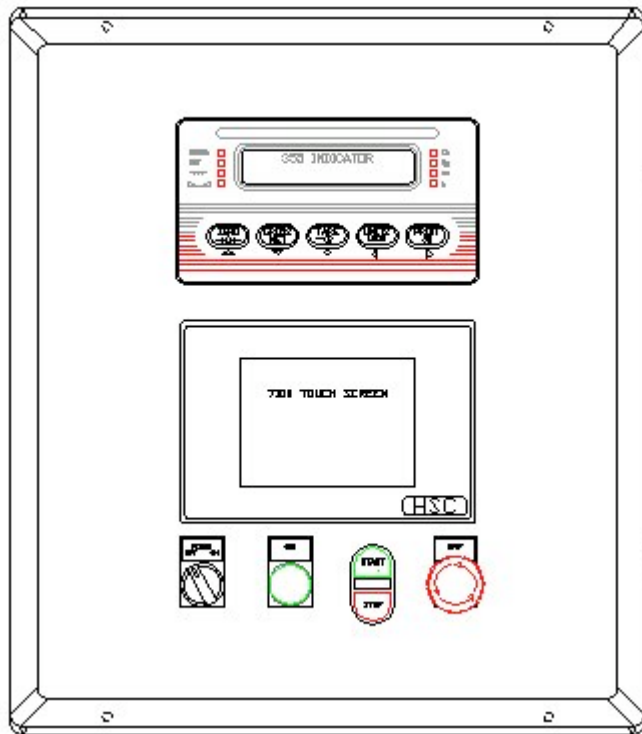


BC623

Continuous Batch Controller

Operation Manual



This system was designed to control a product feeder in one of two different modes. It may be used as a batch controller, or as a continuous feed controller. The BC623 may be used with either a gain in weight system or a loss in weight system. The BC623 utilizes a touch screen interface for operator input and mechanical buttons for frequently used functions. The BC623 will store a batch history when used in batching mode, a rate history when used in continuous mode. The stored data may then be displayed on a line graph giving the operator a visual indication of the system's performance. The BC623 provides a 0 to 10 V or a 4 to 20 mA analog output to control the connected product feeder. Also provided, are contact closures for remote discrete start and stop commands. A second analog output may be used to remotely monitor the currently displayed scale weight. After initial setup is complete, the BC623 may be used to dispense batches of a set amount, or to continuously dispense product at a set rate.

System Operation

Main Menu

After the initial startup sequence has completed, the main menu will be displayed. The operator may select any of the displayed options by pressing the appropriate button. If the system is set to operate in batching mode there is the additional *Batch Setup* button. If the system is set to operate in continuous mode, the *Batch Setup* button is omitted. Pressing the batch setup button allows the operator to enter parameters relevant to the batching process. The *Sys Setup* button allows the operator to configure the system setup parameters, and to perform operations such as calibration. The *Clean Screen* button provides a safe place for the operator to wipe the screen without inadvertently pressing a button. The *History* button displays either the batch history or the rate history depending on which mode of operation is selected. The *Clear History* button, as the name implies, clears the stored history. The last button, *Run Feeder*, readies the system to begin dispensing product.

MAIN MENU




Batch Setup

The batch setup menu allows the operator to view and modify the batching parameters. Only the batch setup parameters that are enabled are displayed. See *System Setup* for information on enabling or disabling batch parameters. The *Preact* option tells the system how many pounds (or Kgs) before the target weight the system should stop the flow of material. The *Preact* value is used to account for material in suspension on Gain in weight systems. The *Slow Fill Amount* adjusts how much product is dispensed at the slow fill rate. The *Slow Fill Amount* allows the system greater control when approaching the target weight by slowing the feed rate to a slower, more controllable speed. The *Batch Tolerance* specifies the allowable tolerance for individual batches. The tolerance is entered as a percentage of the target weight. The *Zero Band* parameter specifies how close to 0.0 the scale must be for the BC623 to consider the scale empty. The *Container Weight* button allows the operator to set the average weight of the containers that the product is being batched into. The *Container Band* is the allowable variation in container weight. The Last three parameters: *Zero Band*, *Container Weight*, and *Container Band*, are typically only used for Gain in weight systems. To return to the *Main Menu* the operator may press the Exit button.

BATCH SETUP	
PREACT	0.05
SLOW FILL AMOUNT	2.00
BATCH TOLERANCE	2%
ZERO BAND	0.02
CONTAINER WEIGHT	5.25
CONTAINER BAND	0.5
EXIT	

System Setup

The System setup menu allows the operator to view and modify the system setup parameters. When the *System Setup* button is pressed from the *Main Menu* the BC623 responds by asking for the System Setup Password. The system setup parameters are protected by password to prevent the unwanted modification of the system functionality. The default system password is blank, that is, do not enter any characters. The operator  should simply press the enter key. The Default password may be changed using the *Password Setup* button. If the entered password has been forgotten or lost, call 1-800-443-1164 to gain access to the *System Setup* menu and then change the password using the *Password Setup* option. Once the correct password has been entered, the system setup parameters and options are displayed.

SYSTEM SETUP	
SYSTEM TYPE	CONTINUOUS / BATCH
FEDER SETUP	
BATCH SETUP	
CONTINUOUS SETUP	
PASSWORD SETUP	
NEXT	EXIT

The *system type* may be set to either Continuous or Batch. When set to Batch, the *Batch Setup* option button is visible, and the system may be used to dispense batches of product specified by the target weight. If Continuous type is selected the *Continuous setup* option button

is visible and the BC623 may be used to dispense product at a specified feed rate. If the system type is set to *Batch with Continuous* the system will dispense product in batches but it will do so at the specified feed rate. Pressing the *System Type* button toggles between the three options.

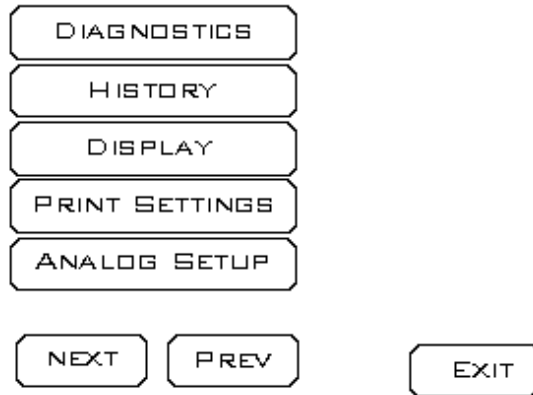
The *Feeder Setup* button allows the observation and entry of parameters relevant to the Feeder setup. The *Batch Setup* button allows the observation and modification of the Batch Setup Parameters. The *Continuous Setup* button allows the observation and modification of the continuous rate setup options, and the *Password Setup* button allows the observation and modification of the password parameters.

Pressing the Next button displays more system setup options. The *Diagnostics* button may be used to trouble shoot a malfunctioning unit.

The *History* option allows the configuration of the batch and rate histories, and the *Display* option allows the operator to adjust the display settings. The *Print Settings* button sends the currently entered configuration settings to the serial port. The settings may then be captured by a printer, or a PC. The *Analog Setup* button allows the configuration of the analog output features. Pressing the *Prev* button displays the previous list of setup parameters. Pressing the *Next* button displays the next page of system setup parameters. The final page of system setup parameters lists the Control program version and release date. The control program name is also listed. When talking to technical support it is important to have this information available. The *Restore Defaults* button allows the operator to return ALL of the system setup parameters to their factory default value.

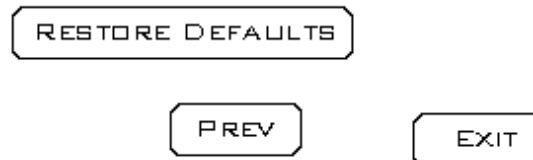
To leave the system setup menu press the *Exit* button. Pressing *Exit* will return the operator to the *Main Menu*. In order to re-enter the *System Setup* Menu, the system setup password must be re-entered.

SYSTEM SETUP



SYSTEM SETUP

FEEDER CONTROL PROGRAM VER 2.9 01/28/02
FILE: BRC623CONTROLLER29.C



Feeder Setup (System Setup Menu)

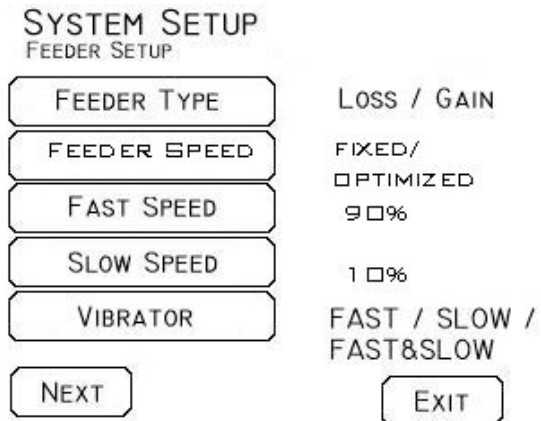
The Feeder Setup menu allows the modification of the feeder parameters. The *Feeder type* may be selected as either *Loss* or *Gain*. If the feeder is setup so that when the feeder is running, product is leaving the scale, then this parameter should be set to Loss. If the feeder setup is such that when the feeder is running product is being added to the scale, this parameter should be set to Gain.

The *Feeder Speed* option may be set to either Fixed or to Optimized. When set to *fixed* the feeder speed will remain constant when

running at fast speed. If this parameter is set to optimize, then the controller will automatically adjust the feeder speed until the fast speed set point optimizes product throughput.

The *Fast Speed* value sets the percentage of the output sent to the feeder when running at the fast speed. This option is only available when the controller is being used in the batching mode. The *Slow Speed* is the speed to which the feeder is switched when the *amount to dribble weight* has been reached.

The *Vibrator* option designates when the feeder vibrator is active. The vibrator output may be set to run when the feeder is running at fast speed only, slow speed only, or at both fast and slow speeds.

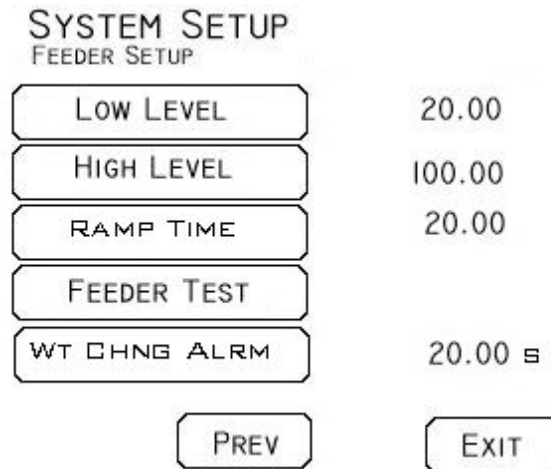


The Next button displays additional options. The *Low Level* option allows the operator to enter the low level weight to trigger a feeder refill. When the weight in the feeder is below the low level set point, and a batch is started, or the BC623 is continuously feeding product, the feeder refill signal will be issued. The refill signal will stay active until the feeder has accumulated weight up to the *High Level*. The automatic refill feature would typically be used with Loss in weight systems only.

The *Feeder Ramp Time* parameter sets the time in seconds that the feeder will take to reach the Fast speed set point when starting. This option is provided to allow a more controlled startup when used with motor drives having no such feature. If the motor drive used to control the feeder has ramp up features, it is recommended that the *Ramp Time* parameter be set to 0 and the innate drive features be utilized.

The *Feeder Test* button allows manual control of the feeder. This option allows the operator to enter the desired output as a percentage of full speed and to start and stop the feeder. This feature may be used for manual control purposes, or to trouble shoot a problematic feeder.

The *Weight Change Alarm* sets the number of seconds the controller allows to pass without seeing a change in the weight before setting the *no weight change alarm*. The controller monitors the changing weight whenever the feeder is running. If the time specified in this parameter passes with no change in weight the alarm is set and an audible chirp is emitted.



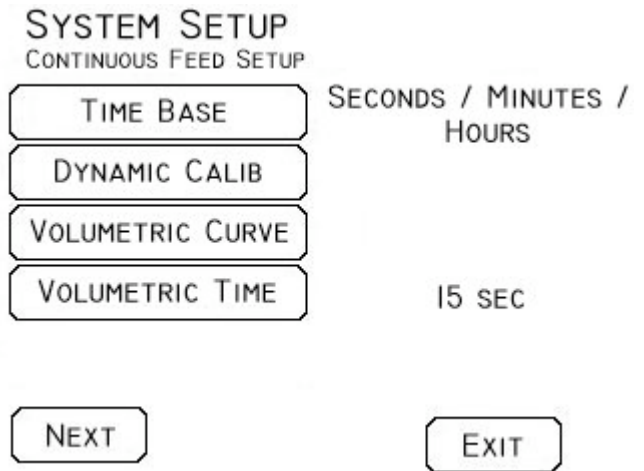
Batch Counter button. The batch counter enables the controller to count the number of batches produced. The operator may enter the desired number of batches to run on the screen. When the batch counter reaches the number of batches to run the controller will stop batching until the reset button is pressed, clearing the batch counter. The reset button and the set desired number of batches button are located on the batching screen. To display the batching screen press the Run Feeder button from the main menu.

The *Slow Fill Amount* may be toggled between *Fixed* or *Optimized*. When set to fixed, the Slow fill amount will remain the same from batch to batch. The amount of product to dispense at the slow speed can be entered on the Batch Setup Screen from the main menu. If this parameter is set to Optimized the controller will automatically adjust the amount of product dispensed at slow speed to the minimal amount needed to still achieve accurate stopping weights.

Continuous Setup (System Setup Menu)

If the system type is specified to be of Continuous type, the *Continuous Setup* button is enabled. The continuous feed setup menu allows the configuration of parameters pertaining to the continuous feed rate feature of the BC623 controller.

Pressing the *Time Base* button toggles the time base between Second, Minutes, or Hours. The time base is the unit of time the controller uses to enter and display rate data. If Hours is selected, the operator must enter the desired rate set point in Lbs (or Kgs) per Hour. The controller will then display the current feed rate in Lbs per Hour, and display the stored history rates in Lbs per Hour. Similarly the BC623 will display data in Lbs (or Kgs) per Minute, or per Second.

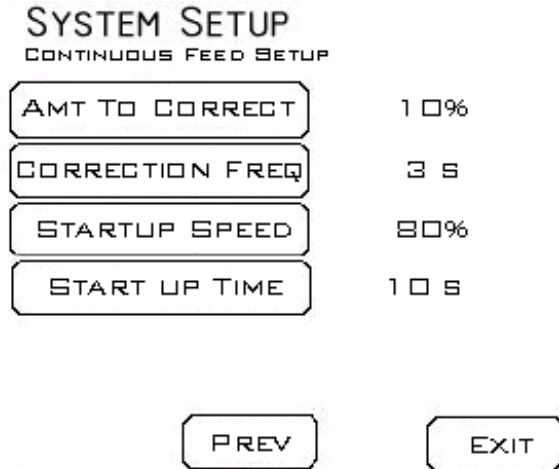


When a feeder system is initially setup, a dynamic calibration must be performed. All feeders behave differently when in motion. Screw feeders vary depending on screw size, blade pitch, and RPM. Belt feeders vary in similar ways. Performing a dynamic calibration accounts for these variations. The dynamic calibration process runs the feeder at varying feed rates to determine its characteristics. A dynamic calibration requires a supply of product, and a suitable catching container. Performing a dynamic calibration also requires that the feeder be run. Make certain that all feeder safety precautions have been met and that it is safe to turn on the feeder prior to performing a dynamic calibration. To start the dynamic calibration press the *Dynamic Calib* button. The BC623 will run the feeder at decreasing speeds from 100% to 10%, and build a volumetric lookup table. This table will then be used to determine an appropriate starting value when the feeder is turned on before switching to gravimetric mode.

When the Volumetric Calibration is complete, the Volumetric look up table may be displayed by pressing the *Volumetric Curve* button. The Volumetric data collected during calibration will be displayed on a line graph.

In the continuous feed rate mode, the BC623 dispenses product volumetrically at startup. The amount of time the controller stays in volumetric mode before switching to Gravimetric mode is specified by the *Volumetric Time* parameter. This value should be set high enough to allow a stable flow of product to be leaving the feeder before gravimetric control begins.

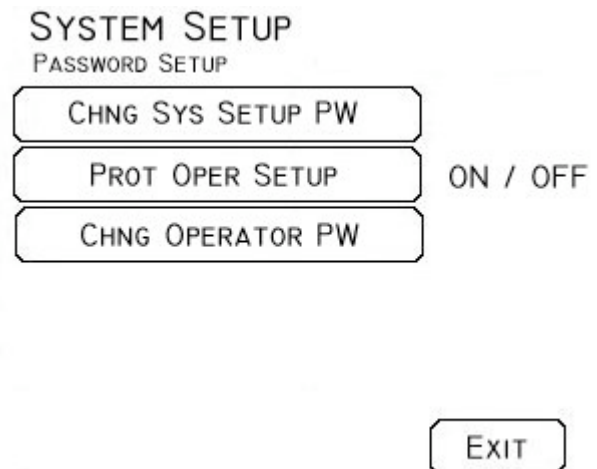
Pressing the *Next* button displays additional parameters. When running in Gravimetric mode the BC623 makes corrections in the output sent to the feeder based on the current rate. How it makes corrections is based on two parameters. The amount to correct parameter tells the BC623 how much of the error between the actual rate and the target rate to correct at a time. The correction frequency specifies how often to make a correction. These two parameters may be adjusted by pressing the *Amt to Correct* and *Correction Freq* buttons. Initially the amount to correct parameter should be set low.



Increasing this value will allow the feeder to make feed rate corrections faster, but also increase the tendency to over correct errors. The Correction Freq should be kept relatively small, allowing the BC623 to make more frequent corrections. A smaller correction amount made more often is typically more desirable than making large corrections less often. The *Startup Speed* parameter specifies what speed to start the feeder to initially. When the feeder is told to run it will first go to the startup speed, it will then go to the volumetric speed determined during the dynamic feeder calibration. Once a stable federate has been established the feeder will go into gravimetric feed mode and adjust the feeder speed to maintain the desired feed rate. The *Startup Time* parameter specifies how long to the feeder will run at the *Startup Speed*. Depending on the feeder style used and the material properties, it is sometimes desirable to run the feeder at a higher speed to establish a good material flow. Conversely some applications will call for a slower initial speed to compensate for feeder flooding. The two startup parameters may be used to tailor the controller to a particular application.

Password Setup

The BC623 allows two levels of security: the administrator level, and the operator level. The administrator password is used to protect the System Setup parameters. The Operator password is used to protect batch parameters, and the batch and rate histories. To Change the Administrator System Setup password, press the *Chng Sys Setup PW*, and enter a new password when prompted. Remember to record the system setup password in a safe place for future reference. If the system setup password is lost or forgotten call 1-800-443-6411 for an access code. The Operator password may be turned on or off by the administrator in the Password setup menu. To toggle the protect operator setup option on or off, press the *Prot Oper Setup* button. If protected, the administrator may also set the operator password by pressing the *Chng Operator PW* button. Whenever the protect operator setup option is turned on, the operator password is initially set to 1234. If the operator password is lost or forgotten, the

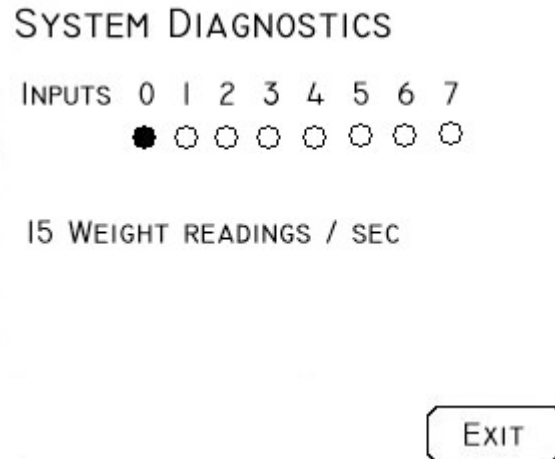


operator password can be reset to 1234 by turning off the protect operator setup option and then turning it back on.

Diagnostics

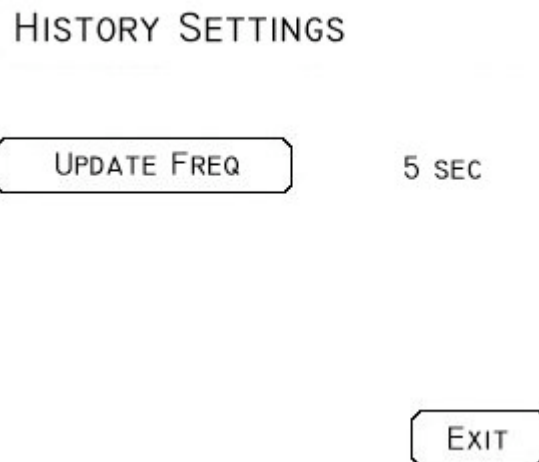
The BC623 is equipped with a diagnostics menu. This menu can be used to help trouble shoot a problematic unit. Displayed on the screen is an indication of each digital input. Solid circles indicate that the BC623 is receiving an input on the specified input. An open circle indicates the BC623 is not currently receiving an input on that input.

The BC623 gets its weight information from a dedicated weight instrument. The Weight indicator continuously sends the weight data to the BC623 using an RS232 communications port. The number of weight readings correctly received by the BC623 is displayed on the diagnostics screen. To return to the setup menu press the *Exit* button.



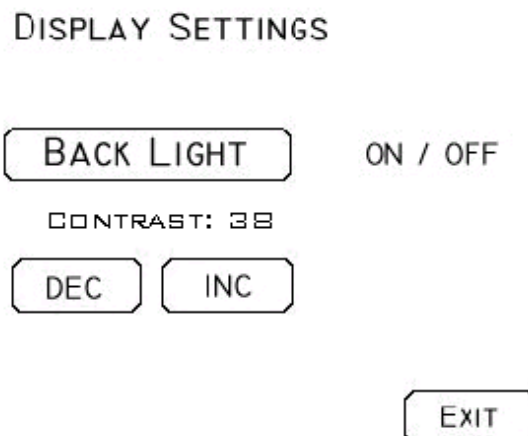
History Settings

When the BC623 is configured to be used as a rate controller, the Update frequency of the rate history may be adjusted. The update frequency is how often the current feed rate is added to the rate history. A new value may be entered by pressing the *Update Freq* button.



Display Settings

The touch screen portion of the BC623 may be adjusted from the display menu. The screen backlighting may be toggled on or off by pressing the *Back Light* button. The screen contrast may be decremented or incremented by pressing the *Inc* and *Dec* buttons respectively.



Print Settings

The Print Setting button may be used to send a listing of all of the system setup parameters to the RS232 Com port 2. The settings can be captured by either a serial printer or a PC serial port using Hyper Terminal. This feature was intended to aid the documentation of system setup parameters.

Analog Setup

The BC632 has a analog output that follows the weight currently displayed on the scale indicator. This signal may be used for remote monitoring or control. The Analog output must be spanned over the appropriate range, dictated by the users application. The Maximum and Minimum weight values must be entered to set the analog output accordingly. If the analog output is configured as a 0 °C 20 mA output then the output will = 20 mA when the scale display is equal to or above the value entered as the Max weight. The output will = 0 mA when the scale display is equal to or below the value entered as the Min Weight. Similarly the analog output may be configured as a 0 °C 10VDC output. To configure the analog output Jumper J2 on the analog output board must be place between pins 1 and 2 or between pins 2 and 3. Jumping pins 1 and 2 sets the output to be, 0 °C 20mA and jumping pins 2 and 3 sets the output to be 0 °C 10 VDC.

SYSTEM SETUP

ANALOG SETUP

MAX WEIGHT	1 0 0 . 0
MIN WEIGHT	- 1 0 0 . 0

OUTPUT WILL = 20MA (OR 10V) AT MAX WEIGHT
 OUTPUT WILL = 0MA (OR 0V) AT MIN WEIGHT

EXIT

Clean Screen

Periodically the BC623 touch screen will need to be cleaned. By nature, it is sometimes difficult to clean a touch screen with out accidentally pressing buttons displayed on it. The BC623 allows the easy cleaning of the touch screen by providing a *safe* cleaning screen. To leave the clean screen display press the exit button the specified number of times.

CLEAN SCREEN

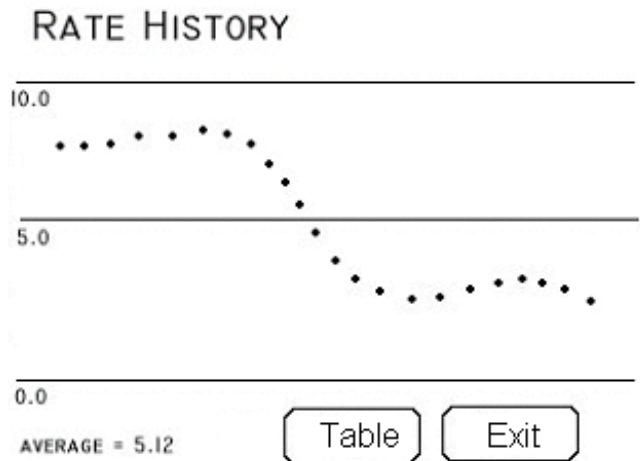
WIPE SCREEN WITH A SOFT
DAMP CLOTH

PRESS EXIT 4 TIMES

EXIT

History

The BC623 has the capability of storing and plotting 30 points of data for both the batching and continuous feed modes these point can be displayed in a line graph by pressing the *History* button from the main menu. The graph will show the Maximum recorded point, the minimum recorded point, and the mid point between the two. The calculated average is displayed at the bottom of the screen. The data points are collected and displayed from left to right. The newest data starts at the left hand side, and the oldest data at the right hand side. When configured to be a batch controller, the batch history is displayed. When the system is configured to be a continuous controller the rate history is displayed. When the rate history is displayed the feed rates stored on the graph are updated at the rate specified in the History setup. The History data can be cleared by pressing the *Clear History* button from the Main Menu. If the Protect Operator Setup option is turned on the operator must enter the operator password in order to clear the history data. The Data points may also be displayed in Table format. Pressing the Table button from the plot screen will display the data table. Also displayed with the data table are statistical data including the average, standard deviation, first and second sigma, maximum and minimum values. The table display also includes the two product totalizers. Two separate totalizers are provided. The totalizers can be used as desired by the operator. For example, one could be used as a daily total, and one as a yearly totalizer. To clear the totalizers press the *Totals* button on the data table display screen. You will then have the option of clearing totalizer A or totalizer B. The operator may also send the stored data to a serial printer. Pressing the *Print* button on the data table screen will send the stored data to serial port 2 available on the back of the touch screen controller. The receiving device should be configured to receive serial data at 9600 baud, 8 data bits, no parity, and 1 stop bit.



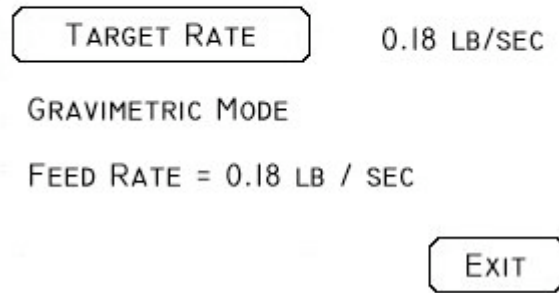
Run Feeder

The Run Feeder screen will vary depending on which mode of operation is selected. If the system is configured to be a continuous controller, the Run Feeder screen will have a *Target Rate* button. To change the target feed rate, press the *Target Rate* button and enter the desired target rate. Once the initial setup has been completed, and the target rate has been entered, the operator may begin feeding product by pressing the Green Start button. To stop feeding product the operator may press the Red Stop Button. While the feeder is running the operator may also press the Exit button to return to the main menu. From the operator may history by pressing the History button. The feeder however, the feeder may be stopped at any time by pressing the red stop button, For this reason it is a good idea to return to the run feeder screen whenever the feeder is running. The Current feed rate is displayed on the run feeder screen as well as the current mode of operation.



may also press the Exit button to return to the main menu. From the operator may history by pressing the History button. The feeder however, the feeder may be stopped at any time by pressing the red stop button, For this reason it is a good idea to return to the run feeder screen whenever the feeder is running.

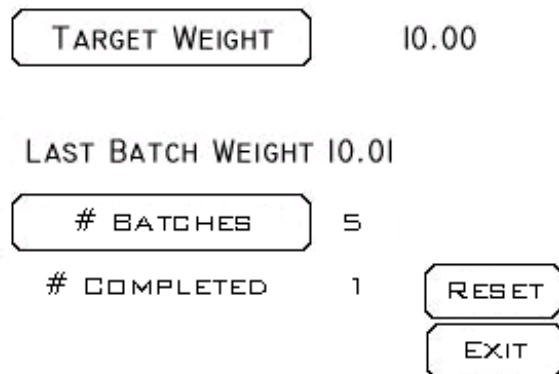
CONTINUOUS FEED



When the start button is pressed, the BC623 starts the feeder in Start up mode the feeder will run at the *start up speed* for the *start up time*, as entered in the continuous feed setup menu. The feeder will then switch to Volumetric mode. After the Volumetric Run Time has elapsed, the BC623 will switch to gravimetric control. It will remain in Gravimetric mode until the stop button is pressed, or if the system is a loss in weight type until a feeder refill is detected. If the feeder is a loss in weight type, and a refill occurs, the BC623 will continue to dispense product in volumetric mode until the refill has been completed. After the Volumetric Run Time has elapsed, the feeder will once again return to Gravimetric mode.

If the BC623 is configured to be a batch controller, the operator is given the option to enter the target weight. To change the target weight the operator may press the *Target Weight* button. Also displayed on the screen is the weight of the last batch. Once the initial system setup has been completed, and the target weight has been entered a batch may be started by either pressing the *Start Batch* button or by pressing the green start button. The BC623 will then step through the batch process as dictated by the system setup parameters. During the batch process, the running batch may be paused by pressing the Stop Push button. Once paused batch may be aborted by pressing the *Abort Batch* button, or resumed by pressing the *Resume Batch* button. The Abort and Resume buttons are displayed once the controller has switched into a paused state. If the Count Batches feature is enabled in

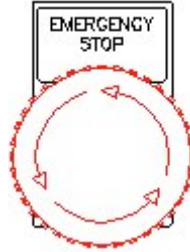
READY TO BATCH



the Batch setup submenu of the System setup menu, the # Batches button is displayed on the screen. The operator may enter the desired number of batches to run. When the number of completed batches equals the number of batches to run the system will a *Completed* message and require that the operator press the *Reset* button before more batches can be run.

Emergency Stop

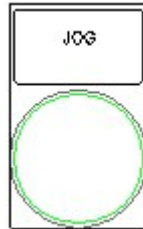
The BC623 is equipped with a mechanical Emergency Stop button. This button may be pressed at any time to stop the feeder. Once the conditions causing the emergency situation have been resolved, the emergency stop button may be pulled out and the feeder may be restarted. If the BC623 is configured as a batch controller, and the emergency stop button was pressed while a batch was in progress, the running batch would be placed in a paused state. Once the emergency stop button is pulled out, the batch may be resumed by pressing the *Resume* button.



mechanical Emergency Stop button time to stop the feeder. The emergency stop button. Once the conditions causing the resolved, the emergency stop button be restarted. If the BC623 is configured emergency stop button was pressed emergency stop button was pressed while a batch was in progress, the running batch would be placed in a paused state. Once the emergency stop button is pulled out, the batch may be resumed by pressing the *Resume* button.

Jog Button

The BC623 has a green Jog button at any time. The jog button will run the the Fast speed % in the Feeder Setup isolated contact closure on terminals 10 conjunction with drive controllers that independently of BC623 controller. It personnel, and its use should be the feeder automatically. The jog button is a momentary push button and returns the feeder to its original state when it is released.

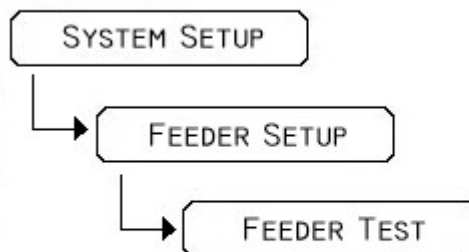


Button that can be used to jog the feeder feeder at the output speed specified by Menu. The Jog button also provides an and 11. This contact may be used in have a jog input. The Jog button works should be used only by experienced avoided when the controller is running

BC623 Rate Controller Setup Steps:

1. Connect Scale to weight Indicator
2. Calibrate Scale Following Calibration Procedure in 355 Indicator Manual
3. Connect BC623 Analog Output to Feeder Drive Controller.
4. Connect Discrete Start / Stop Contact closures to Feeder Drive Controller.
5. Verify Feeder Functionality using the Feeder Test option in the Feeder Setup Menu under the System Setup Menu

MAIN MENU



6. Perform Dynamic Calibration

MAIN MENU

