

Recording and control of carbonation processes

Monitoring and controlling accurate carbonation levels



Easy adjustment of ratio and bias terms for carbonation

Measurement made easy

Introduction

CO₂ levels in carbonated drinks vary between manufacturer and product. Each manufacturer requires different CO₂ levels depending on the final product. For example, cola-type drinks require a different carbonation level to carbonated orange drinks.

Manufacturers demand accurate CO₂ injection and high consistency in the packaged product. To achieve this, it is necessary to control and record the CO₂ gas pressure and record the temperature of the product as part of the quality control procedure.

The correct amount of carbonation for a product is achieved by injecting a predetermined volume of CO₂. The CO₂ pressure set-point varies due to the type of product and the temperature of the product. Therefore the CO₂ pressure set-point is a function of the product temperature. The product temperature is taken as a remote set-point from the process and ratio bias settings are applied to it to produce the process set-point.

$$P = 2.0 + 0.1t$$



Where:

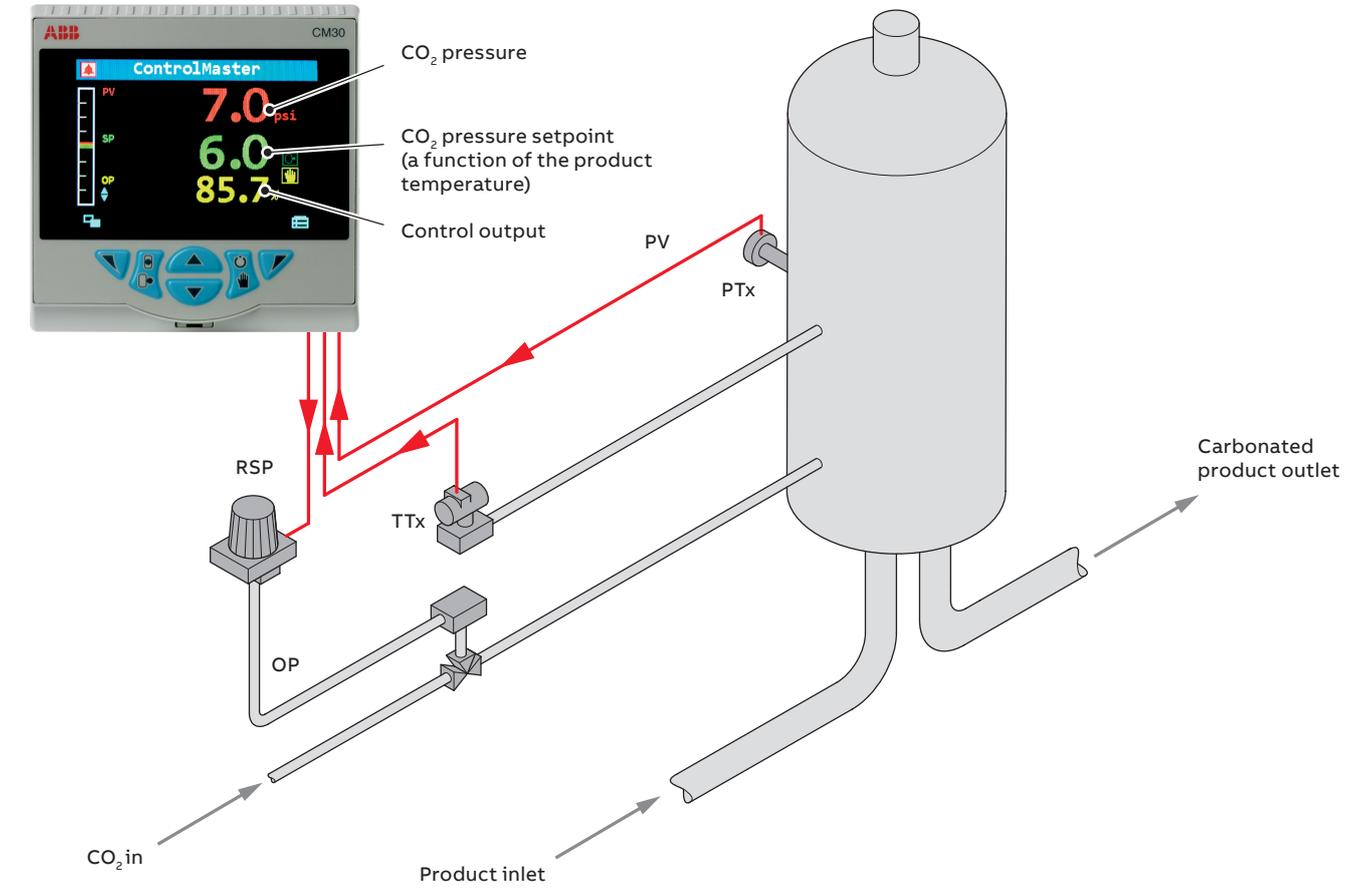
P = final CO₂ pressure set point

t = product temperature

In the above example, to achieve the correct amount of carbonation in a product, a final CO₂ pressure of 3.0 bar is required when the product temperature is 10°C. If the product temperature increases by 1°C, the CO₂ pressure must be increased to 3.1 bar to compensate.

By varying the bias and ratio values, different CO₂ levels can be produced for the complete range of carbonated drinks.

The process



Carbonation process overview

What ABB Products are suitable?

ControlMaster controllers

ABB's ControlMaster controllers (CM10, CM30 and CM50) offer a wide range of control functions and feature straightforward operator controls to simplify adjustments of ratio and bias terms for different carbonated drinks.

With their full-color, TFT displays, all controllers in the ControlMaster range provide engineers with a clear and comprehensive overview of process status and key information. These displays can be tailored to show specific process data, while a chart display provides short term trending information.

Other ControlMaster features include:

- A choice of communications options including Ethernet and MODBUS
 - Ethernet communications can provide automatic notification of critical process events via email or remote monitoring of the controller and process via the ControlMaster's integrated webserver by simply addressing it in a standard web browser.
 - MODBUS (RTU or TCP) enables easy integration with larger control systems (for example, Freelance or 800xA), and allows both read and read / write access to real-time process value data as well as most other variables.
- NEMA4X (IP66) rating as standard, making them suitable for use in almost any location in a modern food processing plant, where cleaning of all surfaces takes place.



ControlMaster CM30 and CMF310

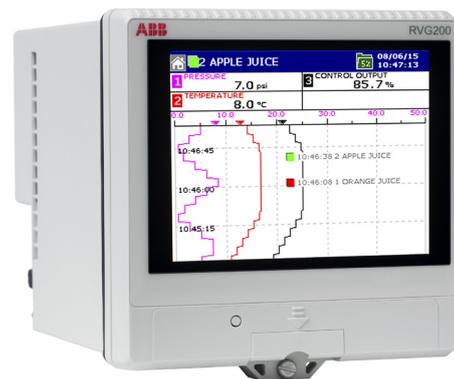
ScreenMaster paperless recorders

ABB's ScreenMaster recorders offer a versatile, secure and proven alternative to traditional paper-based devices.

ABB's ScreenMaster range is ideal for recording the carbonation process, including CO2 pressure, product temperature and flows.

ScreenMaster features include:

- High specification 21CFR Part 11 compliant data security
- High visibility process displays
- Remote access and operation via Ethernet
- Hosedown protection to IP66 and NEMA 4X
- Automated process data management
- Flexible recording capability including alarms, totalizers, math and batch recording
- Batch recording option enables simple recording and reviewing of batch processes



ScreenMaster RVG200 chart view showing batch recording

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ABB Limited
Measurement & Analytics
Howard Road, St. Neots
Cambridgeshire, PE19 8EU
UK
Tel: +44 (0)1480 475 321
Fax: +44 (0)1480 217 948
Mail: instrumentation@gb.abb.com

abb.com/measurement



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