

# SPECIFICATION



Specification	Contents
Type and model	GVA-700 Gas Volume and Air Content Analyzer
Measuring items	1) Gas volume/internal gas pressure of carbonated drink 2) Gas volume/ internal gas pressure of carbonated drink, air content and oxygen concentration 3) Inside gas pressure of non-carbonated drink
Sample container	PET bottles : 2.0L or smaller (190mL cans, various PET containers) Maximum container : 110 (φ) x 320 (H) mm Minimum container : 53 (φ) x 90 (H) mm For special shape of container may not be available.
Measuring range	1) Pressure: 55 to 10cmHg, and 9.8kPa to 0.490MPa (0.1 to 5.0kgf/cm <sup>2</sup> G) 2) Temperature: 0 to 50 °C 3) Residual gas Volume: 0 to 30mL (Residual gas Volume after the absorption of alkaline aqueous solution) 4) Oxygen concentration: 0 to 21% (Oxygen concentration measurement is not available when the residual gas volume is 8mL or less.)
Measurement accuracy	1) Pressure : ± 0.001MPa (± 0.01kgf/cm <sup>2</sup> G) 2) Temperature : ± 0.05 °C 3) Residual gas Volume : ± 2% (for 5mL or over and 30mL or less) for the measured value ± 0.1mL (for 0mL or over and 5mL or less) for the measured value 4) Oxygen concentration : ± 0.2%
Calibration	Gas volume measuring unit : Pressure sensor-zero : pressure gauge for calibration 0.000MPa (0.00kgf/cm <sup>2</sup> ) Pressure sensor-span : pressure gauge for calibration 0.490MPa (5.00kgf/cm <sup>2</sup> ) Temperature sensor : standard thermometer, water Air content measuring unit : Pressure sensor-zero : pressure gauge for calibration 0.000MPa (0.00kgf/cm <sup>2</sup> ) Pressure sensor-span : pressure gauge for calibration 0.098MPa (1.00kgf/cm <sup>2</sup> ) Oxygen measuring unit : Oxygen sensor : automatic calibration during pretreatment (manual calibration is possible) Temperature sensor : room temperature
Measurement time	1) For measuring gas volume / internal gas pressure only : approximately 90 seconds for one sample 2) For measuring gas volume, air content and oxygen concentration : 6 to 16 minutes for one sample Note: Measuring time varies according to sample and condition.
Calculation	Gas volume : Calculation of gas volume / internal gas pressure by using the balance pressure inside the sample container and sample temperature. Calculation formula for the soft drink standard (*1) or the EBC standard (*2) can be selected. *1 According to "Chart 13-2 Table of absorption coefficients of carbon dioxide" in revised Soft drinks overseen by Japan Soft Drink Association *2 According to ASBC Methods of Analysis -Beer- 13: Dissolved Carbon Dioxide Air Content : Calculation of air content by using the residual gas volume and oxygen concentration after absorbing carbon dioxide in the alkaline aqueous solution
Display	16-digit and 1-row LCD (with backlight)
Number of Main unit stored data	Measurement conditions are storable to the main unit up to 20 sets. Measurement data as many as the latest 100 samples are storable. By using a USB memory, can be taken out in a CSV format.
External output	RS-232C 1ch : For an external printer or an external computer 1) Compatible printer IDP-100, DP-600 2) Printout data Date and time, Measurement mode, Sample No., Gas volume (V/V, g/Kg), Internal gas pressure (MPa, kgf/cm <sup>2</sup> G), Pressure (MPa, kgf/cm <sup>2</sup> G, cmHg), Temperature(°C), Air content (mL), Oxygen concentration (%), Residual gas volume (mL) USB 1ch : For method entry, data storage
Ambient condition	Temperature : 5 to 35 °C Humidity : 85%RH or below
Power supply	Voltage : AC100V to 240V ± 10% Frequency : 50/60Hz ± 1Hz
Power consumption	20 W
Dimensions	495(W) × 555(D) × 570(H) mm
Coating	Alkali-resistance
Weight	Approximately 38 kg
Supplied air pressure	Instrument air : pressure of 0.490 to 0.686MPa (5 to 7kgf/cm <sup>2</sup> G)

## Gas Volume Analyzer

# GVA-700



# SUMMARY / FEATURE

## Summary

Only by setting a sample container on the sample stage, all the procedures are performed automatically; punching, depressurizing, stirring of a sample, absorption of measurement gas and so on.

By continuously rotating a sample container, the balance pressure of gas and sample temperature in the container are measured and calculated into gas volume / internal gas pressure, which are displayed on the LCD.

Furthermore, carbon dioxide in the sample gas is absorbed into alkaline solution to leave only nitrogen and oxygen, and then calculate air content using the residual gas volume and oxygen concentration, which are displayed on the LCD.

Data printing is available by connecting an external printer.



## Features

### No personal error/Fully automated measurement

By pressing 'START' button after setting a sample in the equipment, all the procedures are performed automatically with stable measurement results. Therefore, individual measurement errors (variation) will be eliminated.

### Less work/Less possibility to contact alkaline solutions

This equipment relieves operators from the heavy work to shake a large volume bottle manually. By setting highly alkaline solution in the tank, it ensures the safety of chemicals and protects operators from the hazards.

### Improved layout for easy maintenance

Placing the components that require maintenance at the front of the unit improves work efficiency.

### Compact size, space saving

The unit can be installed in small spaces where the conventional products could not be.

### 20 methods can be registered

Can be managed separately (for each product, for each container, etc.)

### USB flash drive makes data management easy

Up to 100 measurement results stored in the main unit can be copied to a USB flash drive. It is also possible to make a backup of methods and transfer a method made by a PC to the main unit.



# MEASUREMENT PRINCIPLE

## Gas volume

Is calculated from temperature (°C) and the balance pressure of gas (MPa, kgf/cm<sup>2</sup>) using a formula. 2 types of calculation formulas can be selected.

\*1 According to "Chart 13-2 Table of absorption coefficients of carbon dioxide" in revised Soft drinks overseen by Japan Soft Drink Association  
\*2 According to ASBC Methods of Analysis - Beer- 13: Dissolved Carbon Dioxide

## Air content

Residual gas volume in the absorption cylinder is calculated from the amount of burette discharge (mL) and pressure (MPa, kgf/cm<sup>2</sup>). And measure oxygen concentration (if residual gas volume is not less than 8mL).

Residual gas volume (mL) and oxygen concentration are calculated as follows;

$$\text{AIR} = V \times C / 21$$

AIR: air content V: residual gas volume C: oxygen concentration

## Internal gas pressure

Equivalent pressure at 20°C (MPa, kgf/cm<sup>2</sup>) is obtained from the calculated gas volume.

## Inside gas pressure

Equivalent pressure at 20°C is calculated from sample temperature (°C) and sample pressure (MPa, kgf/cm<sup>2</sup>).

$$\text{PRESS} = \frac{20+273.15}{\text{Temp}+273.15} \times (1+\text{Press}) - 1$$

Press: measured pressure, Temp: sample temperature, PRESS: Equivalent pressure at 20°C (converted)

\* Only sample pressure (MPa, kgf/cm<sup>2</sup>) is measured.

## Measurement flow

※ Measurement of gas volume and air content

- 1 Set a sample
- 2 Descend the nozzle to open the container.
- 3 The gas inside the container is poured in the absorption cylinder. (Depressurizing)
- 4 Turn around the container
- 5 Measure the sample temperature and the balance pressure. (Measurement of gas volume)
- 6 Pour the gas inside the container into the absorption cylinder
- 7 Turn around the container. Absorb the carbon dioxide gas.
- 8 Measure the total gas volume inside the absorption cylinder. (Measurement of air content)
- 9 Measure the oxygen concentration of the gas inside the absorption cylinder. (Measurement of oxygen concentration)
- 10 Open the depressurizing valve to remove pressure. Close the depressurizing valve.
- 11 Ascend the nozzle. Fill the absorption liquid inside the absorption cylinder.
- 12 Perform calculation, indication and printing.

