

# Virtual Measurements & Control



**Batch Controller**

**7/21/99**

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## Hardware

### 1) Controller

- a) PC104 compliant controller with onboard A/D, serial communications and control interface.

### 2) Display

- a) Graphic/alphanumeric back lit LCD display divided into one large numeric weight display and three alphanumeric prompt displays.

### 3) Front Panel Controls

- a) Start/Resume: Start a batch cycle or resume a paused cycle.
- b) Stop/Pause: Stop a batch cycle.
- c) Reset: Reset a paused batch cycle
- d) Accept: Accept an out of tolerance ingredient addition.
- e) Tolerance Indicator: Illuminates to indicate an out of tolerance ingredient addition.
- f) Hold/Run: Hold a batch cycle after completion of the current ingredient addition.
- g) Manual Off Auto: Operating mode selection
- h) Ingredient Select: Select ingredient to be manually controlled by 'Discharge/Feed' in the manual mode.
- i) Discharge/Feed: Manually feed the selected ingredient or output discharge (batch complete) signal when manual mode is selected.

### 4) Control Outputs 110VAC 3A SSR.

- a) 6 Fast Feed Cut Off: Final cut off at desired ingredient weight less preact.
- b) 6 Slow Feed Cut Off: Begins Slow feed for current ingredient.
- c) Complete Output: Turns on when batch is complete.
- d) Zero Output: Turns on when weight is within zero tolerance.

### 5) Inputs

- a) none
- 6) Power
  - a) 90-280 VAC auto sensing
- 7) Battery Backup of configuration and in process values.
- 8) Enclosure:
  - a) none

## Control

- 1) Set Up
  - a) Set up and control information will be entered via a numeric keypad with direct entry or menu driven methods.
    - i) Setup Formulas:
      - (1) Press F7 on the numeric keypad
      - (2) The display will prompt 'EDIT FORMULA 1=YES 0=NO'. Enter a 1 to edit a formula or a 0 to abort.
      - (3) The display will prompt 'ENTER FORMULA'. Enter the formula ID to edit. There are 20 available formulas.
      - (4) The display will prompt 'FAST FEED 1'. Enter the desired final cut off value for ingredient 1. Entering a 0 will disable the ingredient for this formula.
      - (5) The display will prompt 'DRIBBLE FEED 1'. Enter the amount of weight before final cut off the ingredient feed is to slow.
      - (6) This sequence will repeat from step 4 until all ingredient targets have been entered. The sequence will then continue from step 2.
    - ii) Setup Ingredients:
      - (1) Press F8 in the numeric keypad
      - (2) The display will prompt 'ENTER INGRED. TO EDIT (0=EXIT)'. Enter the ingredient number to edit.

- (3) The display will prompt 'PRACT'. Enter the desired preact value. This is the amount of weight before the final cut off target the cut off will actually take place to compensate for the ingredient in suspension.
- (4) The display will prompt 'OVER TOL.' This is the amount of weight over the final cut off value an 'OVER' tolerance alarm will be issued.
- (5) The display will prompt 'UNDER TOL.' This is the amount of weight under the final cut off value an 'UNDER' tolerance alarm will be issued.
- (6) The display will prompt 'JOG ON TIME'. Enter the amount of time in 0.1 second intervals the ingredient feed will be turned on in an under tolerance condition if jog is enabled.
- (7) The display will prompt 'JOG OFF TIME'. Enter the amount of time in 0.1 second intervals the ingredient feed will remain off between jogs if jog is enabled.
- (8) The display will prompt 'AFTER DELAY'. Enter the amount of time to wait after the ingredient addition is complete to perform tolerance checking and accumulation.

iii) Timer and Option Configuration:

- (1) Press F9 on the numeric keypad.
- (2) Enter the calibration password.
- (3) The display will prompt 'EDIT DECIMAL'. This is the location the decimal point will appear for weight oriented setup information. Usually the same as the displayed weight decimal location.
- (4) The display will prompt '1=ENABLE AUTO TARE'. Enter a '0' to disable or a '1' to enable auto tare between ingredients.
- (5) The display will prompt '1=ENABLE AUTO PRINT'. Enter a 1 if auto print of ingredient weights and batch total is desired.
- (6) The display will prompt '1=ENABLE DISCHARGE/BATCH COMP'. Enter a 1 if a discharge/batch complete signal is desired when the batch is complete.
- (7) The display will prompt 'DISCHARGE DELAY (.1 SECS)'. Enter minimum time to output the discharge/batch complete before checking for zero weight tolerance.
- (8) The display will prompt 'DISCHARGE ZERO TOL.'. Enter the weight at which the discharge/batch complete relay will de-energize and the 'ZERO' output will energize.

- (9) The display will prompt '1=ENABLE JOG'. Enter a 1 to enable jog on an under tolerance error. This will cause the ingredient feed to jog product until the weight is in the acceptable tolerance range.
- (10) The display will prompt '1=ENABLE TOL. CHECK'. Enter a 1 to enable tolerance checking.
- (11) Enter the Motion Tolerance: This is the amount of motion entered in  $\frac{1}{4}$  division increments that is acceptable for printing, tolerance checking, taring or accumulation.

## Automatic Batch Sequence

- 1) To select a formula press F10 on the numeric keypad.
  - a) Enter the formula to be batched
- 2) The display will prompt 'READY formula'.
- 3) Insure the 'STOP' control is in the out position.
- 4) Place the 'MANUAL OFF AUTO' selector in the 'AUTO' position.
- 5) Place the 'HOLD/RUN' selector in the 'RUN' position.
- 6) If the weight is within the 'ZERO TOLERANCE' the 'ZERO' output will be energized.
- 7) Press 'START'.
- 8) The system will auto tare to zero.
- 9) The fast and dribble outputs for the ingredient to be added are energized. The fast cut off remains energized until the final target weight less preact is reached. The dribble cut off remains energized until the slow feed is to begin.
- 10) The 'AFTER CUT OFF DELAY' is performed.
- 11) If 'AUTO PRINT' or "TOLERANCE CHECKING' are enabled the system will wait for motion to stabilize within the 'MOTION' tolerance.
- 12) If 'AUTO PRINT' is enabled the ingredient weight will be printed.
- 13) If 'TOLERANCE CHECKING' is enabled the tolerance check will be performed.
  - a) If 'JOG' is enabled and the ingredient addition is under tolerance the ingredient feed will be jogged until the addition is within tolerance.

- b) If the ingredient addition is over tolerance or under tolerance with 'JOG' disabled the 'TOLERANCE' indicator will illuminate and the display will prompt 'UNDER' or 'OVER' tolerance. The system will pause until the 'ACCEPT' push button is pressed or the batch is aborted by pressing 'STOP' then 'RESET'.
- 14) If the 'HOLD/RUN' selector is in the 'HOLD' position the system will pause until switched to 'RUN'.
- 15) The sequence will continue from the auto tare state until all ingredients have been added.
- 16) If 'AUTO PRINT' is enable the total batch weight will be printed.
- 17) If discharge/batch complete is enabled the discharge/batch complete relay energizes until the discharge zero tolerance is reached.
- 18) When the discharge zero tolerance is reached the 'ZERO' output will energize.
- 19) Pressing 'STOP' or switching from 'AUTO' mode at any point in the fill sequence will pause the batch sequence. The display will prompt 'START=RESUME RESET=ABORT'. To resume batching press START to abort press RESET.

## Manual Operation

- 1) Place the 'MANUAL OFF AUTO' selector to the 'MANUAL' position.
- 2) Insure the 'STOP' control is in the out position.
- 3) To energize an ingredient output select the ingredient to be controlled with the rotary product selector switch the toggle the 'DISCHARGE/FILL' control to the fill position.
- 4) To initiate a discharge/batch complete toggle the 'DISCHARGE/FILL' control to the 'DISCHARGE' position.

## Clearing a Formula

- 1) Press F5 on the numeric keypad.
- 2) The display will prompt 'FORMULA TO CLEAR'
- 3) Enter the formula to be cleared.
- 4) The display will prompt 'CLEAR formula ? 1=YES',
- 5) To clear the formula enter 1 to abort enter 0.

## Exiting SMARTS

- 1) **Press F6 on the numeric keypad.**
- 2) **Enter the calibration password.**
- 3) **Press enter**