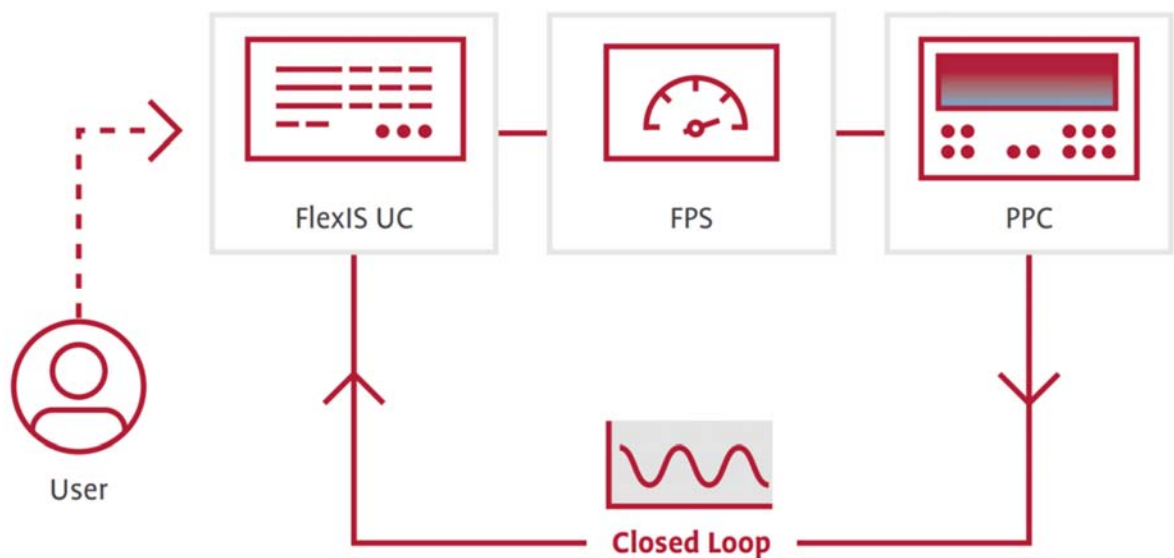


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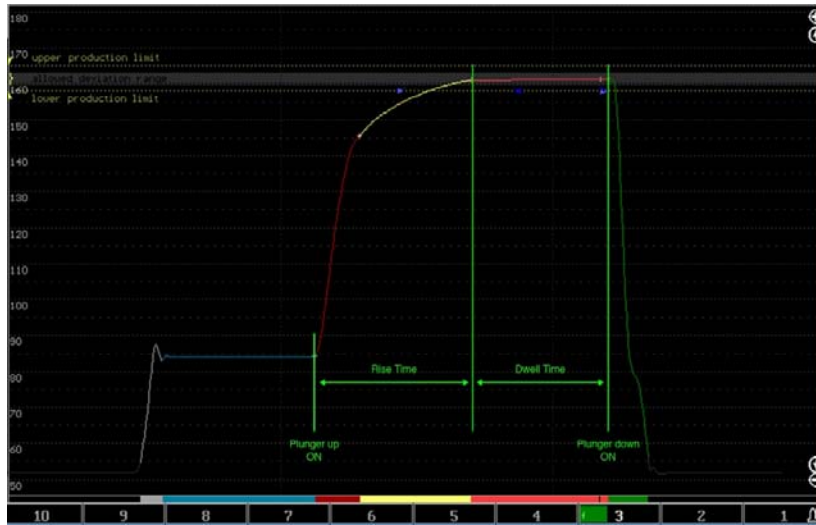
Steinhausen, April 2020

FlexIS Plunger Up Control



Introduction

FlexIS Plunger Up Control is a control loop available in the FlexIS Timing using information from the PPC (Plunger Process Control). In Press and Blow (P&B) and Narrow Neck Press and Blow (NNPB) production, it determines the time needed to move the plunger up to its end pressing position. It adjusts FPS pressures and sets FPS timing values so that the desired time to raise the plunger is maintained. Having a defined plunger rise time means also having a defined full contact time ('dwell time'), which is – in common understanding - an important process parameter.



Plunger Rise- and Dwell-Time between Plunger up and down movement.

Up to now, controlling the plunger rise time and thus the full contact time between plunger and glass was hardly done systematically for all cavities. The result depended on many influencing factors like friction in the plunger mechanism, glass viscosity, loading situation etc. Even if it was controlled systematically, pressing with only one pressure offered a limited range to influence the plunger rise time without risking other quality issues.

FlexIS Plunger Up Control uses multi pressure pressing to have a wide range of influence on the plunger rise time. By continually adjusting the initial pressure levels and also the switch points (timing) for stepping between the pressure levels, the system makes multi pressure pressing usable in a comfortable way without risking any quality issues.



Press curve and FPS pressure sequence shown as example.

Application

FlexIS Plunger Up Control is very beneficial for NNPB and P&B production.

Setting Description

FlexIS Plunger Up Control is fully integrated into the FlexIS controls. All settings are done on the User Console and are stored as job data.

Settings (all per cavity)

- FlexIS Plunger Up Control on / off
- Setpoint value for plunger rise time
- Upper and lower limits for pressure adjustment

Feedback to the user (all per cavity)

- Actual (measured) value for plunger rise time
- FlexIS Plunger Up Control on / off
- Pressure reached a limit

Plunger Up Control Overview

Setpoint value rise time [ms]

Section	01	02	03	04	05	06	07	08	09	10	11	12
Cavity (inner)	440	500	1000	660	500	545	455	495	400	400	400	400
Cavity 2	440	386	450	660	375	385	475	470	320	320	320	320
Cavity 3	440	390	735	660	425	395	430	320	430	430	430	430

Actual value rise time [ms]

Section	01	02	03	04	05	06	07	08	09	10	11	12
Cavity (inner)	810	690	720	696	615	605	690	715	785	715	780	655
Cavity 2	850	775	770	735	780	920	720	740	815	815	715	770
Cavity 3	715	745	795	655	695	795	775	825	820	790	840	735

on / off Take over act. Fill Parameters FPS Setting Overview Parameters Settings Section Setup

FlexIS 1 user interface: Set point values and measured values with colored status indication shown in the Overview page (sample values).

BUCHER emhart glass
Jobname: MyFUC example Line-NO: 112 User-ID: Supervisor ONLINE Speed: 168.0 bpm Feb 7, 2019 3:49:39 PM

Closed Loop Adjustment Section 1

Cavity	(inner)	(2)
Actual rise time [ms]	750	645
Setpoint rise time [ms]	800	800
p1/p2 ratio	1.20	1.20
Upper limit p1 [bar]	0.70	0.70
Upper limit p2 [bar]	0.60	0.60
Lower limit p1 [bar]	0.30	0.30
Lower limit p2 [bar]	0.30	0.30
Automode on/off	On	Off

Alarms: 15 Bar Chart Plunger Section Objects HEWR Closed Loop Adjustment External Systems

FlexIS 2 and 3 user interface: Setpoint values and measured values with colored status indication shown in the Closed Loop Adjustment page (sample values).

Functions

- See all values per section or grouped in an overview
- Fill values to all cavities or to all sections

Remote Access Extension

- The 'PPC remote access box' makes PPC accessible through the FlexIS remote access system.

Installation Requirements

FlexIS Plunger Up Control can be ordered for any forming machine having:

- ✓ FlexIS Timing Control - Software Version 1.07.03.033 or higher
- ✓ PPC Plunger Process Control system
- ✓ FPS Flex Pressure System
- ✓ Basic Closed Loop Equipment (TNB248)

Order Information

FlexIS Plunger Up Control includes:

- 601-20001-3 Software License FlexIS Plunger Up Control
- 601-217-2 Communication Kit for PPC (specify cable length PPC master to FlexIS MC cabinet)
- 601-217-5 PPC Remote Access Kit
- 1 day Service engineer for installation
- 2 days Production specialist for commissioning and on site training

Documentation

H11103_EN is the English manual of FlexIS Plunger Up Control.

Feature/Benefits

Features	Benefit
<ul style="list-style-type: none"> • FlexIS Plunger Up Control is fully integrated into the FlexIS controls, stored in the job file 	<ul style="list-style-type: none"> • Reduced complexity / better ease of use • Improved start up after job change
<ul style="list-style-type: none"> • Uses FPS multi pressure pressing 	<ul style="list-style-type: none"> • More regular plunger motion due to higher initial pressure levels.
<ul style="list-style-type: none"> • Automatically adjusts FPS pressure levels and switch points between pressures according to press curve 	<ul style="list-style-type: none"> • Keeps process steady / less variation <ul style="list-style-type: none"> - over time - from cavity to cavity - less stops ⇒ higher quality / pack rate
<ul style="list-style-type: none"> • PPC remote access through the FlexIS remote access system 	<ul style="list-style-type: none"> • Optimal addition to FlexIS remote service. Experts can support remotely auditing real time PPC and Plunger Up closed loop.