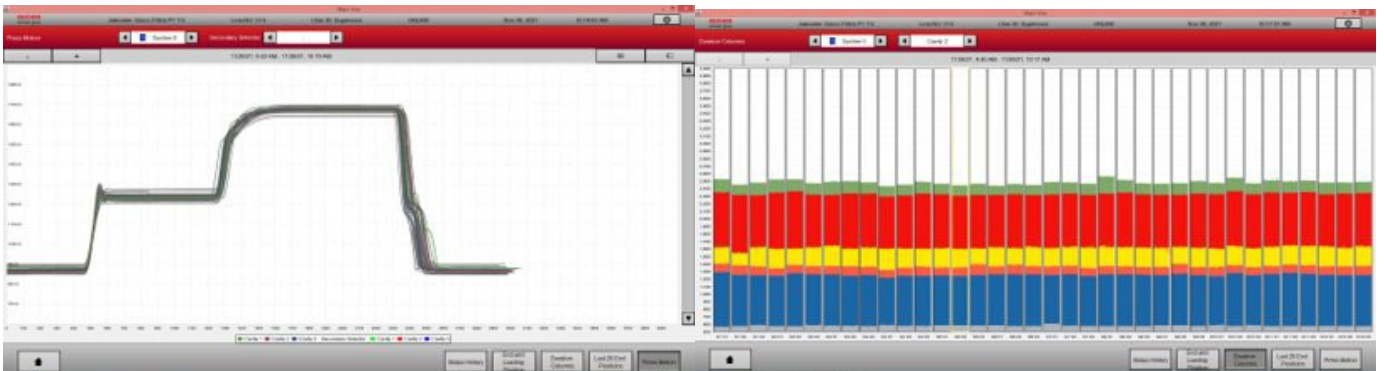# Technical News Bulletin

Switzerland, April 2023

Plunger Process Control 2 – PPC2

- Data extraction
- Full stroke sensor
- Gob weight control
- Scalable user interface
- UC2 cabinet compatible
- Process automation

Introduction

PPC2 is the new generation of the BEG Plunger Process Control system. Like its predecessor the system provides a complete visualization of the parison forming for NNPB and WMPB. The PPC2 is built on the well-established UC2 platform which provides higher flexibility in the user interface, data extraction and enables future innovation due to the close link with the FlexIS control system. The PPC2 replaces the traditional master while maintaining compatibility with all other PPC components. This makes upgrades possible for the installed base.

The system continuously records the entire plunger stroke on all cavities across the machine in real time, as the plunger travels through the glass whilst forming the parison. PPC2 also provides a precise gob weight control through automatic feeder tube height adjustment and optional needle height adjustment. The wireless connection from base plate adapter to plunger mechanism with full stroke sensor eliminates the risk of cable damages during a mechanism exchange. Full Stroke Sensors fit into existing Emhart Glass Quick Change Plunger Mechanisms.

The Emhart Glass PPC2 system "opens the door" to currently unknown variations in the NNPB and PB process and improves the production quality. Especially finish defects can be detected and rejected by using the innovative software features and the automatic Hot End Ware Reject (HEWR).

PPC2 Features

Gob Weight Control
The PPC2 gob weight control algorithm provides close loop gob weight control adjusting the feeder tube height and as an option the feeder plunger needle height. The adjustments are calculated in function of the different plunger strokes on the machine, so that the system maintains a very accurate gob weight.
Even in wide mouth press and blow operation, the high resolution of the sensor allows a very high accuracy of the gob weight control.

It also provides the machine operator with an immediate source of information about possible detrimentally changing forming conditions. These can be instantly recognized and remedied at the hot end.

Process data collection

All monitored data is collected, stored and extracted easily by the software. This allows the tracking of issues which may have happened days or weeks earlier.

Thus, a learning process can begin with the detection and elimination of fault conditions at the hot end where it is most effective.

Software supported process analysis

Furthermore, PPC2 comes with a very powerful diagnostic software and a user-friendly interface allowing the operator to compare press curves from the machine cycle by overlaying them on one screen in a form which highlights instantly any one which may be behaving differently or any trend toward unconformity.
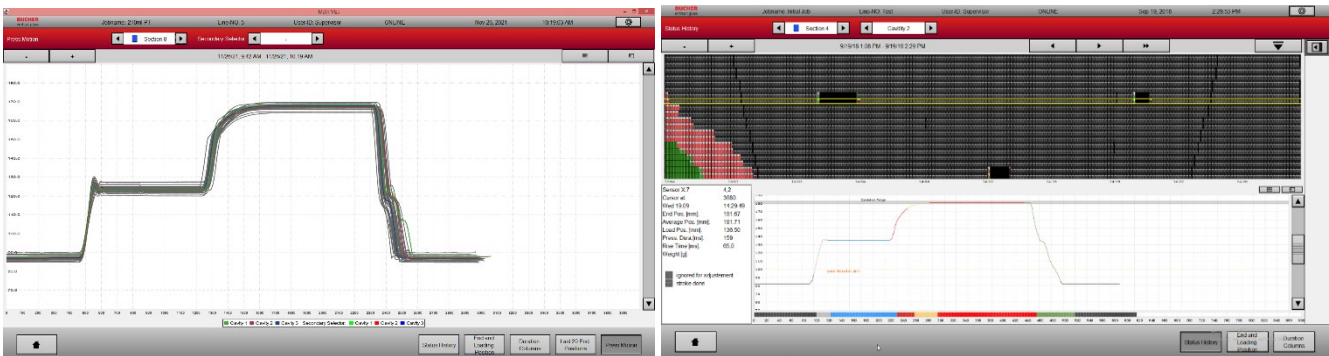
## Connection with Plant Information System

PPC2 can be connected to existing plant information systems, closing the loop to a plant wide quality control. A scale can be shared between PPC2 and the plant information system as well as the HEWR information can be transferred.

User interface

Through the new user interfaces quicker navigation is possible, job/article handling, alarming and scalable user interfaces. The PPC2 supports use of the FlexPad which enables the operator to carry the UI to the machine.

Operation Principles

Each individual Emhart Glass plunger cylinder is fitted with its own ceramic position sensor and replacement cooling tube which communicates wirelessly via the adapter plate to the data acquisition board which transmits information to the PPC2 server which then regulates the tube/needle height motor controllers and the control box.
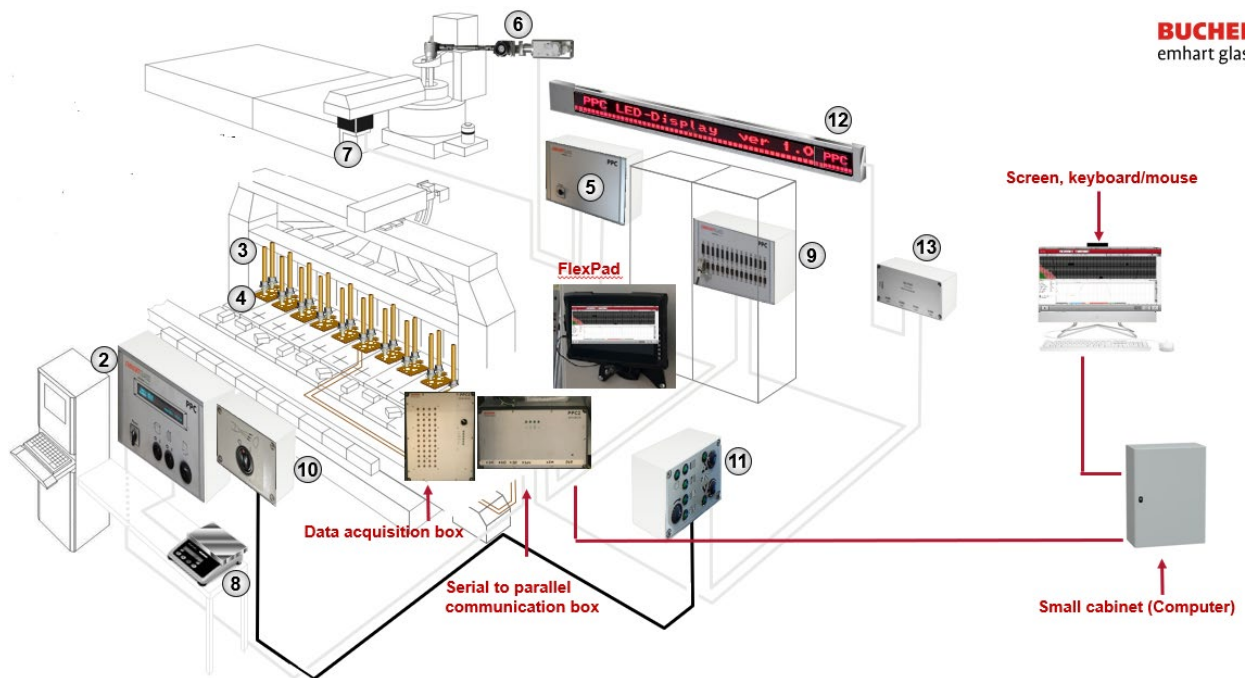
System structure

Cabinet variant

All components required to replace the previous PPC I Master is located inside the cabinet. The cabinet variant would be ideal for a new machine installation when there is flexibility in the placement of the cabinet.

Modular variant

The components for the Modular variant have been designed to facilitate a field installation. The signal processing units will be able to be placed in the machine environment. The computer will be enclosed in a small cabinet which can be installed underneath a table in a control room. The modular variant is designed to be used for retrofits or when there is a limitation in space in the plant.

Both variants cover machines from 6 to 12 sections up to 48 cavities. Tandem machines require hardware for

two systems with the exception of the server/cabinet which can display both machines on the same user interface.

FlexPad is optional for both versions of PPC2.

Technical Data

Voltage	230VAC
Frequency	50Hz
Power consumption	1 kVA (Air conditioner)
Ambient temperature Master	max. 55 °C
Humidity of the Master	max. 95%, not condensing
Ambient temperature	max. 85 °C Universal Adjustment Drive
Humidity Universal Adjustment Drive	max. 95%, not condensing

Drawings

609-1-00	Main system drawing
609-10-00	Main system components
609-20-00	Signal components
609-30-00	Adapter plates
609-40-00	Options

Features / Benefits

Features	Benefits
Data extraction	Possibilities to extract data from every press curve **Enables traceability and statistics**
Full stroke sensor	Monitor the full press curve to ensure smooth operation **Less breakages/defects caused by uneven plunger motion**
Gob weight control	Tight weight control **Stability in the forming process**
Scalable user interface	FlexPad possibilities allowing less time at the machine **Improved ergonomics**
UC2 cabinet compatible	Shares spare parts with FlexIS UC2 cabinet **Reduction in unique spare parts**
Process automation	Controlled plunger rise time via the Plunger Up Control **Platform for future innovation**