# BAS





# The System's basic module



he BAS02 System has evolved as a result of Maselli's drive to help solve the needs of the modern soft drink industry. Faster and more sophisticated process lines, the need to maintain high product quality standards and rising materials costs all require improved ability to monitor and con-

trol the beverage sweetener and carbonation values. Maselli Misure has continually strived to offer products which achieve the two fundamental goals of all beverage processors: consistently high product quality and production cost savings.

The basic module of the BAS02 System is the IB-04 Analysis Assembly. This complete analytic unit for continuous beverage monitoring includes the following functions:

- analysis
- alarms
- data transmission

#### **MAIN FEATURES**

- Stainless steel assembly
- Easy on-line installation
- Analysis of both sugar and diet soft drinks
- · Brix measurement with digital optical sensor
- CO<sub>2</sub> measurement with pressure-temperature system
- Automatic temperature compensation
- No measurement drift
- Settable alarms
- User programmable recipes
- LCD graphic display
- Analog and digital outputs
- Easy to operate



# **IB-04 Analysis unit**

The IBO4 Analysis Assembly allows continuous on-line product quality control. It includes:

- A) Brix refractometer analyzer model UR21
- B) Carbonation analyzer model UC04
- C) Stainless steel waterproof control panel
- D) Recirculating sample pump
- E) Sample loop piping

All components are preassembled and interconnected on a stainless steel frame. The product piping connects the analyzers to the existing beverage line with standard Tri-Clamp ferrules. The unit measures the sugar or other sweetener concentration and the carbonation of the beverage flowing in the product line to the filler. Alarms notify the operator of out-of-specification product conditions. Measured values are transmitted continuously for recording, automatic control or remote data acquisition. The unit requires only an electrical supply, air supply and dry  $CO_2$  gas connection to purge the analyzer housing.

### **Functions**

#### **Brix Analysis**

The microprocessor-based model UR21 refractometer measures the beverage Brix or concentration. The operator may choose between the normal  $5\div15.00$  Brix range for sugar beverages and the  $0\div2.000$  Brix range for diet flavors. The new CCD digital optical transducer assures high accuracy and repeatability without drift over time. The optical detection system is not influenced by changes in measurement lamp intensity, lamp age or minor prism coatings. Likewise, the refractometer measurement is not affected by CO<sub>2</sub> or air bubbles which can introduce errors with density analyzers.

#### **CO<sub>2</sub> Analysis**

The dissolved  $CO_2$  concentration is measured by the model UC04 carbonation analyzer. The analyzer's measurement system is based on Henry's Law, which defines the relationship between the concentration of a dissolved gas and it's saturation pressure. A sample of the product is introduced into a measuring chamber, where a mechanical shock releases a small portion of the dissolved  $CO_2$  until the chamber pressure reaches the corresponding saturation pressure. The instrument electronically detects the sample's pressure and temperature, and calculates the Volumes  $CO_2$  present in the beverage. The measurement cycle can be repeated up to 4 times per minute.

#### Alarms

In order to simplify managing the alarm setpoints for different flavors, the system's software provides 40 different flavor re-cipes. The operator can set individual upper and lower alarm setpoints for each flavor code, to be easily recalled whene- ver that beverage is produced. When the IB-04 Analysis Assembly detects that the Brix or CO<sub>2</sub> value exceeds the alarm settings for that flavor, alarm relay contacts close to warn the operator so that he can make proper adjustments to the process. When changing flavors, the operator needs only to enter the predefined flavor code and the IB-04 unit will respond with the new alarm setpoints.

#### **Data transmission**

The IB-04 Analysis Assembly has both analog and serial digital outputs. The  $4 \div 20$  mA analog outputs are intended primarily for a chart recorder in the lab or process area. The serial outputs are used to send data to a remote display, to the Maselli Brix and CO<sub>2</sub> automatic controller, and to the MULTI-LAB III remote command and data acquisition software installed on a PC located in the Quality Control laboratory. The serial outputs may also be used to continuously print various data or other information on a printer nearby.



# The BAS 02 System elements

he **BAS 02 integrated measurement system** represents the complete answer to the automation of a beverage production process. This not only analyzes the product on-line but also automatically controls the Brix and CO<sub>2</sub>, with chart recording for key variables and remote command and data acquisition from the lab. The BAS 02 System includes:

- IB-04 Analysis Assembly
- Brix Controller (field mounted)
- CO<sub>2</sub> Controller (field mounted)
- Recorder or Printer for data acquisition (in field or lab)
- Remote Display
- MULTILAB III Remote Command and Data Acquisition Software

#### **Brix Controller**

The automatic Brix control feature is customized for the type of beverage production plant on which it is installed. Two different types of control systems are commonly used:

- a) Dosing through a dosing pump
- b) Regulation by valve orifice adjustment

In the first case, the controller drives a motor that adjusts the head position of the dosing pump. In the second it controls the water flowrate by adjusting the micrometer valve. The Brix Controller can receive its operational parameters from the controller panel, from the IB-04 Analysis Assembly or from the MULTILAB III remote command software in the laboratory.

#### **CO<sub>2</sub> Controller**

Automatic  $\mathrm{CO}_{\mathrm{2}}$  control can be achieved using two different methods:

- a) CO<sub>2</sub> injection control
- b) CO<sub>2</sub> saturation tank pressure control

In the first case, a flow transmitter measures the  $CO_2$  flowrate on the  $CO_2$  injection feed piping. The controller maintains a steady flow by modulating a pressure regulator. In the second method, a pressure sensor installed on the product saturation tank measures the CO<sub>2</sub> head pressure. The controller maintains steady pressure through a pressure regulator. For both systems the flow or pressure setpoint value is modified by cascade control from the IB-04 unit, which analyzes the amount of carbonation in the finished product.

#### **Recorder or Printer**

Data can be collected directly from the analysis unit using either an analog chart recorder or a serial printer. The system's internal program supports both numeric and graphic format data to the serial printer.

#### **Remote Display**

A remote display for Brix/Diet value,  $CO_2$  value and alarm conditions is available with the BAS 02 system. This can be used whenever the IB-04 panel is not easily seen from the line or filler operator's station.

# MULTILAB III Remote Command and Data Acquisition Software

The production line can be monitored and controlled from the laboratory using the MULTILAB III Remote Command and Data Acquisition Software, which, installed on a PC, is able to communicate with up to 8 different IB04s assemblies located on the various beverage lines.

MULTILAB III remote command section, by means of a serial bi-directional connection, performs like a remote terminal in the lab where is possible to control and modify all system functions for each line.

MULTILAB III data acquisition section, graphically displays current information, stores and retrieves historical file data, and displays the current values and alarm conditions of each line. Data can be printed and collected for later spreadsheet or SQC analysis using the customer's preferred software program.



# BAS02 System: designed with the Bottlers' needs in mind

n designing a monitoring system with process automation capability for be- v erage applications, Maselli Misure has recognized that processors must man age capital investments. Therefore the BAS 02 System was developed with a modular architecture. In fact, the ba sic module, the IB-04 Analysis

Assembly, is a complete analytical system which can be fully integrated with complementary elements later. This allows the plant manager to optimize the quality/cost ratio of his initial investment and still provide the operators with the basic system of equipment needed to mo-nitor the line and collect data.

The complete system performs the following functions: ANALYSIS

Brix, Diet and CO<sub>2</sub> value monitoring with individual alarms for product values outside the preset limits and data transmission

#### AUTOMATIC CONTROL

Automatic control of Brix and CO<sub>2</sub> **REMOTE COMMAND** 

Monitor and change line functions from the laboratory

#### DATA ACQUISITION

Data acquisition and manage ment, data printing in field or in laboratory

All these functions together make the System UNIQUE because it is designed, manufactured, started up and serviced by a single supplier. This eliminates possible incompatibilities of equipment, simplifies maintenance and service requirements, and allows future integration of additional modules to continuously update the system's functions as the needs of the plant expand.

#### **RETURN ON INVESTMENT**

The trend to concentrate production in strategic centers with high production volumes requires higher line speeds. Installation of the BAS 02 in a high production facility will minimize product deviation from target values and create substantial savings in production costs and downtime. The investment payback period is usually less than 6 months even on moderate capacity lines.



# Technical Data IB-04 Analysis Assembly







MEASURING CHARACTERISTICS:	
Brix analysis	
Sugar beverages:	
Operating range	5 - 15 Brix
Accuracy	± 0,02 Brix
Drift	None
Temperature compensation range	-5 to 35°C (23 to 95°F)
Diet beverages:	0 to 2 Driv (agritual ant)
Operating range	U IU 2 BIIX (equivalent)
Accuracy	
Drift	NOTE + $3^{\circ}$ C from 5 to $35^{\circ}$ C (+ $6^{\circ}$ E from 23 to $95^{\circ}$ E)
remperature compensation range	
CO₂ analysis	
Sugar and diet beverages:	
Operating range	0 - 5 V/V (0 - 10 gr/lt)
Accuracy	± 0,05 vol. (± 0,1 gr/lt)
Drift	None
Temperature compensation range	-5 to 35°C (23 to 95°F)
Working pressure range	0 to 7 Bar (0 to 110 psi)
TECHNICAL CHARACTERISTICS:	
Output signals:	
analog	4 x 4/20 mA (Brix-CO2-PressTemp.)
digital	RS232/422
Alarms - Dry relay contacts	Contacts Min./Max. 2A 220v
Power supply	230-400 Triphases 4A / 50-60 Hz
Sample loop piping connections	Inlet = 1 1/2" Tri-clamp ferrules
	Outlet = 3/4" Tri-clamp ferrules
Weight	100 Kg (220 lb)
Safety standards	IP64

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