property of the purchaser or others, and from other losses or expenses incurred by the purchaser arising from the use, operation, storage or maintenance of the product covered by the warranty; that Phymetrix's liability under this warranty is restricted to repair or replacement of defective parts at Phymetrix sole option; and that Phymetrix neither assumes nor authorizes any other person to assume for it any other warranty. The warranty shall be void if serial numbers affixed to the products are removed, obliterated or defaced.

Return Policy / Procedures

If equipment malfunction is suspected or it is determined that the analyzer needs recalibration, please contact York Instrument, who is Phymetrix's general agent in China.

Communicate the instrument model number, serial number, application including oxygen concentration range being measured, and the details of the problem.

If the analyzer needs factory service you will be issued a RMA and shipping instructions.

The factory will diagnose the equipment and upon determining the problem will notify you whether the terms of the warranty cover the required repair. If the costs are not covered you will need to approve the estimated cost in order to proceed with the repair.

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1. Introduction

PGA620 CO₂ analyzer can be a single measurement, or continuously monitoring the concentration of carbon dioxide in many applications. It has a broad measuring range micro to percentage it can still be measured accurately. It is widely used in many different sectors of industrial, agricultural, and all places that need ventilation control and environmental quality control by monitoring the exhaust of CO₂, or the company producing carbon dioxide gas, etc.

Standard equipment includes:

- The portable analyzer with sensors
- Stainless steel quick disconnect
- Power adapter
- Manual
- A belt
- Portable package

Options:

- Stainless steel sleeve
- FPT pipe
- Printer function

- Software

Analyzer performance characteristics:

- PGA620 CO₂ analyzer uses an internal infrared sensor. The sensor is linear in the measuring range, therefore, the measured value of carbon dioxide is very stable. It is also capable of measuring wide ranges from PPM to the percentage level.
- The resolution for the high quality screen has a 320 * 240 color high-definition LCD screen, and also shows the oxygen density, maximum and minimum values, the total time of measurement, the time difference, measurement process curve, the power and the current time. Furthermore, it can also display the measurement process curve, which will provide a clear and reliable process analysis data for the users.
- Automatic temperature compensation is corrected for the full range, making the instruments more adaptable to harsh environments.
- A robust pressure compensator has been installed, thus the analyzer can test the concentration of carbon dioxide more accurately in the wide range of 0 to 10 psig.
- Easy to use interface; simple calibration procedures, and the user can recalibrate the zero periodically.

- A variety of measurement settings, users can choose one appropriate to their needs
- It can switch interface in both English and Chinese according to users' needs.
- The analyzer is small and portable, making it comfortable to service multiple locations on site.

2 Instrument Description

2.1 Panel description

Front view:



Figure 1

The front panel has a high definition LCD screen, four touch buttons, a flow adjusting valve, and an observation window to monitor the flow on the flowmeter.

Functions of buttons:

No.	Name	Funcion
①	Power/Dimness adjust button	Hold this button to power on or power off. Quick presses will adjust the screen light. When monitoring for long periods, you can dim the screen to save power
②	Up/calibration button	Only in the measuring interface you can perform the calibration operation, all other interfaces scroll up
③	Down/clear curve button	In the measurement interface you can eliminate the curve, other cases scrolls down
④	Confirm/save button	Function keys, long press will save your data, short press to confirm
⑤	Flow adjusting needle valve	Adjust gas flow
⑥	Flowmeter	Display the gas flow, a range of 0.2 to 2, the unit is SCFH
⑦	Display screen	Display the concentration of CO ₂ , process time, minimum and maximum difference, the current time, power and other parameters

Table 1

Back View:

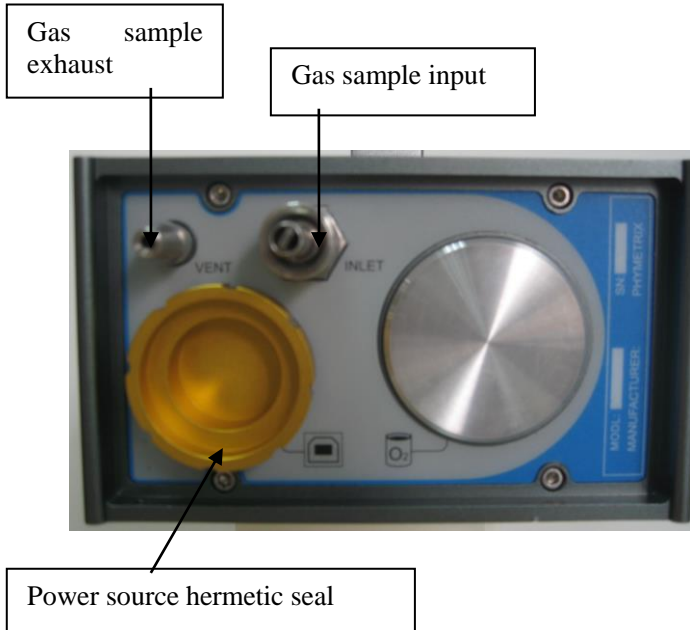
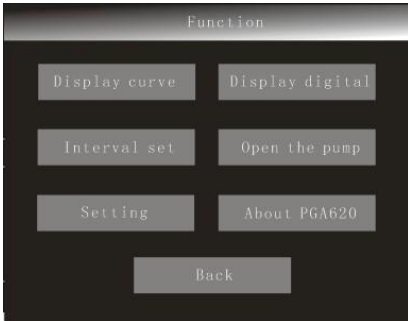


Figure 2

2.2 Introductions of display

Press the "Confirm" button, the following Interface will be shown:



You can use other functions when pressing the UP or DOWN button.

1. Display Curve

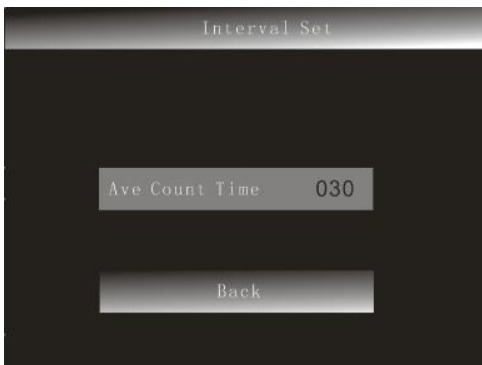
- display the current measured value and curve

2. Display Digital

- display the current value, average value and difference

3. Interval Set

- The following interface will be shown after pressing the "Confirm" button.



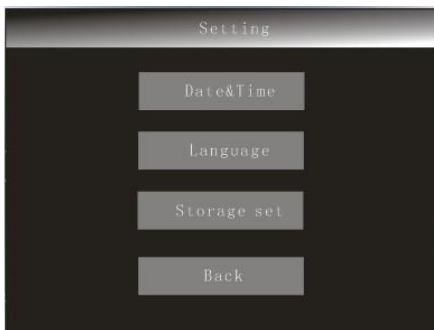
You can set the counting time of the curve and the average time of statistics

4. Open the pump

control the pump ON and OFF (if the pump configuration is ordered)

5. Setting

The following interface will be shown after press the “Confirm” button.



5.1 Date&Time

Setting the date and time

5.2 Language

You can choose either English or Chinese

5.3 Save set

You can set up automatic storage time

6. About

Display the device number, production date and other properties

7. Back: return to the higher level

2.3 Function

1. Turn on the analyzer, the display will appear. Please wait approximately 5s for booting up.
2. After boot up sequence, the analyzer will warm up automatically.
3. The default time is 30 min for Preheat . If you need to terminate the preheating process, you can press the "confirm" button, the analyzer will then ask to reconfirm termination, after which preheating will be terminated
4. Connect sample gas into the "Quick Connect" fitting located on the backside of analyzer.
5. Adjust the sample gas flow with the needle valve between 1.0 to 2.0 SCFH .
6. Waiting for a few minutes for CO₂ reading to stabilize.
7. Record the value.
8. Disconnect the sample line.
9. Use the data storage function, hold "Confirm/save" button for about a second and the data will be saved automatically.
10. Download the data stored in analyzer. Open the "power/data connection hermetic seal", connect the USB data connection

and instrument computer connections. Note that this operation must be done in a safe area. The USB module must be purchased separately, if necessary please contact us for more info.

11. Charge the unit by opening the "power/data connection hermetic seal", on the power cord for instrument charging, Please connect the supplied power adaptor to the charging port on the back end of the analyzer. When the instrument is charging, it will display the status on screen. Charging process must be in a safe area.

3 Specifications

1. Measurement ranges:

0-5000PPM 0-5% 0-20% 0-100%

2. Sensitivity: 1ppm

3. Display: truecolor LCD screen

4. Accuracy: $\pm 1\%$ F.S.(20 °C)

5. Operating temperature: 32-113 F (0-45 ° C)

6. Humidity: 0-85%, non-condensing

7. Preheat time: 2 minutes (the default time is 30 min)

8. Pressure: < 10 psig

9. Response time(T90):

< 10 seconds (100ppm~100%)

< 25 seconds (0~10ppm)

10. Battery charge: 115/230V AC $\pm 10\%$

11. Power: it can work continuously 16 hours after charge adequately

12. Certifications: Factory Mutual Approvals Class I, Div. I, Groups B, C, D.

13. Box dimension: 82 * 138 * 185 high wide deep (mm)

14. Weight: 4.85oz

4 Instrument Instructions

4.1 Using the analyzer

Although the instrument has a strong and robust structure, one should still be gentle and take care when operating. Please avoid exposure to the rain and rapid temperature changes. For example, during operation on a cold winter day, the rapid temperature change from indoor to outdoor can cause the temperature compensation function to fail temporarily and the analyzer will need a period of time to rebalance. The low temperature will also make the sensor slow to respond, damaged or even freeze in extreme situations. One should keep the instruments in a temperature stable environment approximately 15°C-30°C. During transit, it is best to stow the instrument in the portable case. Please avoid long exposures to harsh cold temperatures in the winter or direct sunlight.

4.2 Powering up the analyzer

To power up the analyzer, press the "Power/Dimness Adjust" button on the front panel. When powering up, readings will be slowly rising to the measured value of the current analyzer. When the analyzer has been stored for a while with the valve in the "OFF" position, it is normal for the unit to display between 50 and 500ppm. This is caused by diffusion of oxygen through the

sealing O rings.


If the battery power is low, the instrument will begin “beeping” alarm and the battery icon on the display will become red and flashing. After this point, if operation is continued and the battery power is too low, the instrument will eventually be turned off automatically. To be fully charged, please allow up to seven hours, and for the first use, the recommended charging time is at least 14hrs.

4.3 Range

Electronic components and program in the analyzer make the resolution of readings range automatically, it can measure the concentration of carbon dioxide from minimum 1 PPM to 100%.

4.4 Calibration

Before leaving the factory, the analyzer and sensor calibration have been completed. If it becomes necessary to verify calibration is correct, the general steps is to use a standard calibration gas analyzer, under the measuring interface, press "up/calibration", and through the up and down keys to adjust reading until the numerical analyzer conforms to the calibration gas.

 Note: If the required calibration value is more than 50% of the current displayed, calibration should be carried out several times to complete, but this is not recommended

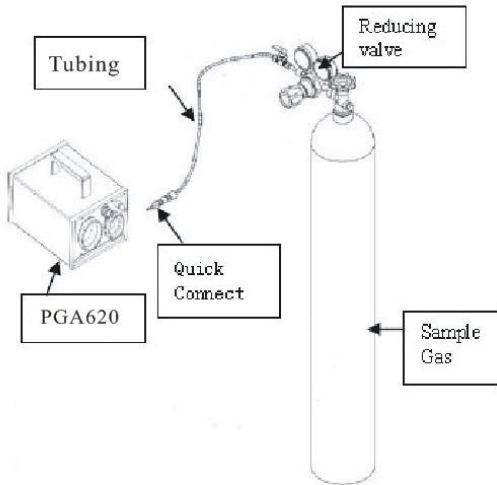
4.5 The Zero calibration

Connect the equipment with high purity nitrogen or argon gas of 99.999%, allow the readings to stabilize, recommended more than 15 minutes, then complete the zero point calibration.


4.6 Using the pump

Select "open the pump" function in the menu. This will extract the gas from the sample lines, used for measuring the concentration of carbon dioxide in negative pressure.

4.7 Sample measurement



As shown in the diagram, the sample gas pipeline is inserted into the Quick Connect. Slowly open the needle valve until the flow reaches about 1 SCFH (cubic feet per hour). Please allow time to let the air samples purge the analyzer, you think you have fully cleared the sample gas pipeline, wait for a minute or so to let the readings stabilize. When you have completed the oxygen concentration measurement, record the current value, and shut off the analyzer.

 **CAUTION:** Never allow emissions port to be restricted, this will produce back pressure in the sensor, and will cause erroneous readings and possible damage to the sensor.

4.8 Data storage

(data storage function by default is turned off)

4.8.1 Data storage function turned on: In measuring interface, holding the “Confirm/Save” key (about 3 S), will open the storage function, at the same time, the flash storage icon will begin flashing at the center bottom of the screen.

4.8.2 Data storage function turned off: In measuring interface, holding the “Confirm/Save” key (about 3 S)), the storage function will be closed; Storage icon will disappear.

4.8.3 Storage interval setting: To enter setup interface, choose the "Storage Settings", and select the storage time interval setting desired;

4.8.4 Storage capacity: Up to 10000 data points. When full capacity, the earliest data of the storage will automatically overwrite.

4.9 Battery charging and discharging

4.9.1 Battery Charge Time: 3hours

4.9.2 Discharge time(reference)

Pump turned off - Bright: 10 hours Dim light: 15 hours

Dark: 20 hours

Pump turned on- Bright: 5 hours Dim light: 8 hours

Dark: 12 hours

4.9.3 Battery replacement: Please contact supplier/distributor if required.

4.10 Safety

This instrument is intrinsically safe, Class I, Div I, Groups B, C, D and can be used in all applicable environments.

Although this instrument has anti-interference protection for its' circuitry, but avoid placint the instrument close to any electrical installations, such as large transformer, generators, relays, etc.

Please also avoid operation in an environment with lots of vibration.

5 Instrument maintenance

- 5.1 Warranty: Within one year on the acquisition date, any material and/or quality damage of the analyzer due to faulty workmanship or defective parts is covered by warranty, but will not extend to damages caused by careless and/or misuse of equipment. by human factors is beyond the scope of the warranty.
- 5.2 Periodic calibration: Factory recommended calibration cycle is every four weeks, but if the analyzer is used frequently and/or used in harsh environments, shorter intervals are recommended.

6 Troubleshooting

➤ **Analyzer does not power up**

1. Recharge the battery. When charging, please check that the charger is plugged into a receptacle that is itself powered.
2. If the instrument is plugged to the adaptor and the battery does not take a charge, replace the battery.

➤ **Batteries don't last long , or will not charge at all**

1. Charge the batteries with the power turned off, for at least 14 hours.
2. The batteries have an expected life of about 300 charge/discharge cycles. They will last best if they are never completely discharged.

If all else fails, please consult with factory for support.

7 Safety of the analyzer

Understand the following safety prevention measures to avoid injury, and prevent damage to the product and the other connecting products. To avoid possible danger, please be sure to operate within the guidelines when using this product.

1. Only allow qualified personnel to perform maintenance programs.
2. Avoid fire and injury.
3. Use certified power cables. Only use the product's supplied cable applicable to the country.
4. Ensure correct installation & gas extraction.
5. Products must be properly grounded. This product is grounded by power grounding wires. To avoid electric shocks, conductor must be grounded. Prior to powering up or operation of this product, please make this product is grounded.
6. Connected to the probe properly. View all ratings of terminal. To avoid fire excessive pressurization, please check all the rating and specifications of this product. Please consult the manual before operating products in order to understand the ratings and other detailed information.
7. Do not open the front cover. Do not open the sampling pod cover when powered on.

8. Avoid any exposed circuit when powered on, please do not touch any of the exposed components.
9. If malfunction is suspected, please do not operate. When in doubt, please contact a qualified service personnel for inspection.
10. Please keep the product surface clean from dust or debris.

8 Glossary of Terms

Accuracy

In general with analyzers when we use the word “accuracy” we imply “repeatability” as well; which is the degree to which an analyzer can repeat the same measurement reading on the same gas. All factory analyzers are compared using a measured gas against a known standard, and the accuracy of their measurement is therefore dependent upon this standard.

Come-down

A term referring to the operation of an analyzer reducing its reading from a high level to a low or zero level. For trace analyzers this can be quite long, as it can take a long time for the final traces of oxygen to diffuse out of the gas sampling system.

Electrochemical

A type of chemical reaction which produces an electrical current as part of the reaction. In this case, the oxygen sensors produce an electrical current in proportion to the amount of oxygen present at their membrane surface.

LCD

Liquid Crystal Display-a form of digital display suitable for

reading in bright light conditions. The display degrades below about -20°C and above about 60°C .

Membrane

A thin layer of permeable material (normally teflon or a similar fluoro-carbon) that controls the rate of diffusion of oxygen into the electrochemical sensor. It also controls the rate of diffusion of electrolyte out of the sensor. If the membrane is torn the sensor must be discarded.

Output-voltage or current

An analog voltage or current proportional to the oxygen measurement as a percentage of range, suitable for acquisition via a chart recorder or computer input.

Range

The operational measurement range of the analyzer. The range is dependent by its amplifier sensitivity forming the analyzer working measurement range. This process is performed via an induction amplifier. If the Oxygen concentration is above the full scale value, it will not be measured accurately. Usually, the analyzer can measure oxygen concentrations between the ranges of the 20-80% accurately.

Response

The response time of an analyzer is defined as the time taken to

go from the beginning of a noticeable change to 90% of the final level. The beginning is often defined as 10% of the final level. This is also called the “t90” time. The transit time of the gas is not included in this measurement.

Calibration

Regularly performed on the upper end range of the measurement, as opposed to the bottom end or zero. Generally this is done by exposing the sensor to a gas of known concentration, and making the analyzer read that value.