Published Manual Number: MTCCNR03

- **Specified Date: 2022216**
- **As-of Date: 2022216**
- **Access Date: 2022216**
- **Depth: Detail**
- **Custom: n/a**
- **Applicability: CCN**
- **Language Code: ENG01, Purpose: publication, Format: 1colA**

Technical Reference—

Mentor Controller, version 3.4.x with Addendum for 4.3.3

Read the **separate safety manual** before installing, operating, or servicing

PELLERIN MILNOR CORPORATION POST OFFICE BOX 400, KENNER, LOUISIANA 70063 - 0400, U.S.A.

Applicable Milnor® products by model number:

76028L3F 76028L4F 76028L4S 76028L5F 76028L5S 76032C2F 76032T2F
76039L3F 76039L3S 76039L4F 76039L4S 92048C1F 92048C2F 92048C3F
92048H1F 92048H2F 92048H3F

Addendum to MTCCNR03 for Version 4.3.3

BNTUUG02.C01 0000426192 A.3 A.5 5/20/22, 2:54 PM Released

This addendum to MTCCNR03, Mentor® controller reference guide for software version 3.4.x, details the changes made between version 3.4 and version 4.3.3 of the Mentor® controller software that affect the user experience.

1. Manual Intermediate Belt Functionality

BNTUUG02.C02 0000426191 A.3 A.5 5/20/22, 11:42 AM Released

Mentor® software version 3.4.2 makes it possible to manually run the intermediate belt for conveyor and rail loading systems. When the operator manually runs the intermediate belt, an input is made on the Mentor® controller that initiates a tunnel hold condition, which prevents the tunnel from transferring. A message also appears on the Mentor® main screen, “Intermediate Belt in Manual,” to indicate the belt is running in manual mode.

The intermediate belt controller is a standard feature of version 3.4.1 and later Mentor® controller software. It requires processor board software 25801 or later to use. See document BICCLC06 for more information on the intermediate belt controller.

2. Steam Disinfect for Reuse Tanks and PulseFlow® Tanks

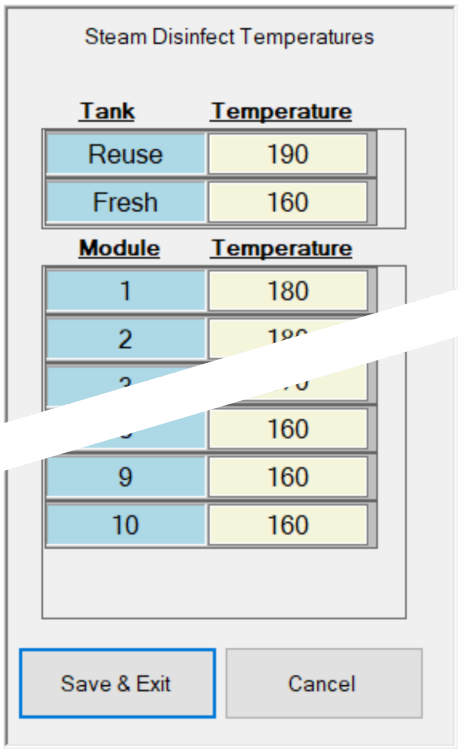
BNTUUG02.C03 0000426190 A.3 A.4 5/20/22, 10:18 AM Released

The steam disinfect feature was modified in Mentor® controller software version 3.4.2 so that, if the reuse tank is equipped with and configured to use a steam valve, the Mentor® controller disinfects the reuse tank when the controller disinfects the tunnel modules. During a steam disinfect, the Mentor® controller steams the modules and the reuse tank to a programmed desired temperature, and maintains the differential temperature for three minutes.

Access the *Steam Disinfect* window, shown in Figure 1, page 1, from the  menu button to program the desired steam disinfect temperatures. You can program a unique desired temperature for each module, and for the reuse tank. If your tunnel is equipped with a PulseFlow® tank, and both sides (fresh and reuse) are equipped with steam valves, the Mentor® controller can steam both sides of the PulseFlow® tank to a desired temperature as well.

See document BICCLC01 for more information on the operation and circuitry of the steam disinfect feature.

Figure 1. Steam Disinfect Window



3. Conductivity Control

BNTUUG02.C04 0000426189 A.3 A.5 5/20/22, 3:12 PM Released

Mentor® controller software version 3.5 changed how conductivity control operates in single tank and PulseFlow® tank CBW® tunnel systems.

3.1. Conductivity Control Operation

BNTUUG02.R01 0000426539 A.3 A.4 5/20/22, 2:58 PM Released

Conductivity control operation has been altered as follows:

Press / Extractor Tank Conductivity Control —

If the conductivity in the extract device (press or extractor) tank rises above the programmed maximum allowed value, an output turns on diverting the extract device water to the sewer instead of the reuse tank (or the reuse side of the PulseFlow® tank). This valve stays open until the conductivity drops below the programmed minimum value. If the conductivity in the extract device tank does not drop below the programmed minimum value before the time programmed in the *Maximum Time to Lower Conductivity in Press* decision expires, the Mentor® controller inserts the programmed high conductivity purge formula into the first module.

Incoming Water Conductivity Sensing —

The conductivity of the incoming water is displayed on the Mentor® main screen for reference only. It does not affect conductivity control in the extract device tank or the reuse tank.

3.2. Conductivity Control Configuration

BNTUUG02.R02 0000426538 A.3 A.4 5/20/22, 1:53 PM Released

The following conductivity configuration values and timers have been modified to accommodate the changes to operation.

See document BICCNFD8 for more information on conductivity control configuration.

Number of Conductivity Meters — If the tunnel system uses conductivity meters, set the number of meters here. A CBW® tunnel washer system supports up to 2 conductivity probes. Older systems may support 3 probes.

0 = Disable conductivity control.
1 = Enable conductivity control for the extract device tank.
2 = Enable conductivity control for the extract device tank, and display the incoming water conductivity.
3 = Enable conductivity control for the reuse tank and the extract device tank, and display the incoming water conductivity (not supported on current systems).

Press High Conductivity Debounce — The maximum time (in seconds) that the extract tank conductivity can be higher than the configured maximum conductivity value. If the extract tank conductivity is higher than the configured maximum conductivity after this time expires, the controller turns on an output to divert the extract device tank water to the sewer.

Press Low Conductivity Debounce — The maximum time (in seconds) that the extract tank conductivity can be lower than the configured minimum conductivity value. If the extract tank conductivity is lower than the configured minimum conductivity after this time expires, the controller turns off the output to stop diverting the extract device tank water to the sewer.

4. Minimum Fresh Water Quantity Option

BNTUUG02.R03 0000426537 A.3 5/20/22, 11:45 AM Released

The "minimum fresh water quantity" option for single tank PulseFlow® tunnel systems pumps fresh water into the reuse tank, to flush out sediment and contaminants that build up in the reuse tank over time. The tunnel pumps the programmed amount of water into the reuse tank every time the tunnel transfers. This option is primarily used in tunnel systems that process heavily-soiled goods. This value can be left at 0 for most tunnels.

To use this option, program the *Minimum Fresh Water Quantity* amount, in gallons or liters, in the PulseFlow® area of the *Formulas* window for every formula. The actual amount of fresh water pumped into the reuse tank is determined by the formula in the tunnel with the highest *Minimum Fresh Water Quantity* value.

NOTE: This option is not available on PulseFlow® tunnels with the divided fresh and reuse PulseFlow® tank.

5. Other Additions and Changes

BNTUUG02.R04 0000426536 A.3 A.6 5/20/22, 3:01 PM Released

Function Op Code “0M, Signal Output” — This op code operates like a standard timed c-bit (op code 00), but does not turn off if a drain is opened in the same module. It is used for signal c-bits. Requires processor board software 25903 or later.

“Enable Batch Data” Configuration Decision — Select this option to enable batch data collection and graphing. Leave this option deselected to disable batch data. Change this setting from the Miltrac™/Mildata®tab of the *Hardware Configuration* window. See Section 7.2.4. “Batch Data” in document BICCNO01 for more information.

“Maximum Module Temperature” Configuration Decision — This value determines the maximum temperature that any module can safely achieve. If the temperature in any module exceeds this temperature, the Mentor® controller displays a “TEMP TOO HIGH” warning on the main screen. Program this value from the Errors tab of the *Hardware Configuration* window.

"Maximum Time to Lose Low Level after Drain" Configuration Decision — This value determines the maximum time (in seconds) the Mentor® controller waits for the water level in a module to drop below the programmed low water level after the drain has been opened. If the drain is open and low level has not been lost after this timer expires, the Mentor® controller displays the error message “Drain Open– Low Level Still Made in Module“ on the main screen. Setting this timer to zero disables the error. Program this value from the Errors tab of the *Hardware Configuration* window.

“Drain Open– Low Level Still Made in Module” Error — This error functions with the configuration decision "Max Time to Lose Low Level after Drain," described previously. This error indicates the drain is open and the module did not lose low level after the “Max Time to Lose Low Level after Drain” timer expired.

Steam Function Limits — In Mentor® software version 4.3.1 and later, c-bit values for steam functions must be between 50 and 200 if configured for Fahrenheit, and 10 to 90 if configured for Celsius.

End of document: BNTUUG02

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Chapter 1
Commissioning

BICCNK01 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

1.1. About the Mentor Manual

1.1.1. Scope

This manual provides information about the Milnor® Mentor controller for CBW® systems. Consult the other manuals available for your system for more detailed information. See the manual on water flow features for detailed descriptions of how the CBW® washer system works and how to use it most efficiently.

1.1.2. How to Identify this Manual and its Included Documents [Document BIUUUD13]

Use the specifications on the front cover of this manual to identify this manual or the included documents. This section tells about these specifications.

Published manual number—The primary identification number for the manual.

Specified date—The first assembly date for the machine or change about which this manual gives data.

As-of date—The company makes new manuals about items that are not new. These new manuals will include data started before this date.

Access date—The date Milnor prepared the manual for its publication.

Depth—"Detail" manuals show the maximum available data. "Synopsis" manuals show the minimum necessary data. A manual with more data goes with a synopsis manual.

Custom—A value of "n/a" here shows that this manual applies to all machines identified on the inner front cover of the manual. Other values show the laundry name and a code for the specified machine.

Applicability—Each value here shows the machines or model numbers that this manual applies to. The inner front cover shows the full list of the applicable models. If this value is "not used," this manual has a different function.

Language Code—The value here shows the language and dialect of this manual. "Eng01" shows that the manual uses United States English.

Refer to a **document** in this manual with all of the specifications shown on the front cover. Replace the published manual number with the document number.

1.1.3. Trademarks of Pellerin Milnor Corporation [Document BIUUUD14]

These words are trademarks of Pellerin Milnor Corporation and other entities:

Table 1: Trademarks

AutoSpot™	E-P Plus®	Linear Costa Master™	MilTouch™	PurePulse®
CBW®	Gear Guardian®	Linear Costo™	MilTouch-EX™	Ram Command™
Drynet™	GreenTurn™	Mentor®	Miltrac™	RecircONE®
E-P Express®	GreenFlex™	Mildata®	MultiTrac™	RinSave®
E-P OneTouch®	Hydro-cushion™	Milnor®	PBW™	SmoothCoil™
		MilMetrix®	PulseFlow®	Staph Guard®

— End of BICCNK01 —

BIUUUK06 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

1.2. Contacting Milnor®

Your authorized Milnor dealer can assist you with your Milnor machine and knows about the local conditions that may be pertinent to the installation, use, or maintenance of the machine. Contact your dealer first. For assistance from the Milnor factory, refer to Table 2 for contact information.

Table 2: Pellerin Milnor Corporation Contact Information

Purpose	Department	Telephone	FAX	E-mail/Website
Order, or enquire about replacement parts	Parts	504-467-2787	504-469-9777	parts@milnor.com
Obtain advice on installing, servicing, or using	Customer Service/ Technical Support	504-464-0163	504-469-9777	service@milnor.com www.milnor.com (Customer Service)
Learn about, request, or enroll in Milnor service seminars	Training	504-712-7725	504-469-9777	training@milnor.com
Determine warranty eligibility or claim status	Warranty Administration	504-712-7735	504-469-9777	service@milnor.com (Attention: Warranty)
Ask about, comment on, or report an error in equipment manuals	Technical Publications	504-712-7636	504-469-1849	techpub@milnor.com

Your first contact with any question should be your authorized Milnor dealer, but problems or special situations may require consultation with the Milnor factory. Mail written correspondence to this address:

Pellerin Milnor Corporation
Post Office Box 400
Kenner, Louisiana 70063-0400
Telephone: 504-467-9591
http://www.milnor.com

— End of BIUUUK06 —

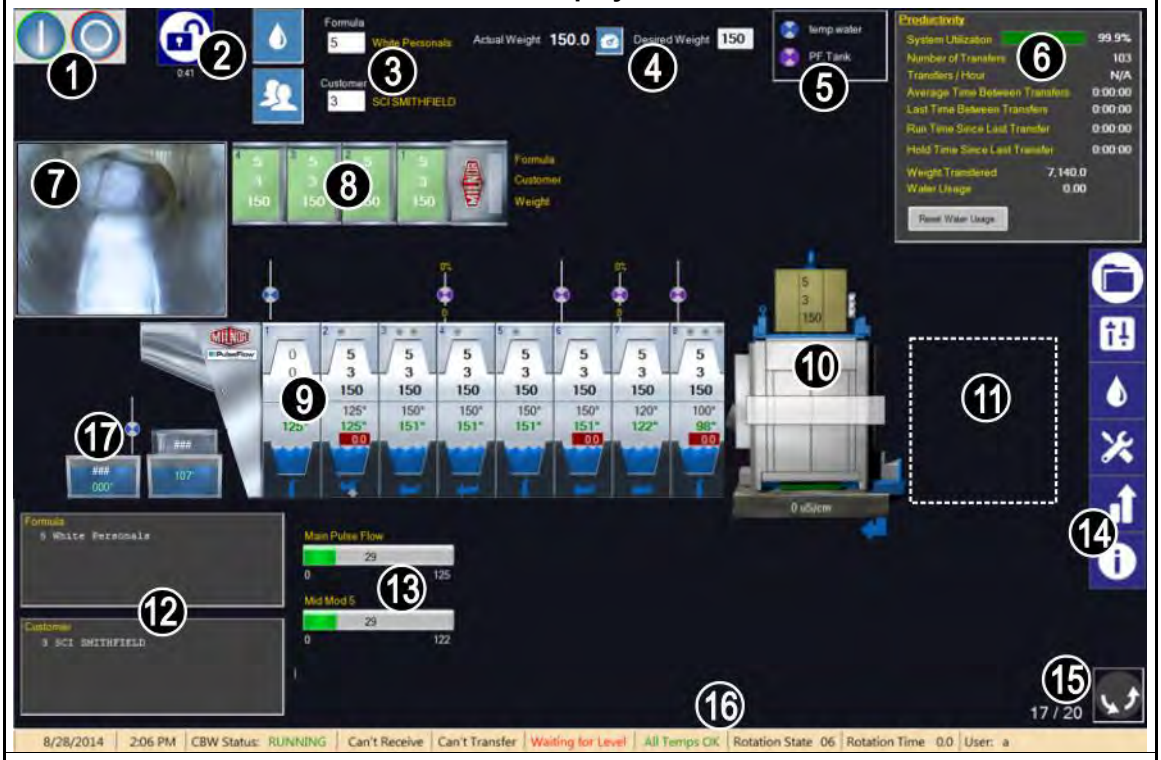
Chapter 2
The Mentor Operating Screen

BICCNO08 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

2.1. The Main Screen

Figure 1: Main Screen of Mentor version 3.0 (Simulated)

Display



Legend

Note. The item numbers in the figure refer to the topic numbers in the text below.

2.1.1. Tunnel Rotation Controls

Touch these buttons to start and stop the rotation of the tunnel. See also Section 3.2.

2.1.2. Administrator Access

Touch this button to log in with additional rights. You will be prompted for a username and a password. See also Section 3.11.

2.1.3. Formula and Customer Entry

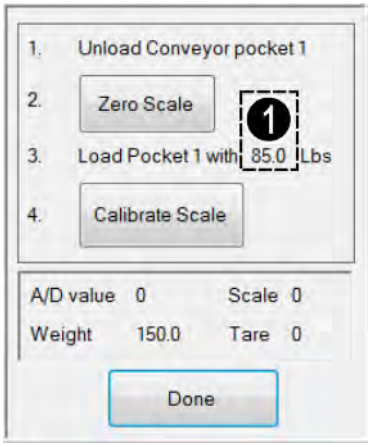
Touch these buttons to select a wash formula or a customer from a list. To directly enter a formula number or customer number, touch the text in the box. See also Section 3.4. and Section 3.5.

2.1.4. Weight Data

Displays the actual weight and the desired weight of the load.

Tip: The tool button appears between the fields for the actual weight and the desired weight if the loading device can be calibrated. Use the displayed procedure to calibrate the loading device to display accurate actual weights. See Figure 2.

Figure 2: Weight Calibration for Loading Device (Simulated)

Screen Image	Legend
	**1.** Described in Section 3.7.2.5.6 “CONWA ”

2.1.5. Water Valve Legend

Shows the color for each water inlet. See Section 3.7.8.

2.1.6. Productivity Summary

Shows an overview of the recent performance and water use of the tunnel washer. See Section 7.2.1.2.

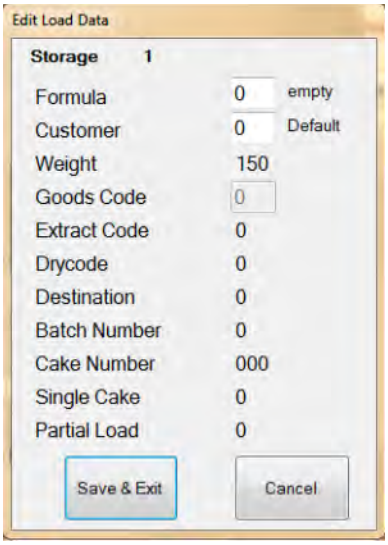
2.1.7. Load Scoop Camera

Allows a visual check that all goods exited the tunnel washer load scoop.

2.1.8. Loading Device Data

Displays and allows entry of data for goods in the storage positions of the loading device.

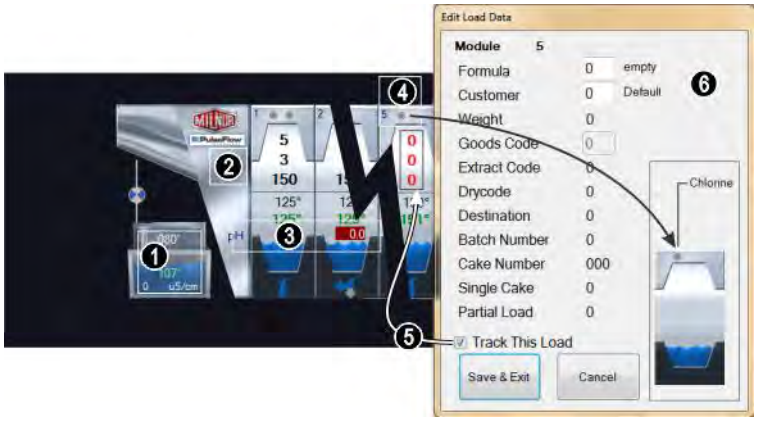
Figure 3: *Edit Load Data* **window for the Loading Device (Simulated)**



2.1.9. Tunnel Washer Data

Displays selected data related to batches in the tunnel washer.

Figure 4: Data for Batches in the Tunnel Washer (Simulated)

Screen Image	Legend
	**1.** Tank temperature and conductivity data **2.** Load chute photoeye indicator **3.** Module pH display **4.** Chemical injection indicator **5.** Data display for tracked batches **6.** *Edit Load Data* window (touch any module to display)

2.1.10. Discharge Device

Displays the data configured on the discharge device. The press tank conductivity value is shown below the display if the discharge device is a press and is configured to monitor water conductivity.

2.1.11. Shuttle Device

Displays the data configured on the shuttle device.

2.1.12. Recent Formula and Customer Data

Displays the formula numbers and customer numbers and the corresponding formula names and customer names for goods in the tunnel washer. This data is for reference only.

2.1.13. PulseFlow® System Data

When a PulseFlow® operation is in progress, this area displays the percent complete of the operation. See these locations for information about configuring and programming the PulseFlow® devices:

- Section 3.7.2.1.1.3 "PulseFlow®"
- Section 3.9.4 "PulseFlow® Button"
- Section 3.8.1.16 "*PulseFlow*® zone"
- Section 6.1.9 "08: Modulating Water with Flowmeter"

2.1.14. Tool Bar

The tool bar contains buttons to access features of the Mentor controller. This item is detailed in Section 3.1.

2.1.15. Rotation and Reversals

Displays the number of reversals completed, the number of reversals commanded, and the rotation direction.

2.1.16. Tunnel Status and Message Area

Displays data and messages about the operation of the tunnel washer.

2.1.17. PulseFlow® Tanks Area

Displays data and messages about the number and status of the PulseFlow tanks.

— End of BICCNO08 —

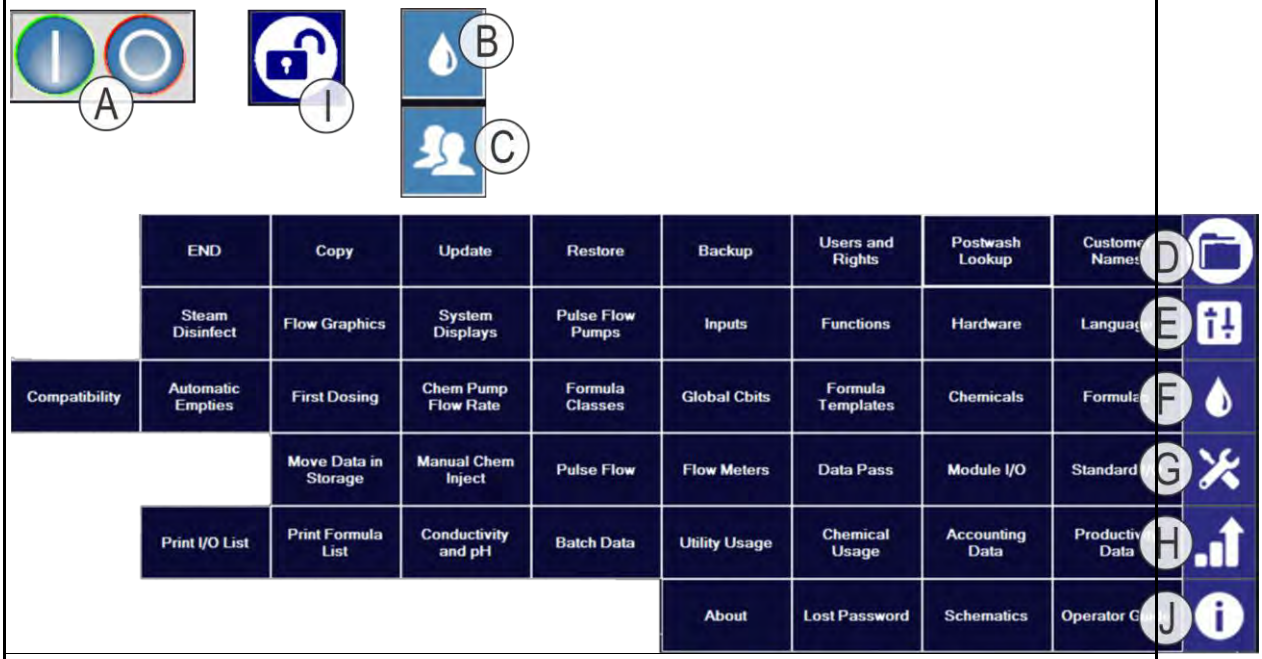
Chapter 3
The Tool Bar User Interface

BICCNF04 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

3.1. Main Screen Controls

Figure 5: Buttons and Menus

Illustration



Legend

A. *Start* and *Stop* buttons for the tunnel washer (see Section 3.2.)
B. *Select Formula* button (see Section 3.4.)
C. *Select Customer* button (see Section 3.5.)
D. *File Operations* button (see Section 3.6.)
E. *Configuration* button (see Section 3.7.)
F. *Programming* button (see Section 3.8.)
G. *Inputs and Outputs* button (see Section 3.9.)
H. *Reports* button (see Section 3.10.)
I. *Administration Mode* button (see Section 3.11.)
J. *Help* button (see Section 3.12.)

— End of BICCNF04 —

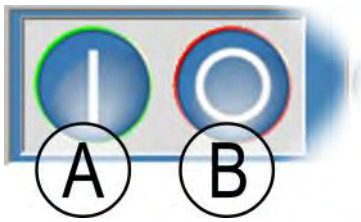
BICCNF05 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

3.2. The *Start* and *Stop* Buttons

The *Start* and *Stop* buttons (Figure 6) control rotation of the tunnel washer cylinder.

- Push the *Start* button to start tunnel rotation. The rotation count starts when all conditions are met, such as water levels and temperatures.
- Push the *Stop* button to stop tunnel rotation. Rotation will stop immediately unless the tunnel washer is committed to transfer when you push the *Stop* button.

Figure 6: The *Start* and *Stop* Controls

Illustration	Legend
	**A.** *Start* button **B.** *Stop* button

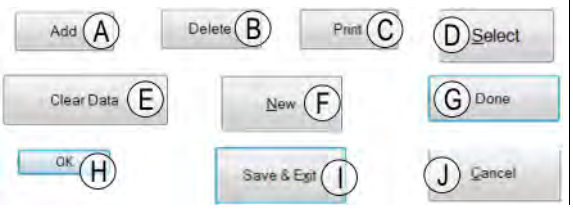
— End of BICCNF05 —

BICCNF28 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

3.3. Buttons with Multiple Locations

The buttons in Figure 7 appear in many Mentor controller windows.

Figure 7: Buttons

Illustrations	Legend
	**A.** *Add* button **B.** *Delete* button **C.** *Print* button **D.** *Select* button **E.** *Clear Data* button **F.** *New* button **G.** *Done* button **H.** *OK* button **I.** *Save & Exit* button **J.** *Cancel* button

3.3.1. Action Buttons

3.3.1.1. *Add* button—Touch the *Add* button to make a new item.

3.3.1.2. *Delete* button—Touch the *Delete* button to erase the selected item.

3.3.1.3. *Print* button—Touch the *Print* button to print the data displayed. The related *Print All* button prints all data of the type shown. For example, the *Print* button in the *Formulas* window prints the displayed formula; the *Print All* button in the same window prints all programmed formulas.

3.3.1.4. *Select* **button**—The *Select* button accepts the highlighted entry from the list and closes the window.

3.3.1.5. *Clear Data* **button**—The *Clear Data* button sets the data to 0.

3.3.1.6. *New* **button**—The *New* button opens a blank form.

3.3.2. Confirmation Buttons

3.3.2.1. *Done* **button**—Touch the *Done* button to close the window after you complete all the required actions.

3.3.2.2. *OK* **button**—Touch the *OK* button to confirm the changes and close the window.

3.3.2.3. *Save & Exit* **button**—Touch the *Save & Exit* button to save the changes and close the window.

3.3.3. *Cancel* Button

Touch the *Cancel* button to discard the changes and close the window.

— End of BICCNF28 —

BICCNF06 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

3.4. Select a Formula or Goods Code

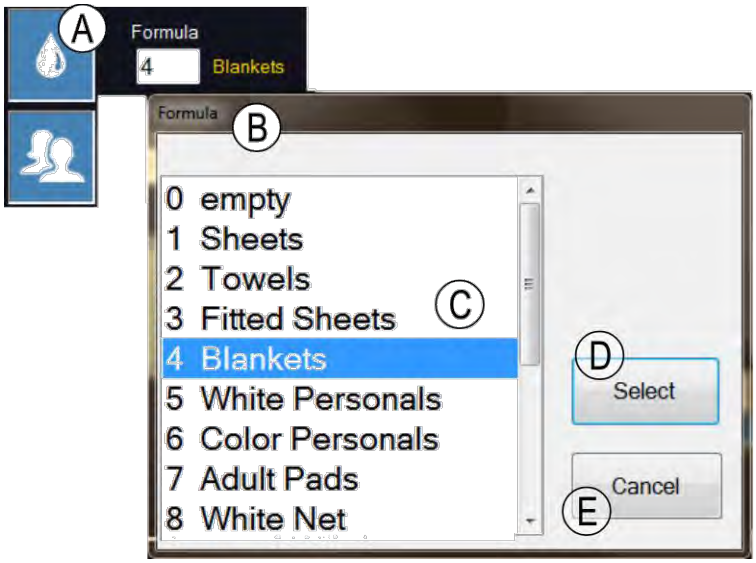
1. Touch the *Select Formula* button to display a list of formulas.

   Note 1: This button allows entry of a goods code if *Goods Code Entry* is enabled in *Settings/Hardware*.

2. Touch a formula in the list.
3. Touch the *Select* button.

Figure 8: The *Select Formula* Button and *Formula* List

Button and List



Legend

A. *Select Formula* button
B. *Formula* List window
C. Formula list
D. *Select* button
E. *Cancel* button

— End of BICCNF06 —

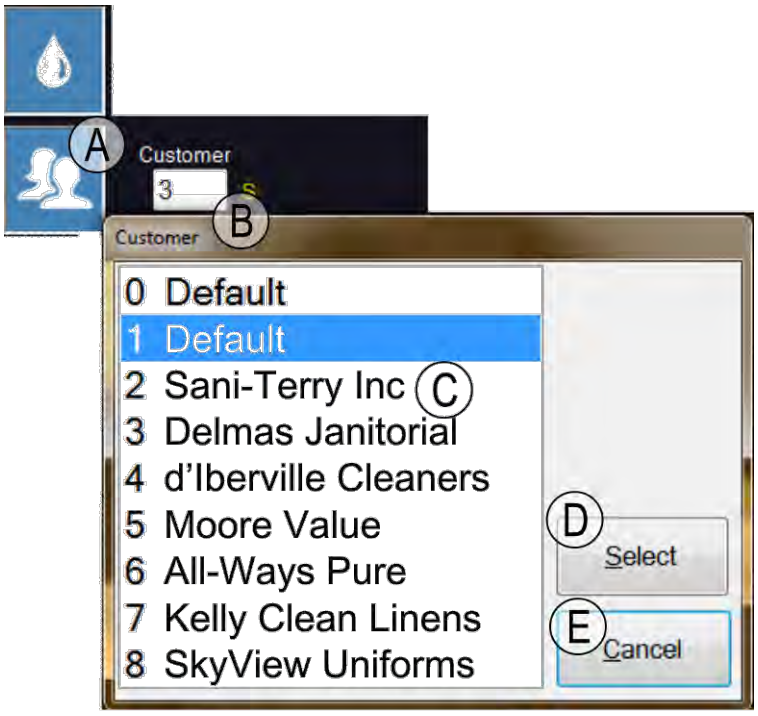
BICCNF07 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

3.5. Select a Customer

1. Touch the *Select Customer* button to display a list of tunnel washer customers.
2. Touch a customer in the list.
3. Touch the *Select* button.

Figure 9: The *Select Customer* Button and *Customer* List

Button and List



Legend

A. *Select a Customer* button
B. *Customer List* window
C. Customer list
D. *Select* button
E. *Cancel* button

— End of BICCNF07 —

BICCNF08 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

3.6. The File Menu Button

Figure 10: The File Menu button

The File Menu

Legend

A. Customer names (see Section 3.6.1)
B. Goods Code Data (see Section 3.6.2)
C. Postwash Lookup (see Section 3.6.3)
D. Users and rights (see Section 3.6.4)
E. Backup (see Section 3.6.5)
F. Restore (see Section 3.6.6)
G. Update (see Section 3.6.7)
H. Copy (see Section 3.6.8)
I. End (see Section 3.6.9)

3.6.1. *Customer Names* [Document BICCNF59]

Touch the *Customer Names* button to manage the customer list that appears when you touch the *Select a Customer* button (Section 3.5.).

You must be logged in with *Machine Configuration* rights to change the *Customer Names* list. See Section 3.6.1.1 "How to Add and Remove Customers".

3.6.1.1. How to Add and Remove Customers [Document BICCNF84]

Figure 11: The *Customer Names* button

Illustration	Legend
	**A.** *Customer Names* window **B.** *Customer numbers* **C.** *Customer names* **D.** Numeric keypad **E.** Alpha-numeric keypad **F.** *Add* button **G.** *Delete* button **H.** *Done* button

3.6.1.1.1. Add a Customer

1. Touch the *Add* button to make a blank row in the *Customer Names* list.
2. Touch the empty field in the *Number* column. Use the numeric keypad on the screen to enter a customer number.
3. Touch the *Done* button to accept the customer number and hide the keypad.
4. Touch the empty field in the *Name* column. Use the alphabetic keypad to enter a customer name.
5. Touch the *Enter* button to accept the customer name and hide the keypad.
6. Touch the *Done* button to accept the changes and close the window.

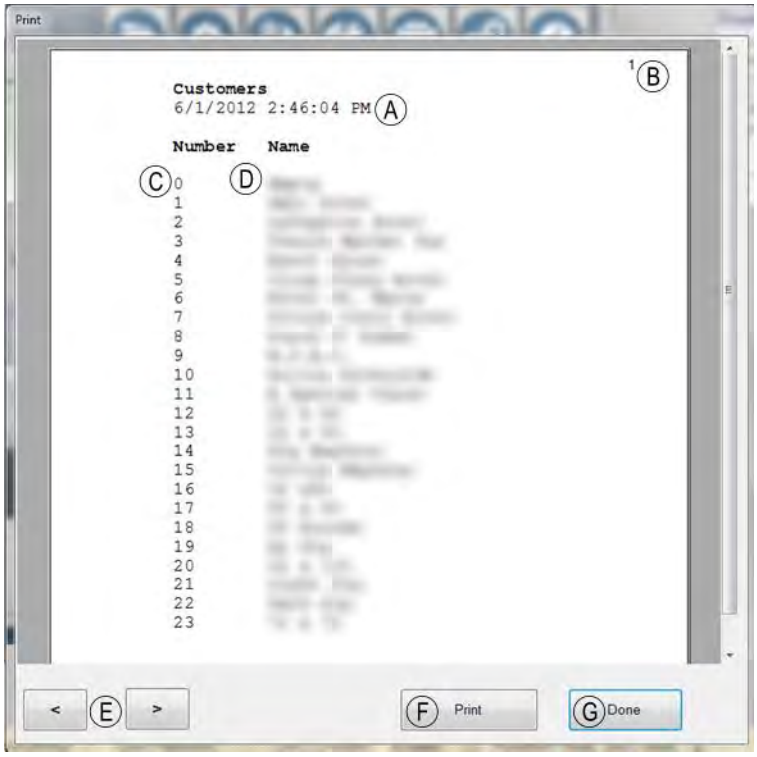
3.6.1.1.2. Remove a Customer

1. Touch the customer number for the customer you want to remove from the *Customer Names* list.
2. Touch the *Done* button to close the keypad window.
3. Touch the *Done* button to delete the selected customer number and name. The text on the row changes from black to gray.
4. Touch the *Done* button to confirm the action and close the *Customer Names* list.

3.6.1.2. Print a Customer List [Document BICCNF87]—You must have *Machine Configuration* rights to print a customer list.

1. Touch the *Reports* button in the tool bar.
2. Touch the *Customer Names* button.
3. Touch the *Print* button to preview the report.
4. Touch the *Print* button at the bottom of the *Customers* report preview window. The report prints to the Windows default printer.
5. Touch the *Done* button to close the preview window.

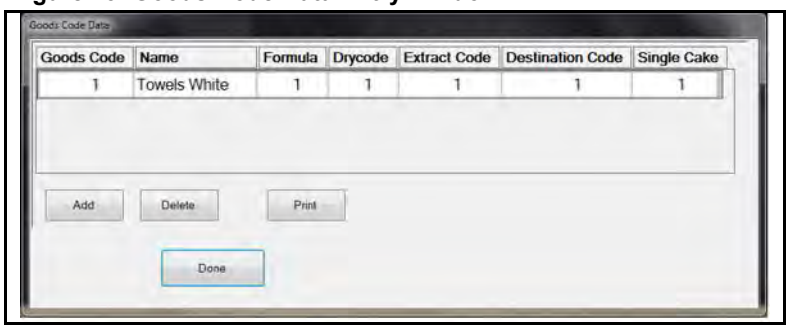
Figure 12: Customer List Print Preview

Window	Legend
	**A.** Report date and time **B.** Report page number **C.** *Customer number* **D.** *Customer name* **E.** *Previous* and *Next* page buttons **F.** *Print* button **G.** *Done* button

3.6.2. Goods Code Data [Document BICCNFB3]

This decision appears only if the controller is configured for goods code data entry. Use this window to add, edit, and delete goods code names and to assign formula numbers.

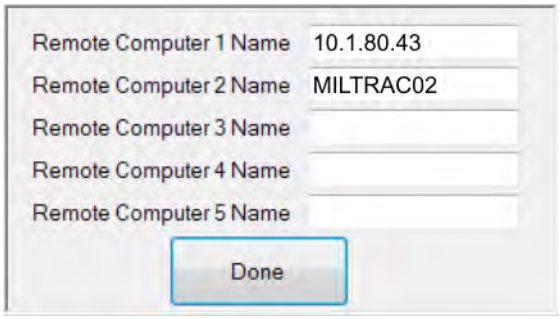
Figure 13: Goods Code Data Entry Window



3.6.3. Postwash Lookup [Document BICCNFB4]

Although this button always appears, it is used only when a Milnor DataFusion system communicates with a dryer pod. Enter the computer names (e.g., MILTRAC02) or IP addresses (e.g., 10.1.80.43) for each remote Miltrac computer with which the Mentor controller must communicate.

Figure 14: Postwash Lookup Window



3.6.4. Users and Rights [Document BICCNF60]

Touch the *Users and Rights* button to manage the list of users who can log in to the Mentor controller and what rights each user has.

You must be logged in with *All Rights* to change the *Users and Rights* list.

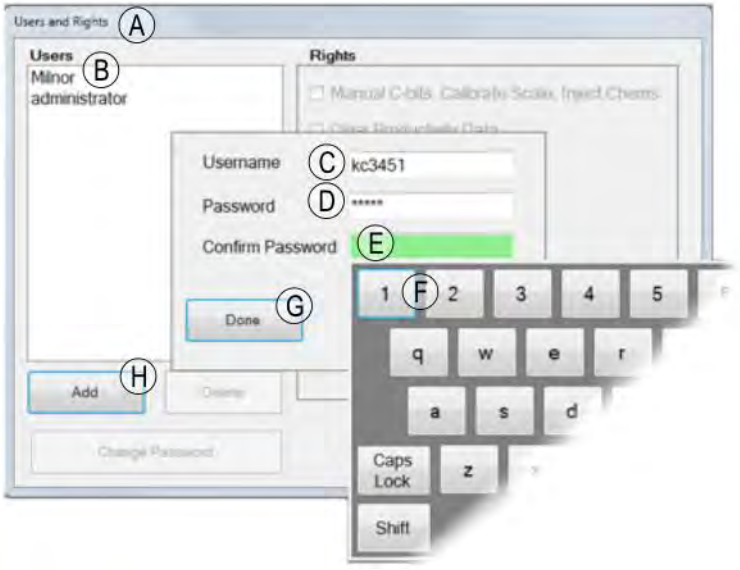
3.6.4.1. Add and Remove Users [Document BICCNF85]—Use this control to change the list of laundry employess who are authorized to use the tunnel washer.

3.6.4.1.1. How to Add a User

1. Touch the *Add* button to open the form for a new user.

Figure 15: Add a New User

Composite Illustration



Legend

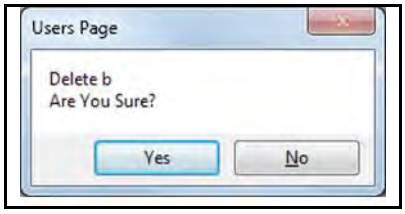
- **A.** *Users and Rights* window
- **B.** *Users* list
- **C.** *User name* field for new user
- **D.** User *password* for new user
- **E.** *Password confirmation*
- **F.** Alpha-numeric keypad
- **G.** *Done* button
- **H.** *Add* button

2. Touch the empty *Username* field. Use the keypad on the screen to enter a name for the new user.
3. Touch the empty *Password* field. Use the keypad on the screen to enter a password for the user.
4. Touch the empty *Confirm Password* field. Enter the password that you entered in the *Password* field.
5. Assign the rights the new user needs to do his or her job.
6. Touch the *Update Rights* button to assign rights to the user.
7. Touch the *Done* button to close the *Users and Rights* list.

3.6.4.1.2. How to Remove a User

1. Touch the user name to remove from the list.
2. Touch the *Delete* button.
3. Confirm that you want to delete the user. (Figure 16)
4. Touch the *Done* button to accept the change and close the window.

Figure 16: Delete User Confirmation Window



3.6.4.2. Change Passwords [Document BICCNF86]

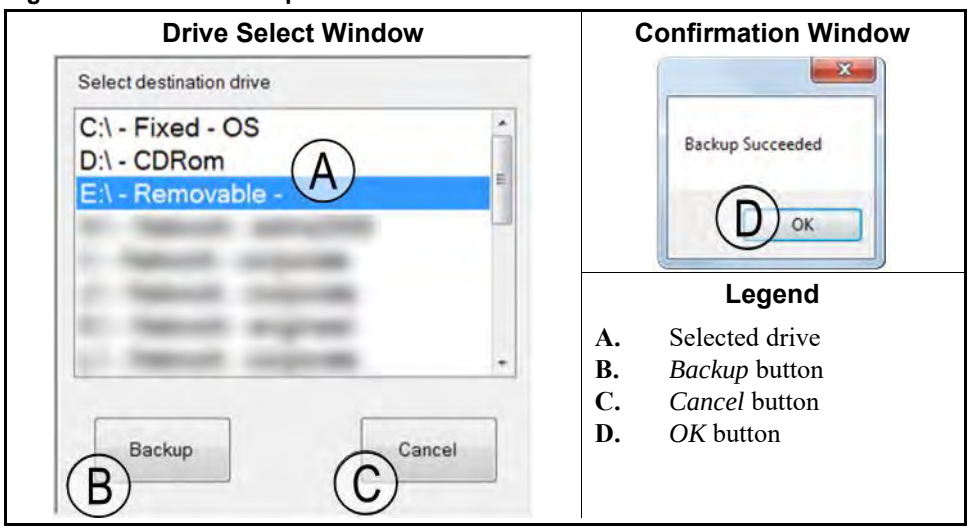
1. Touch the user name to get a new password.
2. Touch the *Change Password* button.
3. Enter a password in the *Password* field.
4. Enter the same password in the *Confirm Password* field.
5. Touch the *Done* button to close the *Users and Rights* form.

3.6.5. Backup [Document BICCNF61]

Touch the *Backup* button to copy data from the Mentor computer to a storage device such as a USB flash drive. You can use the backup device to restore the saved data to the Mentor computer if necessary.

1. Touch the *Backup* button to begin.
2. In the *Drive Select* window (Figure 17), touch the drive where the saved data will be stored. The Mentor controller saves the data to the root directory of the selected drive.
3. Touch the *Backup* button to copy the data, or touch the *Cancel* button to close the *Drive Select* window.
4. When the backup process ends, touch the *OK* button in the *Confirmation* window (Figure 17).
5. Put the backup flash drive in a safe place.

Figure 17: Mentor Backup

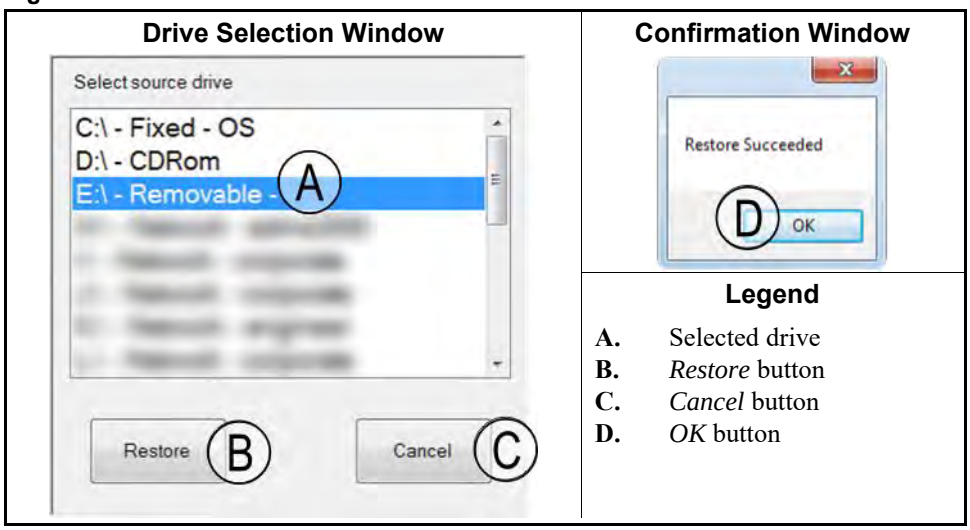


3.6.6. Restore [Document BICCNF62]

Touch the *Restore* button to restore data that was copied from the Mentor computer.

1. Make sure that the storage device with the backup data is available to the Mentor computer.
2. Touch the *Restore* button to begin.
3. In the *Drive Select* window, touch the drive where the backup data is stored.
4. Touch the *Restore* button in the *Select Source Drive* window.
5. When the restore process ends, touch the *OK* button in the *Confirmation* window.
6. Remove the storage device from the Mentor computer.

Figure 18: Mentor Restore



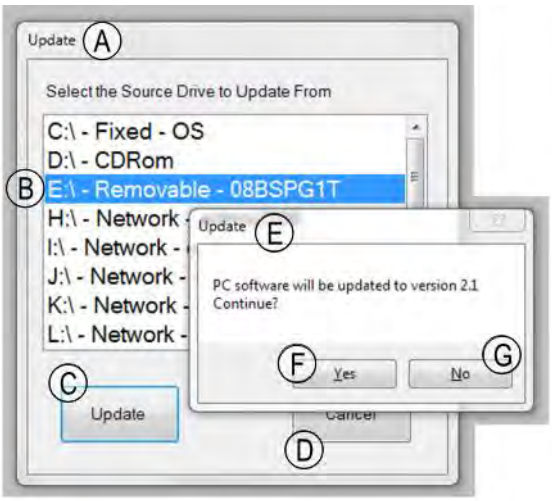
3.6.7. Update [Document BICCNF63]

The *Update* button updates the Mentor software from a `MentorUpdate.zip` stored on a USB flash drive.

1. Connect the USB flash drive containing the `MentorUpdate.zip` file to the Mentor computer.

2. Touch the *File Menu* button.
3. Touch the *Update* button in the *File* menu.
4. In the *Update Source* window, touch the drive containing the update file.
5. Touch the *Update* button in the *Update Source* window.
6. Touch the *Yes* button in the *Confirmation* window.
7. The Mentor controller closes and restarts when the update is complete.

Figure 19: Update Windows

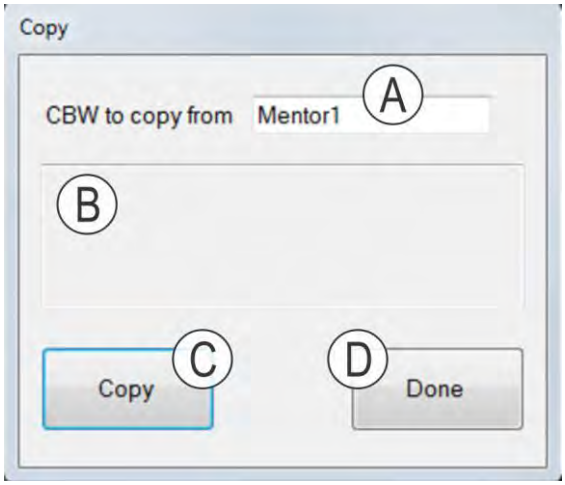
Illustration	Legend
	**A.** *Update Source* window **B.** Selected drive **C.** *Update* button **D.** *Cancel* button **E.** *Confirm the Update* window **F.** *Yes* button **G.** *No* button

3.6.8. Copy [Document BICCNFC5]

The *Copy* button copies the formulas, the customer codes, and the goods codes from another Mentor controller on the same network. The copy will not be allowed if the Cbit assignments are not identical between the two Mentor controllers.

Configuration data is not copied.

Figure 20: Mentor Copy

Copy Window	Legend
	**A.** Name of source **B.** Progress area **C.** *Copy* button **D.** *Done* button

3.6.9. End [Document BICCNF64]

Touch the *End* button to stop the Mentor® control program.

You must be logged into the Mentor controller to stop the program, but no specific rights are required.

— End of BICCNF08 —

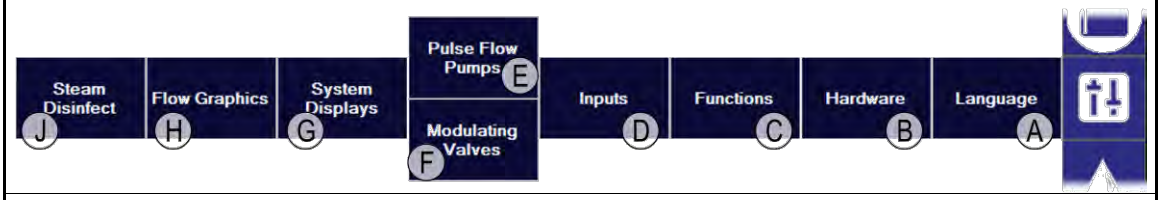
BICCNF09 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

3.7. The Configuration Menu Button

The configuration menu contains settings and values that do not need frequent changes.

Figure 21: Configuration Menu button

Illustration



Legend

- **A.** *Language* button (see Section 3.7.1)
- **B.** *Configure Hardware* button (see Section 3.7.2)
- **C.** *Configure Functions* button (see Section 3.7.3)
- **D.** *Configure Inputs* button (see Section 3.7.4)
- **E.** *Configure PulseFlow Pumps* button (see Section 3.7.5)
- **F.** *Configure Modulating Valves* button (see Section 3.7.6)
- **G.** *Configure System Displays* button (see Section 3.7.7)
- **H.** *Configure Flow Graphics* button (see Section 3.7.8)
- **J.** *Steam Disinfect* button

3.7.1. Configure a Language [Document BICCNFB7]

1. Touch the *Language* button to display a list of available languages.
2. Select the language in which you want the Mentor controller prompts to appear.
3. Touch the Done button to save your change and return to the *Configure* menu.

Figure 22: The Language Selection Menu

3.7.2. Configure Hardware [Document BICCNFC7]

Figure 23: Hardware Configuration Window

Screen Capture

Legend

- **A.** *Machine* decisions (see Section 3.7.2.1.1)
- **B.** *User Interface* decisions (see Section 3.7.2.1.2)
- **C.** *Hardware* decisions (see Section 3.7.2.2)
- **D.** *Optional Hardware* decisions (see Section 3.7.2.2.1)
- **E.** *Rotation* decisions (see Section 3.7.2.3)
- **F.** *PulseFlow* group (see Section 3.7.2.4)
- **G.** *Loading* group (see Section 3.7.2.5)
- **H.** *Discharge* decisions (see Section 3.7.2.6)
- **I.** *Chemical* decisions (see Section 3.7.2.7)
- **J.** *High Level Disinfect* decisions (see Section 3.7.2.8)
- **K.** *Miltrac/Mildata* decisions (see Section 3.7.2.9)
- **L.** *Init Codes* (see Section 3.7.2.10)
- **M.** *Units* decisions (see Section 3.7.2.11)
- **N.** *Meters* decisions (see Section 3.7.2.12)
- **O.** *Errors* decisions (see Section 3.7.2.13)
- **P.** *Levels and Temperatures* decisions (see Section 3.7.2.14)
- **Q.** *Empty Pockets* decisions (see Section 3.7.2.15)

3.7.2.1. Machine and User Interface Decisions [Document BICCNFC6]

3.7.2.1.1. Machine Decisions

3.7.2.1.1.1. Number of Storage Positions—Enter the number of compartments on the loading conveyor or the number of bags available in the rail system queue. The range is 00 to 16 storage positions.

- Enter 00 if the tunnel washer is not associated with any loading device, such as when batch codes are entered directly into the first module.
- Enter 01 if the tunnel washer is loaded by a Miltrac system. The Mentor controller will display the data for the batch about to enter the tunnel washer.

3.7.2.1.1.2. Number of Modules—Enter the number of modules in the tunnel washer. The range is 00 to 20 modules. **Use 00 only for troubleshooting with factory guidance.**

3.7.2.1.1.3. PulseFlow®—Select this option if the tunnel washer has the pumps and valves required for PulseFlow® system operation. See these other locations for more information:

- Section 6.1.9 “08: Modulating Water with Flowmeter”
- Section 3.9.4 “PulseFlow® Button”
- Section 3.8.1.16 “*PulseFlow*® zone”

3.7.2.1.1.4. High Level Disinfect—Enable this choice for tunnel systems that are equipped for High Level Disinfect.

3.7.2.1.1.5. Enable Cold Restart—Enable this choice to allow cold restarts.This choice applies to tunnel washers that are equipped with a heat exchanger system in lieu of steam injection.

3.7.2.1.1.6. Goods Code Entry—Enable this choice to have the Mentor controller prompt for a goods code with each batch.

3.7.2.1.2. User Interface Decisions

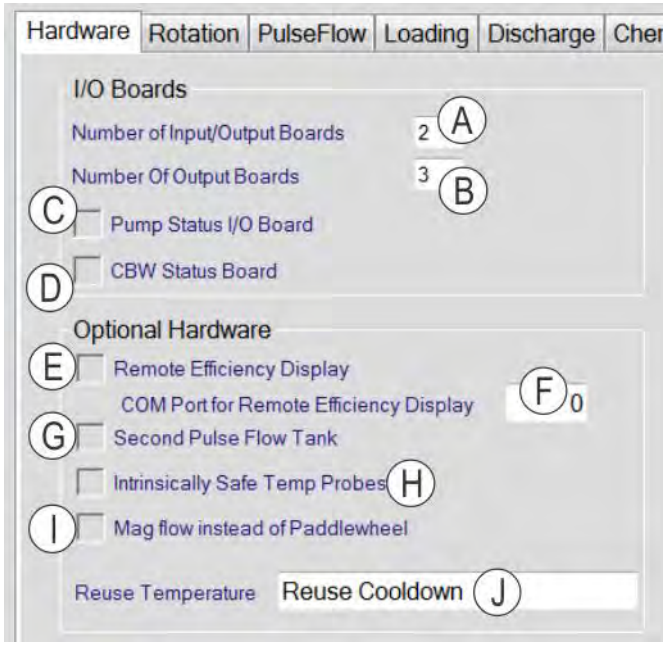
3.7.2.1.2.1. Show Post Wash—Enable this choice to display the position immediately after the last module of the tunnel washer.

3.7.2.1.2.2. Do Not Show Reuse Tank—Enable this choice to hide the reuse tank which usually provides water to flush goods into the first tunnel washer module.

3.7.2.2. Hardware Tab [Document BICCNFC8]

Figure 24: Hardware Tab

Typical Display



Legend

- **A.** Number of Input/Output boards (see Section 3.7.2.2.1)
- **B.** Number of Output boards (see Section 3.7.2.2.2)
- **C.** Pump Status I/O board (see Section 3.7.2.2.3)
- **D.** CBW Status board (see Section 3.7.2.2.4)
- **E.** Remote Efficiency Display (see Section 3.7.2.2.5)
- **F.** COM Port for Remote Efficiency Display (see Section 3.7.2.2.6)
- **G.** Second PulseFlow Tank (see Section 3.7.2.2.7)
- **H.** Intrinsically Safe Temperature Probes (see Section 3.7.2.2.8)
- **I.** Magnetic Flow Meter instead of Paddlewheel (see Section 3.7.2.2.9)
- **J.** Reuse Temperature (see Section 3.7.2.2.10)

3.7.2.2.1. Number of Input/Output boards—Enter the number of 16-input/8-output boards in the tunnel washer control system. There can be from 0 to 15 boards at addresses from 01H to 0FH.

3.7.2.2.2. Number of Output boards—Enter the number of 24-output boards in the tunnel washer control system. There can be from 0 to 15 boards at addresses from 11H to 1FH.

3.7.2.2.3. Pump Status I/O board—not used

3.7.2.2.4. CBW Status board—For tunnel systems with an output board to provide run, stopped, transferring, and error code outputs.

3.7.2.2.5. Remote Efficiency Display—For tunnel systems with Mentor controllers and the optional remote efficiency display, the remote light emitting diode display shows run time as a percentage of total power-on time for the tunnel.

3.7.2.2.6. COM Port for Remote Efficiency Display—the COM port on the Mentor computer where the optional remote efficiency display is connected

3.7.2.2.7. Second PulseFlow Tank—Select this option if the tunnel is equipped with two PulseFlow tanks, one for fresh water and one for reuse water.

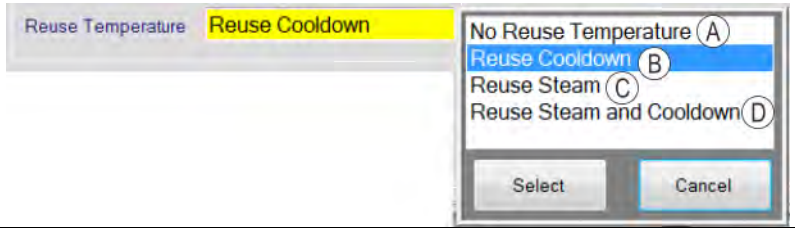
3.7.2.2.8. Intrinsically Safe Temperature Probes—Select this option if the tunnel is equipped with intrinsically safe temperature probes.

3.7.2.2.9. Magnetic Flow Meter instead of Paddlewheel—Turn this ON for tunnel systems that use magnetic flow meters rather than the standard paddlewheel flow meters.

3.7.2.2.10. Reuse Temperature—Select the temperature control features of the tunnel washer reuse tank.

Figure 25: Reuse Temperature List Window

Display



Legend

A. No Reuse Temperature
B. Reuse Cooldown
C. Reuse Steam
D. Reuse Steam and Cooldown

No Reuse Temperature—The temperature of the reuse tank is not monitored. The temperature of the water in the tank will not be adjusted.

Reuse Cooldown—The reuse tank is equipped with a temperature sensing device and a cold water valve. These lower the temperature of the water in the reuse tank.

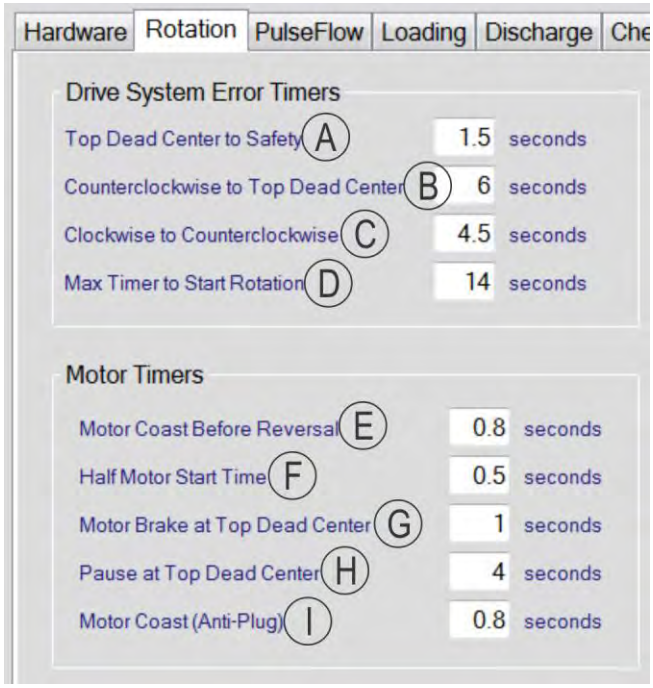
Reuse Steam—The reuse tank is equipped with a temperature sensing device and a steam valve. These raise the temperature of the water in the reuse tank.

Reuse Steam and Cooldown—The reuse tank is equipped with a temperature sensing device, a cold water valve, and a steam valve. These raise or lower the temperature of the water in the reuse tank.

3.7.2.3. Rotation Tab [Document BICCNFC9]

Figure 26: Rotation Tab

Typical Display



Legend

- **A.** Top Dead Center to Safety (see Section 3.7.2.3.1)
- **B.** Counterclockwise to Top Dead Center (see Section 3.7.2.3.2)
- **C.** Clockwise to Counterclockwise (see Section 3.7.2.3.3)
- **D.** Max Timer to Start Rotation (see Section 3.7.2.3.4)
- **E.** Motor Coast Before Reversal (see Section 3.7.2.3.5)
- **F.** Half Motor Start Time (see Section 3.7.2.3.6)
- **G.** Motor Brake at Top Dead Center (see Section 3.7.2.3.7)
- **H.** Pause at Top Dead Center (see Section 3.7.2.3.8)
- **I.** Motor Coast (Anti-Plug) (see Section 3.7.2.3.9)

3.7.2.3.1. Top Dead Center to Safety—the maximum time in tenths of a second between the actuation of the *Top Dead Center* proximity switch and the *Safety* proximity switch

3.7.2.3.2. Counterclockwise to Top Dead Center—the maximum allowable time, in tenths of a second, that may occur between actuation of the *Counterclockwise* proximity switch and the *Top Dead Center* proximity switch

3.7.2.3.3. Clockwise to Counterclockwise—the maximum allowable time in tenths of a second between actuation of the *Clockwise* proximity switch and the *Counterclockwise* proximity switch

3.7.2.3.4. Max Timer to Start Rotation—the maximum allowable time in tenths of a second between when power is applied to the tunnel and when the Mentor controller signals the operator to press *Ctrl+D* to begin tunnel rotation

3.7.2.3.5. Motor Coast Before Reversal—the time in tenths of a second to actuate the motors in braking mode after the *Top Dead Center* proximity switch is made

3.7.2.3.6. Half Motor Start Time—the time in tenths of a second after the first half of the tunnel motors start and before the second half of the motors start

3.7.2.3.7. Motor Brake at Top Dead Center—how long in tenths of a second, to actuate the motors in braking mode after the *Top Dead Center* proximity switch is made

3.7.2.3.8. Pause at Top Dead Center—the time in tenths of a second that the tunnel should pause at top dead center to allow the goods to slide down the transfer scoop to the next module or out of the tunnel

3.7.2.3.9. Motor Coast (Anti-Plug)—the time in tenths of a second between when power is removed from the motors and when the motors are restarted in the opposite direction. This setting applies primarily to normal (non-transferring) reversals.

Tip: The tunnel washer basket should transition smoothly from counter-clockwise to clockwise rotation during normal reversals. If the reversals seem jerky or rough, make this value smaller. For example if this value is 0.8 seconds and reversals are not smooth, adjust this value to 0.7 seconds and observe the tunnel again.

3.7.2.4. PulseFlow Tab [Document BICCNFD0]

Figure 27: PulseFlow Tab

Typical Display

Legend

- **A.** Pump Configure decisions (see Section 3.7.2.4.1)
- **B.** Control Timers (see Section 3.7.2.4.2)
- **C.** Debounce Timers (see Section 3.7.2.4.3)
- **D.** Errors and Warnings (see Section 3.7.2.4.4)
- **E.** Tank Temperature Control (see Section 3.7.2.4.5)
- **F.** Alternate PulseFlow (see Section 3.7.2.4.6)
- **G.** Pulse Ratio (see Section 3.7.2.4.7)
- **H.** Pump 1 and Pump 2 decisions (see Section 3.7.2.4.8)

3.7.2.4.1. Pump Configure decisions

Number of PulseFlow Pumps—Enter the number of PulseFlow pumps included in the tunnel washer system. The maximum number of pumps is 3.

PulseFlow Pump [1, 2, 3] Initial Value—When the PulseFlow operation starts, the Mentor controller records the last analog-to-digital value that gave the correct flow rate. If the Mentor controller did not record an analog-to-digital value, the controller starts at the value you entered here.

3.7.2.4.2. Control Timers

Extra PulseFlow Time after Commited to Transfer—sets the duration that the tunnel washer PulseFlow operates after the number of counts is satisfied or after the machine goes into a hold condition. This value is used to calculate the PulseFlow flow rate. See Section 3.7.2.4.9.1 to determine a good starting value for this decision.

3.7.2.4.3. Debounce Timers

PulseFlow High Level Debounce—used only for pumped flow pumps in middle tunnel modules. Pumped flow pumps turn off when the level in the source module is below high level for the time set here.

PulseFlow Low Level Debounce—used only for pumped flow pumps in middle tunnel modules. Pumped flow pumps turn off when the level in the source module is below low level for the time set here.

3.7.2.4.4. Errors and Warnings

PulseFlow Rate Error Percentage—For PulseFlow tunnel washers. Set this value to a minimum percentage of the desired flow rate. The Mentor controller signals an error if the PulseFlow flow rate is less than this percentage of the desired flow rate. The tunnel washer will enter a hold condition if the error is not cleared.

Maximum Time to Lose High Level—sets the maximum time the high level input can be present for a pumped flow PulseFlow pump. The Mentor controller signals an error and stops the tunnel washer if the high level input is present when this timer ends.

3.7.2.4.5. Tank Temperature Control

Module for PulseFlow Tank Temperature—If the PulseFlow tank is configured for steam or cooldown, set this value to the tunnel washer module that will control the temperature in the PulseFlow tank. A value of 0 or 1 will cause module 1 to control the tank temperature.

3.7.2.4.6. Alternate PulseFlow

Alternate PulseFlow Purge Formula—Enter the formula number to use for the Alternate PulseFlow purge. This formula is programmed to open the drains and to specify the water amounts for the alternate PulseFlow pump.

Alternate PulseFlow Zone 1 Last Module—Enter the number of the last module fed by water header number 1. PulseFlow zone 1 begins at module 1. This constant changes the header from fresh water to the PulseFlow tank while the purge is in this zone.

Alternate PulseFlow Zone 2 Last Module—Enter the number of the last module fed by water header number 2. PulseFlow zone 2 begins at the module immediately after the last module of zone 1. This constant changes the header from fresh water to the PulseFlow tank while the purge is in this zone.

Tip: For more information about using the Alternate PulseFlow features of the Mentor controller, see Section 4.1. “How to Configure and Program Alternate PulseFlow®”.

3.7.2.4.7. Pulse Ratio

PulseRatio—Select this option to adjust water consumed during a PulseFlow operation in proportion to the average of the loaded clean dry load weights in the PulseFlow zone.

3.7.2.4.8. Pump 1 and Pump 2 decisions

Pump from Pulse Flow Tank—Select this choice to if the PulseFlow pump draws from the PulseFlow tank.

Pump from Middle Module—Select this choice to if the PulseFlow pump draws from the middle module of the PulseFlow zone.

Alternate PulseFlow—Select this choice to if this is an alternate PulseFlow arrangement.

Count Offset—Enter the number of flowmeter counts required to prevent the pump from overshooting the desired amount.

Flow Percent—Enter the percent of flow that the pump should supply.

Flow Meter Counts per Unit—Enter the number of counts from the flowmeter that equals one unit (kilogram, pound, gallon, etc.) of water.

3.7.2.4.9. PulseFlow Calculations—The following explain the derivation of certain PulseFlow functions.

3.7.2.4.9.1. How to Find the *Additional PF Time after Committed to Xfer* Value—Before Mentor version 2.6.2, the *Additional PF Time after Committed to Xfer* field was called *Pulse Flow Time after Hold*. Use the following guidelines to determine a good starting value for this value.

1. With the tunnel washer rotating normally, measure the time from when the tunnel commits to transfer until the tunnel moves again after the pause at top dead center (TDC).

   Commit to Transfer + transfer rotation time + pause at TDC = ***Preliminary Time***

2. Subtract 2 seconds from the Preliminary Time to determine the desired value.

   Preliminary Time – 2 seconds = ***Desired Value***

3. Enter the **Desired Value** in the field for *Additional PF Time after Committed to Xfer*.

3.7.2.4.9.2. How the Mentor Controller Sets the Pump Flow Rates—The Mentor controller signals the inverter to adjust the speed of each PulseFlow pump.

1. The *Flow Time* equals the number of counts (rotations) in the formula multiplied by the actual time required to perform one rotation.

   *(Number of Counts * Actual Rotation Time) + Additional PF Time after Committed to Xfer = Flow Time*

2. The *Flow Rate* equals the quantity of water flowed, divided by the calculated Flow Time.

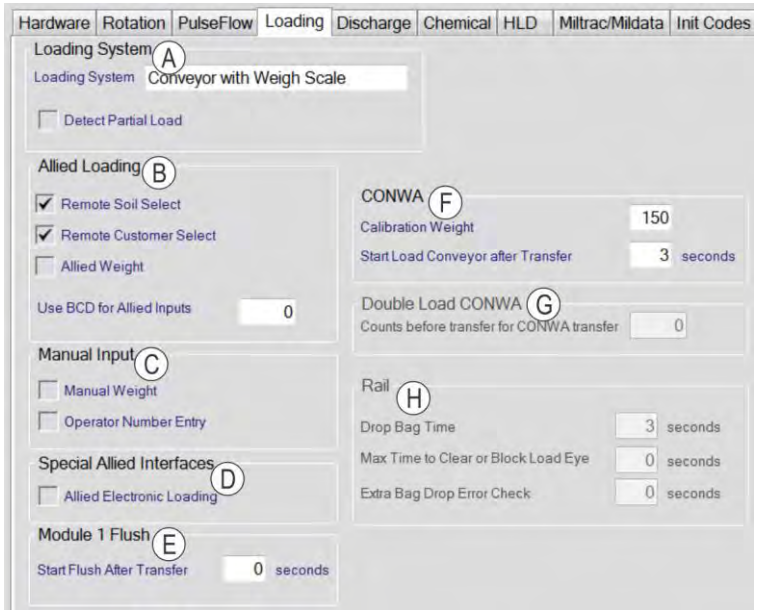
   Water Quantity / Flow Time = Flow Rate

The main PulseFlow pump runs until it has pumped the programmed quantity. Each mid-tunnel PulseFlow pump runs until it has pumped the programmed quantity **and** the high water level switch remains off for the number of seconds set as the *PulseFlow High Level Debounce Time*. This procedure balances the flows by forcing the main PulseFlow pump to lead and the mid-tunnel PulseFlow pump to lag.

3.7.2.5. Loading Tab [Document BICCNFD1]

Figure 28: Loading Tab

Typical Display



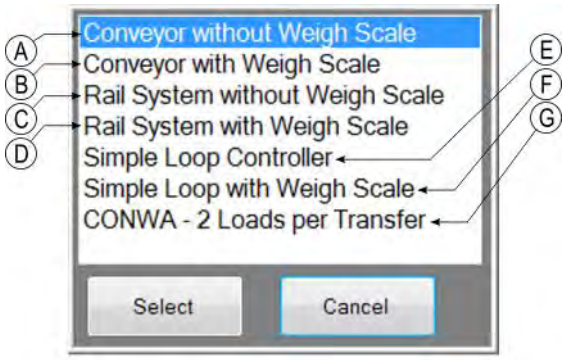
Legend

- **A.** Loading System decisions
- **B.** Allied Loading decisions
- **C.** Manual Inputs
- **D.** Special Allied Interfaces
- **E.** Module 1 Flush
- **F.** CONWA decisions
- **G.** Double Load CONWA
- **H.** Rail decisions

3.7.2.5.1. Loading System—Select the type of system which loads the tunnel washer system.

Figure 29: Loading System List Window

Typical Display



Legend

- **A.** Conveyor without Weigh Scale
- **B.** Conveyor with Weigh Scale
- **C.** Rail System without Weigh Scale
- **D.** Rail System with Weigh Scale
- **E.** Simple Loop Controller
- **F.** Simple Loop Controller with Weigh Scale
- **G.** CONWA - 2 Loads per Transfer

Conveyor—includes devices such as the Milnor CONLO (non-weighing) and CONWA (weighing) conveyors

Rail System—trolley-mounted bags hanging from a rail above the tunnel washer

Simple Loop Controller—a first in, first out rail system with 16 bags

CONWA - 2 Loads per Transfer—causes the conveyor to discharge two pockets into a single compartment of the tunnel washer

> **Note 2:** Any loading device capable of weighing the goods requires a load cell analog-to-digital board at address 20H.

Detect Partial Load—Enables the Mentor controller to compare the weight of a load to information programmed in the *Formula* window. The results tell the dryer whether the load is a full load or a partial load.

3.7.2.5.2. Allied Loading

Remote Soil Select—Allow remote formula or goods code entry in binary format through inputs 25 through 32 on MTA3 of the board at address 80h.

Remote Customer Select—Allow remote customer code entry in binary format through standard inputs 10 and 11 on the board at address 00h and 17 through 24 on MTA4 of the board at address 80h.

Allied Weight—Enable allied weight passing and display the data value of the first cake position. This feature requires an 8-input/16-output board at address 4Fh for weights from 0 to 409.5 units.

> **Note 3:** The Mentor controller normally passes weight in tenths of a unit. Connect MTA4-18 on the board at 4F to ground to pass whole weight units.

Use BCD for Allied Inputs—Set this value to "1" if the Mentor controller reports the formula, customer, and weight fields in BCD format. Use "0" for other formats.

3.7.2.5.3. Manual Inputs

Manual Weight—This option allows the operator to manually enter the weight of the batch in the first storage position.

Operator Number Entry—Allow the entry of an operator number with each load.

3.7.2.5.4. Special Allied Interfaces

Allied Electronic Loading—Allow the Mentor controller to use an external program to communicate with an allied loading system with the NetDDE protocol.

3.7.2.5.5. Module 1 Flush

Start Flush After Transfer—the minimum duration in tenths of a second that the Mentor should flush the load chute after a transfer is initiated. The amount of water used to flush the goods into the tunnel washer is programmed on the formula page. The minimum value for this timer is 5 seconds.

3.7.2.5.6. CONWA

Calibration Weight—the known weight or mass used in calibrating the loading device weigh scale. The value entered here should be the weight of some reliably reproducible weight, such as that of a full unopened bag of dry chemical or a bucket of liquid chemical.

Start Load Conveyor after Transfer—he duration in tenths of a second that the Mentor controller runs the load conveyor after a transfer starts

3.7.2.5.7. Double Load CONWA

Counts before Transfer for CONWA Transfer—This constant is not used in current versions of the Mentor controller.

3.7.2.5.8. Rail

Drop Bag Time—the number of seconds that the *Drop Bag* signal will be turned on.

Max Time to Clear or Block Load Eye—the maximum time in tenths of a second that the *Load Eye Blocked* signal will be ignored. This timer is used to signal an error if the load chute does not empty properly or an undesired bag is dropped.

Extra Bag Drop Error Check—the number of seconds after the *Maximum Time to Block/Clear Eye* timer expires within which the tunnel stops if the eye is blocked.

3.7.2.5.9. Intermediate Belt Controller [Document BICCLC06]—The *Intermediate Belt Controller* is a standard feature of version 3.4.1 and later Mentor controller software. An intermediate belt is physically located between the soiled goods bag or the tunnel loading conveyor and the tunnel load chute. The intermediate belt can be used with tunnels loaded by rail or compartmented conveyor, either allied or Miltrac.

3.7.2.5.9.1. Configure Decisions

Figure 30: Loading Tab of Hardware Configure Screen

Typical Screen

Legend

A. Loading tab
B. *Intermediate Belt* decisions
C. *Intermediate Belt* selection
D. *Intermediate Belt Clear Time* (seconds)
E. *Maximum Time to Clear or Block Belt Eye* (seconds)

3.7.2.5.9.2. Input and Output—The *Intermediate Belt Controller* requires an 8-input/16-output board at address 0E.

Note 4: For board address 0E, set switch SW2 to 0 and switch SW1 to E

The *belt eye* input is on 0EMTA4-3. The *run belt* output is on 0EMTA5-10 and 0EMTA5-19.

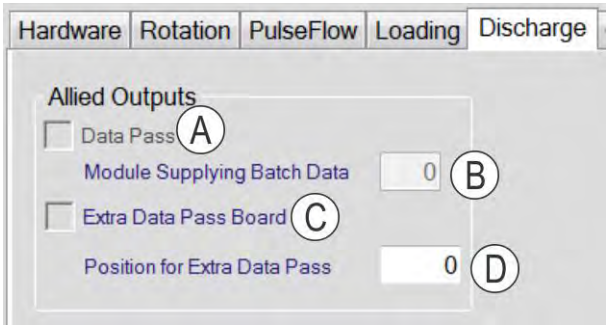
3.7.2.5.9.3. Errors

Belt Error--No Load—the *Max Time to Clear or Block Belt Eye* timer expired before the eye was blocked

Belt Error--Eye Blocked—the belt ran for the *belt clear time* while discharging a load to the tunnel washer, but the eye remained blocked

3.7.2.6. Discharge Tab [Document BICCNFD2]

Figure 31: Discharge Tab

Typical Display	Legend
	**A.** *Data Pass* **B.** *Module Supplying Batch Data* **C.** *Extra Data Pass Board* **D.** *Position for Extra Data Pass*

Data Pass—This selection permits the use of a 24-output board at address 10h to supply binary processing data to allied post-wash devices that use relay logic and/or non-serial communications protocols.

Module Supplying Batch Data—informs the Mentor controller which module of the tunnel washer is used to supply batch data to the next device in the system. The value of this field is usually the last module of the tunnel.

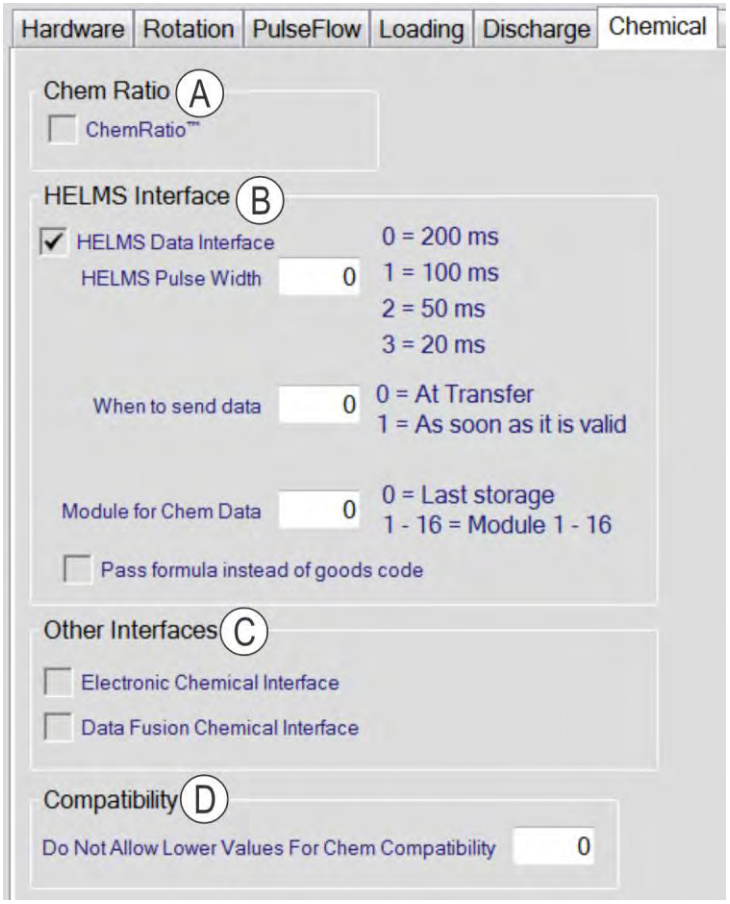
Extra Data Pass Board—This option allows Mentor to pass the formula number and weight data in tenths of a unit; requires a 24-output board at address 16h.

Position for Extra Data Pass—the module where the extra data pass board is connected. This board is usually connected to module 1 to pass batch weight to the chemical system.

3.7.2.7. Chemical Tab [Document BICCNFD3]

Figure 32: Chemical Tab

Typical Display



Legend

A. Chemical Ratio decisions (see Section 3.7.2.7.1)

B. HELMS Interface decisions (see Section 3.7.2.7.2)

C. Other Interfaces (see Section 3.7.2.7.3)

D. Compatibility (see Section 3.7.2.7.4)

3.7.2.7.1. Chemical Ratio decisions

ChemRatio™—Select this option to adjust the amount of chemical injected into a module according to the ratio of clean dry weight loaded to nominal clean dry weight.

3.7.2.7.2. HELMS Interface decisions

HELMS Data Interface—Select this option if the tunnel washer system is equipped with a HELMS data interface for chemicals.

HELMS Pulse Width—Set the pulse width of the signal sent to the HELMS controller

When to send data—send the data when the tunnel washer transfers or as soon as the chemical data is valid

Module for Chem Data—Select the module to provide the chemical data to the HELMS controller

Pass formula instead of goods code—Select this option to have the Mentor controller pass the formula rather than the goods code.

3.7.2.7.3. Other Interfaces

Electronic Chemical Interface—Use a custom interface to a chemical system

Data Fusion Chemical Interface—Enable the Mentor controller to use the Data Fusion electronic chemical interface software.

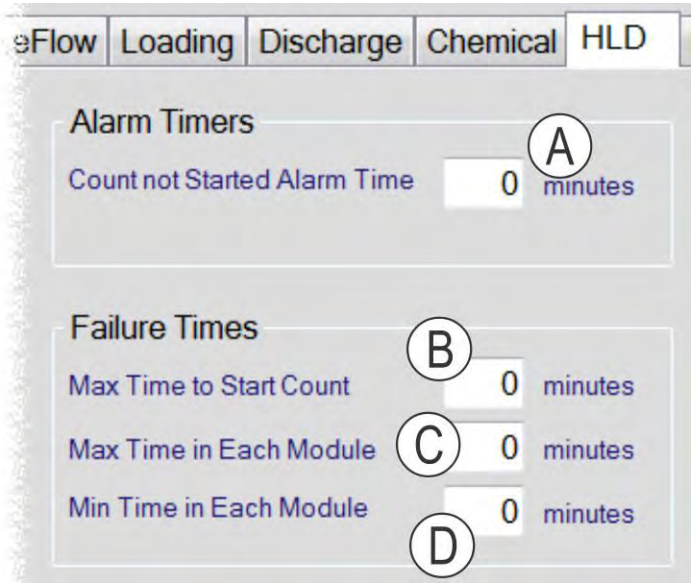
3.7.2.7.4. Compatibility

Do Not Allow Lower Values for Chemical Compatibility—Do not allow the chemical compatibility calculation to reduce the programmed chemical dose.

3.7.2.8. High Level Disinfect Tab [Document BICCNFD4]

Figure 33: HLD Tab

Typical Display



Legend

- **A.** Count not Started Alarm Time
- **B.** Maximum Time to Start Count
- **C.** Maximum Time in Each Module
- **D.** Minimum Time in Each Module

3.7.2.8.1. Alarm Timers

Count not Started Alarm Time (minutes)—starts when the tunnel washer transfers goods from one module to the next. If the timer counts down to 0 before the rotation count starts, the controller warns the operator that an error condition prevented the rotation counter from starting. The warning message says that the level was not satisfied, the temperature was not satisfied, or the chemical concentration was too low.

3.7.2.8.2. Failure Times

Maximum Time to Start Count (minutes)—starts when the tunnel washer transfers goods from one module to the next. If the timer counts down to 0 **before** the rotation count starts, the controller sets the rotation count to one rotation before transfer and starts counting. If the timer counts down to 0 **after** the rotation count starts, the controller sets the rotation count to one rotation before transfer.

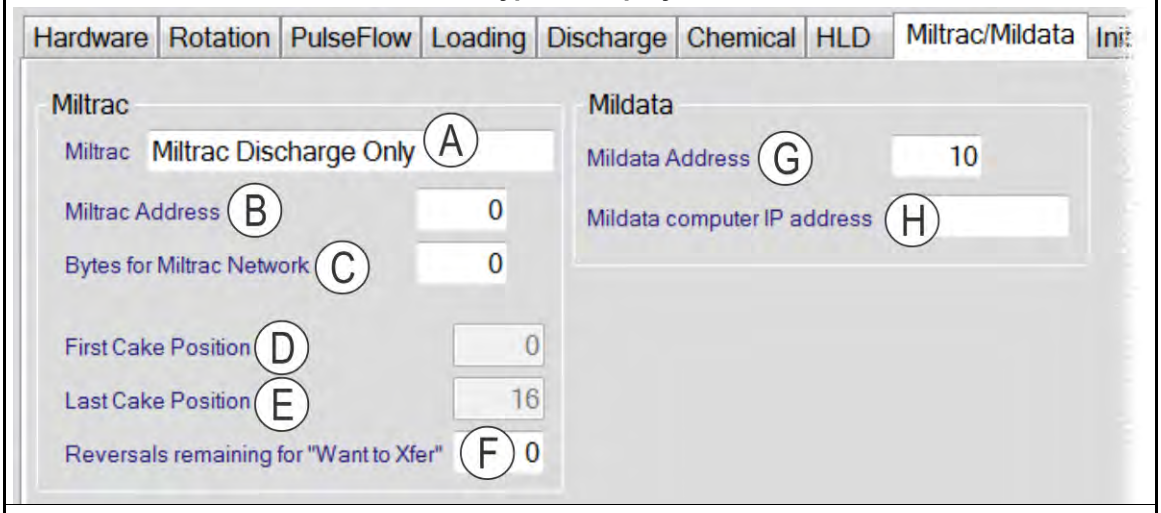
Maximum Time in Each Module (minutes)—starts when the tunnel washer transfers goods from one module to the next. If the timer expires and the tunnel washer cannot transfer, the first two modules empty and refill with fresh water.

Minimum Time in Each Module—warns the operator that the tunnel washer transfered too soon. The tunnel washer inserts empty modules in the queue.

3.7.2.9. Miltrac/Mildata Tab [Document BICCNFD5]

Figure 34: Miltrac/Mildata Tab

Typical Display



Legend

A. Miltrac Type
B. Miltrac Address
C. Bytes for Miltrac Network
D. First Cake Position
E. Last Cake Position
F. Reversals remaining for "Want to Xfer"
G. Mildata Address
H. Mildata computer IP address

3.7.2.9.1. Miltrac

Miltrac Type—enables the tunnel washer as a Miltrac device for loading or loading and discharging.

Miltrac Address—the logical address, in hexadecimal, that the Mentor controller occupies on the Miltrac network

Bytes for Miltrac Network—determines how the Mentor controller communicates with the Miltrac system. Set this value to 0 to use new Miltrac protocol. Set this value to the actual byte value for earlier versions of the Miltrac system. Contact the Milnor factory for more information.

First Cake Position—the first cake position that the Mentor controller reports to the Miltrac system. This is usually the first module of the tunnel washer.

Last Cake Position—the last cake position that the Mentor controller reports to the Miltrac system. This is usually the last module of the tunnel.

Reversals remaining for "Want to Xfer"—the number of reversals before transfer when the Mentor controller sends a signal that a transfer will occur soon.

3.7.2.9.2. Mildata

Mildata Address—This is the address of the Mentor controller on the Mildata network.

Mildata computer IP address—This is the network IP address of the Mildata computer. This is in the format of xxx.xxx.xxx.xxx.

3.7.2.10. Init Codes Tab [Document BICCNFD6]

Figure 35: Init Codes Tab

Typical Display

Legend

A. Reversals for *Init Code A*
B. Reversals for *Init Code I*
C. Reversals for *Init Code J*
D. Reversals for *Init Code K*
E. Reversals for *Init Code L*
F. Reversals for *Init Code M*
G. Reversals for *Init Code N*
H. Reversals for *Init Code O*

3.7.2.10.1. Reversals Before Transfer

Reversals for Init Code A—the number of reversals before transfer when *Init Code A* is actuated
Reversals for Init Code I—the number of reversals before transfer when *Init Code I* is actuated
Reversals for Init Code J—the number of reversals before transfer when *Init Code J* is actuated
Reversals for Init Code K—the number of reversals before transfer when *Init Code J* is actuated
Reversals for Init Code L—the number of reversals before transfer when *Init Code L* is actuated

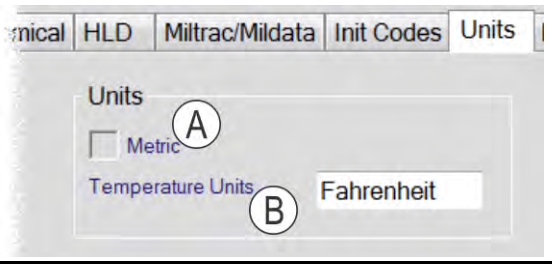
3.7.2.10.2. Reversals After Transfer

Reversals for Init Code M—the number of reversals after transfer when *Init Code M* is actuated
Reversals for Init Code N—the number of reversals after transfer when *Init Code N* is actuated
Reversals for Init Code O—the number of reversals after transfer when *Init Code O* is actuated

3.7.2.11. Units Tab [Document BICCNFD7]

Figure 36: Units Tab

Typical Display



Legend

A. *Metric* selection
B. *Temperature Units* decision

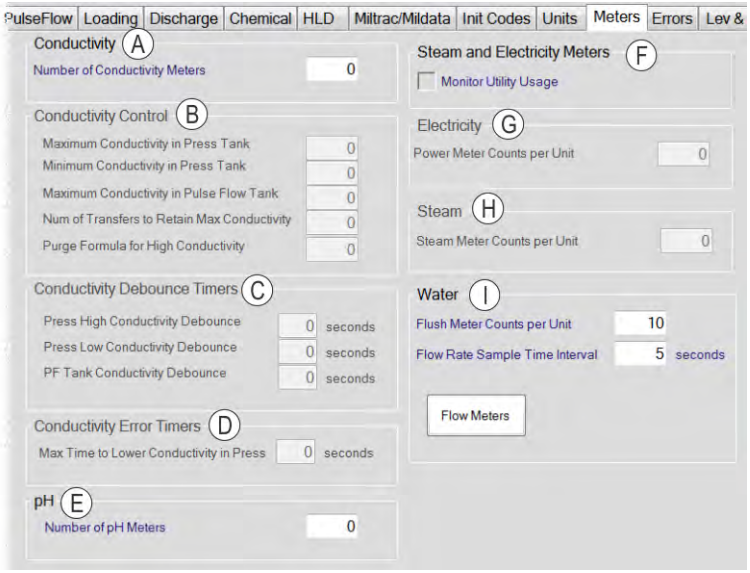
Metric **selection**—When checked, the Mentor controller displays weights and volumes in SI (metric) units.

Temperature Units—Select either Fahrenheit or Celsius for all Mentor temperature displays.

3.7.2.12. Meters Tab [Document BICCNFD8]

Figure 37: Meters Tab

Typical Display



Legend

A. *Conductivity*
B. *Conductivity Control*
C. *Conductivity Debounce Timers*
D. *Conductivity Error Timers*
E. *pH*
F. *Steam and Electricity Meters*
G. *Electricity*
H. *Steam*
I. *Water*

3.7.2.12.1. *Conductivity*

Number of Conductivity Meters—If the tunnel system uses conductivity meters, set the number of meters here. Use "3" to enable full conductivity control. Use "2" to enable conductivity control for the PulseFlow system tank and the extract device tank. Use "1" to enable conductivity control for the PulseFlow system tank. Use "0" to disable conductivity control.

3.7.2.12.2. *Conductivity Control*

Maximum Conductivity in Press Tank—Set this value to 0 to use the *Press Maximum Conductivity* value on the *Formulas* programming screen.

Minimum Conductivity in Press Tank—Set this value to 0 to use the *Press Minimum Conductivity* value on the *Formulas* programming screen.

Maximum Conductivity in PulseFlow® Tank—Set this value to 0 to use the *PulseFlow Tank Maximum Conductivity* value on the *Formulas* programming screen.

Number of Transfers to Retain Maximum Conductivity—Set the number of transfers for the controller to count before it implements a change in the press tank conductivity as programmed for a formula.

Purge Formula for High Conductivity—Enter the number of the formula that the Mentor controller runs if the conductivity in the extract device tank remains high longer than the time programmed in the *Maximum Time to Lower Conductivity in Press*.

3.7.2.12.3. *Conductivity Debounce Timers*

Press High Conductivity Debounce—sets the amount of time that the extract tank conductivity must be higher than the configured maximum conductivity value before the controller turns ON the fresh water valve in the last module.

Press Low Conductivity Debounce—sets the amount of time that the extract tank conductivity must be lower than the configured minimum conductivity value before the controller turns OFF the fresh water valve in the last module.

PulseFlow Tank Conductivity Debounce—sets the amount of time that the PulseFlow tank conductivity must be higher than the configured maximum conductivity value before the controller drains the tank.

3.7.2.12.4. *Conductivity Error Timers*

Maximum Time to Lower Conductivity in Press—sets the maximum time allowed for the conductivity in the extract device tank to go to less than the configured minimum conductivity value.

3.7.2.12.5. *pH*

Number of pH Meters—Set the number of pH meters on the tunnel system. The range is from 0 to 5.

3.7.2.12.6. *Steam and Electricity Meters*

Monitor Utility Usage—Put a checkmark in this box to cause the Mentor controller to monitor utilities (e.g., electricity and steam).

3.7.2.12.7. *Electricity*

Power Meter Counts per Unit—Set the number of counts from the power meter that equals one unit.

3.7.2.12.8. *Steam*

Steam Meter Counts per Unit—Set the number of counts from the steam meter that equals one unit of steam.

3.7.2.12.9. *Water*

Flush Meter Counts per Unit—Set the number of counts from the flush meter that equals one unit of water

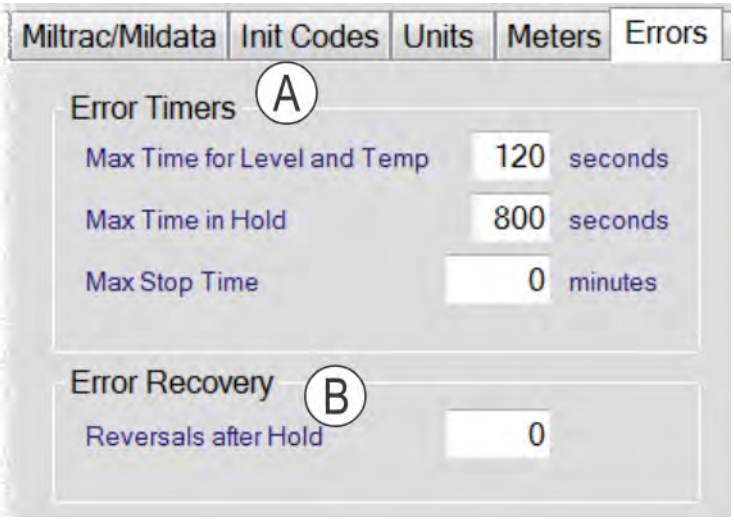
Flow Rate Sample Timer Interval—Set the time between samples

Flow Meters—Touch this button to open the *Flow Meters* window for calibration and data monitoring.

3.7.2.13. Errors Tab [Document BICCNFD9]

Figure 38: Errors Tab

Typical Display



Legend

A. Error Timers (see Section 3.7.2.13.1)

B. Error Recovery (see Section 3.7.2.13.2)

3.7.2.13.1. Error Timers

Maximum Time for Level and Temperature—the maximum time in tenths of a second to wait for both level and temperature to be achieved before an error condition is signalled

Maximum Time in Hold—the maximum time in tenths of a second for which the tunnel washer will continue to reverse after being placed in a hold condition. If this value is exceeded, the tunnel stops and an error message is displayed

Maximum Stop Time (minutes)—If the tunnel is stopped for longer than this time, the reversal count sets to 0 of 20 counts. When the tunnel starts, 20 counts will execute before the tunnel resumes the normal programmed counts.

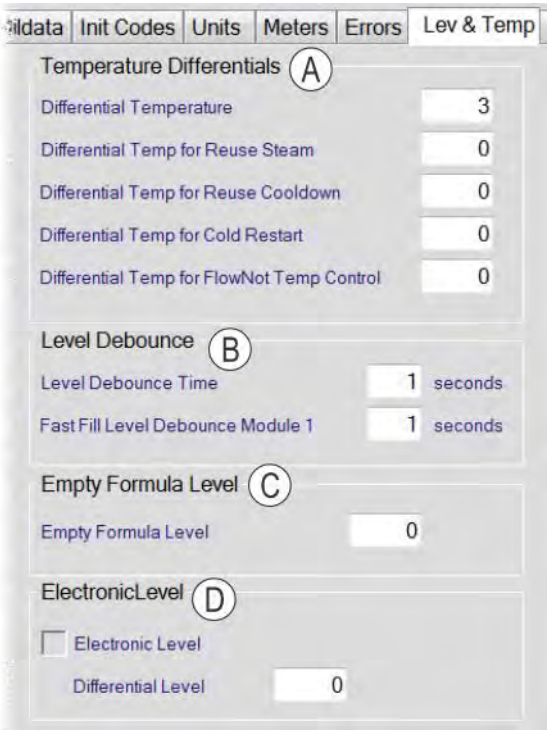
3.7.2.13.2. Error Recovery

Reversals after Hold—the minimum number of reversals the tunnel washer must complete after a hold condition and before a transfer

3.7.2.14. Levels and Temperatures Tab [Document BICCNFE0]

Figure 39: Levels and Temperatures Tab

Typical Display



Legend

- **A.** Temperature Differentials (see Section 3.7.2.14.1)
- **B.** Level Debounce (see Section 3.7.2.14.2)
- **C.** Empty Formula Level (see Section 3.7.2.14.3)
- **D.** Electronic Level (see Section 3.7.2.14.4)

3.7.2.14.1. Temperature Differentials

Differential Temperature—the number of degrees below the desired bath temperature that the liquid in a module is allowed to fall before steam is injected to return the temperature to the desired

Differential Temperature for Reuse Steam—the number of degrees below the desired temperature that the reuse tank will be allowed to fall before steam is injected to return the temperature to the desired.

Differential Temperature for Reuse Cooldown—the number of degrees above the desired temperature that the reuse tank will be allowed to rise before cold water is injected to return the temperature to the desired.

Differential Temperature for Cold Restart—used only on tunnels that are heated by a heat exchanger instead of steam. If the tunnel washer start command is issued when the actual temperature is below the desired temperature by the value set here, the tunnel washer performs a cold restart.

Differential Temperature for FlowNot Temperature Control—A flow not valve with op code 0L is controlled by temperature. The valve energizes when the actual temperature is greater than the desired temperature. The valve turns off when the actual temperature is less than the desired temperature minus the differential temperature configured here. Program the desired temperature in the time field for the c-bit in each formula.

3.7.2.14.2. Level Debounce

Level Debounce Time (seconds)—A non-zero value here prevents the CBW controller from recognizing that level is lost before this time expires. This decision is most often used with G4 models to prevent a false indication that level has been lost.

Fast Fill Level Debounce Module 1 (seconds)—Set the number of seconds to allow the level in module 1 to stabilize after a fast fill operation.

3.7.2.14.3. Empty Formula Level

Empty Formula Level—If the tunnel system is equipped with electronic level sensing, this is the level to be achieved in each module as an empty pocket formula is passed. If the tunnel system is configured for PulseFlow, set this value to "2" to allow the tunnel washer to transfer without level in an empty pocket. This value is required because the Alternate PulseFlow purge drains remain open until the tunnel washer transfers.

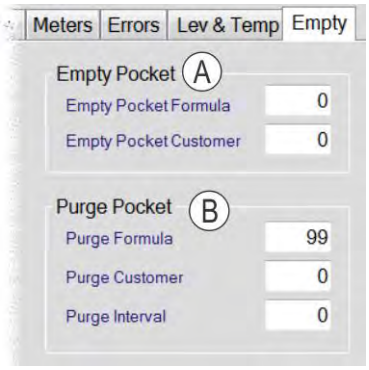
3.7.2.14.4. Electronic Level

Electronic Level—this value is not used

Differential Level—this value is not used

3.7.2.15. Empty Pockets Tab [Document BICCNFE1]

Figure 40: Empty Pockets Tab

Typical Display	Legend
	**A.** *Empty Pocket* decisions **B.** *Purge Pocket* decisions

3.7.2.15.1. *Empty Pocket* Decisions

Empty Pocket Formula—the formula which is passed when an empty pocket is desired

Empty Pocket Customer—the customer which is passed when an empty pocket is desired

3.7.2.15.2. *Purge Pocket* Decisions

Purge Formula—the formula number which is passed when a purge pocket is commanded

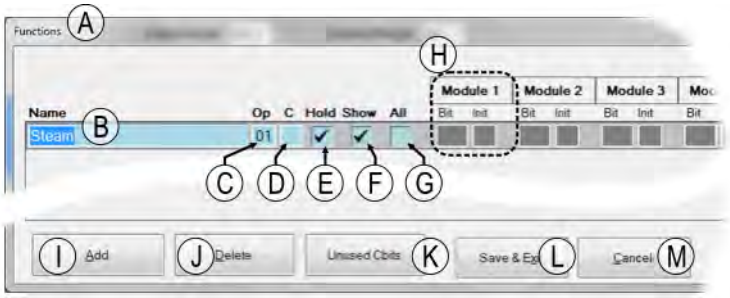
Purge Customer—the customer number which is passed when a purge pocket is commanded

Purge Interval—When enabled and set to a value other than 0, the tunnel unconditionally purges all pockets after this many transfers. This value is usually set to 0 and its function performed by a programmed automatic purge.

3.7.3. Configure Functions [Document BICCNF23]

Functions are the specific actions commanded by wash formulas, including opening drains and water valves and injecting steam and chemicals. Functions are programmed separately from formulas so that after each function gets certain operating characteristics, it can be included in any formula without extra programming.

Figure 41: Functions Configuration Window

Screen Capture	Legend
	**A.** *Functions* window **B.** Function name (see Section 3.7.3.1) **C.** Operational code (see Section 3.7.3.1) **D.** Compatibility code (see Section 3.7.3.3) **E.** Hold code (see Section 3.7.3.4) **F.** Show in *Programming* window (see Section 3.7.3.5) **G.** *Select All* field (see Section 3.7.3.6) **H.** *Bit number* and *Init code* for Module 1 (typical, see Section 3.7.3.7) **I.** *Add* button **J.** *Delete* button **K.** *Unused Cbits* button **L.** *Save & Exit* button **M.** *Cancel* button

3.7.3.1. Name field—Functions other than chemicals are named and coded at the Milnor factory before a Mentor system is shipped. However, the owner/operator may prefer a different name or to change the names of functions from English to another language.

To change the text in the *Name* column, click twice on the name to be changed. The first click will select the function and the second will activate the text cursor (a flashing vertical bar) in the *Name* field. Delete the old function name and enter the desired name.

3.7.3.2. Op = Operational Code field—Enter the desired op code (operational code) from the drop-down list. The available op codes are described in Section 6.1..

3.7.3.3. C = Compatibility Code field—Functions that do not control chemicals (designated by op code 06) can be controlled by the formula in a module other than the one in which it occurs. Use backward compatibility if the function is controlled by a module earlier in the tunnel (for example, if the formula in module 03 controls a function in module 04). Use forward compatibility if the function is controlled by a module later in the tunnel (for example, if the formula in module 05 controls a function in module 04).

3.7.3.4. *Hold Code* **field**—Select this field to stop the function if it is on when the tunnel washer enters a hold condition. If this field is not selected, the function will operate until the programmed value for the function is achieved.

3.7.3.5. *Show in Programming Window* **field**—Select this field to show this function on the *Formula Programming* page. This is necessary for functions with variable values, such as steam, drain functions, and chemicals. Functions which do not change from one formula to another are not usually shown on the *Formula Programming* page. These functions include flushes and fast fills.

3.7.3.6. *All Formulas* **field**—Select this field for functions that are identical in every formula. These functions will appear in the *Global Cbits* window (Section 3.8.4).

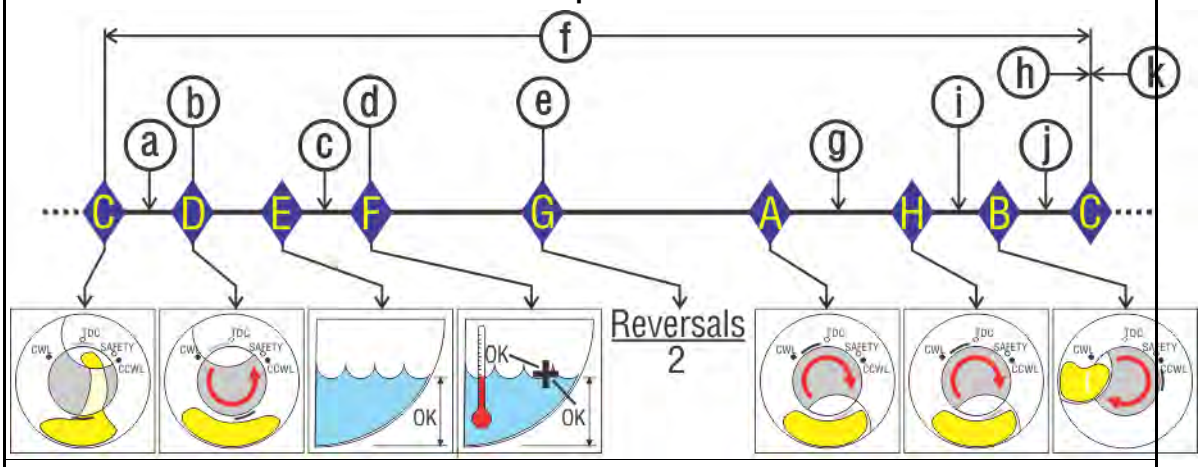
3.7.3.7. **Bit Number and Init Code**—For each module, set the *Cbit* number and the *Init code* for the function.

Outputs are assigned by their number in the output array. That is, all outputs are numbered sequentially from 1 to the number of outputs on the machine. Assignment of a particular output relay to a specific machine function requires wiring the desired function (device) to an available output relay and using the *Bit* column to assign that function to the output relay. Assignment and deletion of bits is necessary only when equipment is added or removed after manufacture. Details of this procedure are described elsewhere in this manual.

The init column displays the initialization code (init code) for each bit in a module. The init codes allow a function to start at almost any point during a formula. Some init codes correspond to configuration values entered in the *Program Constants* window. For example, an init code of “I” causes the function to start when the number of reversals in the formula equals the value entered for *Reversals for Init Code I* on the *Program Constants* window, and if the tunnel is not already committed to transfer.

Figure 42: Sequence and Description of Init Codes

Graphic



Legend

A. **Init codes A, I, J, K, and L:** Action begins when counts remaining equal INITx (x=A, I, J, K, L, respectively), but before tunnel is committed to transfer.

B. **Init code B:** Action begins during transfer when the target passes CCWL just before memory shifts (while goods are still sliding down the transfer scoop).

C. **Init code C:** Action begins when transfer is complete and cylinder pauses at TDC limit switch, just after the memory shifts. This init code is only available on earlier Mentor controllers.

D. **Init code D:** Action begins when tunnel starts truning after TDC pause. Tunnel rotation always starts counterclockwise (CCW).

E. **Init code E:** Action begins following a transfer after tunnel starts turning and water levels are OK.

F. **Init code F:** Action begins following transfer after tunnel starts turning and both water levels and temperatures are OK. Count-up starts now.

G. **Init code G:** Action begins when count-up reaches halfway point (when half the time until next transfer has elapsed).

H. **Init code H:** Action begins when tunnel is committed to transfer (as the clockwise switch CWL sees the target and the transfer scoop beings to lift the goods.

a. TDC pause time: set on the *CBW Output Timers* page, described in “How to Configure the Mentor Controller” elsewhere in this manual (see Contents)

b. Tunnel cylinder starts turning

c. Time required to achieve water levels and/or temperatures

d. Start of count-up

e. Time determined by number of reversals specified in Init A

f. Memory for module X

g. Init A plus one reversal

h. Tunnel cylinder stops turning

i. 1.5 second minimum

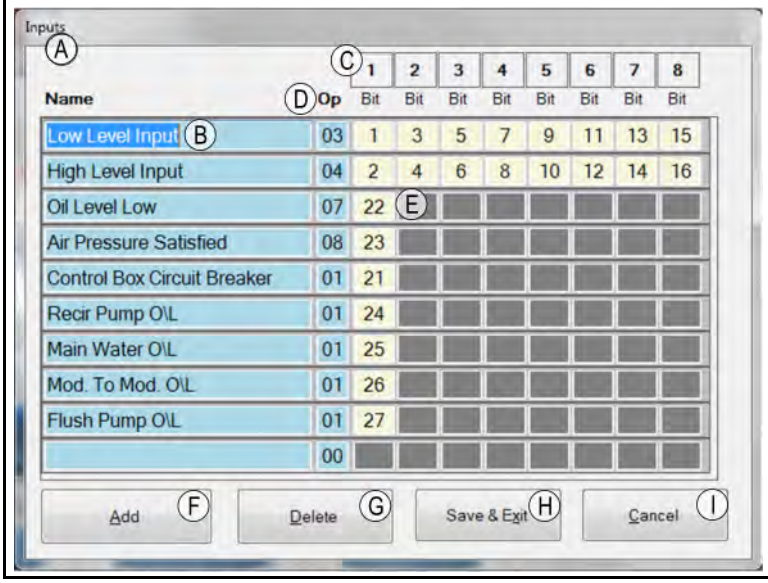
j. 2.25 second maximum

k. Memory shift from Module X to Module X+1

3.7.4. Configure Inputs [Document BICCNF24]

Inputs to the Mentor controller come from switches and other sensors on the tunnel washer.

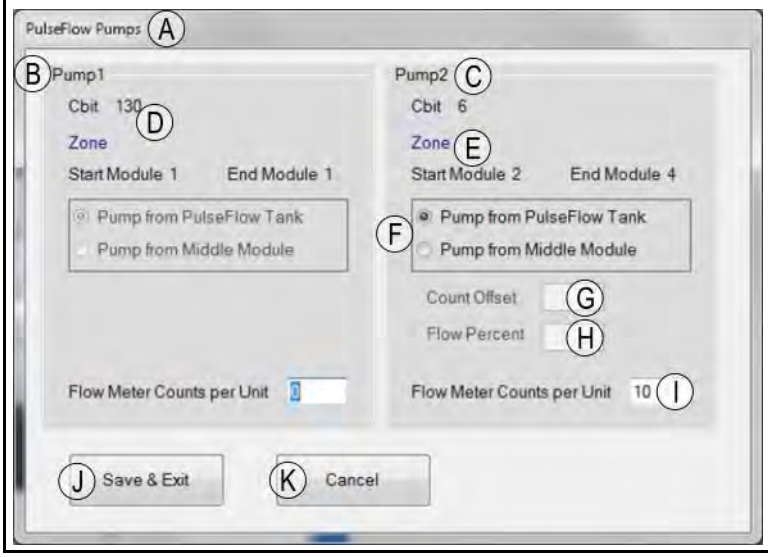
Figure 43: Inputs Window

Illustration	Legend
	**A.** *Inputs* window **B.** Input name **C.** Module number **D.** Operational code column **E.** Cbit grid **F.** *Add* button **G.** *Delete* button **H.** *Save & Exit* button **I.** *Cancel* button

3.7.5. Configure PulseFlow® Pumps [Document BICCNF25]

This button appears if the Mentor controller is configured for a PulseFlow® tunnel washer.

Figure 44: *PulseFlow Pumps* **Window**

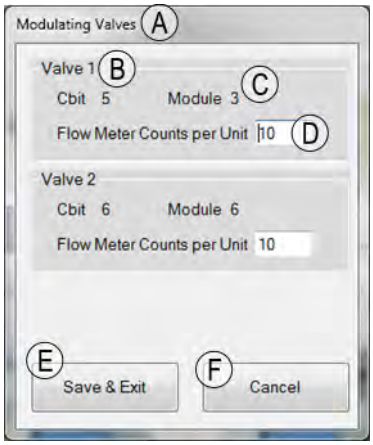
Illustration	Legend
	**A.** *PulseFlow Pumps* window **B.** Pump 1 data area **C.** Pump 2 data area **D.** Cbit number **E.** Start and End Module for each zone **F.** *Pump Source* decision **G.** *Count Offset* field **H.** *Flow Percent* field **I.** *Counts per Unit* field **J.** *Save and Exit* button **K.** *Cancel* button

3.7.6. Configure Modulating Valves [Document BICCNF83]

This button does not appear if the Mentor controller is configured for a PulseFlow® tunnel washer.

For each modulating valve on the tunnel washer system, enter the number of flowmeter counts necessary to flow one unit of water through the valve. See the related section in document BIPCUC04 or Section 5.1. for detailed information about how to calibrate flowmeters.

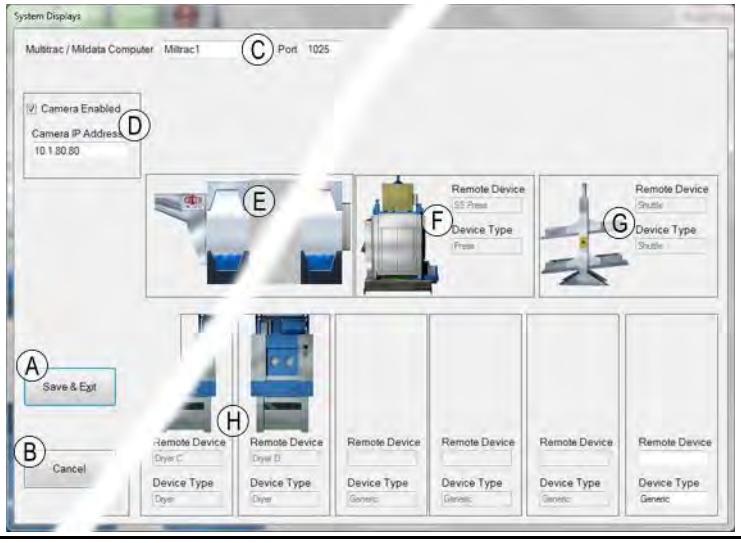
Figure 45: The Modulating Valves Window

Illustration	Legend
	**A.** *Modulating Valves* window **B.** Cbit number for Valve 1 **C.** Module location for Valve 1 **D.** Flowmeter configure value **E.** *Save and Exit* button **F.** *Cancel* button

3.7.7. Configure System Displays [Document BICCNF26]

Use this window to configure camera addresses and other data that appear on the normal system display.

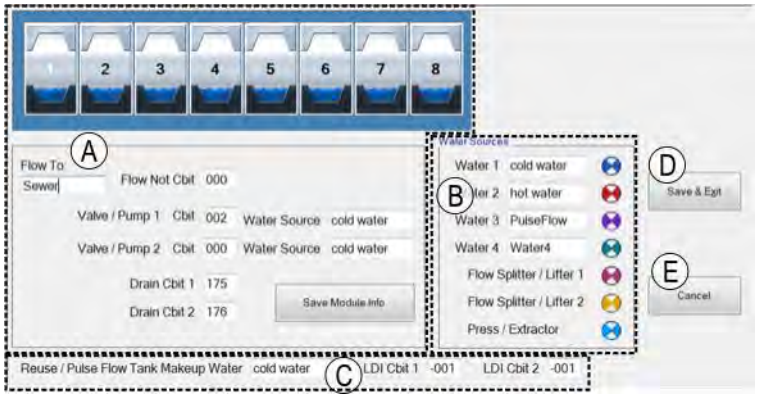
Figure 46: System Display

Illustration	Legend
	**A.** *Save & Exit* button **B.** *Cancel* button **C.** Miltrac/Mildata computer name and port fields **D.** Load scoop camera address field **E.** Tunnel washer image (static) **F.** Extract device name and type fields **G.** Remote device name and type fields **H.** Remote device names and types

3.7.8. Configure Flow Graphics [Document BICCNF27]

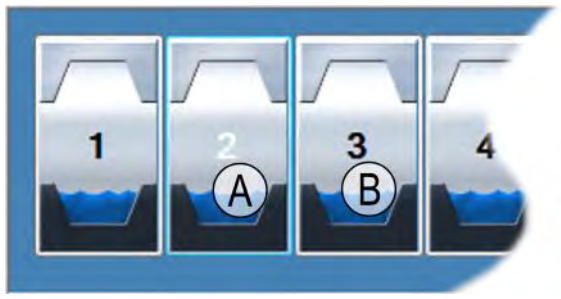
Use this window to choose graphics in the Mentor controller main window that correspond to the tunnel washer.

Figure 47: The Flow Graphics Window

Illustration	Legend
	**A.** *Module Information* area **B.** *Water Sources* area **C.** *Long Distance Incompatibility* Cbits **D.** *Save & Exit* button **E.** *Cancel* button

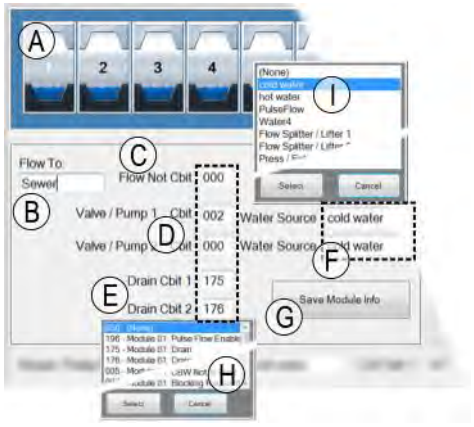
3.7.8.1. Selected Module [Document BICCNF79]—Touch module 1 to change the flow graphics for that module. After you change information for each module, touch the *Save & Exit* button to save the changes and return to the Mentor controller main window.

Figure 48: *Selected Module* **Graphic**

Illustration	Legend
	**A.** Selected module **B.** Unselected module

3.7.8.2. *Module Information* **Area [Document BICCNF80]**—Set how the tunnel washer is shown on the Mentor controller main window.

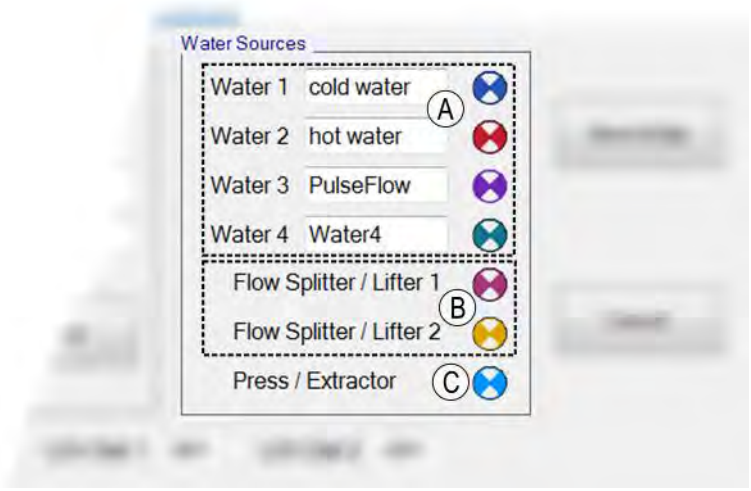
Figure 49: *Module Information* **Area**

Window Detail	Legend
	**A.** Selected module **B.** *Flow to* field **C.** *Flow Not Cbit* field **D.** *Valve/Pump Cbit* fields **E.** *Drain Cbit* fields **F.** *Water Source* field **G.** *Save Module Information* button **H.** *Module Cbits* window (typical) **I.** *Water Sources* selection window

3.7.8.3. *Water Sources* **Area [Document BICCNF81]**—Enter the label for each available water source. These labels appear in the legend at the lower left corner of the Mentor controller main window.

Figure 50: *Water Sources* **Area**

Window Detail



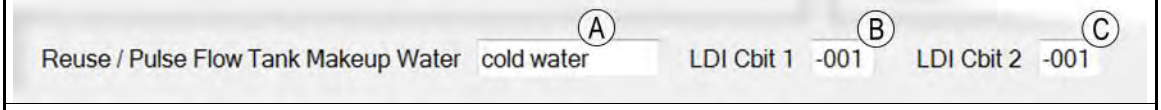
Legend

A. *Water* label fields
B. *Flow Splitter/Lifter* colors
C. *Extraction Device* color

3.7.8.4. *Reuse Water* **Controls [Document BICCNF82]**

Figure 51: *Reuse Water Controls* **Detail**

Detail of Flow Graphics Window



Legend

A. *Reuse Water/Pulse Flow Tank Makeup Water* field
B. *Long Distance Incompatibility Cbit 1* field
C. *Long Distance Incompatibility Cbit 2* field

3.7.8.4.1. *Reuse Water/Pulse Flow Tank Makeup Water*—Select the water source that supplements the reuse water tank or the PulseFlow® tank.

3.7.8.4.2. *Long Distance Incompatibility Cbit X*—Select the Cbit that controls long distance incompatibility.

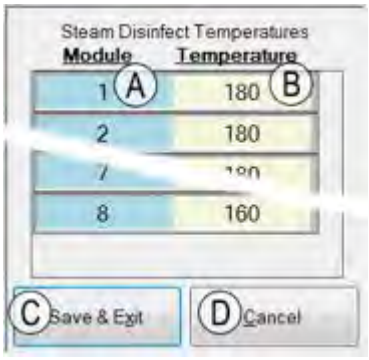
3.7.9. Data Fusion™ for Chemicals [Document BICCNFB6]

This feature is not implemented.

3.7.10. Steam Disinfect [Document BICCNF96]

Set the steam disinfection temperatures of all modules. Steam disinfection is an optional feature. For details on this option, see Section 4.2..

Figure 52: Steam Disinfect Window

Illustration	Legend
	**A.** *Module number* column **B.** *Temperature* column **C.** *Save and Exit* button **D.** *Cancel* button

— End of BICCNF09 —

BICCNF10 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

3.8. The Programming Menu Button

The items in this menu set how the Mentor computer controls the tunnel washer when a wash formula runs.

Figure 53: The Programming Menu

Screen Capture

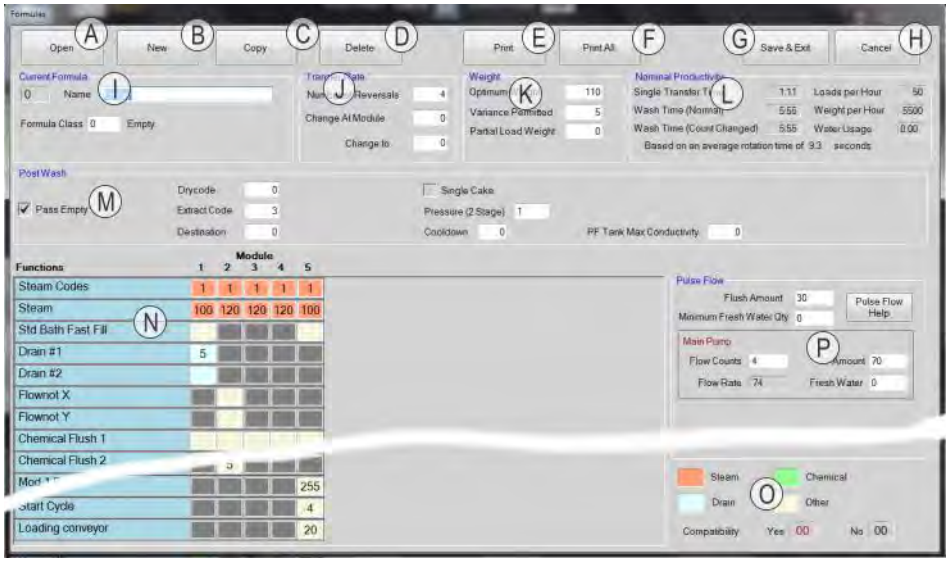
Legend

A. *Formulas* button (Section 3.8.1)
B. *Chemicals* button (Section 3.8.2)
C. *Formula Templates* button (Section 3.8.3)
D. *Global Cbits* button (Section 3.8.4)
E. *Formula Classes* button (Section 3.8.5)
F. *Chemical Pump Flow Rate* button (Section 3.8.6)
G. *First Dosing* button (Section 3.8.7)
H. *Automatic Empties* button (Section 3.8.8)
I. *Compatibility* button (Section 3.8.9)

3.8.1. Formulas [Document BICCNF88]

Use the *Formulas* window to write and change the wash formulas.

Figure 54: Formulas Window

Screen Capture	Legend
	**A.** *Open* button **B.** *New* button **C.** *Copy* button **D.** *Delete* button **E.** *Print* button **F.** *Print All* button **G.** *Save and Exit* button **H.** *Cancel* button **I.** *Current Formula* zone **J.** *Transfer Rate* zone **K.** *Weight* zone **L.** *Nominal Productivity* zone **M.** *Post Wash* zone **N.** *Module Functions* zone **O.** *Compatibility* zone **P.** *PulseFlow*® zone

3.8.1.1. *Open* **button**—Touch this button to open a wash formula. You can view, change, or copy the open formula.

3.8.1.2. *New* **button**—Touch this button to create a new formula at one of the available formula numbers.

3.8.1.3. *Copy* **button**—Touch this button to copy the open formula to one of the available formula numbers.

3.8.1.4. *Delete* **button**—Touch this button to delete the open formula and make the formula number available.

3.8.1.5. *Print* **button**—Touch this button to print the open formula.

3.8.1.6. *Print All* **button**—Touch this button to print all programmed formulas.

3.8.1.7. *Save and Exit* **button**—Touch this button to save the changes and close the *Formulas* window.

3.8.1.8. *Cancel* **button**—Touch this button to abandon the most recent changes and close the *Formulas* window.

3.8.1.9. *Current Formula* **zone**—This zone shows the *Formula Number*, *Formula Name*, *Formula Class Number*, and *Formula Class Name*. You can set the *Formula Name* and the *Formula Class Number*.

3.8.1.10. *Transfer Rate* **zone**—This zone shows and lets you set the *Number of Reversals*, the *Change at Module* value, and the *Change to* value.

3.8.1.11. *Weight* **zone**—This zone shows and lets you set the *Optimum Weight*, the *Variance Permitted*, and the *Partial Load Weight*.

3.8.1.12. *Nominal Productivity* **zone**—This zone shows the calculated productivity values. These values are calculated from rotation counts, certain output timers, and other factors.

3.8.1.13. *Post Wash* **zone**—This zone lets you set the *Drycode*, *Extract Code*, *Destination*, and other post-wash data. The *Post Wash* zone shows the identifying names for the *Drycode*, *Extract Code*, *Destination* numbers if the database is available to the Mentor controller.

3.8.1.14. *Module Functions* **zone**—This zone shows and lets you change values for all functions that are set to show on the page. The color of the cell shows the modules where 4 kinds of functions are available.

3.8.1.15. *Compatibility* **zone**—

3.8.1.16. *PulseFlow*® **zone**—Program PulseFlow values for each formula here.

Tip: Program only the total amount of water desired and the amount of fresh water desired; the Mentor controller calculates the required amount of reuse water from these values.

When the CBW is filling to achieve level at power-up, the Mentor controller sets valve *VESTED* to use water from the fresh water tank.

Before the PulseFlow cycle starts, the Mentor controller monitors the level in the reuse tank. If the water level in the reuse tank goes below low level, the controller sets valve *VESTED* to use water from the fresh water tank until low water level is achieved in the reuse tank.

During a PulseFlow cycle, the Mentor controller first uses the calculated amount of water from the reuse tank, then switches to the fresh water tank until the cycle ends. If the reuse tank low level is lost at any time, the controller switches to the fresh water tank.

PulseFlow operations require optional pumps and valves and specific configuration and programming. See these locations for more information:

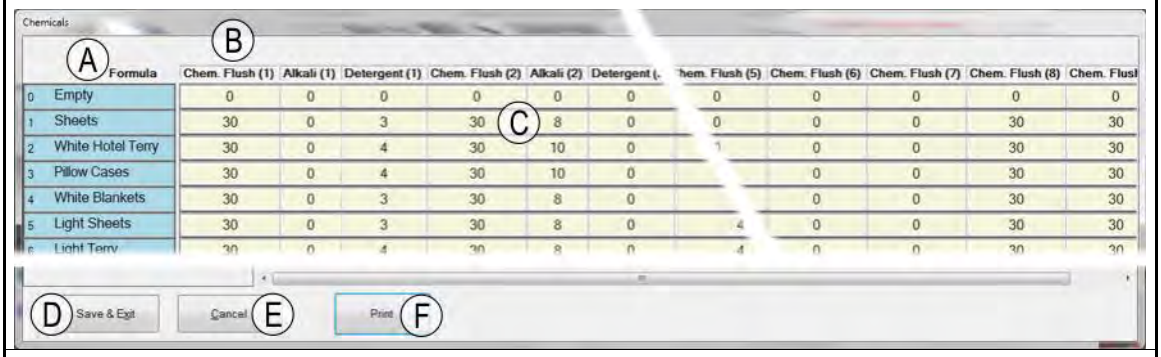
- Section 6.1.9 “08: Modulating Water with Flowmeter”
- Section 3.9.4 “PulseFlow® Button”
- Section 3.7.2.4 “PulseFlow Tab”
- Section 3.7.2.4.9.2 “How the Mentor Controller Sets the Pump Flow Rates”

3.8.2. Chemicals [Document BICCNF89]

Set the chemical injections in every module for every wash formula.

Figure 55: The Chemicals Window

Illustration



Legend

A. *Formula* column
B. *Chemical function* columns
C. *Time* values
D. *Save and Exit* button
E. *Cancel* button
F. *Print* button

3.8.2.1. Formula—The *Formula* column displays every wash formula that has been set in the Mentor controller.

3.8.2.2. Chemical Function—The top row of the table displays every chemical function that has been set in the Mentor controller. Starting with column 2, each column shows the name of the chemical function or chemical flush function and the module number.

3.8.2.3. Time Values—Set the number of seconds that each chemical function is ON when the formula is in the module.

3.8.2.4. Save and Exit Button—Touch this button to save the changes and close the *Chemicals* window.

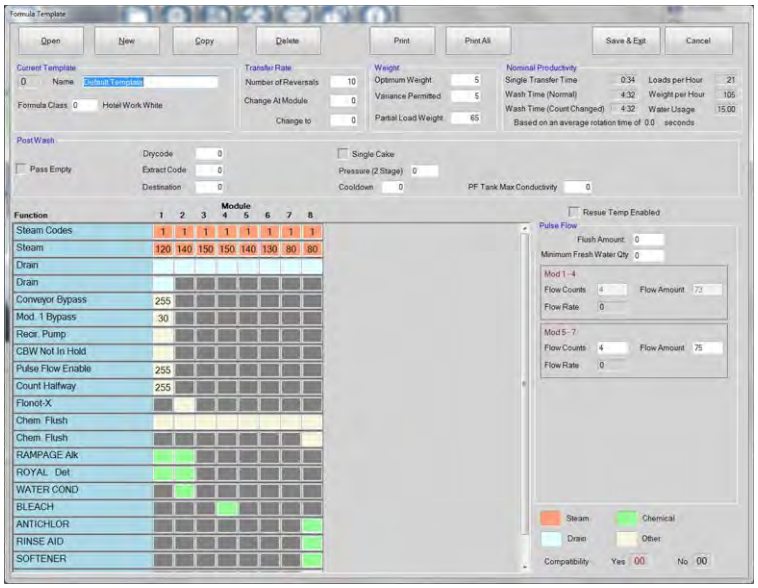
3.8.2.5. Cancel Button—Touch this button to cancel the changes and close the *Chemicals* window.

3.8.2.6. Print Button—Touch this button to see a preview of the *Chemicals* report. Touch the *Print* button in the report window to send the report to the Windows default printer.

3.8.3. Formula Templates [Document BICCNFB5]

Formula templates provide a uniform foundation for new formulas. When a new formula is to be programmed, select the best formula template for the planned formula, then change only the functions and values that differ from the template.

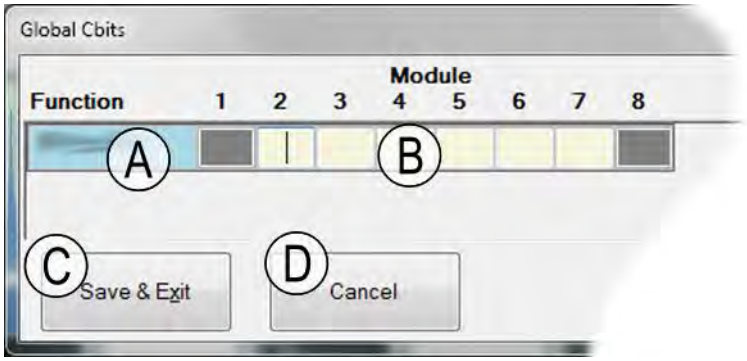
Figure 56: Formula Template Window

Illustration of a Typical Formula Template	Legend
	

3.8.4. Global Cbits [Document BICCNF90]

Global Cbits are set in the *Functions* window under the *Configure* toolbar button. Global Cbits function the same in all of the formulas. Set the value for each module in this window.

Figure 57: The Global Cbit Window

Illustration	Legend
	**A.** *Function* name **B.** *Function value* by module **C.** *Save and Exit* button **D.** *Cancel* button

3.8.4.1. Function Name—To set a Cbit function as a global function, touch the *ALL* box for the function in the *Function* window (see Section 3.7.3.6). Only global Cbit functions appear in the *Global Cbits* window.

3.8.4.2. Function Value—Set the value for the function in each module.

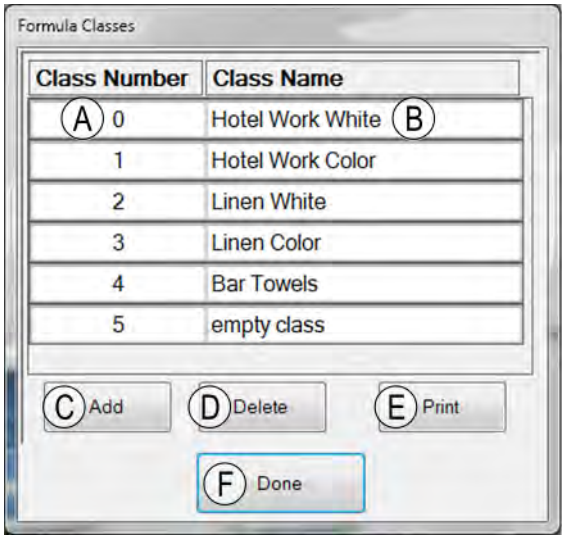
3.8.4.3. Save and Exit button—Touch this button to save the changes and close the window.

3.8.4.4. Cancel button—Touch this button to abandon the changes and close the window.

3.8.5. Formula Classes [Document BICCNF91]

Set formula classes so that each class contains formulas that are compatible. These classes simplify the management of compatibility.

Figure 58: The Formula Classes Window

Illustration	Legend
	**A.** *Class Number* column (Section 3.8.5.1) **B.** *Class Name* column (Section 3.8.5.2) **C.** *Add* button (Section 3.8.5.3) **D.** *Delete* button (Section 3.8.5.4) **E.** *Print* button (Section 3.8.5.5) **F.** *Done* button (Section 3.8.5.6)

3.8.5.1. *Class Number* **Column**—Set a class number for each formula class. This number appears in the *Current Formula* area of the *Formula Programming* window.

3.8.5.2. *Class Name* **Column**—Set a class name for each formula class. This name appears in the *Current Formula* area of the *Formula Programming* window.

3.8.5.3. *Add* **Button**—Touch this button to add an empty row to the bottom of the *Formula Classes* window.

3.8.5.4. *Delete* **Button**—Touch this button to remove the selected row from the *Formula Classes* window.

3.8.5.5. *Print* **Button**—Touch this button to preview the *Formula Classes* report and optionally print it on the Windows default printer.

3.8.5.6. *Done* **Button**—Touch this button to save the changes and close the *Formula Classes* window.

3.8.6. Chemical Pump Flow Rate [Document BICCNF92]

Set the units per second for each chemical pump. For chemical cbits with a pump flow rate set in this window, use weight or volume units for chemical injections. The controller operates cbits with "0" in the *Units per Second* column for the number of seconds set in the *Formula Programming* window.

Figure 59: Chemical Pump Flow Rate Window

Illustration	Legend
	**A.** *Chemical Function* name column (Section 3.8.6.1) **B.** *Module number* column (Section 3.8.6.2) **C.** *Cbit number* column (Section 3.8.6.3) **D.** *Pump Rate* column (Section 3.8.6.4) **E.** *Save and Exit* button (Section 3.8.6.5) **F.** *Cancel* button (Section 3.8.6.6)

3.8.6.1. *Chemical Function* **Column**—This column displays the name of each chemical function.

3.8.6.2. *Module Number* **Column**—This column displays the module number of each chemical function.

3.8.6.3. *Cbit Number* **Column**—This column displays the Cbit number of each chemical function.

3.8.6.4. *Pump Rate* **Column**—This column allows you to set the units per second for the pump. Set a value here, then set the desired quantity of chemical when you program the wash formula.

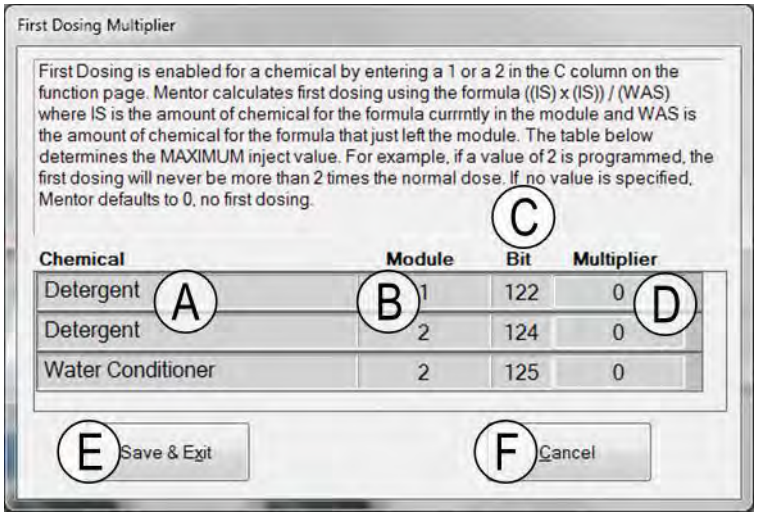
3.8.6.5. *Save and Exit* **Button**—Touch this button to save the changes and close the window.

3.8.6.6. *Cancel* **Button**—Touch this button to abandon the changes and close the window.

3.8.7. First Dosing [Document BICCNF93]

Use this feature to quickly change the chemical concentration in a tunnel washer module when the wash formula in the module changes. Compatibility must be enabled for the chemical function to enable this feature.

Figure 60: First Dosing Window

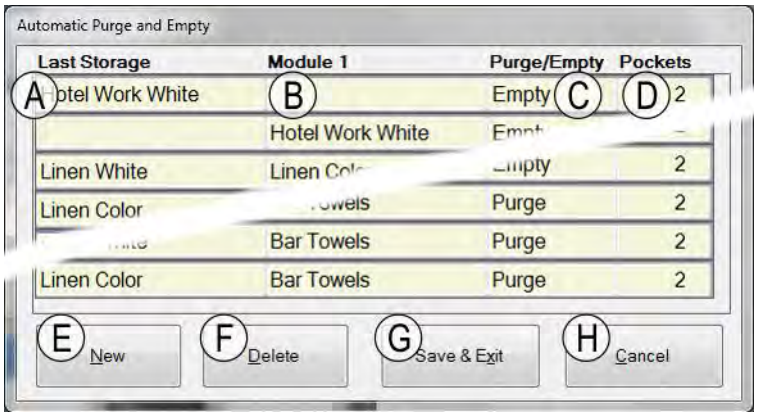
Illustration	Legend
	**A.** *Chemical name* fields **B.** *Module number* fields **C.** *Bit* fields **D.** *Multiplier* fields **E.** *Save and Exit* button **F.** *Cancel* button

3.8.8. Automatic Empties [Document BICCNF94]

The controller can automatically insert empty pockets and purge pockets between incompatible loads of goods.

- Empty pockets allow normal tunnel washer counterflow to dilute the contaminated water before the goods that would be contaminated arrive in the module.
- Purge pockets work like empty pockets with the addition of draining and refilling the module.

Figure 61: Automatic Empties Window

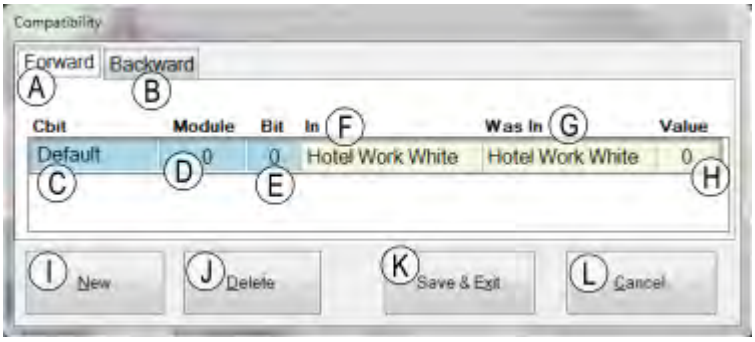
Illustration	Legend
	**A.** *Last Storage* column **B.** *Module 1* column **C.** *Purge or Empty* action **D.** Number of *Pockets* **E.** *New* button **F.** *Delete* button **G.** *Save & Exit* button **H.** *Cancel* button

3.8.9. Compatibility [Document BICCNF95]

This feature drains the contaminated water from a module before an incompatible load enters the module.

Figure 62: Compatibility Window

Window



Legend

A. *Forward Compatibility* tab
B. *Backward Compatibility* tab
C. *Cbit* value
D. *Module* number
E. *Bit* number
F. *Formula IN* the module
G. *Formula that WAS IN* the module
H. *Value* number
I. *New* button
J. *Delete* button
K. *Save and Exit* button
L. *Cancel* button

— End of BICCNF10 —

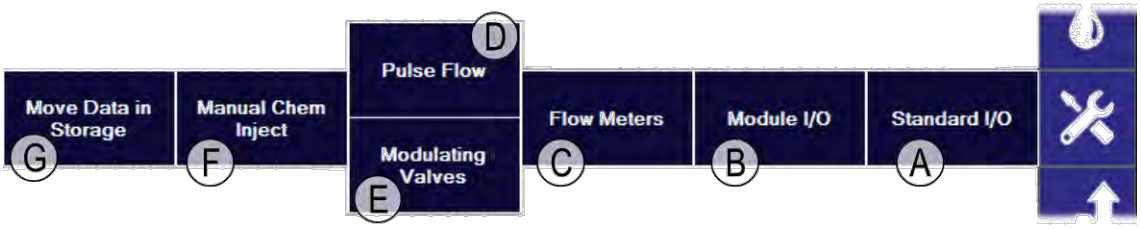
BICCNF11 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

3.9. The Inputs and Outputs Menu Button

View the inputs and control the outputs from the Mentor controller.

Figure 63: Inputs and Outputs Menu

Illustration



Legend

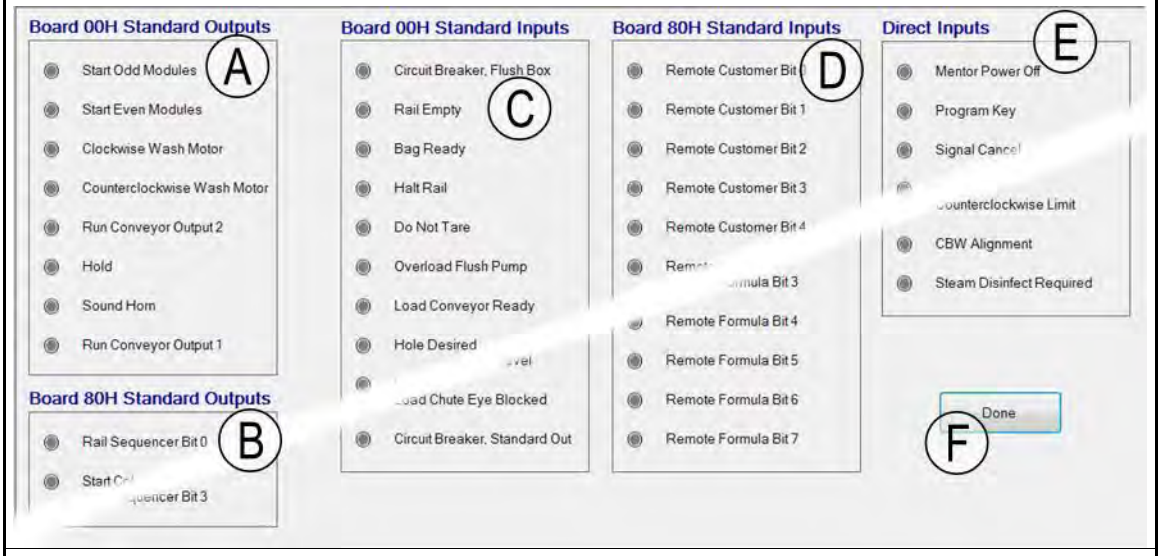
A. *Standard I/O* button (see Section 3.9.1)
B. *Module I/O* button (see Section 3.9.2)
C. *Flow Meters* button (see Section 3.9.3)
D. *PulseFlow* button (see Section 3.9.4)
E. *Modulating Valves* button (see Section 3.9.5)
F. *Manual Chemical Injection* button (see Section 3.9.6)
G. *Move Data in Storage* button (see Section 3.9.7)

3.9.1. Standard I/O [Document BICCNF97]

View the standard inputs and outputs.

Figure 64: Standard Input and Output Window

Overview Illustration



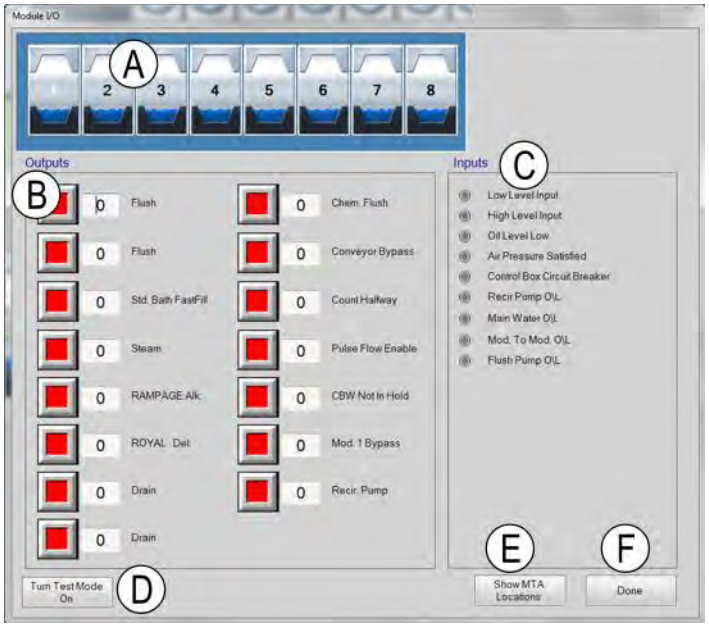
Legend

A. Board 00H Standard Outputs
B. Board 80H Standard Outputs
C. Board 00H Standard Inputs
D. Board 80H Standard Inputs
E. Direct Inputs
F. Done button

3.9.2. Module Inputs and Outputs [Document BICCNF98]

Use the controls in this window to manually operate the outputs and view in status of the inputs for the selected module.

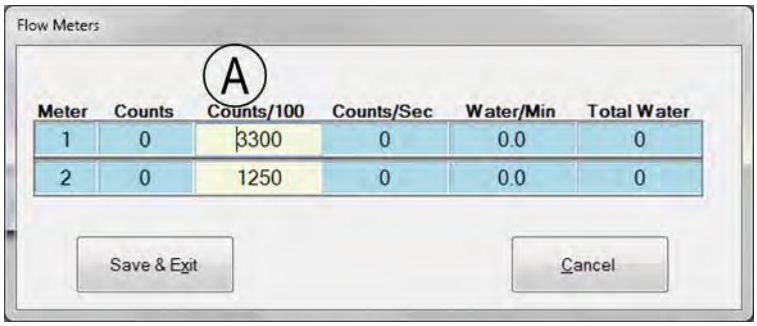
Figure 65: Module I/O Window

Illustration	Legend
	**A.** Select module **B.** Operate module outputs **C.** View module inputs **D.** Enable test mode **E.** Display MTA locations **F.** Close

3.9.3. Flow Meters [Document BICCNF99]

Use this selection to specify the number of counts per 100 units that flow through the flow meters.Touch the field and enter the pre-determined counts for each flow meter. Save and exit to apply the changes.

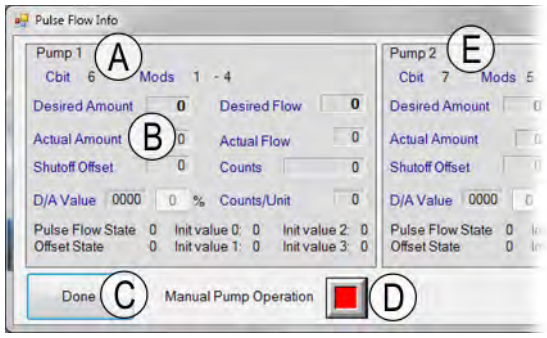
Figure 66: Flow Meters Window

Illustration	Legend
	**A.** Counts per 100 field

3.9.4. PulseFlow® Button [Document BICCNFA0]

Use this window to set and view the data for the PulseFlow feature. The PulseFlow button appears only if the tunnel washer is configured for the PulseFlow feature.

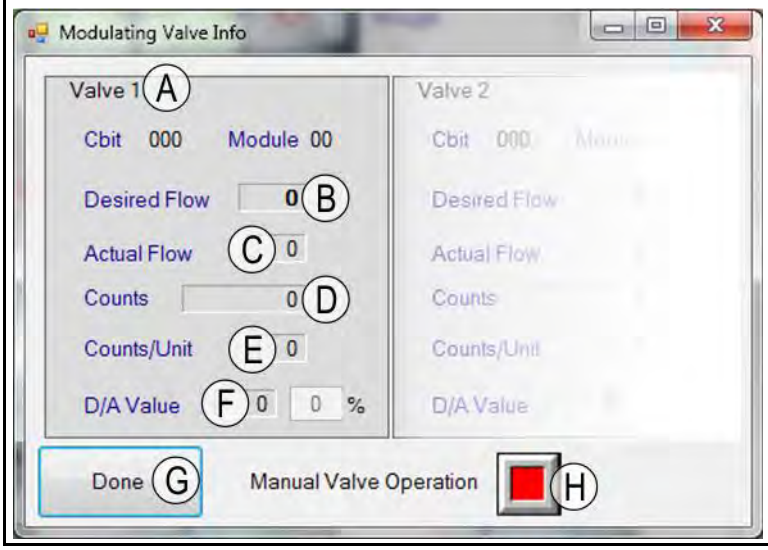
Figure 67: PulseFlow Settings Window

Illustration	Legend
	**A.** Pump number and Cbit data **B.** PulseFlow system data **C.** Done button **D.** Manual Pump Operation button **E.** Second pump number and Cbit data

3.9.5. Modulating Valves [Document BICCNFA1]

The modulating vavles window shows data for each modulating valve and lets you manually operate the valves. This button is not available if the tunnel washer is configured to use PulseFlow® features.

Figure 68: Modulating Valves Window

Illustration	Legend
	**A.** *Valve Number and Data* **B.** *Desired Flow* field **C.** *Actual Flow* field **D.** *Counts* field **E.** *Counts per Unit* field **F.** *Digital-to-Analog* field and percent **G.** *Done* button **H.** *Manual Valve Operation* button

3.9.5.1. *Valve Number* **and** *Valve Data*—The *Modulating Valves* window shows each modulating valve on the tunnel washer by number, the module and controlling Cbit, and other attributes of each valve.

3.9.5.2. **Desired Flow**—Set the desired flow for the valve.

3.9.5.3. **Actual Flow**—This field shows the actual flow through the valve.

3.9.5.4. **Counts**—This field shows the flowmeter counts from which the flow is calculated

3.9.5.5. **Counts per Unit**—This field shows the counts set for each unit of flow.

3.9.5.6. Digital-to-Analog Value and Percent—The value field shows the value used to calculate the modulating valve position. The percent field shows the percent open for the valve.

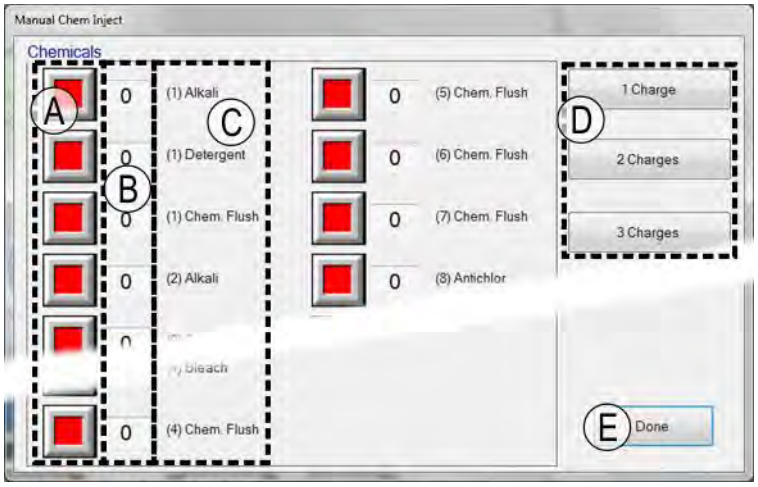
3.9.5.7. Done button—Touch this button to save the latest changes and close the window.

3.9.5.8. Manual Valve Operation button—Touch this button to enable manual operation of the modulating valves.

3.9.6. Manual Chemical Injection [Document BICCNFA2]

Inject chemicals manually to change concentrations.

Figure 69: Manual Chemical Injection Window

Illustration	Legend
	**A.** *Chemical Function* buttons **B.** Injection duration in seconds **C.** *Chemical Function* module and name **D.** *Charges* buttons **E.** *Done* button

3.9.7. Move Data in Storage [Document BICCNFA3]

Move the data in the first storage position to another position in the tunnel washer load system.

Figure 70: Move Data in Storage window

Illustration	Legend
	**1.** *Destination Module* field **2.** *Done* button **3.** *Cancel* button

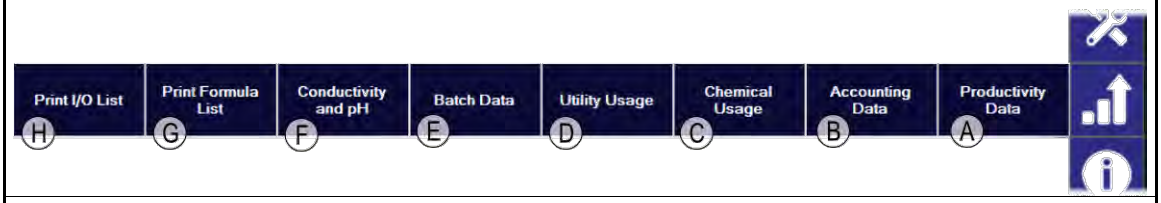
— End of BICCNF11 —

BICCNF12 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

3.10. The *Data and Reports Menu* Button

Figure 71: The Data and Reports Menu

Illustration



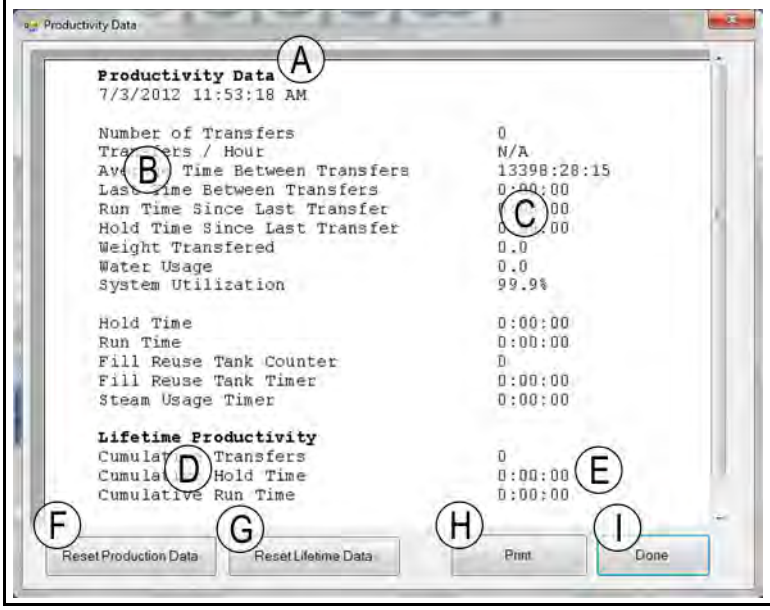
Legend

A. *Productivity Data* button (see Section 3.10.1)
B. *Accounting Data* button (see Section 3.10.2)
C. *Chemical Usage* button (see Section 3.10.3)
D. *Utility Usage* button (see Section 3.10.4)
E. *Batch Data* button (see Section 3.10.5)
F. *Conductivity and pH* button (see Section 3.10.6)
G. *Print Formula List* button (see Section 3.10.7)
H. *Print I/O List* button (see Section 3.10.8)

3.10.1. Productivity Data Button [Document BICCNFA4]

Figure 72: Productivity Data Preview Window

Illustration



Legend

A. Report title, date, and time
B. *Production Data* field names
C. *Production Data* values
D. *Lifetime Productivity* field names
E. *Lifetime Productivity* values
F. *Reset Production Data* button
G. *Reset Lifetime Data* button
H. *Print* button
I. *Done* button

3.10.1.1. Production Data Report Fields

Number of Transfers—the number of times the tunnel washer has transfered goods since the field was reset to 0

Transfers per Hour—the average number of times the tunnel washer has transfered per hour since the field was reset to 0

Average Time Between Transfers—the average time between tunnel washer transfers since the field was reset to 0

Last Time Between Transfers—the time between the most recent two tunnel washer transfers

Run Time Since Last Transfer—the time that the tunnel washer ran after the most recent tunnel washer transfer

Hold Time Since Last Transfer—the time that the tunnel washer held after the most recent transfer

Weight Transfered—the weight of goods that the tunnel washer transfered since the field was reset to 0

Water Usage—the amount of water used by the tunnel washer since the field was reset to 0

System Utilization—the percent of time the tunnel was ON but not in hold since the field was reset to 0

Hold Time—the time that the tunnel washer held since the field was reset to 0

Run Time—the time that the tunnel washer ran since the field was reset to 0

Fill Reuse Tank Counter—the number of times that the reuse tank was filled with fresh water

Fill Reuse Tank Timer—the time that the reuse tank fresh water valve was open since the field was reset to 0

Steam Usage Timer—the time that the steam valves were open since the field was reset to 0

3.10.1.2. Lifetime Production Data Report Fields

Cumulative Transfers—the number of times the tunnel washer has transfered goods since the field was reset to 0

Cumulative Hold Time—the time that the tunnel washer held since the field was reset to 0

Cumulative Run Time—the time that the tunnel washer ran since the field was reset to 0

3.10.2. Accounting Data Button [Document BICCNFA5]

Touch this button to view a chart of how many batches of each goods type or customer code the tunnel has processed.

Figure 73: Accounting Data Preview Window

Illustration

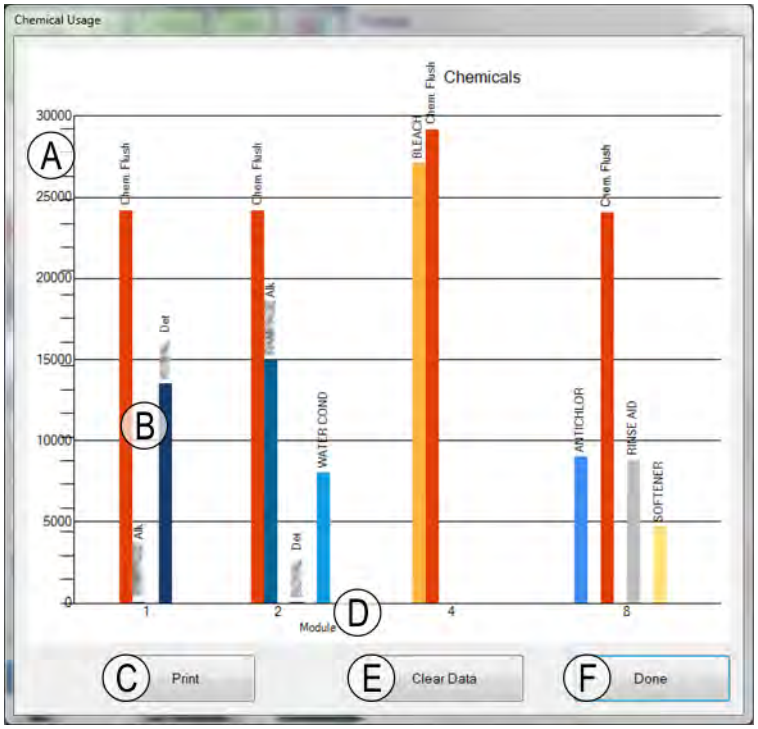
Legend

A. Batches processed per formula
B. Formula names
C. Filter selector field
D. *Print* button
E. *Clear Data* button
F. *Done* button

3.10.3. Chemical Usage Button [Document BICCNFA6]

Touch this button to monitor and print total chemical usage for each module.

Figure 74: *Chemical Usage* **Window**

Illustration	Legend
	**A.** *Units* scale (see Section 3.10.3.1) **B.** *Chemical Usage* graphs (typical, see Section 3.10.3.2) **C.** *Print* button (see Section 3.10.3.3) **D.** *Module* scale (see Section 3.10.3.1) **E.** *Clear Data* button (see Section 3.10.3.4) **F.** *Done* button (see Section 3.10.3.5)

3.10.3.1. Horizontal and Vertical Axes

Units scale (vertical axis)—labeled with the number of units.

Module scale (horizontal axis)—labeled with the module numbers. Only modules with chemical Cbits programmed appear.

3.10.3.2. Chemical Usage graphs—One vertical bar represents each chemical Cbit. The amount of chemical injected determines the height of the bar.

3.10.3.3. Print button—Touch this button to print the graph on the Windows default printer.

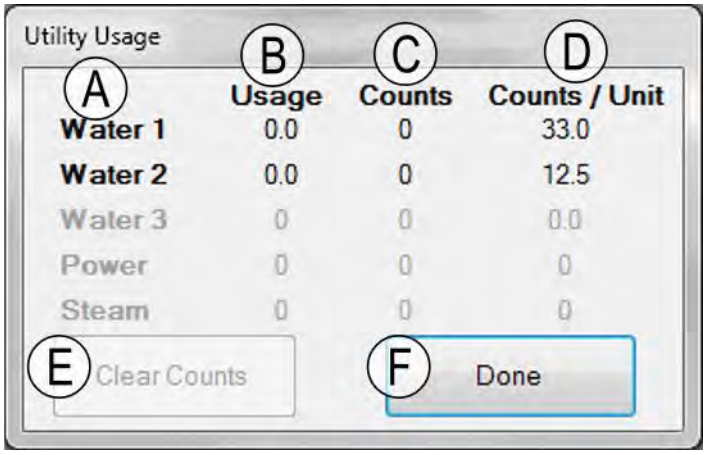
3.10.3.4. Clear Data button—Touch this button to clear the accumulated chemical data and set the values to 0.

3.10.3.5. Done button—Touch this button to close the graphs window.

3.10.4. Utility Usage Button [Document BICCNFA7]

Touch this button to view utilities used since the values were set to 0.

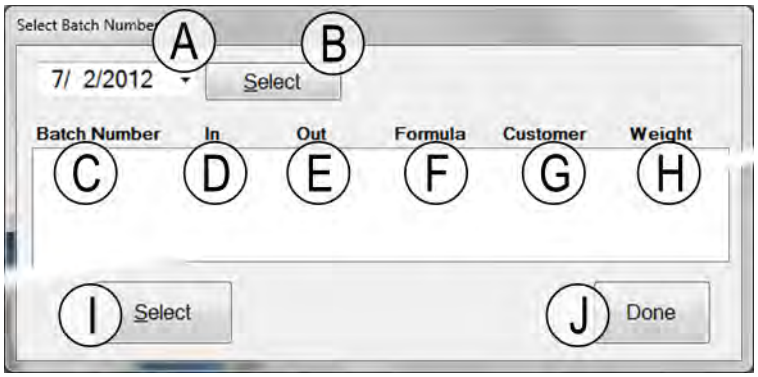
Figure 75: Utility Usage Window

Illustration	Legend
	**A.** Utilities column **B.** Calculated *Usage* column **C.** *Counts* column **D.** *Counts per Unit* column **E.** *Clear Counts* button **F.** *Done* button

3.10.5. Batch Data Button [Document BICCNFA8]

Touch this button to view data about tunnel washer batches.

Figure 76: Batch Data Window

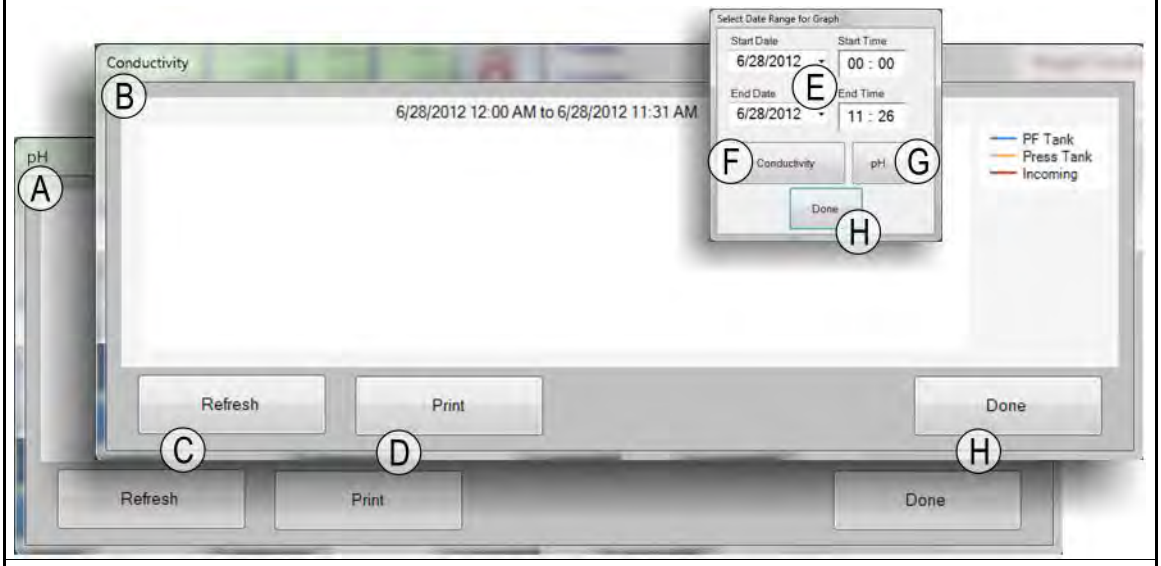
Illustration	Legend
	**A.** *Date* field **B.** *Select* button **C.** *Batch Number* column **D.** *In* data column **E.** *Out* data column **F.** *Formula* column **G.** *Customer* column **H.** *Weight* column **I.** *Select* button **J.** *Done* button

3.10.6. Conductivity and pH Report Button [Document BICCNFA9]

Touch this button to view graphs of conductivity and pH levels over time.

Figure 77: Conductivity and pH Reports

Illustration



Legend

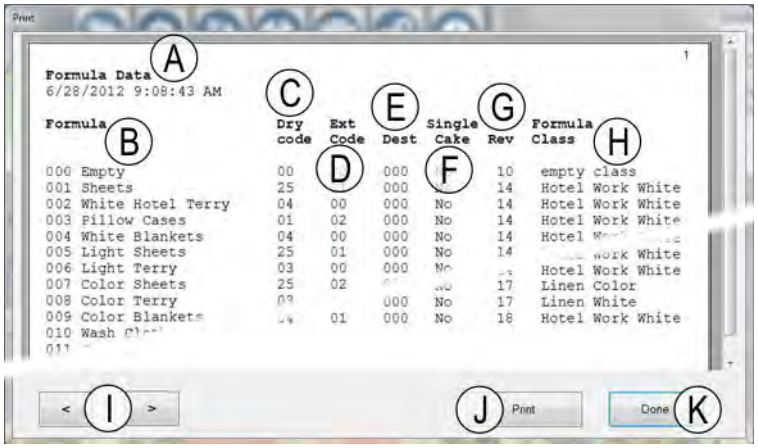
A. *pH Report* preview window
B. *Conductivity Report* preview window
C. *Refresh* buttons
D. *Print* buttons
E. *Report Date and Time* fields
F. *Conductivity Report* button
G. *pH Report* button
H. *Done* buttons

3.10.7. *Print Formula List* Button [Document BICCNFB0]

Touch this button to preview and print a list of the formulas in the Mentor controller.

Figure 78: Formula List Print Preview Window

Illustration



Legend

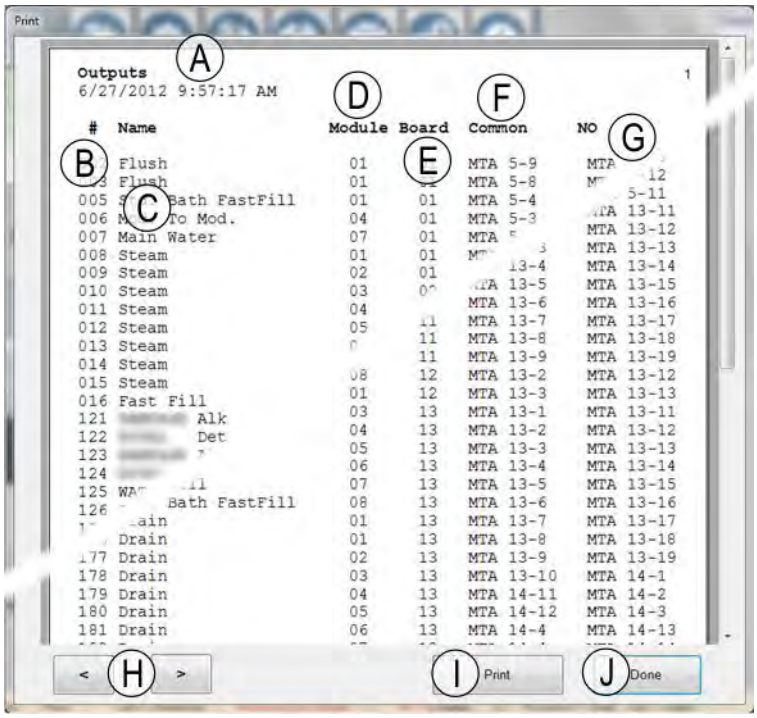
A. Report title, date, and time
B. *Formula Number* and *Name*
C. Assigned *Drycode*
D. Assigned *Extract Code*
E. Assigned *Destination Code*
F. Status of *Single Cake* flag
G. Number of *Reversals*
H. Assigned *Formula Class*
I. *Previous Page* and *Next Page* buttons
J. *Print* button
K. *Done* button

3.10.8. *Print I/O List* Button [Document BICCNFB1]

Touch this button to view lists of tunnel washer inputs and outputs.

Figure 79: The Input/Output List

Preview of Outputs Report



Legend

- **A.** Report title, date, and time
- **B.** Output number
- **C.** Output name
- **D.** Module number
- **E.** Board address
- **F.** Common connector and pin
- **G.** Normally open connector and pin
- **H.** *Previous Page* and *Next Page* buttons
- **I.** *Print* button
- **J.** *Done* button

— End of BICCNF12 —

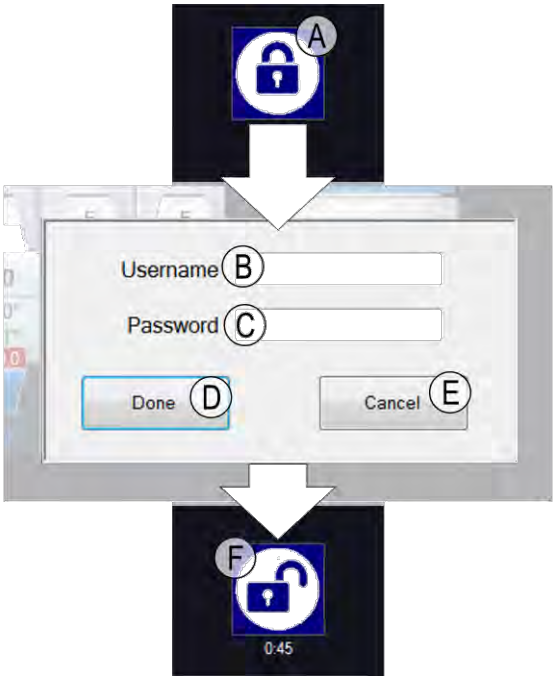
BICCNF13 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

3.11. The Administrator Login Button

Touch this button to log into the Mentor® controller as a user with elevated rights. These rights are required to modify the list of users, shut down the Mentor controller, and do other operations.

The login is effective for 45 minutes, as shown by the timer below the button when an administrator is logged in.

Figure 80: *Administrator Login* **Window**

Window	Legend
	**A.** *Administrator Login* button (*Locked* position) **B.** User name field **C.** Password field **D.** *Done* button **E.** *Cancel* button **F.** *Administrator Login* button (*Unlocked* position)

— End of BICCNF13 —

BICCNF14 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

3.12. The *Help Menu* Button

Touch this button to view data about operating and maintaining the tunnel washer and the Mentor® controller.

Figure 81: The *Help* **Menu**

Illustration

Legend

A. *Reference Manual* button (see Section 3.12.1)
B. *Schematics* button (see Section 3.12.2)
C. *Lost Password* button (see Section 3.12.3)
D. *About* button (see Section 3.12.4)
E. *pH Calibration* button (see Section 3.12.5)
F. *Conductivity Calibration* button (see Section 3.12.6)

3.12.1. *Reference Manual* Button [Document BICCNF55]

Touch this button to see the version of this manual that was current when the software was created or the last time it was updated. The manual tells how to use the Mentor® control system for tunnel washers.

3.12.2. The *Schematics* Button [Document BICCNF56]

Touch this button to view the complete set of electrical diagrams and related data. The Milnor factory will ask you to refer to this data when you troubleshoot the machine or add an electrical component.

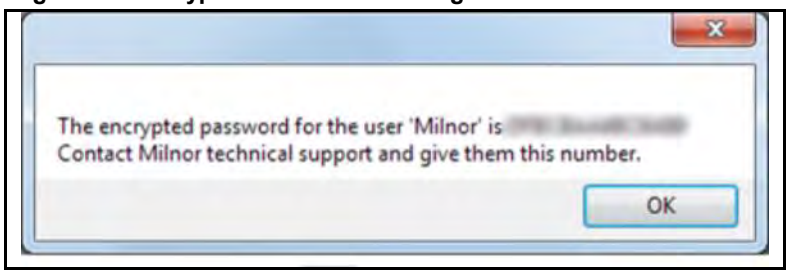
3.12.3. The *Lost Password* Button [Document BICCNF57]

Touch this button to view an encoded version of the password for the Mentor permanent user named "Milnor."

- The telephone number for the Milnor Customer Service department is **504.712.7780**. This number is in the Central time zone (UTC/GMT-6 hours) in the United States.
- The email address for the Milnor Customer Service department is **Service@Milnor.com**.

Tip: For the fastest service, use the telephone.

Figure 82: Encrypted Password Message



3.12.4. The *About* Button [Document BICCNF58]

Touch this button to view the Mentor® software version and the version of the CBW® processor board. Touch the *OK* button to return to the main Mentor® window.

Figure 83: The Mentor *About* Window

3.12.5. *pH Calibration* Button [Document BICCNFB9]

Touch this button to see a document that describes how to calibrate the pH sensor. The document that this button displays is provided by the manufacturer of the input analyzer, not Pellerin Milnor Corporation.

3.12.6. *Conductivity Calibration* **Button [Document BICCNFC0]**

Touch this button to see a document that describes how to calibrate the conductivity sensor. The document that this button displays is provided by the manufacturer of the input analyzer, not Pellerin Milnor Corporation.

— End of BICCNF14 —

Chapter 4
Configuring the Mentor Controller

BICCNFB8 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

4.1. How to Configure and Program Alternate PulseFlow®

Prerequisites: The *Alternate PulseFlow®* feature requires CBW PC software version 2.5 or later and board software 25500 or later.

The *Alternate PulseFlow®* feature is used to purge the water when incompatible goods are processed in the tunnel washer. An *Alternate PulseFlow®* purge inserted between the incompatible batches. As the purge reaches each module, it commands the module drain to open and remain open during the PulseFlow® operation. This causes the water from the module and the subsequent PulseFlow® operation to drain to the sewer.

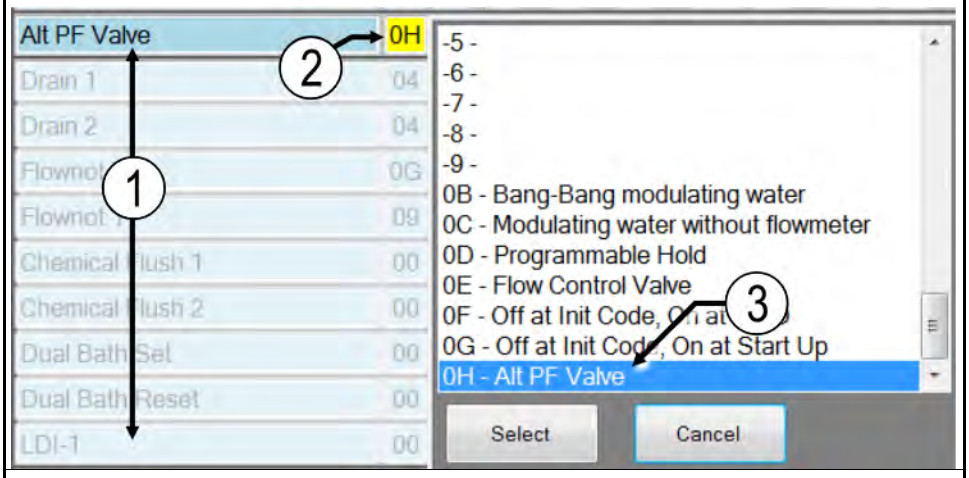
Each module from module 2 to the module before the main pulse flow module is equipped with an *Alternate PulseFlow®* valve. This valve opens when the purge is in the next module. An *Alternate PulseFlow®* pump sends water to this valve when the tunnel washer calls for PulseFlow® operation. The *Alternate PulseFlow®* valves are supplied form the same headers as the fresh water fast fill valves. When the tunnel washer runs in *Alternate PulseFlow®* mode, valves on the fresh water headers switch to feed the header from the PulseFlow® tank.

4.1.1. Alternate PulseFlow® Valves

The c-bits for the *Alternate PulseFlow®* valves in each module are configured on the function page using op code 0H. The hold code and init code are ignored.

Figure 84: Function Page

Detail



Legend

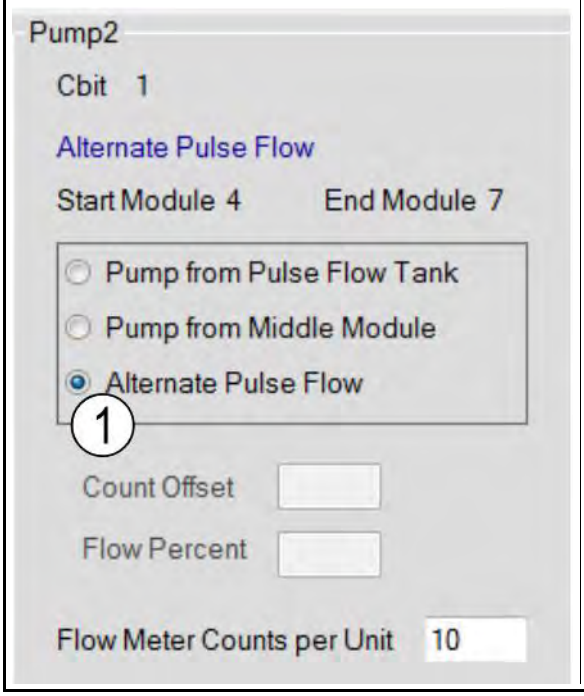
1. Function List
2. Selected Op Code for *Alternate PulseFlow*® Valve
3. Op Code List

4.1.2. Alternate PulseFlow® Pump

The pump is configured on the Function page just like any other PulseFlow pump, using op code 08. On the PulseFlow Pump configuration page, set the pump type to *Alternate PulseFlow*®.

Figure 85: Pump Configuration Window

Detail



Legend

1. *Alternate PulseFlow*® pump selection

4.1.3. Program Constants

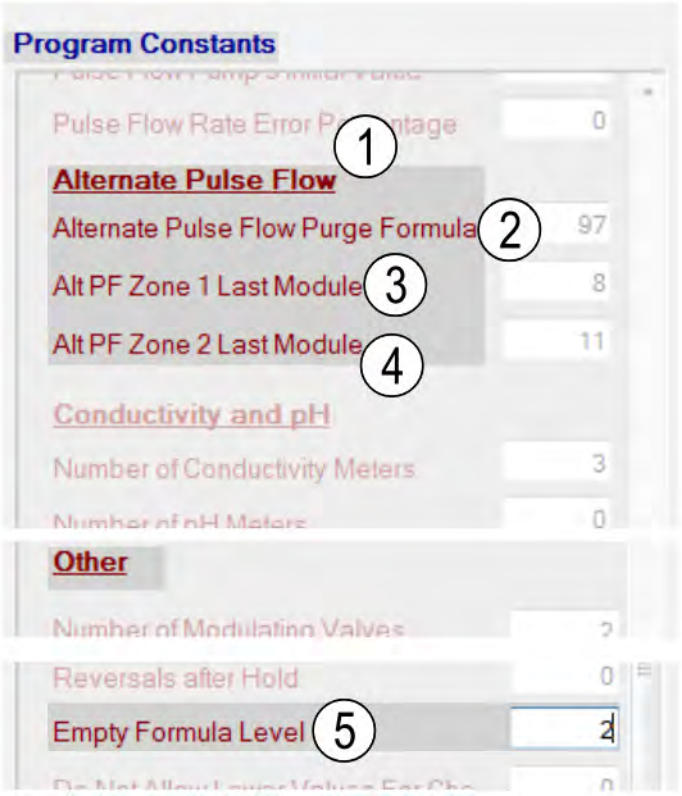
Alternate PulseFlow® **Purge Formula**—This defines which formula to use for the alternate pulse flow purge. Pick a formula number and program that formula to open the drains. The water amounts for the alternate pulse flow pump are programmed in this formula.

Alternate PF Zone 1 Last Module—Set this to the last module fed by water header number 1. The zone starts at module 1. This is used to switch the header from fresh to the pulse flow tank as long as the purge is in this zone. In the example above, this would be modules 1 to 8.

Alternate PF Zone 2 Last Module—Set this to the last module fed by water header number 2. This zone begins at the next module following zone 1. This is used to switch the second header from fresh to the pulse flow tank as long as the purge is in this zone. In the example above, this is modules 9 to 11.

Empty Formula Level—Set this constant to 2 to allow the CBW to transfer without level in an empty pocket. This is required because the *Alternate PulseFlow*® purge drains remain open until the tunnel washer transfers.

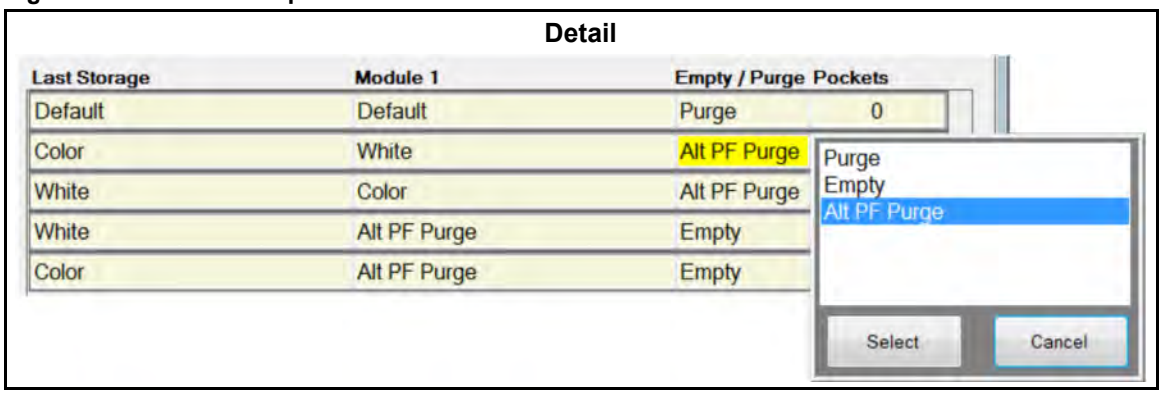
Figure 86: Program Constants Window

Detail	Legend
	**1.** *Alternate PulseFlow*® section of *Program Constants* window **2.** *Alternate PulseFlow*® purge formula **3.** *Alternate PulseFlow*® *Zone 1* last module **4.** *Alternate PulseFlow*® *Zone 2* last module **5.** Empty Formula Level in *Other* section of *Program Constants* window

4.1.4. Automatic Empties Table

A new option has been added to the Automatic empties table. Now, a purge, empty, or Alt PF (*Alternate PulseFlow*®) purge can be inserted automatically. The Alt PF purge is used to enable *Alternate PulseFlow*®.

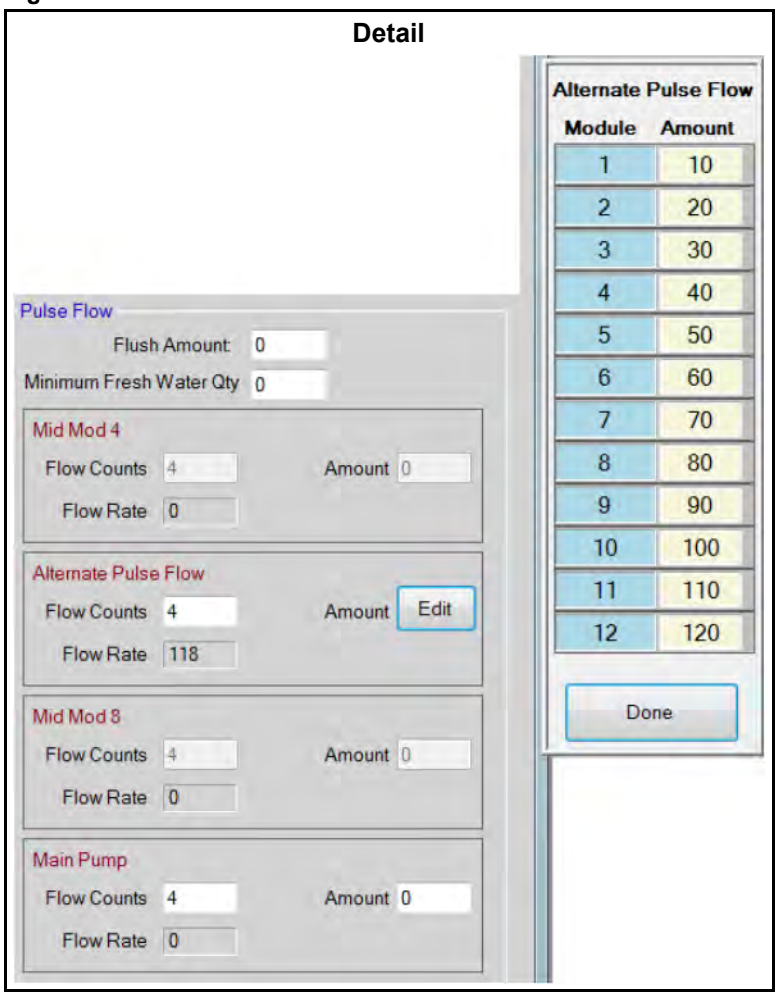
Figure 87: Automatic Empties Table



4.1.5. Alternate PulseFlow® Purge Formula

The drains and water amount for the *Alternate PulseFlow®* pump are programmed on the formula page under the *Alternate PulseFlow®* purge formula. This formula number is determined by the *Alternate PulseFlow®* Purge Formula program constant. The drains are programmed like any other c-bit. The water amount is programmed by module. This allows for a lower amount to be programmed in the first few modules.

Figure 88: Formula Window



4.1.6. Additional Outputs for *Alternate PulseFlow®* Features

Two non-c-bit outputs control the valves that switch the water headers from fresh to the pulse flow tank

Alt PF Zone 1 Enable—80MTA5-10 & 5-19

Alt PF Zone 2 Enable—81MTA5-2 & 5-12

Both of these outputs can be viewed under the *Tools* menu. The first output is in the *Standard I/O* window, and the second output is in the PulseFlow® window.

— End of BICCNFB8 —

BICCLC01 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

4.2. Steam Disinfection Option on CBW® Tunnel Washers

Steam disinfection is an optional feature available with Mentor versions 20100 and later consisting of software and associated external circuitry. Although the menu selection shown in Figure 89 may be available on your specific Mentor controller, the optional external circuitry is required for steam disinfection to operate.

Consult with the proper local or national regulatory authorities for required temperatures.

4.2.1. Operation

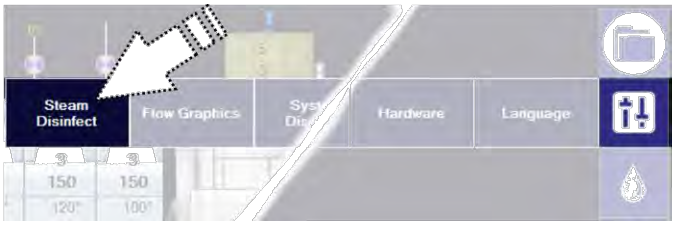
When the operator starts a CBW® tunnel washer with this option, the Mentor controller checks the status of a microprocessor input (described in Section 4.2.3). If this input is grounded, the controller assumes that the tunnel washer has been turned off for at least three hours and prompts the operator that the tunnel must be disinfected before goods can be processed. When the operator acknowledges this, the controller commands the tunnel to begin reversing rotation and opens steam valves in each module.

When the programmed disinfection temperatures are achieved in all modules, the controller maintains the temperatures for three minutes. At the end of the disinfection period, the tunnel washer re-arms the disinfection circuit for the next cycle. As part of resetting the circuit, the steam disinfection input is removed, allowing the controller to operate the tunnel and transfer goods as programmed.

4.2.2. Setting Module Disinfection Temperatures

The required temperature for each module is set individually through the *Steam Disinfect* selection in the *Programming* menu on the *Mentor Operational Display*, as shown in Figure 89.

Figure 89: Location of *Steam Disinfect* Menu Selection



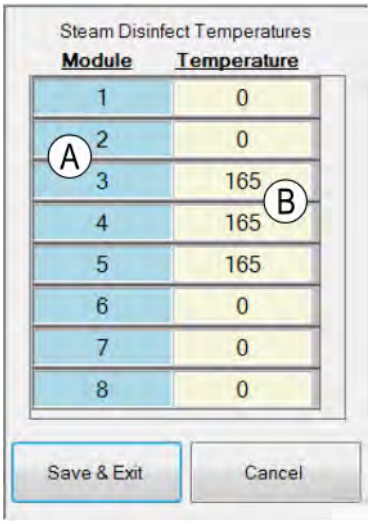
When *Steam Disinfect* is selected from the Mentor *Programming* menu, a window opens similar to Figure 90. Enter the required temperature for each module in the *Temperature* column, pressing the *Tab* key to advance to the next module.

Tip: Hold the *Shift* key and press the *Tab* key to move backward through the module settings.

After entering the temperature for the last module, click on *Exit* at the upper left of the *Temperatures* window to return to the *Mentor Operational Display*. If the associated external circuitry is present, the Mentor controller will require steam disinfection the next time it is started.

Figure 90: Setting Temperatures

Steam Disinfect Temperatures **Window**



Legend

A. Module number
B. Required temperature

4.2.3. Standard Inputs and Outputs for Steam Disinfect

At start-up, the Mentor controller checks the microprocessor input at MTA39-6 on the tunnel washer processor board. If this input is grounded, the steam disinfection process must be run to clear the input and allow the tunnel washer to transfer goods from one module to the next.

Three minutes after the programmed temperatures are achieved in each module, the third output on the standard input/output board at address 80H is enabled, clearing the input at MTA39-6 and allowing the tunnel washer to transfer. At the same time, the steam disinfection circuit is reset for the next tunnel start-up.

— End of BICCLC01 —

BICCLC05 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

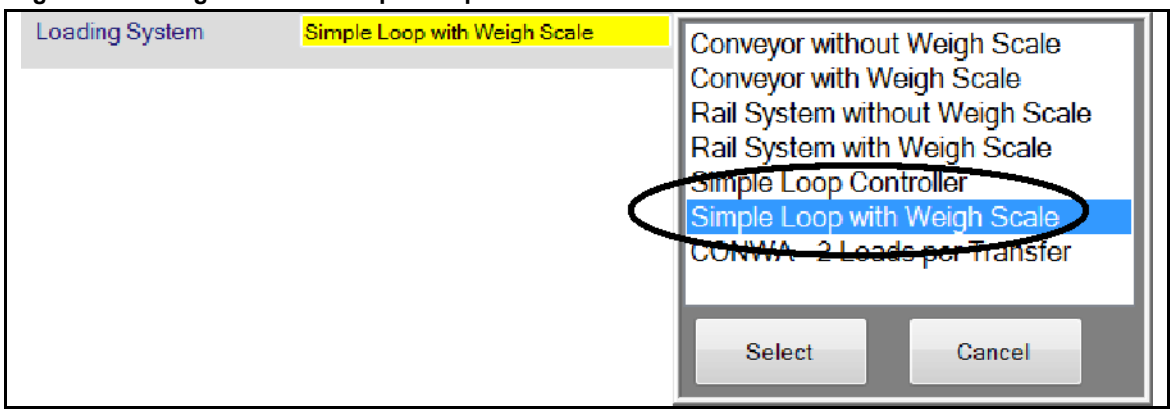
4.3. About the Simple Loop Controller Loading System

The *Simple Loop Controller* is a feature of the Mentor® CBW® tunnel washer controller which manages loading the tunnel washer from a rail system. The rail system can have a maximum of 16 positions: one loading position and 15 bag positions. Mentor® configuration decisions allow selection of a *Simple Loop Controller* with or without a weighing scale.

4.3.1. Configuration

1. Select the system which loads the tunnel washer on the *Hardware Configuration* page of the Mentor® controller software (Figure 91). The configuration procedure and available options are described in Section 3.7.2.5 "Loading Tab". Choose the correct option according to whether the loading system provided with your tunnel washer incorporates a weighing scale.

Figure 91: Configuration for Simple Loop Controller



2. In the *Number of Storage Positions* decision, configure the number of storage positions available on the rail. The value entered here must equal the number of bags on the rail system plus the one loading position. For example, if the rail system holds 12 bags, enter "13" for the number of storage positions.

   Note 5: The loading station is not a position on the rail; it is a data entry position only.

   The number of storage positions in a simple loop controller system cannot exceed 16; thus, 15 is the maximum number of bags possible with this loading system option.

4.3.2. Installation

The simple loop controller requires two inputs: *Data Valid* and *Bag Ready*. Both of these inputs are shown on the *Standard and Direct Inputs* page (see Section 3.9.1 "Standard I/O").

Data Valid **input**—This input is wired to direct input MTA38-4. The *Data Valid* input is usually provided by the button the operator presses to hoist a bag onto the rail to signal the Mentor® controller that the operator moved a bag from the loading area onto the rail. This input must be present for at least one second to ensure detection by the Mentor® controller.

A weighing scale in the loading system requires a time delay relay on the hoist to delay lifting for three seconds to allow accurate weight measurement.

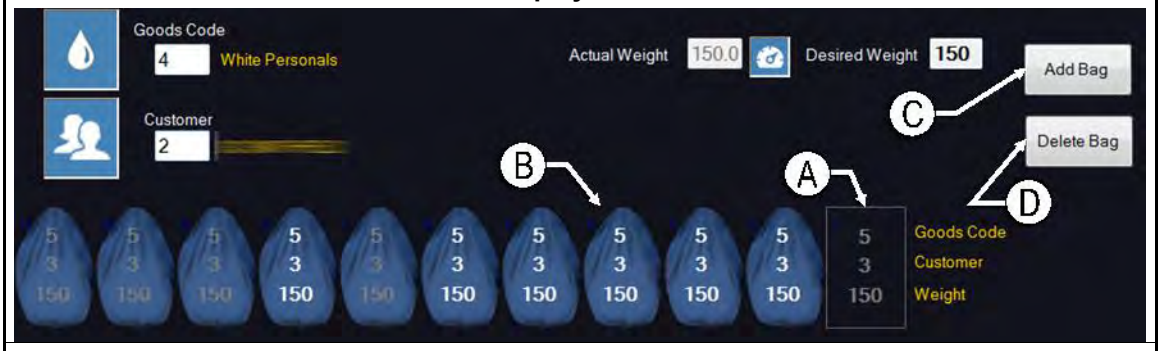
Bag Ready **input**—This input is wired to 00MTA4-3 on the standard input board at address 00H. The *Bag Ready* input signals the Mentor® controller that a bag is in position above the tunnel washer load chute and is ready for loading into the tunnel washer.

4.3.3. Display

When the *Simple Loop Controller* is configured, the display appears similar to the detail shown in Figure 92.

Figure 92: Simple Loop Controller on Mentor® Operational Display

Display Detail



Legend

A. Loading station
B. Storage positions 1 through 15
C. *Add Bag _* button
D. *Delete Bag _* button

The *Loading System* screen region shows a representation of the load station and each bag position controlled by the simple loop controller.

Display or Action	Explanation
`LS`	The rightmost position (item A in Figure 92) represents the load station, where the operator loads each bag and enters data according to the bag contents.
`1 ... 15`	Each numbered box represents a storage location and the contents of the bag at that position.
`--` `---`	Dashed lines in the load station or any storage positions represent positions without a bag.

Bag positions along the rail are displayed in numeric order, starting immediately to the left of the load station position.

4.3.4. Operation

The data in the loading station position is moved to the *last empty position* when

- the *Data Valid* input is made, or
- the operator selects the *Add Bag _* button.

Note 6: The *last empty position* is defined as the storage position box furthest to the left and containing only dashes.

The data in each position shifts one position to the left and the last bag position that contained data becomes dashed when

- the tunnel washer transfers, or
- the operator selects the *Delete Bag _* button.

The *Simple Loop Controller* inserts empty pockets if the *Bag Ready* input is made when the rail is empty (all storage positions except the load station contain dashes).

— End of BICCLC05 —

Chapter 5
Configuring Other Devices

BIPCUC10 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

5.1. How to Calibrate Water Flow Meters Used on the Milnor® CBW® Washer

Depending on options purchased, the Milnor® Continuous Batch Washer® may be equipped with float-type visual flow meters, electronic paddlewheel flow meters, electronic magnetic flow meters, or a combination of types.

5.1.1. About Visual (Sight Glass) Flow Meters

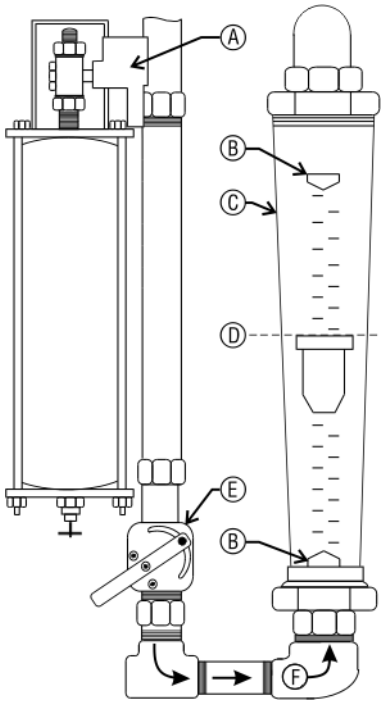
These flow meters (see Figure 93) operate by forcing a weight of specific mass and size upward in a clear plastic cone of specific dimensions. As the flow rate increases, the weight moves up, increasing the gap between the sides of the weight and the inside of the cone and allowing the increased flow to pass. The flow rate is read on the scale along the outside of the plastic cone at the **top** of the weight. Visual flow meters of three different sizes are used in Milnor® applications, depending on the expected flow rate:

- 0.88 to 11.00 US gallons (3.3 to 42.0 liters) per minute
- 4.0 to 44.0 US gallons (15.0 to 167.0 liters) per minute
- 6.6 to 79.0 US gallons (30.0 to 200.0 liters) per minute

This type of flow meter does not require calibration, but must be installed absolutely vertical and kept clean. Verify that the centerline of the cone is plumb in all planes, or else the indicated flow rate will be incorrect. Carefully clean mineral and rust deposits from the inside of the plastic cone with a non-abrasive pad and a cleaning solution such as a calcium, lime and rust remover; or a citrus based cleaner.

> **Note 7:** Use care when removing sight glasses from flow meters. Plastic sight glasses may become brittle over time.

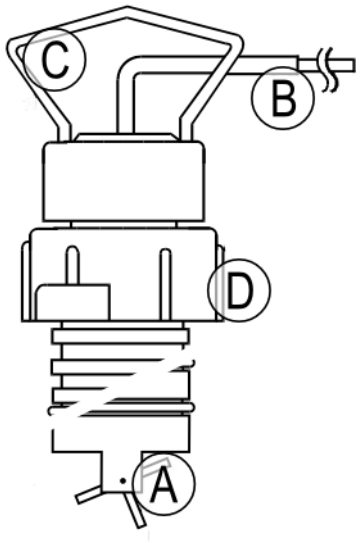
Figure 93: Typical Visual (Sight Glass) Flow Meter

Flow Meter	Legend
	**A.** Air-operated valve **B.** Movable marker **C.** Flow meter sight glass **D.** Read flow rate at top of indicator weight **E.** Hand-operated lockable vernier adjusting valve **F.** Direction of flow

5.1.2. Electro-mechanical (Paddlewheel) Flow Meters

Paddlewheel flowmeters are used when flow rates of clean water need to be automatically collected. As the water flows past the flowmeter, it causes the paddlewheel to spin. The rotations of the spinning paddlewheel are counted and transmitted to the Mentor computer. While the machine is running, the Mentor computer continuously collects the number of paddlewheel rotations (called “counts”) from each flowmeter and the time that the flowmeter is active. Using these data and the user-calibrated “Counts per Quantity” value, the Mentor controller calculates and displays the quantity of fresh and reuse water used per minute, as well as the cumulative total quantities of water.

Figure 94: Typical Electro-mechanical Flow Meter

Illustration	Legend
	**A.** Paddlewheel **B.** Shielded lead to tunnel washer input/output board **C.** Protective bail and paddlewheel axis indicator **D.** Cap for attachment to pipe fitting

Supplement 1

Operational Theory

Electro-mechanical paddlewheel flow meters operate according to the **Hall effect**. The Hall effect is the voltage created when magnetic field passes around an active electrical conductor. In the specific case of paddlewheel flow sensors, there is no moving mechanical linkage between the paddlewheel in the pipe and the sensing unit outside the pipe. Instead, a conductor in the sensing unit carries a small electrical current. When fluid flows past the flow meter, the paddlewheel spins at a speed proportional to the velocity of the fluid in the pipe. The blades of the paddlewheel are magnetized, so the magnetic field around each blade passes around the conductor in the sensing unit, altering the electrical current. The current alterations caused by each paddlewheel blade are counted for a period of time, resulting in a number that represents the fluid velocity. The final calculation that results in flow rate as **units per period** includes factors to account for the inside diameter of the pipe, the viscosity of the fluid, and several other variables.

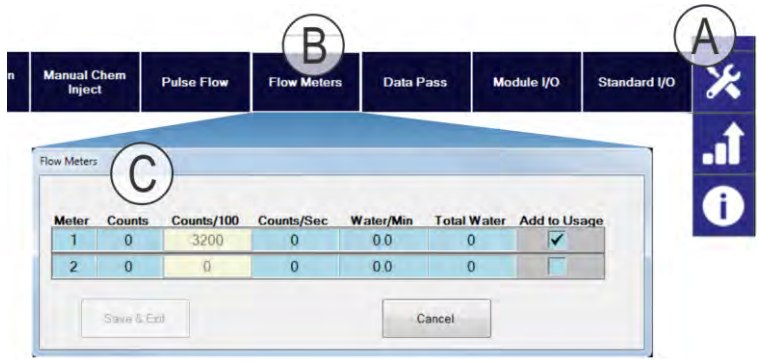
5.1.2.1. Calibration Procedure Using a Weighing Device—The Milnor® factory uses the following calibration procedure during machine assembly and testing. If your laundry facility has the space and equipment necessary to capture and accurately weigh a large quantity of water, this method is more accurate even with smaller sample sizes than the method described in Section 5.1.2.2.

This method requires a calibration container and a means of accurately weighing the container when it is filled with water. To minimize rounding errors and improve the accuracy of the calibration procedure, the calibration container should be as large as can be safely handled and weighed. A large drum (55 gallons or more) is suitable. The procedure should also be performed two or more times and the results averaged.

1. Place the calibration container and weighing device near the tunnel washer flow meter that will be calibrated.
2. Record the weight of the empty calibration container

3. Replace the piping just downstream of the flowmeter with a piece of flexible hose of similar inside diameter. This tubing should be long enough to conveniently reach the calibration container.
4. Place the free end of the flexible hose in the calibration container. Secure the hose so it won't fall out of the drum when you turn the water on.
5. At the Mentor controller, log in with programmer rights so you can change the *Counts per Quantity* value later.
6. On the *Mentor operational display*, put the mouse cursor on a blank area within the module where the flow meter is electrically connected, then click the right mouse button once. The *Manual Output Toggle page* for the module appears. The *Mentor operational display* and the *Manual Output Toggle page* are shown in Figure 95.

Figure 95: Flow meter calibration



Legend

1. *Mentor operational display* screen
2. *Manual output display* screen
3. Flowmeters button on *output display* screen
4. *Flow meter data* page (typical)
5. *Counts per Quantity* calibration value
6. *Clear Counters* button on *Flow meter data* page

7. Position the mouse cursor on the *Flowmeters* button at the bottom of the *Manual Output Toggle* page and click the left mouse button once. The *Flowmeter data* window appears, as shown in Figure 95.
8. Click the mouse once on the *Clear Counters* button to clear the contents of all counters.
9. Open the water inlet until the calibration container is nearly full, then shut off the water. **Do not overfill the container.** Record the weight of the container with its contents.
10. Subtract the weight of the empty container from the weight of the container when filled, as shown below. The difference between the filled weight and the empty weight is the weight of the water flowed into the calibration container.

$$W_f - W_e = W_w$$

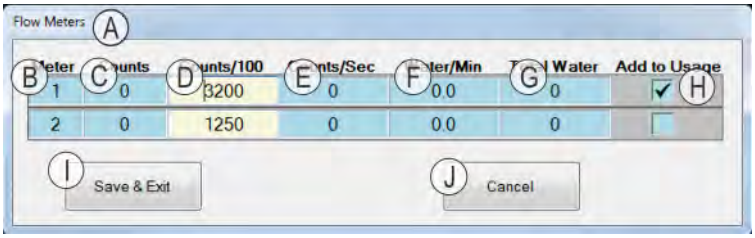
Where:
W_f = Weight of calibration container and water when filled
W_e = Weight of empty calibration container
W_w = Weight of water flowed into container

1232 pounds - 218 pounds = 1014 pounds

559 kg - 99 kg = 460 kg

11. At the Mentor controller, record the number displayed for *Counts*, as shown in Figure 96.

Figure 96: Elements of Utilities Window

Illustration	Legend
	**1.** *Counts* value (record this number for calibration calculations) **2.** Touch this button to clear the counters

12. Convert the weight of water flowed to the units that will be used in programming tunnel wash formulas. Some helpful conversion factors are given in Table 3. Record this value.

$$W_w \ / \ D = Q_f$$

Where:
W_w = Weight of water flowed into container
D = Density of water (weight per unit volume)
Q_f = Quantity of water flowed

1014 pounds / 8.33 pounds per gallon = 121.73 gallons

459.76 kilograms / 1 kilogram per liter = 459.76 liters

Table 3: Units Conversion Factors for Clean Water

To convert from	to	multiply by
U.S. pounds	kilograms	0.454
	liters	0.454
	gallons	0.12
kilograms	U.S. pounds	2.205
	liters	1
	gallons	0.264

13. Divide the *Counts* value (Figure 96) by the calculated quantity of water flowed (gallons, pounds, liters, etc.) to determine the *Counts per Quantity*.

$$Counts \ / \ Q_f = Counts \ per \ Quantity$$

Where:
Counts = copied **from** top line of Flowmeters display
Q_f = Quantity of water flowed
Counts per Quantity = calculated value used for calibration

4327 counts / 121.73 gallons = 35.55 counts per gallon

4327 counts / 459.76 liters = 9.41 counts per liter

14. Enter the *Counts per Quantity* value for the desired flow meter in the *Fresh Water* or *Reuse Water* column of the *Flowmeter data display*, depending on the flowmeter being calibrated. If the *Counts per Quantity* values are gray, return to the *Operational display* and log in with programmer rights as described earlier in this procedure. If the *Counts per Quantity* values are the same color as the other values on this display, adjust the value by placing the mouse cursor on the number and clicking the left mouse button once. Delete the existing numbers

and enter the correct value, then press the *Tab* key on the Mentor controller keyboard to write the value to memory.

15. Return the tunnel washer to operating condition by replacing the piping downstream of the flow meter and draining the calibration container.
16. For other flow meters, repeat this procedure.

5.1.2.2. Flow Meter Calibration when a Weighing Device is not Available—Sometimes flow meters may need to be calibrated when there is no convenient method of weighing the water flowed into the container. Although the calibration is usually less accurate than the factory procedure, a replacement flowmeter can be calibrated without a weighing device if a graduated calibration container is available.

> **Note 8:** Recognize that the nominal capacity of standard steel and plastic drums includes a certain amount of headspace—usually 1 to 2 inches (25 to 50mm) to allow for expansion of the original contents. Therefore, filling a standard drum brim full will result in flowing an additional amount of water, approximately 4 percent.

1. Place the calibration container near the tunnel washer flow meter that will be calibrated.
2. Replace the piping just downstream of the flowmeter with a piece of flexible hose of similar inside diameter. This tubing should be long enough to conveniently reach the calibration container.
3. Place the free end of the flexible hose in the calibration container. Secure the hose so it won't fall out of the container when you turn the water on.
4. At the Mentor controller, log in with programmer rights so you can change the *Counts per Quantity* value later.
5. On the *Mentor operational display*, put the mouse cursor on a blank area within the module where the flow meter is electrically connected, then click the right mouse button once. The *Manual Output Toggle page* for the module appears. The *Mentor operational display* and the *Manual Output Toggle page* are shown in Figure 95.
6. Position the mouse cursor on the *Flowmeters* button at the bottom of the *Manual Output Toggle* page and click the left mouse button once. The *Flowmeter data* window appears, as shown in Figure 95.
7. Click the mouse once on the *Clear Counters* button to clear the contents of all counters.
8. Open the water inlet until the water level in the calibration container reaches exactly to a graduation of known quantity, then shut off the water.
9. At the Mentor controller, record the number displayed for *Counts*, as shown in Figure 96.
10. Divide the *Counts* value by the quantity of water flowed (gallons, liters, etc.) to determine the *Counts per Quantity*.

$$Counts \ / \ Q_f = Counts\ per\ Quantity$$

Where:
Counts = copied **from** top line of Flowmeters display
Q_f = Quantity of water flowed
Counts per Quantity = calculated value used for calibration

4327 counts / 121.73 gallons = 35.55 counts per gallon

4327 counts / 459.76 liters = 9.41 counts per liter

11. Enter the *Counts per Quantity* value for the desired flow meter in the *Fresh Water* or *Reuse Water* column of the *Flowmeter data display*, depending on the flowmeter being calibrated. If

the *Counts per Quantity* values are gray, return to the *Operational display* and log in with programmer rights as described earlier in this procedure. If the *Counts per Quantity* values are the same color as the other values on this display, adjust the value by placing the mouse cursor on the number and clicking the left mouse button once. Delete the existing numbers and enter the correct value, then press the *Tab* key on the Mentor controller keyboard to write the value to memory.

12. Return the tunnel washer to operating condition by replacing the piping downstream of the flow meter and draining the calibration container.
13. For other flow meters, repeat this procedure.

5.1.2.3. Comparative Calibration Procedure—In cases where it's impossible to calibrate the flowmeters by weighing or measuring the amount of water, the flowmeters which provide input to the control system can be calibrated to correspond to the sight glass flow meter. This method is somewhat less accurate than methods involving weighing or measuring the amount of water because it depends on the accuracy of the sight glass flow meter.

1. Set up the tunnel washer with power on but rotation stopped.
2. Establish a steady water flow. Higher flow rates will yield more accurate calibration than low flow rates.
3. Ensure that **all** water valves are closed except the one corresponding to the flow meter to be calibrated.
4. Use the manual throttling valve to set the flow so the sight glass flow meter (Figure 93) indicates a flow where there is a calibration mark (e.g., 30 gallons per minute). The value indicated on this flow meter will be used for variable Q_f when calculating the counts per quantity as described below.
5. Access the Mentor display of flow meter data (shown in Figure 95).
6. Simultaneously start a timer and clear the *Counts* value on the flow meter data display.
7. After a few minutes, record the *Counts* value and the time the valve was open.
8. Calculate the *Counts per Quantity* according to this equation:

$$Counts \ / \ [(T \ / \ 60) \ x \ R_I] = Counts \ per \ Quantity$$

Where:

Counts = value indicated on the top line of the Mentor flowmeters display

T = time water valve is open (in seconds)

R_I = flow rate indicated by sight glass flow meter

9. Repeat this process several times, adjusting the *Counts per Quantity* value after each trial.
10. Enter the *Counts per Quantity* value on the Mentor display.

5.1.3. Magnetic Flow Meters

Magnetic flow meters, shown in Figure 97 and Figure 98, calculate flow rate by measuring the voltage created when a conductor (the fluid being measured) moves through the magnetic field created by the flow meter. The voltage produced is proportional to the velocity of the fluid. The flowmeter converts this low voltage analog signal to a digital signal (pulses) for use by the controller.

Magnetic flow meters are used when the fluid is unsuitable for a paddlewheel flow meter. This may be because the fluid is contaminated with lint which would foul the paddlewheel, or because the fluid is not chemically compatible with the paddlewheel material.

Supplement 2

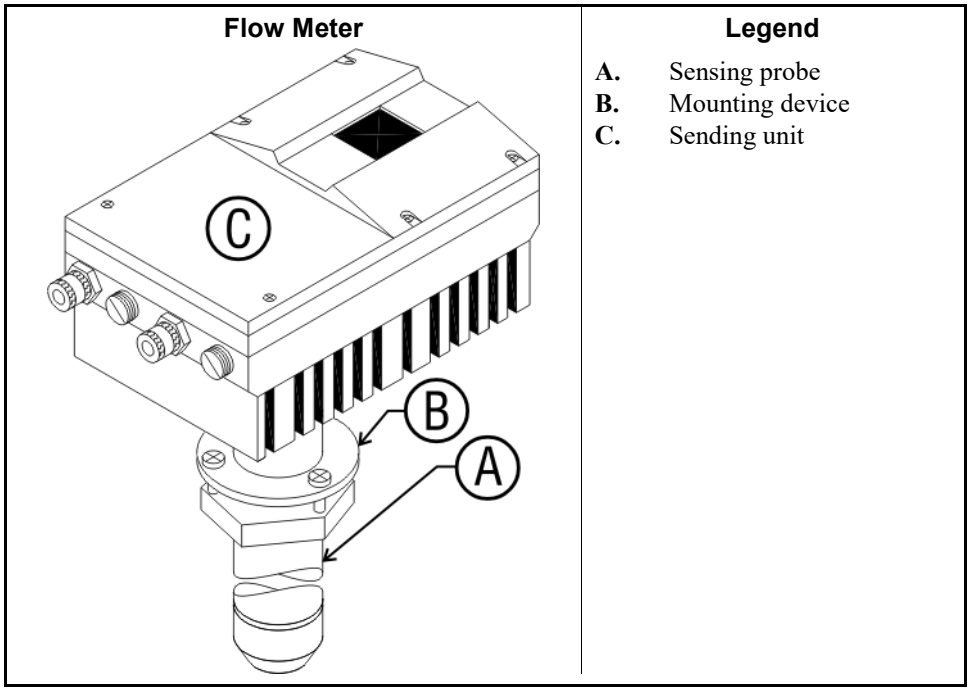
Operational Theory

Magnetic flow meters, like the paddlewheel type described in Section 5.1.2, also operate according to the **Hall effect,** which describes that a voltage is created when an electrical conductor passes through a magnetic field. The most obvious difference between paddlewheel and magnetic flow meters is that magnetic flow meters do not require a paddlewheel extending into the fluid flow.

Because the fluid used in laundering is primarily water, it is electrically conductive. The magnetic flow meter passes an electrical current through the liquid in close proximity to a magnetic field. The voltage produced is proportional to the velocity of the fluid. The flow meter measures the voltage produced and includes several other factors in calculating the flow rate in **units per period**. Pipe diameter, fluid temperature, viscosity, and conductivity must be considered. These values and others are included in the factors entered during calibration.

5.1.3.1. **+GF+ Signet Magnetic Flow Meter**—While this type of flow meter operates on a different principle than that of the electro-mechanical meter, the calibration procedure is the same. Use any of the procedures described in Section 5.1.2.1 through Section 5.1.2.3.

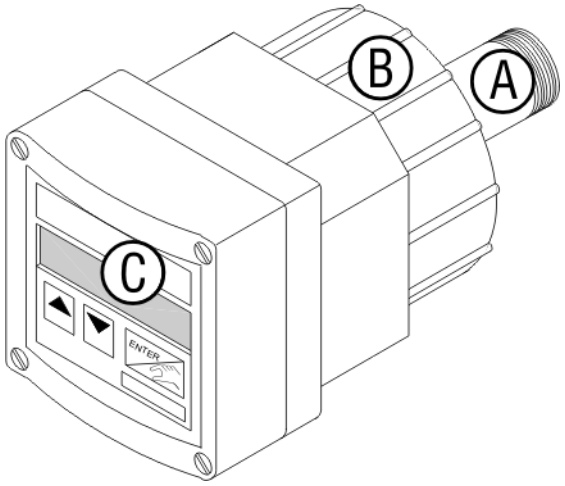
Figure 97: Typical +GF+ Signet Magnetic Flow Meter



5.1.3.2. **Burkert Magnetic Flow Meter**—As of January 18, 2002, the Burkert magnetic flow meter is compatible only with Mentor version 20005A.

5.1.3.2.1. Description—The Burkert model 8045 MID magnetic flow meter is used on some tunnel washer configurations. The flow meter is attached via a Burkert type S030 stainless steel fitting of 1 1/4 inch nominal size. The operating principle is similar to other magnetic flow meters, with the addition of this device being able to communicate with a valve positioner to automatically modulate water flow.

Figure 98: Typical Burkert 8045 Magnetic Flow Meter

Flow Meter	Legend
	**A.** Sensing probe **B.** Mounting device **C.** Transmitter

5.1.3.2.2. Calibration Procedure

Display or Action	Explanation
▼ + ✍ **(5 seconds)**	Press these two buttons simultaneously and hold them for five seconds to enter the *Calibration* menu.
LANGUAGE	*Language* is the first parameter of the *Calibration* menu. If necessary, press ▲ and ▼ to scroll to *ENGLISH*.
✍	Accepts the selected language and advances to the next decision.
UNIT	Select *UNIT* to continue with calibration, or scroll to *TOTAL* to exit the calibration menu.
✍	Accepts "UNIT" to continue with calibration.
FLOW	At this display, press ▲ and ▼ to scroll to the desired units of flow (U.S. gallons per minute).
US GAL/M	Press ✍ to select this choice and continue.
DEC PT	After accepting flow units, the display prompts for the number of decimal places.

Note 9: In some cases, the transmitter may automatically default the DEC PT decision to *0* (no decimal places).

▲ / ▼	Scroll to select *DECPT 0* for no decimal places.

Tip: Different revisions of software may exist in the Burkert magnetic flow meters on your machines, depending on the build date of the flow meters. These software revisions vary primarily in how the K-factor is calibrated and entered, although the differences are minor. Differences in the calibration procedures are shown in the following procedure as *Tips*, similar to this statement. CBW washers built after February 2004 may employ flow meters with any software version, so you should carefully observe the prompts on the flow meter and use the calibration procedure that corresponds to the prompts.

Display or Action	Explanation
K-FACTOR	The K-factor is a calibration constant used by the transmitter to adjust the raw readings to the specific environment and manufacturing tolerances of the flow meter. This constant can be calculated manually for any implementation of the meter. However, for the application covered here, Milnor® has previously calculated the value.
☜	Advances the transmitter control to choose how the K-factor will be entered. Use ▲ / ▼ to scroll.

Tip: For flow meters with newer versions of the Burkert software, the transmitter control displays the current K-factor at this time. Press ☜, then press ▲ or ▼ to scroll to the desired value. If the transmitter control prompts *K-FITING*, you have determined that the flow meter is using a newer software version. For newer software, scroll to **4.32** (the K value of the fitting used in CBW washers), then press ☜. Then scroll to *VALID Y*, and press ☜ again to confirm the value. For older software, follow the instructions below.

TEACH N	Indicates that a pre-calculated K-factor will be entered. Press ☜ to accept *TEACH N*.

Locate the specific cell constant on the side of the transmitter. This value is written on a sticker on the side of the transmitter, and is usually in the form of *0.9xx*. Calculate the necessary K-factor by multiplying the specific cell constant of the sensor times the value for the sensor fitting, as shown below:

$$K_{fitting} \times F_s = K\text{-}factor$$

Where:
$K_{fitting}$ = 4.32 for the Milnor® CBW® washer
F_s = specific cell constant from side of transmitter, typically about 0.9xx

To enter the calculated K-factor with the transmitter keypad, press ▲ until the proper digit appears, then press ▼ to advance to the next digit.

K=0.945	Example display of K-factor. Press ☜ to accept the displayed value.
▲ / ▼	Scroll to the *PULSE* decision and press ☜ to access the value.
PU=00.10	Enter 00.10 for this value, indicating that one meter pulse represents 0.1 gallon. Press ▲ until the proper digit appears, then press ▼ to advance to the next digit.
☜	Accepts the displayed value and advances to the next decision.
▲ / ▼	Scroll to the *FREQUENC* display, and select 60 Hz.
F=60 HZ	Press ☜ to accept this value.
▲ / ▼	Scroll to the *END* display, and press ☜ to finish calibration.

5.1.3.2.3. Zeroing the Flow Meter—After calibration, the flow meter needs to know what condition represents no flow (0 gallons per minute).

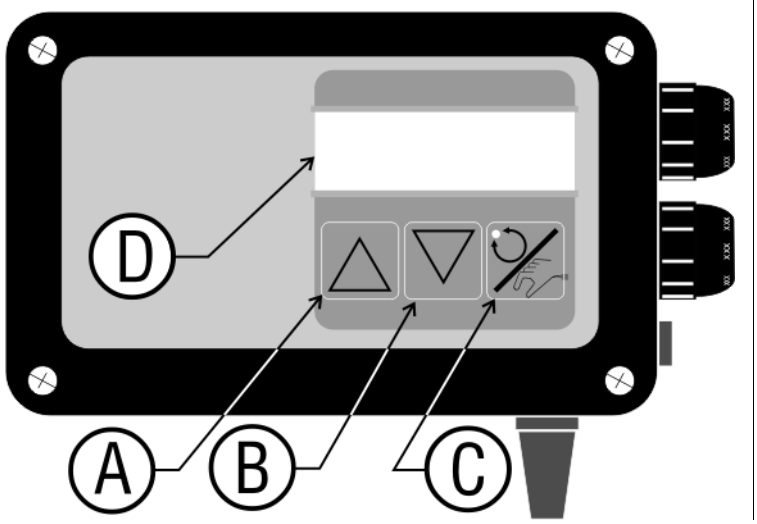
Display or Action	Explanation

Display or Action	Explanation
For this procedure to be accurate, the flow meter pipe must be completely full of water, but not flowing.	
▲ + ▼ + (5 seconds)	Press and hold all three keys for five seconds to gain access to the *TEST* menu.
▲ / ▼	Scroll to the *CALIB 0* selection, then press to enter this menu.
CALIB Y	Press ▲ or ▼ until this display appears, then press .
MEASURE	Indicates that the flow meter is setting the zero flow value. This display will appear for about 12 seconds.
FLOW	Indicates that the flow meter is zeroed. Press ▲ or ▼ until *END* appears in the display, then press .

5.1.4. Burkert Valve Positioner

5.1.4.1. Description—Burkert model 2632 angle-seat valves equipped with Burkert model 1067 valve positioners are available on some tunnel washer configurations. The control panel of the valve positioner is shown in Figure 99.

Figure 99: Typical Burkert Valve Positioner Control



5.1.4.2. Setup—This procedure must be repeated for each valve equipped with a positioner.

Display or Action	Explanation
(5 seconds)	Hold the *Automatic/Manual* button depressed for five seconds to enter the *Configure* menu.
▲ / ▼	Use the *Scroll* buttons to select the *Input* field.
INPUT	With the *Input* field selected, press *Automatic/Manual* to see the available

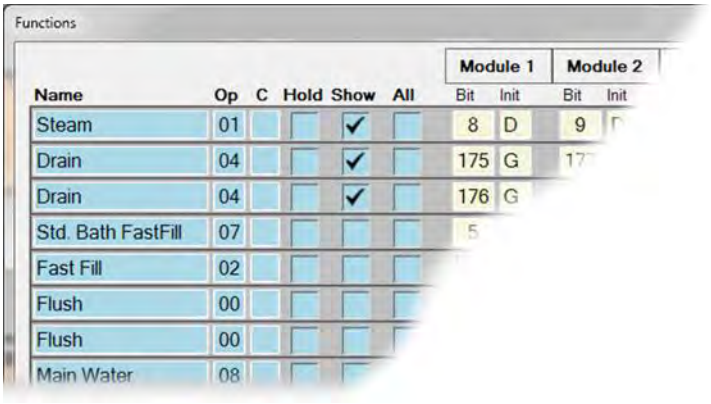
Display or Action	Explanation
	choices.
0...10V	Use the *scroll* buttons to select the *0 to 10 volt* input range.
	Accepts the selected input range.
END	Scroll to the *End* selection and press to exit the *Configure* menu.

5.1.5. Mentor Configuration for Burkert Magnetic Flow Meters and Valve Positioners

As of January 18, 2002, this information and some of the Mentor screens that appear here apply only to Mentor version 20005A.

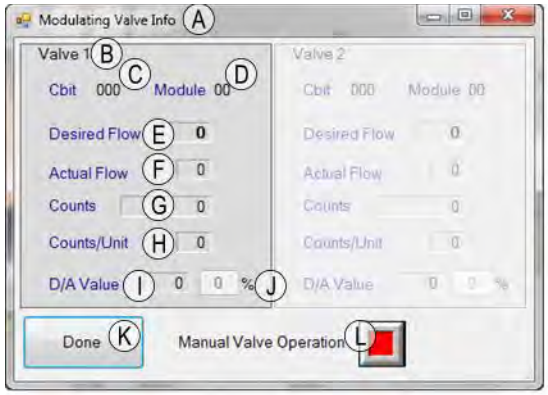
1. On the *Function Programming* page, enter each valve and assign a bit to the valve in the appropriate module. The relay controlled by this bit operates a blocking valve. The bit is enabled when the valve position is greater than 0 and disabled when the valve position equals 0.

Figure 100: View of Function Programming Window



2. Also on the *Function Programming* window, assign one of the two possible op codes to each modulating valve bit.
   - Use op code 08 if a flow meter controls the modulating valve to achieve the desired flow rate. When a flow meter is attached to the valve, the values programmed in wash formulas are flow rates in gallons per minute.
   - Use op code 0C if there is no flow meter controlling this valve. When no flow meter is involved, the values programmed in wash formulas are in percent open, from 0 to 100 percent.
   - When two valves share the same flow meter, one must use op code 08, and the other must use 0C.
3. When assigning bit numbers to valves, always assign the lowest numbered bit to valve 1. The next lowest bit is assigned to valve 2, etc.
4. Log into Mentor as a user with *Programmer* privileges before attempting to configure the flow meter counts per unit.
5. Configure the flow meter counts per unit on the *Modulating Valves* selection of the *Inputs and Outputs* menu. This *Modulating Valves* screen, shown in Figure 101, also allows manual adjustment of the valves.

Figure 101: View of Modulating Valves Window



6. For each valve with an op code of 08 (flow rate), enter a value of 10. Valves with an op code of 0C (percent open) will not allow entry of a count value.
7. On the *Formula Programming* window (Figure 102), enter the desired flow rate or valve position for each module in each wash formula. If no value is entered for a valve, the valve remains closed.

Figure 102: View of Formula Programming Window

— End of BIPCUC10 —

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5.2. How to Calibrate the Load Conveyor Scale

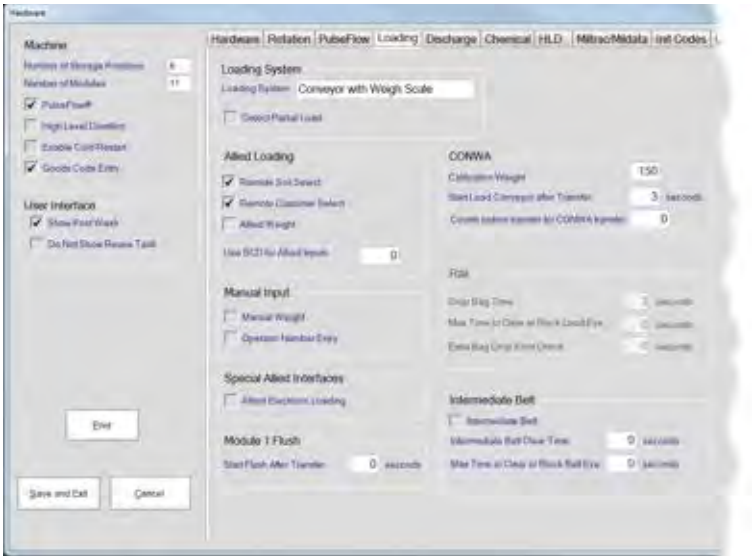
This document describes how to configure and calibrate the weighing mechanism of the Milnor® CONWA loading conveyor on Milnor® CBW® systems with the Milnor® Mentor™ version 3.4 control system. The CONWA conveyor uses colored lights to prompt the operator to load batches of goods that are consistent in weight for each wash formula. If the loading conveyor is improperly configured or out of adjustment, wash quality and/or productivity may suffer. In extreme cases, tunnel jams may occur.

5.2.1. Configure Mentor

Configuration of the Mentor® controller tells the computer what types of devices are attached and how the information to and from those devices should be interpreted.

5.2.1.1. Define the Loading System—The Mentor® controller uses several screens or pages of information to record what devices are connected to it, along with other functional characteristics. The *Loading* tab of the *Hardware* page is shown in Figure 103.

Figure 103: Hardware/Loading Tab (Detail)



Before proceeding further with these calibration and configuration instructions, verify that the installed CBW® system is configured for a Milnor® CONWA loading conveyor. The most apparent characteristic of a CONWA conveyor is the large bank of four "traffic lights" on the conveyor. These lights are used to direct the operator in loading the device. If these lights are not present, the loading system is probably a Milnor® CONLO loading conveyor—a non-weighing loading conveyor.

After the loading conveyor is verified to be a weighing (CONWA) model, the configuration of the Mentor® controller must be verified to ensure that the correct loading device is designated. Log in to the Mentor® system with programmer rights (see Note 10), then select the *Configuration* menu. From the *Configuration* menu, select the *Loading* tab of the *Hardware* display page (Figure 103). The entry in the *Loading System* field should read *Conveyor with Weigh Scale* (see item B in Figure 104).

> **Note 10:** Log in to the Mentor® controller by touching the *Login* button on the *Operational Display*. In the box that appears, enter your login name and password. If the login name was previously given programmer rights, the *Configuration* and *Programming* menus will become available. If these menus do not become available, consult laundry management.

If necessary, change the loading system configuration by touching the current *Loading System* entry. This action will display a list of possible loading devices. Touch the desired loading system (*Conveyor with Weigh Scale* or *Rail System with Weigh Scale*), then touch the *Select* button.

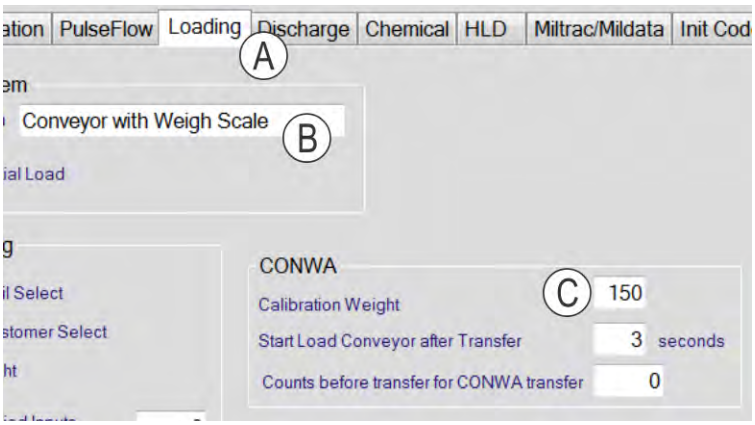
Select *Save and Exit* to make the changes permanent and return to the *Operational Display*.

5.2.1.2. **Set the Number of Storage Positions**—The *Number of Storage Positions* field, located near the upper left corner of the *Hardware* display page, controls how many storage positions are visible on the Mentor™ *Operational Display*. Count the compartments on the loading conveyor capable of holding goods, then enter the correct number in this field. The last two numeric digits of the machine model number (see machine nameplate) also indicate the number of compartments. For example, a device with a model number of CONWA308 is a weighing conveyor with eight compartments. Valid entries are from 1 to 12, inclusive. The entry of "1" is rarely used with conveyor systems, but is often applied to rail loading systems.

5.2.1.3. **Set the Calibration Weight**—The CONWA conveyor determines the weight of the goods in the first storage position by comparing the signal from the load cell to two references: with a load weight of 0 (empty) in the first storage position, and with a value determined with a known weight in the first storage position.

While the setting of the two reference points is accomplished later in this document, the known weight used for calibration should be determined and configured before calibration begins. Log in to the Mentor™ controller as described in Note 10, then select the *Loading* tab on the *Hardware* page of the *Configuration* menu. The *Calibration Weight* field is in the CONWA section of the *Loading* tab..

Figure 104: CONWA *Calibration Weight* Field



Touch the *Calibration Weight* text box. With the entire number highlighted, enter a new calibration weight.

Common items used for calibration weights include items of a known weight that can be placed in the first storage position of the conveyor. Full bags of dry chemicals, barbell weights, or even a person of known and relatively constant weight may be used if appropriate precautions are followed to prevent falls and other injuries.

WARNING 1: Avoid Serious Injury—Standing on a moving conveyor can cause serious injuries, including head injuries and broken bones. Before allowing anyone to stand on the scale, make certain the tunnel is not committed to transfer by waiting at least 15 seconds after the tunnel has been manually placed in hold.

With the new calibration weight entered, touch *Save and Exit*. To discard the changes and revert to previous values on this screen, touch *Cancel*.

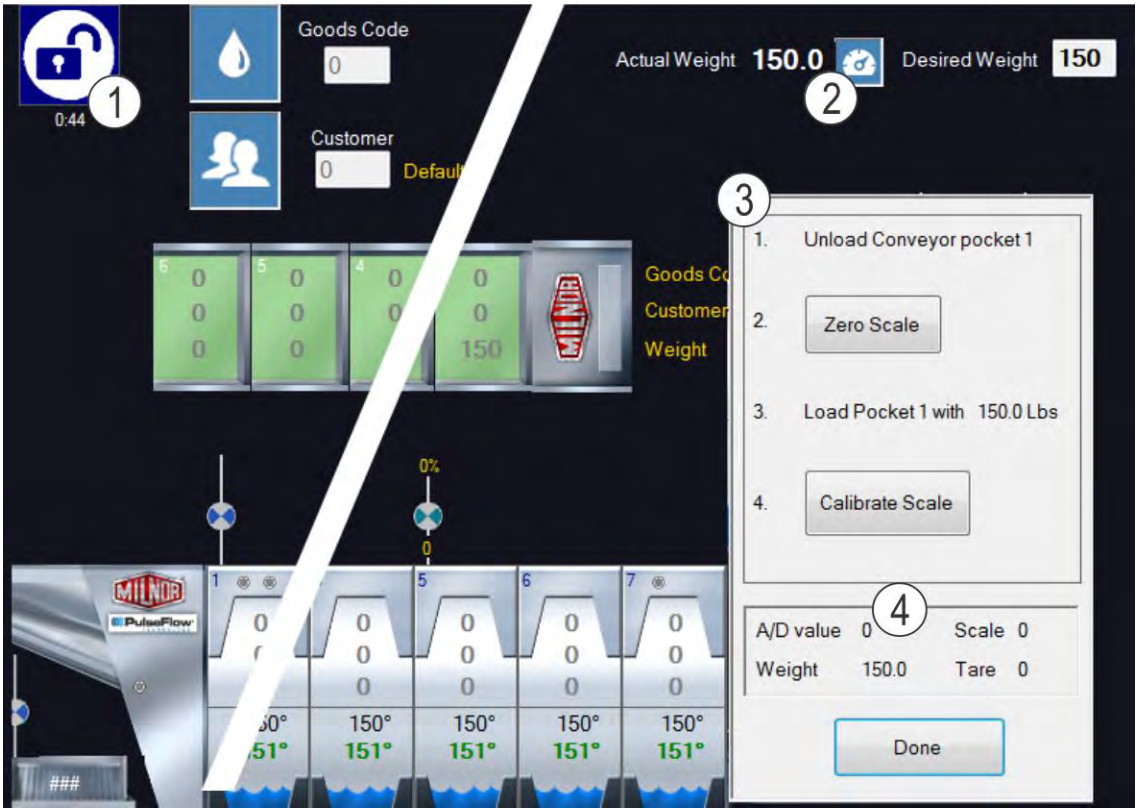
5.2.2. Calibrate Conveyor-to-Mentor Interface

The weighing conveyor sends signals to the Mentor® controller as variations in voltage. Weight applied to the loading conveyor causes the voltage output of the load cell to increase. The weight

present in the first compartment of the conveyor is calculated by comparing the voltage from the loaded conveyor to the voltages measured when the conveyor is empty and when it is loaded to a known weight.

For accurate weight calculation, the load cell interface must be adjusted so the voltage produced with an empty conveyor falls within the acceptable range. The Mentor® controller uses a menu system (Figure 105) to provide an easy method of accomplishing this adjustment, as described below.

Figure 105: Calibrate Scale Menu



1. At the Mentor® computer, touch the *Calibrate Scale* button (item 2 in Figure 105). The *Calibrate Scale* procedure (item 3 in Figure 105) appears.
2. In the Mentor® cabinet, locate the weigh scale interface board. This board, shown in Figure 106, is identified by a single amber LED and a small brass potentiometer adjusting screw. This screw adjusts the zero offset to the A/D signal.

Figure 106: Load Cell Interface to Control

Board	Legend
	**1.** Potentiometer adjusting screw

3. Observe the hexadecimal *A/D value* near the bottom of the *Calibrate Scale* procedure (see Figure 105) and press gently on the weigh scale. After noting whether counts increase or decrease with pressure, remove all external forces (people, tools, etc.) from the weigh scale.
4. If the *A/D value* increases when pressure is applied to the conveyor, turn the potentiometer adjusting screw so that the value is in the range from C0 to 120 **without passing 0**. These are hexadecimal numbers.
5. If the *A/D value* decreases when pressure is applied to the conveyor, turn the potentiometer adjusting screw **past 0** and continue turning until the range of C0 to 120 is achieved.
6. With the *A/D value* in the appropriate range, the zero offset is correct.

The load cell must be calibrated to provide accurate data to the Mentor® controller. This device is affected by any change in weight, whether the result of a load being added, someone leaning against the conveyor, a slight shift of the conveyor frame, etc. Therefore, it is imperative to periodically re-calibrate the scale and to verify that no objects other than goods being loaded are in contact with the conveyor during weighing. **Local conditions may require daily calibration of the load cell.**

5.2.3. Calibrate the Load Scale

With the load cell interface properly calibrated, the Mentor® controller must be calibrated with two known values. These allow the controller to determine the weight of the goods by comparison to the weight of the empty conveyor and the weight of the conveyor with a known weight in the first storage position.

5.2.3.1. Calibrate Scale to Zero

1. To provide a true reading of the weight of the empty conveyor, verify that there are no goods in the first storage position and that there are no people or equipment leaning on the conveyor.
2. At the Mentor® computer, touch the *Zero Scale* button. Again verify that the first storage position is empty and that no people or objects are touching the conveyor.

5.2.3.2. Calibrate Scale to Calibration Weight

1. The final step in calibrating the weigh scale is providing a known weight for comparison to the zero value set in Section 5.2.3.1 "Calibrate Scale to Zero".

2. Place a weight of the given value in the center of the first storage position. The weight for which the Mentor® controller prompts is the weight entered according to Section 5.2.1.3 "Set the Calibration Weight".
3. When the desired weight is properly placed in the first storage position, touch the *Calibrate Scale* button shown in Figure 105.
4. Touch the *Done* button to save the values and close the window.

— End of BIPCAC02 —

Chapter 6
Programming Mentor Formulas

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6.1. Op Code Descriptions

These codes apply to functions and determine how the functions work.

6.1.1. 00: Standard Timed [Document BICCNC03]

This is the default op code. Functions with this op code operate on time only and stay on until the programmed time expires, even if the tunnel transfers. Set a value of 255 to keep the function ON until one of the following conditions is met:

- Power to the tunnel is turned off or lost accidentally,
- The tunnel enters a hold condition, and the *Hold* code for the function is enabled, or
- The timer is reset by a formula commanding a value of less than 255 for the function.

6.1.2. 01: Steam [Document BICCNC04]

Use this op code to operate a temperature-dependent function after the desired water level is achieved. Ignore the init code, and set the hold code for the function to *NO*.

A steam function opens a steam valve when the actual temperature in that module is less than the commanded temperature minus the *differential temperature* set in the *Program Constants* area of the *Configure Hardware* window. Steam functions may also operate according to steam codes or as overridden by a function with a higher priority, such as a drain.

6.1.3. 02: Fast Fill [Document BICCNC05]

Each module may have one fast fill function to open the fast fill water valve when the water level goes below low level. This function also closes the valve when the water level goes above high level. Operation depends on arming the function before the level goes below low level. The function is armed when the drain opens and closes at startup and whenever the op code is first set for fast fill. The function remains armed after the tunnel transfers. The controller ignores the value, init code, and hold code for the function.

6.1.4. 03: Hold [Document BICCNC06]

A module may have any number of hold functions. Normal operation enables this function type, and a hold condition disables this function type. These functions usually control inlet water valves, pumps, and other devices that must stop or shut off when the tunnel is in hold. The controller ignores the value, init code, and hold code for the function.

6.1.5. 04: Drain [Document BICCNC07]

A module may have any number of drain functions. Drain functions disable all other module functions while the drain function is enabled. All function timers continue to count down even though the output is turned off by the drain function. Multiple drain functions wired in parallel in one module allow the module to drain at several init codes.

Tunnel modules with two drain valves include a separate function-controlled pilot valve for each drain valve. This allows more accurate partial draining, which is helpful in the operations described in Section 6.2. "Interval Purge, Automatic Empty Pockets, and Automatic Purge Pockets".

- Drain1 is the function name for the drain valve in the drain sump where water exits the module (i.e., not the sump containing the steam line, if any).
- The adjacent drain valve is Drain2.

6.1.6. 05: Cooldown [Document BICCNC08]

For a single formula, a module may have one cooldown function or one steam function, but not both. Cooldown functions operate at a desired temperature. The controller ignores the init code. A desired temperature of 000 disables cooldown.

To insure that no other module is cooled, use this feature only in a module that drains to the sewer. These features prevent the counterflow of cooler water to the adjacent module.

6.1.6.1. Mentor Software before Version 3.2.2—When this function turns on, the cooldown water inlet valve remains open. Count-up begins when all factors are satisfied, and transfer occurs when the actual temperature is less than the commanded temperature.

6.1.6.2. Mentor Software Version 3.2.2 and Later—When this function turns on, the cooldown water inlet valve remains open and count-up is held until the desired temperature is achieved. If the high level input is made, the drain opens for 5 seconds.

6.1.7. 06: Chemical [Document BICCNC09]

Chemical functions operate on time or quantity. An actuated chemical function remains enabled until the commanded value expires, including during any intervening transfer(s).

Set the value to 255 to keep the function ON until one of these conditions is met:

- Power to the tunnel is turned off or lost accidentally,
- The tunnel enters a hold condition and the *Hold* code for the function is enabled, or
- A formula sets a value less than 255 for the function.

Supplement 3

Chemical Injection Times and Wash Quality

Inject chemicals for 10 seconds or more. Injection times less than 10 seconds allow only large adjustments in chemical quantity, and erratic lag times between the signal and the start of injection cause large differences in chemical quantity.

- Use smaller pumps and valves to increase injection times.
- Use two pumps for the same chemical if large and small quantities of the same chemical are needed.

Op code 06 identifies chemical functions. First dosing uses this information to calculate chemical injection quantities at startup and after an empty pocket formula or a purge pocket formula. For more information, see Section 6.2. "Interval Purge, Automatic Empty Pockets, and Automatic Purge Pockets".

6.1.8. 07: Fast Fill Standing Bath [Document BICCNC10]

A module may have one fast fill function. The fast fill function opens the fast fill water valve when the water level goes below low level, and closes when the liquor level goes above high level. The controller ignores the value, init code, and hold code for the function.

Use this op code only on standing baths or flushing baths, where no water counterflows into the module and all flow out of the module goes to the sewer.

6.1.9. 08: Modulating Water with Flowmeter [Document BICCNC11]

This op code operates a modulating water valve controlled by an electronic flowmeter. Values are programmed in gallons per minute or liters per minute.

Use this op code for each PulseFlow® pump used on PulseFlow® tunnel washers. For PulseFlow® machines, disable the hold code. The controller ignores the compatibility and init codes for PulseFlow® pump functions.

6.1.10. 09: Early Call [Document BICCNC12]

Use this op code when the tunnel discharges to a Milnor® centrifugal extractor. This op code turns its function OFF when the tunnel transfers, regardless of the remaining enabled time. Usually used for the early call input input of the extractor. This op code causes the extractor to prepare for the next load before maximum extract time expires. Proper use reduces tunnel holds when the extractor is not ready for a load.

6.1.11. 9A: Flow Splitter Stop Reuse Cooldown [Document BICCNC18]

This op code prevents the flow of hot water from the flow splitter to the reuse tank if the tank temperature is hotter than the set temperature. The function turns ON when the reuse tank temperature is hotter than the desired temperature plus the set differential, which stops the flow of hot water from the flow splitter to the tank. When the temperature of the water in the tank is between the set temperature and the set temperature plus the differential, the function turns OFF, and the flow splitter pumps water to the tank.

6.1.11.1. How the Desired Reuse Tank Temperature is Determined—The controller monitors the temperature in the reuse tank. If a steam output is programmed for module 1 and *Reuse Enabled* is selected, the controller sets the reuse tank temperature to satisfy the formula in the last storage position or the formula in the first module. These rules determine which requirements are used:

- If the formula in the first module controls the reuse tank temperature, the controller sets the tank temperature to the temperature for the formula in the first module.
- If the formula in the last storage position controls the reuse tank temperature, the controller sets the tank temperature to the module 1 temperature of the formula in the last storage position.
- If the formulas in module 1 and in the last storage position desire to control reuse tank temperature, the controller sets the tank temperature to the cooler of the two set temperatures.
- The feature is disabled if neither formula controls the tank temperature.

Note 11: This function requires a steam output programmed for one or both formulas (module 1 and the last storage position). A steam valve is not needed.

Note 12: The controller ignores op code 0A (dual temperature) for reuse temperatures. The controller uses the steam function to set the temperature of the reuse tank.

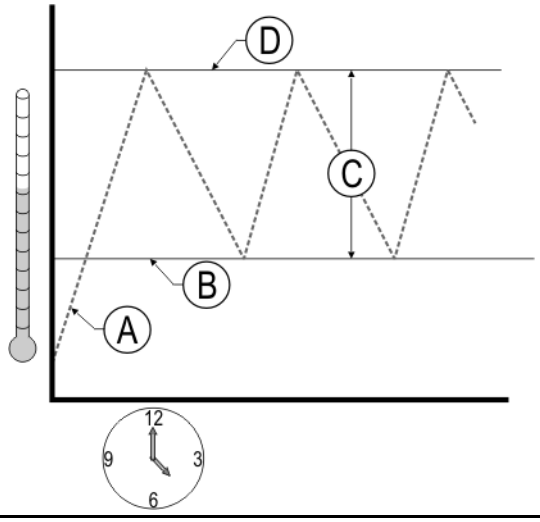
6.1.11.2. Temperature Differentials [Document BICCNC31]—The Mentor controller uses three configured temperature differentials. These values are called *Differential Temperature*, *Differential Reuse Temp for Steam*, and *Differential Reuse Temp of Cooldown*. Each value allows for a user-defined temperature range.

Temperature differentials are set on the *Program Constants* page (accessed from the operational display through *Configuration/Operating Parameters/Program Constants*).

6.1.11.2.1. Differential Temperature—This value controls the steam valves in the washer. A simplified temperature curve in a sample module is shown in Figure 107. A module equipped with steam and processing a wash formula with a specific temperature uses steam to achieve the desired temperature. At the desired temperature, the steam valve closes. The steam valve opens when the temperature goes lower than the set temperature **minus the differential temperature**.

Figure 107: Differential Temperature

Graph

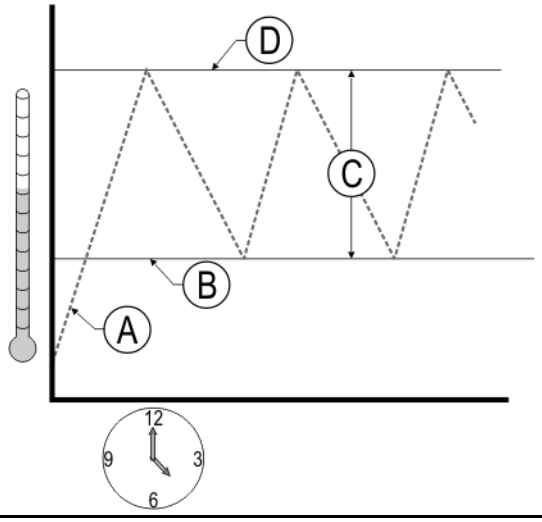


Legend

A. Actual bath temperature
B. Steam ON at or below this temperature
C. Set temperature differential
D. Set temperature (steam turns OFF)

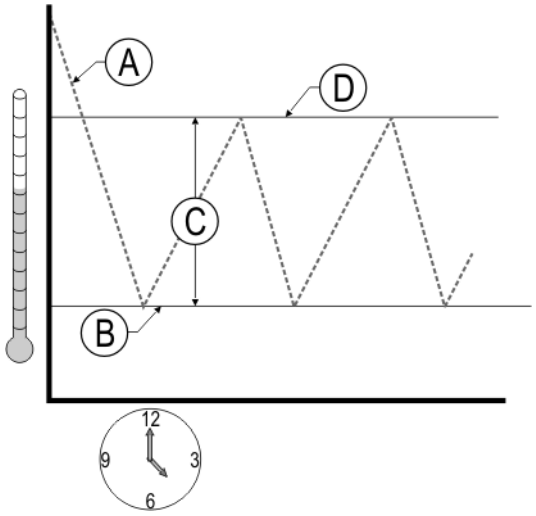
6.1.11.2.2. Differential Reuse Temperature for Steam—The value in this field is the amount of cooling allowed in the reuse tank before steam is injected to return the temperature to the desired. The temperature curve of the reuse tank during steaming is shown in Figure 108.

Figure 108: Differential Reuse Temperature for Steam

Graph	Legend
	**A.** Actual reuse tank temperature **B.** Steam turns ON at or below this temperature **C.** Set temperature differential **D.** Set temperature (steam turns OFF)

6.1.11.2.3. Differential Reuse Temperature of Cooldown—This value is the amount of heating allowed in the reuse tank before cold water is injected to lower the temperature to the desired. The temperature in the tank may rise above the set temperature when the bath temperatures set in the last modules of the washer are much higher than the temperatures set in the first module. The temperature curve of the reuse tank during cooldown is shown in Figure 109.

Figure 109: Differential Temperature

Graph	Legend
	**A.** Actual reuse tank temperature **B.** Set temperature (cold water turns OFF) **C.** Set temperature differential **D.** Cold water turns ON at or above this temperature

6.1.12. 97-99: Reuse Tank [Document BICCNC19]

6.1.12.1. Steam [Document BICCNC20]—Op code 97 turns the function ON when the temperature in the reuse (flush) tank is colder than the colder of the set temperature for the first module or the last storage position. The controller ignores the value and init code. The hold code is always *Hold=NO*.

- turns ON when the reuse tank temperature is colder than the desired temperature for the first module minus the *Differential Reuse Temp for Steam* field in the *Program Constants*.
- turns OFF when the reuse tank temperature is hotter than the desired temperature in the first module plus the *Differential Reuse Temp of Cooldown* field.

6.1.12.2. Cooldown Drain [Document BICCNC21]

—Use op code 98 with op code 99. The controller ignores the value, init code, and hold code.

- If the reuse tank cooldown function is filling the tank, this op code opens the drain when the water level in the tank is above the high level.
- The drain closes when the water level in the tank is below the high level.

6.1.12.3. Cooldown Cold Water [Document BICCNC22]

—Use op code 99 to open the cold water valve when the temperature in the reuse tank is hotter than the desired temperature in the first module plus the value for *Differential Reuse Temp of Cooldown*. The controller ignores the value, init code, and hold code. The hold code is replaced with *Hold=N*.

- The valve closes when the reuse tank temperature is colder than the desired temperature in the first module minus the value for *Differential Reuse Temp for Steam*.
- Functions with op code 9A (*Flow Splitter Stop Reuse Cooldown*) turn ON when functions with op code 99 are enabled.

6.1.13. 0A: Dual Temperature [Document BICCNC23]

This op code sets the second bath temperature in a dual-temperature bath.

- The steam function for the current formula controls the first temperature.
- At the set init code, the dual temperature function takes over.
- The steam code of the current formula controls the dual temperature function and works like the steam function.
- The dual temperature function holds the count and/or maintains temperature as set by the steam code.

6.1.14. +n: Modified Module Assignment [Document BICCNC24]

Standard functions can be controlled by formula data “n” modules **after** the current module. These op codes correspond to op code -n (Section 6.1.15). A typical application is *long distance incompatibility*, when goods in the extraction device might contaminate the extracted water usually sent to the reuse tank. Long distance incompatibility requires optional valves to discharge contaminated water to the sewer. If the valves are present, the function bit named "LD2," "Color," or "Nasty" in the last or next-to-last module is assigned an op code of +n to monitor the goods in the extraction device. If goods in the extraction device activate the LD2 function bit, the controller sends the extracted water to the sewer.

Supplement 4

Example: Long Distance Incompatibility

Water extracted from RED goods in the press can discolor WHITE goods in the last storage position if the press water flushes the WHITE goods into the tunnel. If we close the normally open valve from the last module to the reuse tank and open the normally closed valve from the last module to the sewer opens, the contaminated (red) water goes to the sewer. Fresh water replaces the contaminated water in the reuse tank and prevents discoloration of the WHITE goods. The controller operates the two valves with an op code of +1 on the valve in the last module, instructing the controller to operate the valves according to the formula located one position beyond the valves.

6.1.15. -n: Modified Module Assignment [Document BICCNC30]

Formula data "n" modules **before** the current module can control standard functions. These op codes correspond to op code +n (Section 6.1.14). The loading conveyor bypass function (CRAB) is a typical use of this op code. The CRAB function allows the tunnel washer to transfer an empty pocket. The CRAB function must recognize the formula in the last storage compartment (the position before the first module). A function controlled by the first tunnel module and affecting the previous position requires a modified module assignment value of -1. The same function controlled by the second tunnel module requires a value of -2.

6.1.16. 0B: Bang-bang Modulating Water - Hold [Document BICCNC25]

This op code sets how long a non-modulating valve is open or closed to simulate a modulating water valve. This op code is rarely used.

6.1.17. 0C: Modulating Valve without Flowmeter [Document BICCNC26]

Use this op code to open a modulating valve to a particular percentage without input from a flowmeter. Set the value as a percent open for the valve. The range is 0 to 100 percent.

6.1.18. 0D: Programmable Hold [Document BICCNC27]

A module may have any number of functions configured as *programmable hold* functions. This function is enabled when the tunnel operates normally and is disabled when the tunnel holds. The *Programmable Hold* op code is similar to op code 03 (*Hold*), except that the controller operates functions with this op code when an *on time* of 255 is programmed for each formula where the function is desired.The controller ignores the init code and hold code.

6.1.19. 0E: Flow Control Valve [Document BICCNC28]

This op code controls a programmable flow valve. The function is ON when the value is not 0. The controller ignores the init code, hold code, and CBW rotation. A value of *0* turns the function OFF.

6.1.20. 0F: Off at Init Code, On at Init D [Document BICCNC37]

Use op code 0L. See Section 6.1.26 “0L: Flow if Temperature is Low”.

6.1.21. OG: Off at Init Code, On at Startup [Document BICCNC38]

Use op code OL. See Section 6.1.26 “0L: Flow if Temperature is Low”.

6.1.22. 0H: Alternate PulseFlow Valve [Document BICCNC40]

This op code is detailed in Section 4.1. "How to Configure and Program Alternate PulseFlow®".

6.1.23. 0J: Chemical Flush [Document BICCNC36]

This op code controls a chemical flush valve. The function is ON when the last chemical in the module to which it is assigned finishes injecting. The function remains enabled for the programmed time. The controller ignores the init code.

6.1.24. 0K: Shaker Screen [Document BICCNC41]

This op code is ON if the tunnel washer is not in hold and if level is satisfied in the module. This op code controls a shaker screen to filter lint out of the bath liquor.

6.1.25. SC: Steam Code [Document BICCNC29]

This op code allows you to program selected steam codes in the *Formula Programming* window.

6.1.25.1. Assigning Steam Codes—Because bath temperatures should change gradually to prevent thermal shock, it is easier to first program steam codes and temperatures for all modules, then program all other functions for a single module at one time. Steam codes control the relationship between steam and the reversal counter, as well as whether temperature is maintained after it is first achieved. Figure 59 illustrates the available steam codes.

6.1.25.1.1. Steam Code 0—Use steam code 0 if steam is available in the module, but will not be used for this formula. This steam code causes the Mentor ®controller to ignore the temperature of the module.

6.1.25.1.2. Steam Code 1—Use steam code 1 if reversals conducted before achieving the programmed temperature will not overly compromise wash quality. Using steam code 1, reversals are counted and steaming begins as soon as the liquor level in the module is achieved. When the desired temperature is achieved, the steam valve closes. When the temperature in the module drops by the number of degrees programmed for *Differential Temperature* (at *Configuration/Operating Parameters/Program Constants*), the steam valve opens again and remains open until the programmed temperature is achieved. This continues until the programmed number of reversals are counted. This is the most commonly used steam code.

6.1.25.1.3. Steam Code 2—Use steam code 2 if reversals should only be counted after temperature is achieved and if temperature does not need to be maintained. Note that the tunnel normally continues reversing even though the counter is not engaged. The counter is engaged with the first reversal after temperature is achieved. Also, after the programmed temperature is achieved after transfer, steam in this module is not turned on again until the next load is transferred.

6.1.25.1.4. Steam Code 3—Steam code 3 combines the counting characteristic of steam code 2 with the temperature maintenance characteristic of steam code 1. The counter is engaged only after temperature is first satisfied, and steam is turned on any time the temperature in the module falls below the programmed temperature minus the configured differential temperature.

6.1.25.1.5. Steam Code 4—Use steam code 4 to begin counting reversals before temperature is achieved, but without steaming to maintain temperature after it is first achieved.

6.1.25.1.6. Steam Code 5—Steam code 5 is similar to steam code 1, with the exception that differential temperature is not considered. If a value of 175 is programmed with a steam code of 5, steaming

will stop at 175 degrees and begin again when the temperature falls to 174 degrees. One case for the use of this steam code is if the configured differential temperature is a relatively large value, perhaps 10 degrees. While this broad differential temperature may work well for most formulas, there may be one or two formulas requiring a much more limited temperature range. Steam code 5 effectively limits the temperature swing to a very narrow range, generally to within three degrees above or one degree below the desired temperature.

6.1.25.1.7. Steam Code 6—Steam code 6 has all the characteristics of steam code 5, except counting starts only after temperature is first achieved.

6.1.25.2. Programming Functions Other Than Temperature—When the steam code and temperature in each module of the tunnel have been assigned, all other functions of each module should be programmed. Ideally, after determining and programming temperatures, every function of the first module should be programmed. These may include drains, valves, and chemicals, among others.

6.1.25.2.1. Drains—Most Milnor tunnel washers are equipped from the factory with two drains in the first module of each zone. Each drain is normally controlled by two separate function bits, allowing each module with two drains to be emptied and refilled up to four times per formula. This is accomplished by assigning each function bit a different initialization (init) code.

Standard names for the two drains are Drain One and Drain Two. On the Formula Programming page, these drains and their init codes are called Drain One 1, Drain One 2, Drain Two 1, and Drain Two 2. If Drain One 1 is assigned an init code of G (when count-up reaches halfway point), and Drain One 2 is assigned an init code of H (during transfer when tunnel is committed), then Drain One can be opened at the midpoint of the formula and at the end of the formula. This allows, for example, a partial drain halfway through the formula, then a complete drain during transfer.

6.1.25.2.2. CRAB (Conveyor Bypass)—CRAB is an output which bypasses the load end photo-eye of the conveyor when enabled. It allows the conveyor to advance empty pockets via the empty pocket formula without error messages. This function is usually assigned to be backward compatible with the previous position so the first module can signal the conveyor to allow transfer of an empty pocket. This function is programmed only for formulas within the Empty goods classification, including the empty pocket and purge pocket formulas.

6.1.25.2.3. Flow-Not—The Flow-not function controls a valve which prevents the normal counterflow of bath liquor from the discharge end of the tunnel toward the load end. The flow-not valve diverts the contaminated bath liquor from the normal flow to the drain trough. A common application of this feature is if white goods must follow goods with a tendency to bleed (e.g., new red goods). Normal counterflow would allow the bath liquor contaminated with red dye to flow into the module with the white goods, thereby discoloring the white goods. By enabling the flow-not valve, the discolored bath liquor leaving the module is diverted to the sewer rather than the next upstream module.

6.1.25.2.4. Rinse Enhance—Rinse enhance controls a valve which introduces additional fresh water into the rinse zone.

6.1.25.2.5. Rinse Flow—Main incoming rinse water entering the CBW®. This is the main water source supplying all of the counter-flow water for the tunnel. It is usually piped to the last or next-to-last module.

6.1.25.2.6. Reuse Tank Drain—Used for programming the reuse tank to drain if a formula in the last storage position is following an incompatible formula or to clean out a buildup of solids in the bottom of the tank.

6.1.25.2.7. Fast Fill Standing Bath—A fast fill valve for a standing bath module. This is a module which never has counterflow or any form of continuous flow. This function will open the fast fill valve any time the level switch for that module signals a low level for a particular time period, usually for a few seconds. This function is most often used for the finish zone of the tunnel washer.

6.1.25.2.8. Wash Enhance—Wash enhance controls a valve which introduces additional fresh water into the wash zone. Wash enhance should always be used in conjunction with rinse enhance. When used in conjunction with Rinse Enhance, a second water flow rate can be achieved.

6.1.25.2.9. Chemicals—These functions are not pre-programmed at the Milnor® factory. Because of the many variables in chemical supply systems, chemical functions for each module must be programmed specifically for each installation. Refer to the document on programming chemicals for detailed information.

6.1.26. 0L: Flow if Temperature is Low [Document BICCNC39]

This op code usually controls a flow/flow-not valve between module 1 and module 2 of a PulseFlow® tunnel washer. When the temperature in module 1 is too cold, the valve opens to admit hotter water from module 2.

— End of BICCNC02 —

BICCNO03 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

6.2. Interval Purge, Automatic Empty Pockets, and Automatic Purge Pockets

6.2.1. Explanation of Interval Purge, Automatic Empty Pockets, and Automatic Purge Pockets

These functions are usually initiated automatically but may also be initiated manually as explained elsewhere in this section.

6.2.1.1. Interval Purge—Interval purge disregards all other programming and configuration to send a single purge pocket (defined in Section 6.2.1.3 "Automatic Purge Pockets") through the tunnel after each "x" number of transfers, where "x" is the value entered in the *Purge Interval* field of the *Configuration/Hardware/Program Constants* display. Additionally, interval purge purges each tunnel module equipped with drain and refill capability if so commanded in the purge formula. Each module with drain and refill valves can be automatically drained, refilled with water, and steamed up to an average temperature. Chemical dosing should be avoided in the purge formula, as first dosing and chemical compatibility perform this function more efficiently.

A dedicated purge formula must be created and its code entered in the *Purge Formula* field of the *Configuration/Hardware/Program Constants* display. The corresponding *Interval Purge* customer code (if any) must be entered in the *Purge Customer* field of the *Configuration/Hardware/Program Constants* display. This should only be used on a CBW® which processes primarily one type of goods, especially heavily soiled goods which may leave accumulations of sand or other solids in the module sumps. In cases of purging for reasons of incompatibility, use automatic purge pockets, described in Section 6.2.1.3.

6.2.1.2. Automatic Empty Pockets—An empty pocket is caused by allowing the tunnel washer to transfer while preventing the loading device (loading conveyor or rail system) from delivering a new batch of goods to the tunnel washer. Because all modules (pockets) of the tunnel transfer simultaneously, once an empty pocket is introduced, it maintains its position relative to the batches before and after it until it reaches the discharge end of the tunnel.

6.2.1.2.1. Benefits of Automatic Empty Pockets—The automatic empty pockets function separates "good goods" from "bad baths" by inserting one or more empty pockets between incompatible batches. For example, if the goods that will next enter the first module of the tunnel are declared incompatible with the bath liquor remaining in the first module after transfer, the Mentor™ controller will prevent the conveyor or rail system from advancing for a preset number of transfers. These empty pockets cause dilution of the contaminated bath liquor through the normal water flow of the Milnor® CBW®, so the goods about to enter the tunnel meet with a compatible bath. This automatic operation is programmed on the *Programming/Automatic Empties* display.

Do not confuse the compatibility decisions for initiating an automatic empty pocket with forward or backward compatibility decisions.

Automatic empty pockets can be useful even when the first module is drained and refilled at transfer because the empty pockets maintain their position relative to all other batches in the tunnel.

6.2.1.2.2. Use of the Automatic Empty Pockets Capability—To use automatic empty pockets, a dedicated empty pocket formula code (and empty pocket customer code, if appropriate) must be designated. The formula code for the dedicated empty pocket formula must be entered in the *Formula in Empty Pocket* field of the *Configuration/Hardware/Program Constants* display. The corresponding code for the customer in empty pocket must also be entered on the *Program Constants* display. The formula code causes a specific formula to be executed in each module while it is empty of goods.

Usually, the empty pocket formula causes the module to achieve level and to steam to a temperature near the average temperature for all formulas processed in the tunnel. The designated empty pocket formula usually does not call for any chemical injections, as injecting chemicals into an empty pocket would be wasteful. Also, the first dosing capabilities of the Mentor™ controller are such that chemical concentrations can quickly be returned to normal levels when goods are next introduced into the module.

6.2.1.3. Automatic Purge Pockets—A purge pocket is caused by introducing an empty pocket (see Section 6.2.1.2 above), and also opening the drain valve until the module (pocket) is drained, closing the drain valve, and refilling the module. Because all modules of the tunnel transfer simultaneously, once a purge pocket is introduced, it maintains its position relative to the batches before and after it until it reaches the discharge end of the tunnel. In this manner, if a load of white goods follows a load of red goods which have tinted the bath liquor, the bad (red) liquor is drained to the sewer and the module refilled with fresh water before the white goods arrive.

6.2.1.3.1. Benefits of Automatic Purge Pockets—The automatic purge pocket function works similarly to automatic empty pockets described earlier. It separates goods of one formula class from incompatible baths left by a previous formula class by inserting one or more purge pockets between incompatible batches. Modules which are programmed to drain in the purge formula will drain the contaminated bath liquor to the sump and automatically refill from the fast fill valves. This causes the goods about to enter the tunnel to meet with a compatible bath. This automatic operation is programmed on the *Programming/Automatic Empties* display.

Do not confuse the compatibility decisions for initiating an automatic purge pocket with forward or backward compatibility decisions.

Automatic purge pockets can be useful even when the first module is drained and refilled at transfer because the purged pockets maintain their position relative to all other batches in the tunnel.

6.2.1.3.2. Use of the Automatic Purge Pockets Capability—To use automatic purge pockets, a dedicated purge formula code (and purge customer code, if appropriate) must be designated. Enter the formula code for the dedicated purge formula in the *Purge Formula Code* field of the *Configuration/Hardware/Program Constants* display. Enter the corresponding purge customer code on the *Program Constants* display. Automatic purge pockets and interval purge employ the formula referenced in the *Purge Formula Code* box of the *Program Constants* screen.

6.2.1.4. Comparisons of Interval Purge and Automatic Empty/Purge Pockets

6.2.1.4.1. Interval Purge—Interval purge passes a single purge pocket between batches based solely on how many transfers have occurred since the last interval purge. This feature is used to drain and refill any module equipped with drain and fast fill valves to flush any build up of sediment from the module—as may occur when goods with a high content of greasy soil or sand are processed. The formula and customer code for purge (assigned under *Configuration/Hardware/Program Constants*) are automatically invoked for pockets passed in this manner.

> **Note 13:** Workwear modules have drains and level switch-controlled fast fill valves, cold or hot, but not both. Standard linen modules can also be optionally fitted with these devices. Milnor® tunnels manufactured specifically for the food and beverage industry have drains on the wash and bleach zone modules, but not on the rinse and finish zone modules.

6.2.1.4.2. Automatic Empty/Purge Pockets—Automatic empty pockets or automatic purge pockets command the passage of one or more empty or purged pockets (defined above) between batches. These empty/purged pockets are inserted solely according to the programmed incompatibility of the goods that will next enter the tunnel, as compared to the bath that remains in that module after transfer. This feature segregates incompatible goods if the tunnel does not have the bath exchange option. The incompatibility between adjacent batches are determined by the formula codes assigned to each batch. When certain incompatible characteristics are seen by the Mentor™ controller, the formula code and customer code assigned to the empty formula or purge formula are automatically invoked. One or more pockets are then passed in this manner, as assigned in *Configuration/Hardware/Program Constants.*

6.2.1.4.3. Summary of Usage—Both *Automatic Empty/Purge Pockets* and *Interval Purge* invoke dedicated formula codes, and dedicated customer codes if used. Although any module with drain and refill capabilities can be commanded to do so under either function, it is best to either drain, refill, etc. under *Automatic Purge Pockets,* or to use the formula compatibility features (*Programming/Automatic Empties*) for this purpose.

As a general rule, it is more common to use *Automatic Empty/Purge Pockets* to separate incompatible goods when the tunnel does not have bath exchange features, and to use Bath Exchange when the tunnel has bath exchange features. Use *Interval Purge* for draining and refilling modules to periodically and unconditionally remove any sediment built up in them.

> **Note 14:** Bath exchange is described in more detail in the section on compatibility (see Table of Contents).

6.2.1.5. What the Empty and Purge Formula and Customer Code Program Constants Do

1. The Mentor™ controller assigns the configured batch codes in the empty formula and empty customer program constants fields to all automatic empty pockets, and assigns the dedicated batch codes in the purge formula and purge customer fields to all interval purge pockets and automatic purge pockets. See Note 15 below.
2. If load error detection (*Configuration/Hardware/Output Timers/Max Time to Clear or Block Load Eye*) is configured, when empty or purge pockets are initiated either automatically or manually, the Mentor™ controller knows that goods will not drop into the tunnel load chute at transfer. Mentor™ then revises the load error detection logic according to the status of the *Pass Empty* checkbox on the formula programming page for the empty and purge formulas.

Note 15: For more accurate accounting by customer, the Mentor™ controller assigns dedicated customer codes for the empty or purge customer to all empty and purge pockets, respectively. It is acceptable to use the same customer code for both the customer in empty pocket and purge customer codes (*Configuration/Operating Parameters/Program Constants* display).

6.2.1.6. How To Set Up the Empty and Purge Formulas—The empty and purge formulas should be similar. Where appropriate, each should call for steaming to an average temperature and be assigned a formula transfer rate of 05 (or the lowest count of the lightest formula) in the *Time (Transfer Rate)* area of the formula programming page. This ensures that transfer time is controlled by the real formulas in the tunnel and is not delayed by the transfer time for the empty or purge formulas. For the purge formula, command a 15 second drain (usually starting immediately after transfer) in all modules with drain and fast refill valves. Chemical compatibility will automatically re-dose chemicals afterward.

6.2.2. How To Use Automatic Empty Pockets or Automatic Purge Pockets to Separate Incompatible Batches

Automatic empty pockets and automatic purge pockets keep incompatible goods from sharing the same bath liquor. Shared liquor may reduce wash quality because of soils or dyes left in the module by previous batches.

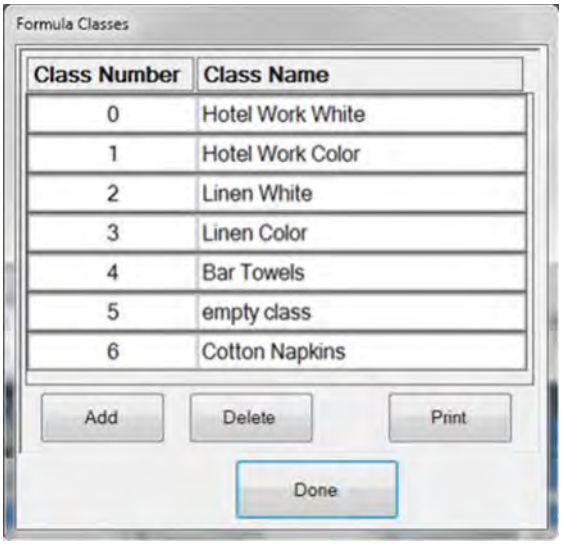
In some versions of the Mentor™ software, the terms Formula Class and Compatibility Grade are used interchangeably. Be aware that formula classes as addressed in the *Programming/Compatibility/Formula Classes* menu are identical to compatibility grades addressed in the upper right corner of the *Programming/Formulas* screen.

6.2.2.1. Program All Formulas—The first step in employing the compatibility features of the Mentor™ controller is to create all necessary formulas, accepting "Default" as the compatibility grade. The compatibility grade will be changed later, after all formulas are created and fully evaluated for inclusion in a compatibility class.

6.2.2.2. Create Formula Classes—The evaluation of formulas and their inclusion in formula classes is best performed with a thorough understanding of wash chemistry and goods characteristics as they relate to the individual installation. Each wash formula appears in one and only one formula class. The programmer must consider the acceptable quality of wash against the required programming time to determine how many formula classes are necessary. More formula classes will add flexibility, but at the cost of more complex programming and more time required.

After all formulas have been programmed, create a formula class appropriate for one or more of the existing formulas (*Programming/Compatibility/Formula Classes/New Class*). The screen used to create formula classes is shown in Figure 110.

Figure 110: Formula Classes Screen



A common formula class is Heavy White, which typically contains all formulas for heavily soiled white goods, such as kitchen apparel and napkins. Another formula class is Dark Color Dye, which typically includes new, unfaded goods with a tendency to bleed dye into the bath liquor.

6.2.2.3. **Define the Compatibility List**—Defining the compatibility list is a simple procedure which tells the Mentor™ controller how many empty pockets or purge pockets to insert between batches from different compatibility grades (formula classes).

1. The first step is to create a new entry in the Automatic Purge and Empty Pockets table (*Programming/Compatibility/Auto Purge and Empty*). Figure 111 illustrates this table. From the Automatic Purge and Automatic Empty Pockets screen, click *New* to create a new compatibility entry.
2. Click once in the table underneath the Last Storage column heading of the new compatibility entry to reveal a drop-down menu of all available formula classes, then select a formula class from the list. This defines the formula class in the last storage position (the next batch to enter the tunnel), which will follow the class defined in the next step. For convenience, it is often best to begin with the formula class at the top of the list.
3. Click once in the Module 1 column to select the formula class currently in the first module of the tunnel, and select a formula class from the list. If the formula classes were defined properly (i.e., broadly enough), an entry will be required for every formula class other than the class entered in the “Last Storage” column on the same row.
4. In the Purge/Empty column, select whether to purge or pass one or more empty pockets between the goods in the first module and the last storage position.
5. In the Pockets column, enter the desired number of purges or empties.
6. Repeat this procedure for each formula class, ensuring that all combinations of formula classes in the last storage position column are associated with all formula classes in the column for the first module of the tunnel.

Figure 111: Compatibility Matrix Screen

As described in the section on interval purge, etc. (see Table of Contents), an empty pocket operates according to the empty pocket formula which is usually programmed to steam to an average temperature but not inject any chemicals. A purge pocket formula is usually programmed to drain, refill, and steam to an average temperature without chemicals. If drain valves are available and production is considered more important than water consumption, a purge pocket will impact production less than two or more empty pockets.

6.2.2.4. An Example of Formula Compatibility

—For an example of how to program compatibility, consider three formula classes: sheets/terry, very heavy white, and dark color dye.

- Sheets/terry can contain formulas for most hotel goods, including bed sheets and terrycloth items, but not bar mops or kitchen towels, which contain a large amount of grease and other solids.
- Grease-laden white goods are assigned to the very heavy white formula class.
- Dark color dye goods are likely to leave the bath liquor contaminated with dye, thus staining white goods exposed to bath liquor in which these goods have been processed.

Because of the limited number of formula classes used in this example, compatibility can be described in a simple matrix of three columns and three rows. While actual values can only be determined by evaluating the goods and formulas for an installation, the following values are reasonable for this example:

1. If the first module of the tunnel contains a formula from the very heavy white formula class (e.g., bar mops), and the last storage position contains a formula from the sheets/terry formula class (e.g., bed sheets or hand towels), then a reasonable entry in the Automatic Purge and Automatic Empty Pockets table would be to purge two pockets.
2. If the first module of the tunnel contains a formula from the Dark Color Dye formula class, a reasonable entry would be to purge two to three pockets before a formula from any other class. This helps insure that the goods in the last storage position are not tinted by the dye remaining in the bath liquor from the Dark Color Dye formula.

6.2.3. How To Use Interval Purge

The interval purge feature causes a purge pocket to pass through the tunnel after a specified number of batches have transferred. Enter the purge formula code and the purge customer code under *Configuration/Operating Parameters/Program Constants*, and the desired number of transfers between each purge into purge interval. The Mentor™ controller will operate normally, but after each specified number of transfers, a purge pocket will be introduced into the tunnel (no goods will be dropped into the first module, which will be drained, refilled, steamed to an average temperature, etc. according to the purge formula).

6.2.4. How To Manually Initiate Automatic Empty Pockets and Automatic Purge Pockets

If the tunnel system is loaded by a Milnor® compartmented loading conveyor, automatic empty pockets and automatic purge pockets can be initiated manually. To do this, leave each conveyor compartment empty, but tell the Mentor™ controller that each compartment contains the formula code and the optional customer code for the empty or purge formula, as appropriate. The tunnel will accept the non-existent batches of goods and perform the functions specified by the empty pocket or purge codes as previously explained. The conveyor switches must be set to allow it to pass empty pockets.

6.2.5. How Load Error Detection Is Modified for Automatic Empty Pockets and Auto-Purge

A photoeye on the tunnel load scoop detects goods that enter the tunnel (standard input 15—load eye blocked). If load error detection is enabled (by specifying a window of time under *Configuration/Operating Parameters/Output Timers/Max Time to Clear or Block Load Eye*), the Mentor™ controller recognizes the formula or goods codes for the empty or purge formula as the "legitimate" empty and purge formulas respectively, and makes the decisions shown in the table below if the empty and purge formulas have the *Pass Empty* box checked on the formula programming page.

Table 4: Modification of Load Error Detection

Formula Code that just entered Module 01 matches Empty Formula or Empty Customer	Goods blocked then cleared photoeye during "Max Time to Clear or Block Load Eye"	Mentor controller initiates a hold condition	Error Message
No	Yes	No	—
No	Didn't block eye	Yes	Too Long to Block Eye
No	Didn't block eye	Yes	Too Long to Block Eye
Yes	No	No	
Yes	Yes	Yes	Load Eye was Blocked

6.2.6. How To Manually Purge Workwear Tunnel Washers

Workwear tunnel washers are equipped with a manual purge capability. It is recommended to use this feature only outside of normal operating hours and with the tunnel empty of goods, because the module drains and the tunnel holds during the purge.

1. Energize the tunnel.
2. Starting at the discharge module, open the drain valve by clicking on each module to access the *Manual Output Toggle* page. Click on the drain output, changing it from red to green, which indicates that the drain is open. Do not open more drains simultaneously than the drain trough can safely drain to the sewer.
3. On the Function Programming page (*Programming/Functions*), write down the op codes of the fast fill valves. In most cases, this code is 01 for a standard fast fill valve or 07 for a fast fill standing bath. Change these op codes to 00 (standard timed) for flushing.

4. Starting again with the discharge module on the Mentor™ operational display, successively activate the fast fill valves in each module for 10 seconds to flush the sump of each module free of soil. Turn off each fast fill valve before going to the next module.
5. Starting once again at the discharge module, close each drain.
6. Refer back to the notes on fast fill op codes from step 3 to restore all Op codes to their previous values.
7. If the tunnel is so equipped, purge the flow splitter tank and flow lifter tank as explained in "Rinse Zone Flow Splitters and Wash Zone Flow Lifters."

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6.3. Programming Inputs and Outputs

Any tunnel washer device can be wired to an available microprocessor input or output relay, respectively, then named and configured with the Mentor® controller software.

6.3.1. Quick Reference to Peripheral Boards

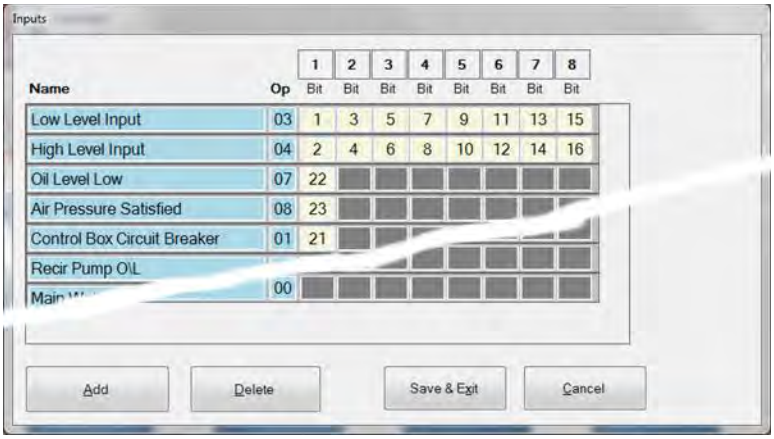
6.3.2. Programming Microprocessor Inputs

The on/off status of the input causes the microprocessor to perform some action, usually posting a message on the display that a condition has occurred.

6.3.2.1. Inputs Definition Page—The inputs definition page is the user interface between the input devices (module level switches, oil and air pressure sensors, motor overloads, etc.) and the Mentor microprocessor. This page, shown in Figure 112, displays the electrical signals from the input devices to the microprocessor.

An example of how microprocessor inputs are used can be drawn from the Low Level Input shown in Figure 112. Access the *Input Definition page* by selecting *Inputs* from the *Programming* menu on the Mentor operational display. You must be logged in with programmer rights to view or change any configuration or programming data.

Figure 112: Typical Inputs Definition Page



6.3.2.1.1. Input Name—The first column in the table is the name of the input and is open to the user's discretion. The text entered here appears on the Mentor display when the input is made.

6.3.2.1.2. Module Number—The *Module* row of the *Input Definition* page displays the number of the module in which a particular bit represents a type of input. As shown in the example figure (Figure 112), a single type of input, e.g., *Low Level Input*, may be used in several modules.

6.3.2.1.3. OP—The second column (OP) of the *Input Definition* page is the operational code for the input. This code controls how the input is interpreted by the microprocessor. A more detailed explanation of input operational codes is provided in Section 6.3.2.2.

6.3.2.1.4. Bit—Depending on hardware, each input may be monitored in one or more tunnel modules. A complete explanation of the process of matching bits from this display to specific hardware and wiring locations is in Section 6.3.2.3 "Correlating Input Sensing Devices with the Mentor Controller".

6.3.2.2. Op Codes for Inputs

6.3.2.2.1. 01: Warning, Signal ON—This is a warning input that displays the text of the warning in the warning line of the operational display and turns on the signal relay to alert the operator of the error condition. Inputs coded with this op code initiate a hold condition in the tunnel when the input is made.

6.3.2.2.2. 02: Warning without Signal—This is a warning input that displays the text of the warning ion the operational display. Inputs coded with this op code will not initiate a hold code.

6.3.2.2.3. 03: Low Level Input—Inputs with this op code signify that low level has been achieved. Usually, an input with this op code is assigned to each module of the tunnel.

6.3.2.2.4. 04: High Level Input—Inputs with this op code signify that high level has been achieved. Usually, an input with this op code is assigned to the first module and the last module of the tunnel.

6.3.2.2.5. 05: Workwear—This input op code is not currently used.

6.3.2.2.6. 07: Oil Level—This input must be configured. An "Oil Level Low" error will appear when this input is made.

6.3.2.2.7. 08: Air Pressure—This input must be configured. An "Air Pressure Low" error will appear when this input is made.

6.3.2.2.8. 09: Fill Tank, Low Level—This input signifies that low level has been achieved in a fill tank. Usually, one input with this op code is assigned to each module that is filled from a tank.

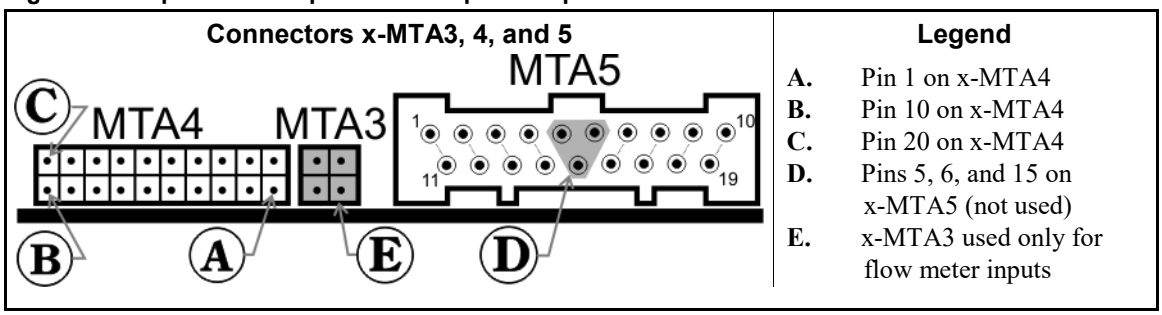
6.3.2.2.9. 10: Fill Tank, High Level—This input signifies that high level has been achieved in a fill tank. Usually, one input with this op code is assigned to each module that is filled from a tank.

6.3.2.2.10. 11: Press Free—This input is only enabled when Data Pass is configured. The tunnel will enter a hold condition if this input is not made at transfer. If Data Pass is configured, this input is required for proper operation. This input is usually assigned to the last module of the tunnel.

6.3.2.3. **Correlating Input Sensing Devices with the Mentor Controller**—A microprocessor input signal can be thought of as an electrical circuit in which the device being monitored is a switch. When a device closes, such as a level switch, the input is made. This signals the microprocessor that an action has occurred, at which time the microprocessor may execute certain functions through outputs and/or send a message to the display. Depending on the operational code for the input, its normal state may be either made or not made, as described in Section 6.3.2.2.

Inputs from devices in the tunnel system enter the Mentor system through MTA3 and MTA4 of an 8 output/16 input board, as illustrated in Figure 113. Each input number on each board is permanently associated with a particular pin on that board.

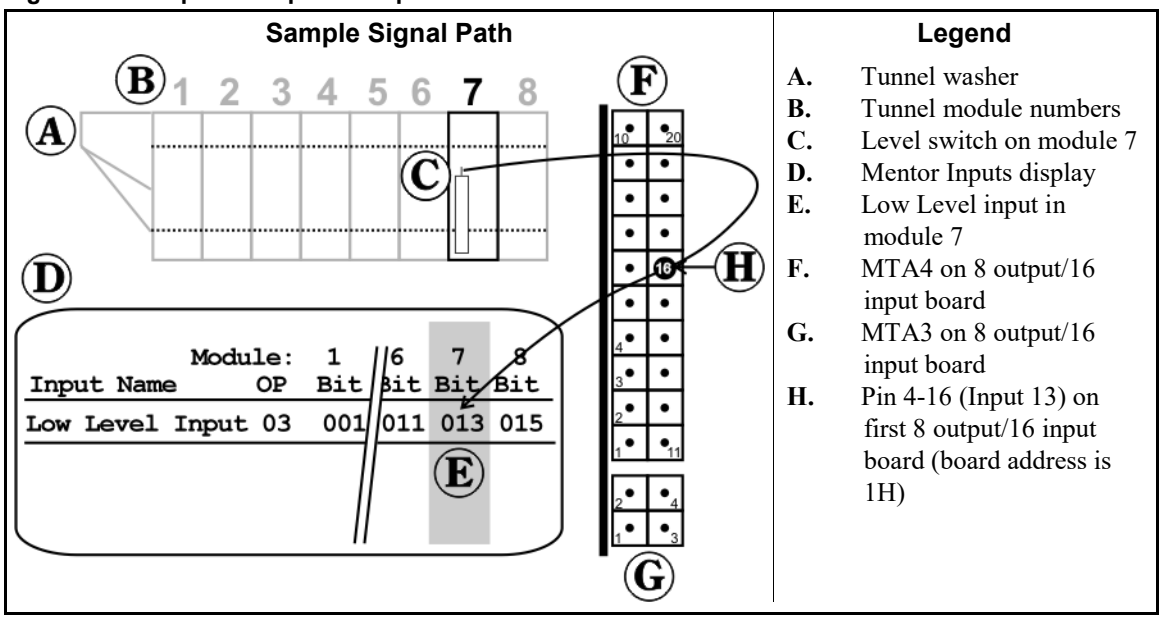
Figure 113: Inputs and Outputs on 8 Output/16 Input Board



See the following examples (Section 6.3.2.3.1 and Section 6.3.2.3.2) to better understand the relationship between devices and specific pins on 8 output/16 input boards. Note that both examples make use of pin 16, but that the pins are on two different 8 output/16 input boards, known to the processor by their respective addresses. These addresses are set via two rotary switches on each board, as described in Section 6.3.4 "Determining Board Addresses".

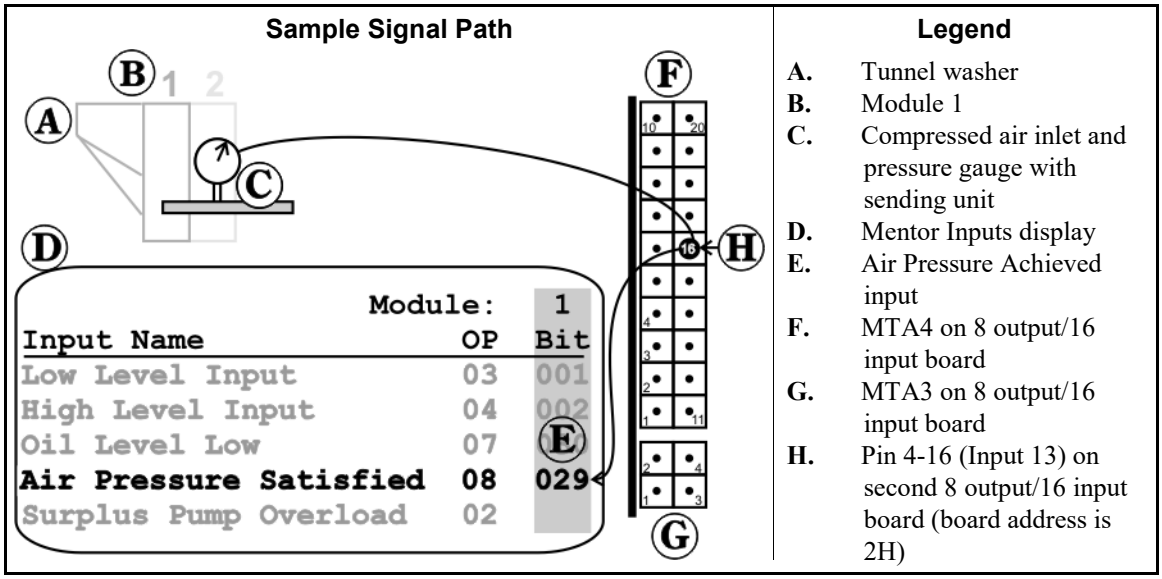
6.3.2.3.1. Input Example 1: Low Level Input for Module 7—In this example (see Figure 114), we assume that the seventh module of the tunnel washer is equipped with a level switch controlling whether the input is made or not made. When the level switch is above low level, the input is made. The status line on the Mentor operational display shows "Low Level Input."

Figure 114: Graphic of Input Example 1



6.3.2.3.2. Input Example 2: Tunnel Air Pressure Satisfied—In this example (Figure 115), we assume an air pressure switch is used to tell the microprocessor whether there is sufficient air pressure for the tunnel to operate. Because air pressure is usually monitored at only one position on the tunnel washer, only one input is required. For convenience, this input is usually assigned to the first module of the tunnel.

Figure 115: Graphic of Input Example 2



6.3.3. Assigning Outputs and Functions

6.3.3.1. Function Page—For Mentor control systems, the procedure for assigning outputs and functions changes only to the degree that each function and module pair is assigned a unique bit number. This part of this document describes how devices which act on microprocessor outputs are correlated with the correct peripheral board and pin on that board.

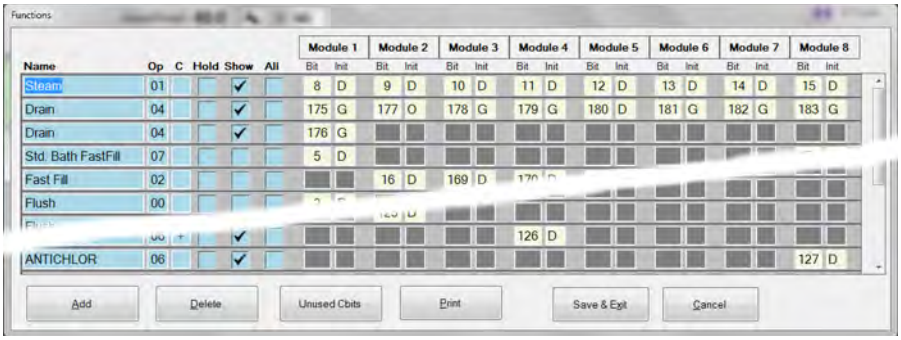
As shown in Figure 116, each function is represented by a row on the *Function Programming* page, and each module is represented by two columns (Bit and Init). The intersection of the module information (column) and the function (row) contains the output number and operational code of the function.

By convention of the Milnor factory, functions are usually assigned in this order:

1. Steam functions for all modules are assigned to the first available output relays.
2. Fast fill functions are assigned to the next available output relays.
3. Drain functions are assigned to immediately follow fast fill functions.
4. Other options are assigned to the remaining output relays, using additional output boards if necessary.
5. Chemicals are usually assigned to a separate board to isolate them from other functions.

Outputs are numbered sequentially, with output 001 corresponding to the first output on the first 8 output/16 input board (address 1H). When this output is energized, the red light emitting diode labelled “0” on the edge of the board illuminates.

Figure 116: Typical Function Page



When all available outputs on the 8-output/16-input boards are assigned, 24-output boards are used for additional functions. One 24-output board is usually dedicated to chemical supplies, so that chemical signals remain somewhat isolated from other components.

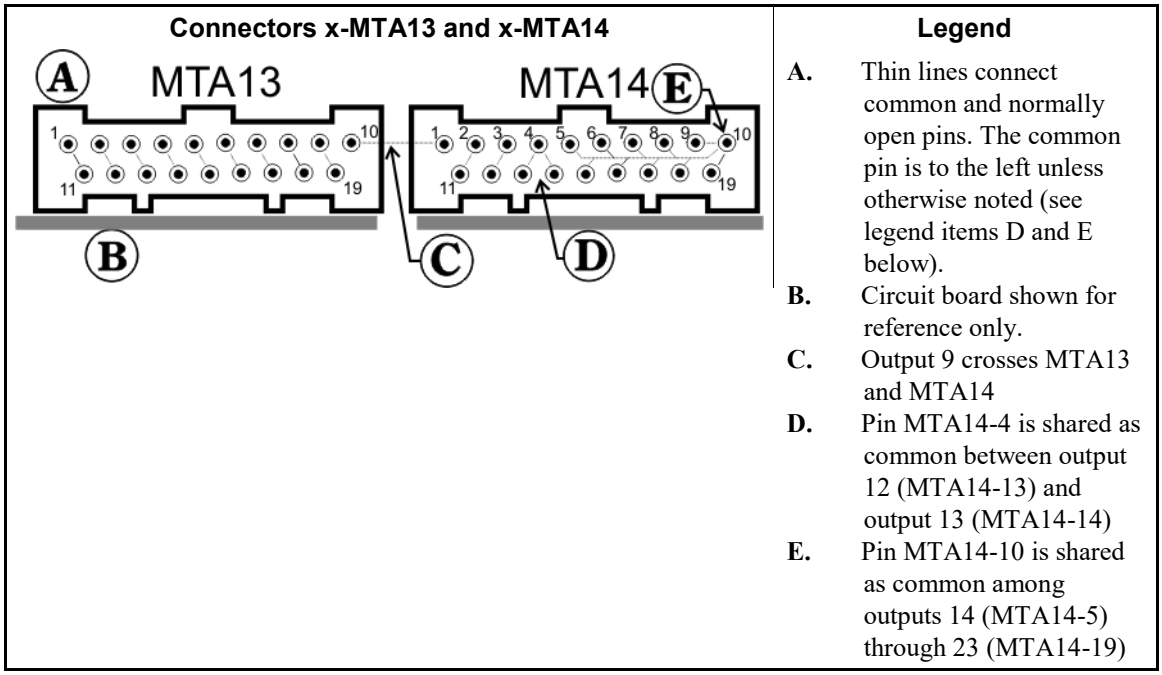
6.3.3.2. Correlating Devices to Functions—Each output relay provides a common and a normally open pin on the edge of the board on which it occurs. For 8 output/16 input boards, the arrangement of outputs is shown in Figure 113. On these boards, MTA3 is dedicated to microprocessor inputs for optional flowmeters. MTA4 provides inputs to the microprocessor from non-flowmeter devices (described in Section 6.3.2.3). MTA5 provides outputs on pins 1 through 4, 7 through 10, 11 through 14, and 16 through 19.

For 24 output boards, see the arrangement in Figure 117. In matching functions to pins in MTA13 and MTA14 of each 24 output board, use the following guidelines:

1. Output 0 (the first output per board) spans pins MTA13-1 and MTA13-11
2. All outputs on MTA13 have the normally open pin on the row nearest the circuit board and the common pin on the row farthest from the circuit board.

3. Output 9 spans across the two MTA connectors, from MTA13-10 to MTA14-1.
4. On MTA14, outputs 14 through 23 (the last 10 outputs) use pin 10 as common. See Figure 117 for details.

Figure 117: Outputs on 24-Output Board



6.3.3.2.1. Outputs Example 1: Adding a Module Drain Valve—For the first example of assigning an output from the microprocessor to a device on the tunnel, assume a second drain has been added to the first module of the tunnel. The signal to open the drain must travel from the desired pins on an 8 output/16 input board or a 24 output board. For this example, only 8 output/16 input boards will be used.

1. Output 5 (MTA5-3 and MTA5-13) on the third 8 output/16 input board (address 3H) is found available.
2. Wire from the device to the selected output, as specified above.
3. Create the new function for the second drain valve in module 1. Depending on the function added, this procedure may include programming an operational code, hold code, compatibility code, etc.
4. Following procedures at the Mentor controller similar to those described in Section 6.3.2.1, assign the selected output bit to the function. In this example (shown in Figure 116), this is bit 021. This number represents the fifth output on the third 8 output/16 input board.

6.3.3.2.2. Outputs Example 2: Configuring a Steam Valve Output—Assume the bit for the steam valve on module 7 was lost and must be restored.

1. Trace the wire from the steam valve back through all intermediate components to the MTA connector on the 8 output/16 input board.
2. Verify the board address where this connector attaches. If our example system is similar to that shown in Figure 116, this board will have address 3H. See Section 6.3.4 for how to interpret rotary switch settings to board addresses.
3. Verify the pins occupied by this device. According to our example, pins MTA5-2 and MTA5-12 are used here.

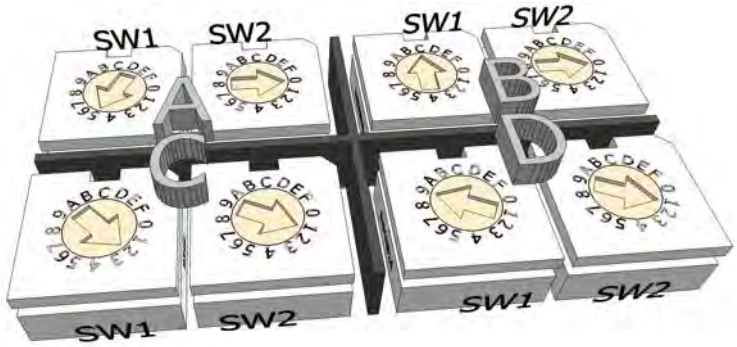
4. From the address of the board (3H) and the pins on that board occupied by the device (MTA5-2 and MTA5-12), we can determine that the correct bit code for the steam valve on module 7 of our tunnel is 017.

6.3.4. Determining Board Addresses

The microprocessor communicates with all peripheral boards via a serial link. Each peripheral board is known to the microprocessor by an address that is unique within the system. The address is determined by the setting of two rotary switches on the board.

Figure 118: Sample Addresses from Rotary Switches

Examples Switch Settings



Legend

A. Board at address 5H
B. Board at address CH
C. Board at address 12H
D. Board at address 19H

— End of BIPCUT01 —

Chapter 7
Operation

BICCNO06 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

7.1. Tunnel Start-up and Shut-down

7.1.1. How To Restore Water Levels and Temperatures after a Lengthy Shutdown

Enable console power, then tunnel power, but do not start the tunnel.

1. The "Power Failure" message appears on the controller.
2. The main water valves open.
3. The Flow Splitter/Lifter pumps start.
4. Water valves close and steam valves open when water levels reach the commanded levels.
5. The steam valves remain open until commanded temperatures are achieved,
6. then the steam valves close and "Level and Temp Satisfied-Press Ctrl D to Start" appears.

To conserve heated water, the controller stops the water flow after the correct water levels are achieved but before the commanded temperatures are achieved.

Before you process goods, restore the chemical concentrations after the levels and temperatures are achieved. See Section 7.1.2 "How To Achieve Desired Chemical Concentrations at Start-Up" (below).

CAUTION 2: Entanglement Hazard—The *Start button* starts cylinder rotation. Verify that all machine guards are in place and that all personnel are away from the tunnel.

The *Start button* starts rotation of the cylinder and normal processing. A minimum of 20 reversals are required after a power failure.

The *Stop button* stops rotation and normal processing except as stated below. The Mentor® controller remembers the reversal that was in progress. The controller resumes processing at that reversal. If the tunnel stopped with less than "count minus 4 reversals" before transfer, the tunnel defaults to 4 reversals when restarted. For example, assume that 2 reversals remain when the tunnel stops. When the tunnel resumes, the count is set to 4 reversals, not the 2 reversals that remained when the tunnel stopped.

WARNING 3: Do not use *Ctrl-K* to stop cylinder rotation.—To completely stop the tunnel in an emergency, turn off power at the wall disconnect switch. Cylinder rotation also stops when you push any of the red emergency stop buttons on the Mentor controller console or the tunnel. However, these do not turn off certain pumps or other devices associated with the system.

CAUTION 4: Receive Faults—In Miltrac™ systems, after Miltrac™ acknowledges "Start Transfer" (during the last reversal), *Ctrl-K* causes a "Receive Fault" in the Milnor® press. See the explanation of error messages in the press technical manual for instructions on how to correct this error.

7.1.2. How To Achieve Desired Chemical Concentrations at Start-Up

After the chemical concentrations are achieved, the maintenance dose injections set by each formula replace the chemical used at each transfer. However, numerous transfers may be needed before concentrations achieve the normal level if chemical levels are very low, such as after a shutdown. Section 7.1.2.1 and Section 7.1.2.2 explain how to quickly achieve normal chemical concentrations at start-up.

7.1.2.1. If the Tunnel Contains Goods at Start-up—Some operators leave goods in the tunnel overnight. The operator must consider the chance that a bleach bath will damage goods after a few hours. After you start tunnel rotation, use the *Inject Chemicals* menu item (*File/Inject Chemicals*) to establish proper chemical concentrations.

The *Inject Chemicals* selection of the *File* menu on the operational display permits an operator to manually inject a quantity of chemicals equal to one, two, or three transfers for all formulas currently in the tunnel. If the corresponding goods and batch codes remained in the tunnel overnight, the operator need only inject additional chemicals using this method to achieve working concentrations. If the tunnel was empty, leaving only the "empty" formula code in each module, this method will be ineffective, as the formula for an empty pocket should not call for chemical injections.

1. From the operational display, press *Alt-F* or select *File* near the upper left corner of the screen.
2. Select *Inject Chemicals* from the drop-down menu list by hovering the mouse cursor over it or using the up and down arrow keys to move the highlight bar.
3. When the menu of charges appears, select the number of chemical charges to inject into all modules to restore the desired chemical concentrations.

If three or more reversals remain before transfer, this command injects the specified number of charges of chemical and resets the rotation counter to 20.

If the tunnel is stopped, this command is stored in memory by the Mentor® controller. When *Ctrl-D* is next issued to start cylinder rotation, the Mentor® controller injects the specified number of charges.

If fewer than three reversals remain before transfer, this command does not inject chemicals.

To avoid injecting chemicals after the flyout menu appears, click the mouse on the title bar of the operational display or press *Escape* once to close each menu level.

7.1.2.2. If the Tunnel is Empty of Goods at Start-up—Assuming the tunnel was emptied before shutdown as described in Section 7.1.4 or Section 7.1.5 of this document, the Mentor® controller will have in each module an empty pocket formula which commands an average temperature, but no chemicals (assuming the empty pocket formula has been properly programmed to inject no chemicals). After starting tunnel cylinder rotation, use first dosing (explained below) to re-establish the proper working chemical concentrations.

Used only when the tunnel was emptied of goods, first dosing, explained in detail in the document on Chemical Compatibility (contained in the reference manual), provides a special first

dosing chemical quantity to be injected when and only when, for example, heavy soil goods follow light soil goods. If the tunnel is to be emptied of goods at evening shutdown, use first dosing to automatically inject the extra large doses necessary to achieve working concentrations when and only when any real formula follows the empty formula.

7.1.3. Interruptions in Normal Tunnel Washer Operation

7.1.3.1. Tunnel Holds

7.1.3.2. Maximum Time in Hold—If the Max Time in Hold feature is enabled on the *Configuration/Operating Parameters/Output Timers* page, the tunnel stops and displays “Too Long in Hold” on the operational display after the specified maximum time in hold is met. The operator alarm sounds. Clear the cause of the hold, then restart the tunnel with *Ctrl-D*.

7.1.4. How to Empty the Tunnel Washer with XLOAD

If this feature is desired and not wired from the factory, contact Milnor® technical support for assistance. To empty the tunnel without XLOAD, the most efficient method is to simply disable the loading system and let the tunnel continue to run without being loaded. Using this method, be sure to change the formula code and customer code to an empty code in the first module at the beginning of each transfer.

The XLOAD input (standard input 08) simplifies emptying the tunnel. When this input is made, the Mentor® controller suppresses the "start conveyor (drop bag)" output and inserts empty pockets by automatically entering the Empty formula and Empty customer codes into module 01 and permitting the tunnel to transfer. This feature eliminates the data entry on the operational display and the need to use the change code procedures as explained above. The operator merely closes input 08 via a switch and wiring provided by the customer (not by Milnor®) at the end of the day's operation and permits the CBW® system to operate until the tunnel is empty of goods. After shutdown, the operator returns the input 08 switch to its normal position for the next day's operation.

7.1.5. Evening Shut-down

If goods remain in the tunnel at shutdown, the Mentor® controller will retain batch code data even with console power off, so the batch codes are synchronized with the goods remaining in the machine at the next start-up. To empty the machine, use the empty formula and empty customer codes. To facilitate emptying the tunnel with the empty formula and empty customer constants, the user may want to use standard input 08 XLOAD (see Section 7.1.4).

7.1.6. Emptying a Conveyor-Fed Tunnel

To empty the tunnel and leave the load conveyor loaded, refer to Section 7.1.4.

To empty both the load conveyor and the tunnel, stop loading the conveyor and enter the empty formula and customer codes in the first empty compartment on the conveyor. If the empty formula does not automatically permit the empty pockets to enter the tunnel, set the Pass Empty Pockets switch on the load conveyor to OK.

7.1.7. Emptying a Rail-Fed Tunnel

Refer to Section 7.1.4. Turn off the Drop Bag signal by checking the *Pass Empty* checkbox in the Post Wash Codes zone of the Formula Programming screen (*Programming/Formulas*), then use one of the following methods to permit empty pockets to enter the tunnel:

1. If the rail system defaults to the empty formula and empty customer when the “bag ready” signal is turned off, empty pockets will automatically enter the tunnel as it transfers. No other action is necessary.
2. If load error detection is not enabled, the Mentor® controller will permit empty pockets encoded with a “real” formula to enter the tunnel. As each empty pocket enters module 01, use the code correction procedures described in “Operational Display of Mentor” to replace the real formula and customer codes in module 01 with the empty values.
3. If the code reading position on the rail is ahead of the position where the bag empties its contents into the load scoop (last storage position), each time the tunnel transfers, use the code correction procedures described in “Operational Display of Mentor” to replace the real formula and/or goods and customer codes in the last storage position with the empty values.

7.1.8. Removing Power from the Mentor® Controller

The *Stop* button (see Section 3.2.) stops cylinder rotation unless the tunnel is committed to transfer.

Shut off console power.

— End of BICCNO06 —

BICCNO01 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

7.2. Statistical Reports

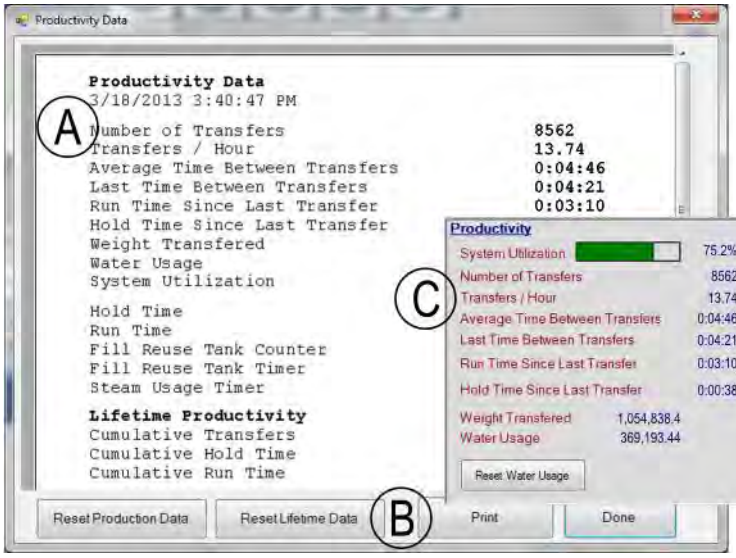
The Milnor® Mentor® controller monitors and records data continuously. By monitoring the accumulated data, management can make adjustments to increase the efficiency of the laundry.

7.2.1. Productivity Data

Productivity data includes information on transfers, operational timers, and efficiency of the CBW® system. As shown in Figure 119, the data are segregated. The main operating display shows an overview.

The *Productivity Data* report described below gives more detail.

Figure 119: Productivity Data Views

Illustration	Legend
	**A.** Detailed *Productivity Data* report **B.** Button bar **C.** Productivity summary from *Run* screen

7.2.1.1. Button Bar—The buttons at the bottom of the *Productivity Data* window allow three actions:

- close the window and return to the *Run* screen,
- begin a new period for data collection, or
- begin a new "life" for the CBW® system.

7.2.1.1.1. Button: Reset Production Data—The *Reset Production Data* button is accessible to a user with the rights to "Clear Productivity Data".

Touch this button to clear the data for the current period and begin a new one.

> **Note 16:** Data items accumulated over the life of the CBW® system, described in "Lifetime Productivity", are not cleared when a new period is begun.

7.2.1.1.2. Button: Reset Lifetime Data—Touch this button to clear all counters.

Only persons with programming rights can use the *Reset Lifetime Data* button. The button is disabled for non-programmer users. To further safeguard against the unintended loss of important data, print the *Productivity Data* window periodically.

7.2.1.1.3. Button: Print—Sends the *Productivity Data* window to the default printer attached to the Mentor® computer.

7.2.1.1.4. Button: Done—Closes the *Productivity Data* window.

7.2.1.2. Transfer Information for this Period

7.2.1.2.1. Number of Transfers—This field shows the total number of tunnel transfers since the tunnel was put into service or a new period was begun. The value in this field increments at *init code D* (after the tunnel starts turning after pause at top dead center) of each transfer, up to a maximum value of 65,535. Upon reaching this maximum value, the counter returns to 0 and begins again.

7.2.1.2.2. Transfers per Hour—This value is calculated by dividing the number of transfers for this period by the run time of the period:

$$X = T_p \div R_p$$

Where:
X = average number of transfers per hour
T_p= number of transfers in this period
R_p= the run time of the period in hours

7.2.1.2.3. Average Time Between Transfers—The average time between transfers is calculated by summing the time between all transfers, then dividing the total time by the number of transfers:

$$X = (T_1 + T_2 + T_3 + \ldots T_n) \div n$$

Where:
X = average time between transfers
T_n = time from first *init code D* to next *init code D*
n = the number of tranfers in the period

7.2.1.2.4. Last Time Between Transfers—This value is the time between the most recent two

transfers of the tunnel, timed from *init code D* of the first transfer to *init code D* of the second.

7.2.1.2.5. Run Time Since Last Transfer—This value is the time that the tunnel has run without a hold condition since the last transfer.

7.2.1.2.6. Hold Time Since Last Transfer—This value is the time, if any, that the tunnel has been in hold since *init code D* of the last transfer.

7.2.1.2.7. Weight Transferred—This value is the running total of the weight of the soiled goods as they enter the tunnel. The data for individual batches making up this sum may be received from the keypad (if manually entered), or from the weighing device on the rail. This value is incremented as each batch is discharged from the tunnel.

7.2.1.2.8. Water Usage—This value is the total amount of fresh water used in processing for this period.

7.2.1.2.9. System Utilization—System utilization is determined by subtracting the hold time for the period from the run time for the period, then dividing this value by the run time for the period:

$$X = (R_p - H_p) \div R_p$$

Where:
X = system utilization
R_p = run time for the period
H_p = hold time for the period

Example (units are seconds of time):

$$X = (52,227 - 14,029) \div 52,227 = 0.731 = 73.1\%$$

7.2.1.3. Operational Timers for This Period—Operational timers log the occurrence of certain actions at the tunnel. This data is gathered from the Mentor® controller and other devices directly. The controller sums this data for display, but performs no other calculations on it. Because this zone is focused on data for a particular period, it is cleared in its entirety when a new period is begun.

7.2.1.3.1. Hold Time—This cumulative timer is incremented each time the tunnel enters a hold condition. The value is displayed in hours, minutes, and seconds.

7.2.1.3.2. Run Time—Run time is accumulated whenever the tunnel is operating and is not in a hold condition.

7.2.1.3.3. Fill Reuse Tank Counter—This value is incremented each time make-up water is used to restore the level of the reuse tank because of the lack of reuse water from the extraction device. Frequent use of long distance compatibility to prevent contaminated water from being used to refill the reuse tank may cause additional fresh water consumption through the reuse tank.

7.2.1.3.4. Fill Reuse Tank Timer—This timer accumulates the number of hours, minutes, and seconds the fresh water valve to the reuse tank is open. This timer begins incrementing each time the *Fill Reuse Tank* counter (above) is incremented.

7.2.1.3.5. Steam Usage Timer—The *Steam Usage* timer begins counting whenever the steam valve to any module or tank is opened, and stops incrementing when all steam valves are closed.

7.2.1.4. CBW Efficiency Over Life of Service—The three values in this zone of the *Productivity Data* window are not cleared when a new period is begun. They are set to zero when a user selects *Begin New Life*.

7.2.1.4.1. Cumulative Transfers—This field maintains a total of all transfers made by the tunnel since commissioning or since the *Begin New Life* button was selected. This is the sum of the values in the "Number of Transfers this Period" field.

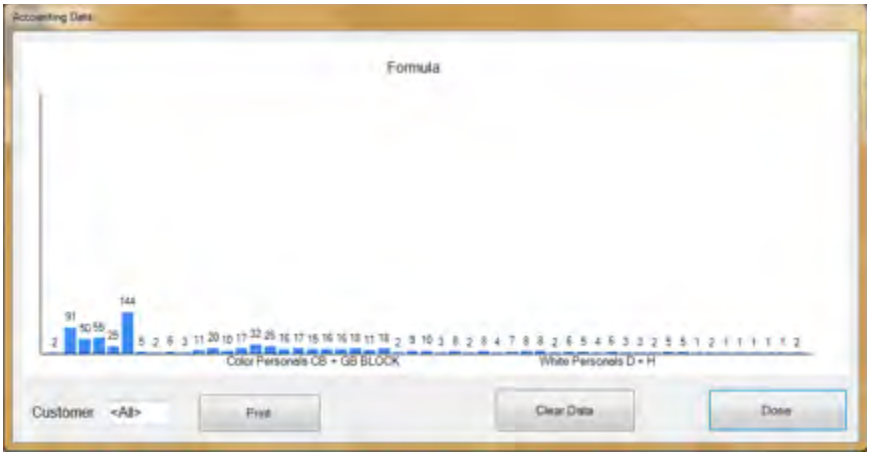
7.2.1.4.2. Cumulative Hold Time—The *cumulative hold time* is the sum of all hold times from every period since commissioning or the beginning of a new service life.

7.2.1.4.3. Cumulative Run Time—This field maintains a total of all the times accumulated in the *Run Time* field of the *Operational Timers* zone since commissioning or the beginning of a new service life.

7.2.2. Accounting Data

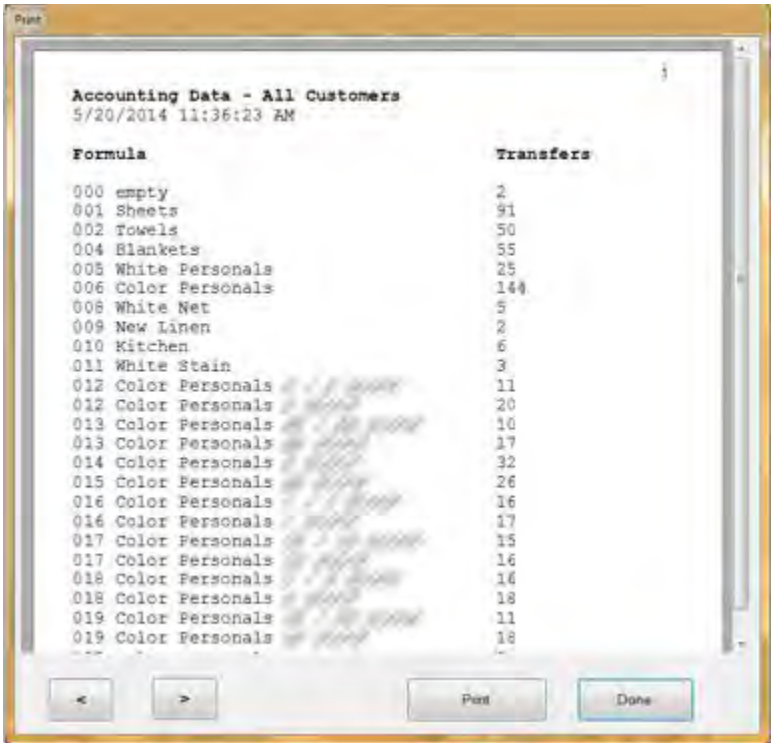
The *Accounting Data* window, shown below, presents data for tracking transfers by formula for all customers (Figure 120) or for one selected customer (Figure 122).

Figure 120: Accounting Data Window, Graphic View



Touch the *Print* button to view this data in a table for printing (Figure 121).

Figure 121: Accounting Data Window, Print View

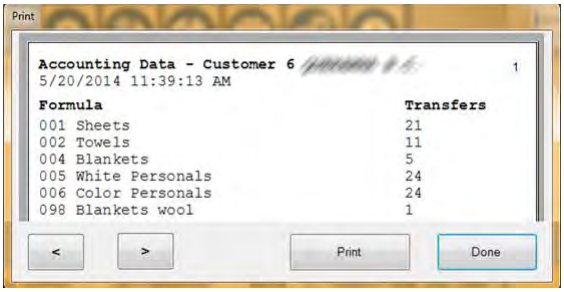


The graphic view and the text view show that formula 006 (Color Personals) was transfered 144 times for all customers.

7.2.2.1. **Selected Customer View**—The customer view of the accounting data window allows management to reconcile the number of transfers of each formula to individual customers. Using Figure 122 and Figure 123 as examples, the *Color Personals* formula was used for 24 transfers.

Figure 122: Accounting Data Window, Selected Customer Graphic View

Figure 123: Accounting Data Window, Selected Customer Text View



7.2.2.1.1.1. Button Bar—The controls at the bottom of the *Accounting Data* window allow the user to perform four operations:

- view data for a single customer,
- view cumulative totals in text format for printing,
- delete all records and begin data accumulation from zero, or
- close the window and return to the operational display.

7.2.2.1.1.1.1. Field: *Customer*—Touch this field and select a customer to view specific data.

7.2.2.1.1.1.2. Button: *Print*—From a graphic view, touch this button to see the data in text format before you print it. From a text view, touch this button to print the data.

7.2.2.1.1.1.3. Button: *Clear Data*—Touch this button to clear the accumulated data.

7.2.2.1.1.1.4. Button: *Done*—Touch this button to close the window without printing or making changes.

7.2.2.1.1.2. *Formula* Column—This column lists the formula number and name of each formula executed since the accounting data was last cleared.

> **Note 17:** The formula number is assigned to a formula when the formula is programmed. The formula number cannot be changed.

7.2.2.1.1.3. *Transfers* Column—This column lists the number of transfers (loads discharged) from the tunnel washer.

7.2.2.1.1.4. Formula Name—Each formula is named when it is created. The list of programmed formulas is available for viewing by all users through the *List of Formulas* menu selection of the operational display. Users with programmer rights can change the name for any formula through the *Programming/Formulas* menu selection.

Because this view is designed to emphasize customers over formulas, the formula name may not be completely visible, although the Mentor® controller is maintaining all data. To view the full formula name, switch to the Formulas view (click the *Formulas* button near the bottom of the window).

7.2.2.1.1.5. Customer Name—A customer name may be assigned to each customer account to aid in production and cost accounting. The Mentor® controller maintains accounting data by customer number, not name, so this data is for the benefit of personnel and has no effect on accounting. Any user can view (but not edit) the complete list of customers by selecting *List of Customers* from the operational display. Similarly, any user with programmer rights can view and edit the customer list by selecting *Programming/Customer Names*.

7.2.2.1.6. **Transfers**—The transfers field maintains a cumulative total of the number of batches discharged from the tunnel washer which match both the formula number and the customer number shown in the leftmost two columns.

7.2.2.2. Formulas View—The formulas view of the accounting data window allows management to view the number of transfers for each formula. Using Figure 121 for an example, formula number 006 (Color Personals) was used for 144 batches of goods. Because this view does not include the customer number or name, management can view the entire formula name and quickly see how many batches are produced with each formula.

See the part of this document describing the *Customers* view of the accounting data (above) for a complete description of each field in this window.

7.2.3. Chemical Usage Data

Chemical usage data is maintained for the period since all records were last deleted. This data allows management to accurately track the amount of chemicals commanded by the Mentor® controller. Examples of these displays are shown in Figure 124 "Chemical Usage Graphic Window" and Figure 125.

Figure 124: Chemical Usage Graphic Window

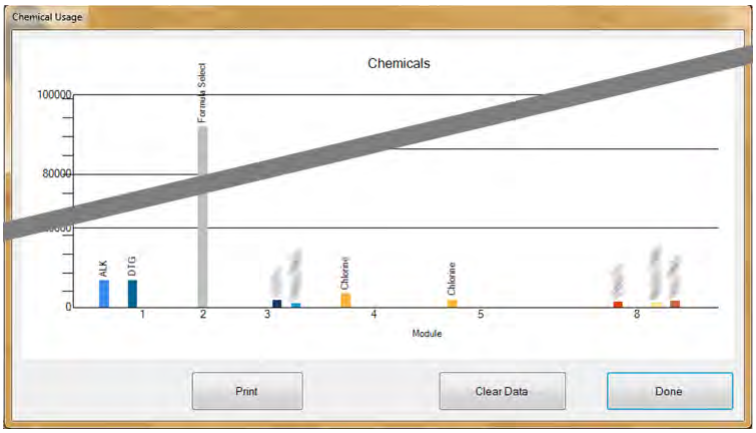
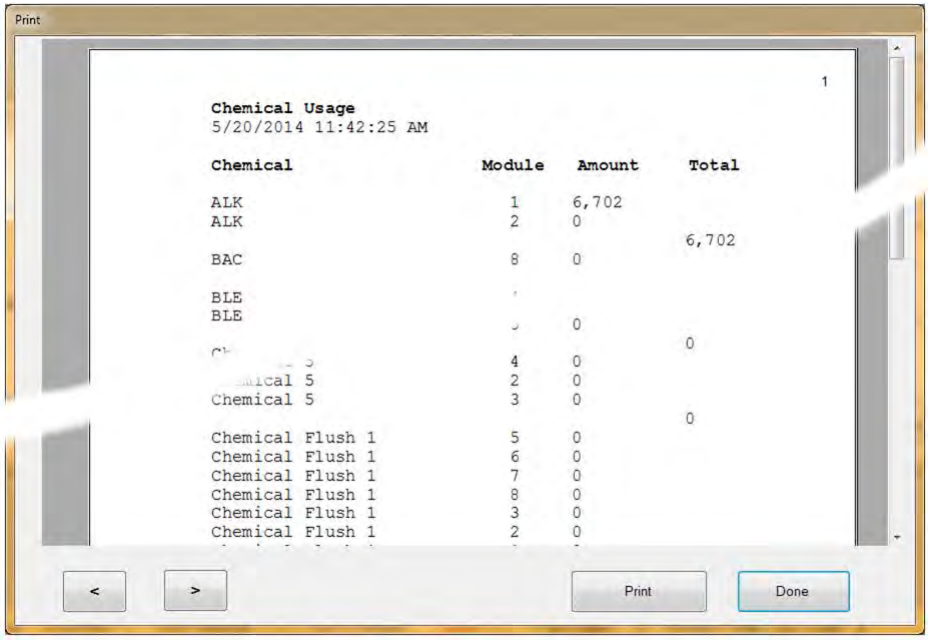


Figure 125: Chemical Usage Text Window



7.2.3.1. Name—This column contains the name of the chemical, as entered on the *Function Programming* page (*Programming/Functions* from the Mentor® operational display). Because certain chemicals are often commanded in more than one module, a chemical name may appear more than once in this column.

7.2.3.2. Module—The *Module* column lists the module controlling this particular chemical output. All entries in this window are sorted by this column, i.e., all chemicals called for in the first module will appear at the top of the list, followed by all chemicals for the second module, etc.

7.2.3.3. Bit—The *Bit* is the output (control function) actuated to inject the chemical. The module number and the bit number are combined in the form "Module:Bit" in the *Output Data* field of the *Formula Programming* page (*Programming/Formulas* from the operational display).

7.2.3.4. Units per Second (Units/Sec)—This column displays the units of chemical injected for each second of time the associated chemical output bit is actuated. The chemical flow rate is calculated and entered in the *Chemical Pump Flow Rate* table, accessed through the *Configuration* menu from the operational display.

7.2.3.5. Total Time—The Mentor® controller maintains a cumulative counter of the total number of seconds each chemical output is actuated. The controller recognizes outputs as chemicals from the op code (06) entered on the *Functions Programming* page.

7.2.3.6. Total Units—The value in this column is calculated by multiplying the *Total Time* value by the *Units/Sec* value. The number displayed is the total number of units commanded by the controller since the last time the records were deleted.

7.2.4. Batch Data

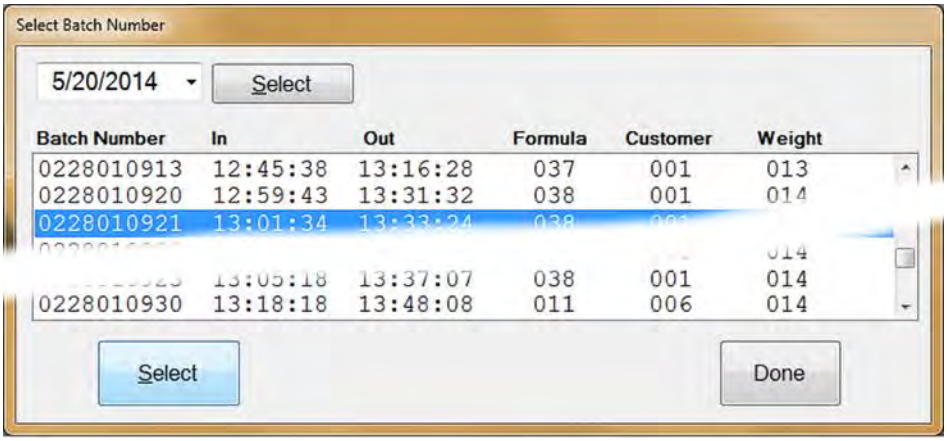
The *Batch Data* menu selection allows the operator to view a graph of temperature, liquor flow, and pH in each module for any batch produced in the last 30 days. This information is useful in

reconstructing production histories when analyzing chemical use and production delays in the tunnel washer.

Notice 5: Batch data is collected in the units for which the Mentor controller is configured. Changing temperature units as described in Section 3.7.2.11 "Units Tab" causes errors when graphing temperature and flow data collected previously.

7.2.4.1. **Selecting a Batch**—When the *Batch Data* menu item is selected, the Mentor controller prompts for the date on which the desired batch was processed. When a date is entered and found in the collected data, the user is presented with a screen similar to the one shown in Figure 126.

Figure 126: Select Batch Screen

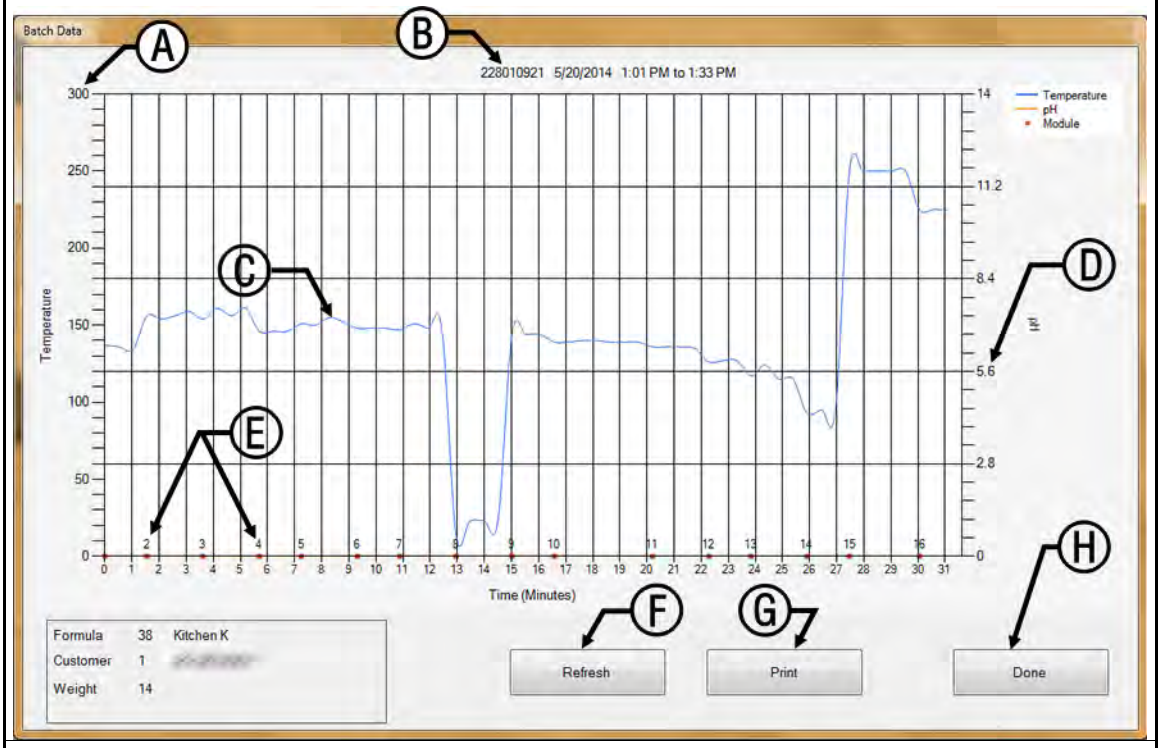


1. Click on a row to select the batch.
2. To view a graph similar to Figure 127 for the selected batch, click the *Select* button at the bottom of the screen.
   - Click the *Done* button to back up to the *Select Date*.
   - Click the *Done* button to close the *Select Batch Number* screen and view the *Mentor Operational* display.

7.2.4.2. **Interpreting Displayed Batch Data**—The graphic display for historical batch data shows up to three graphs for the selected batch on a single screen. The formula number and name, customer number and name, weight, and when the batch entered and exited the tunnel are also shown.

Figure 127: Batch Data

Typical Graph



Legend

A. Temperature scale
B. Batch number
C. Module number
D. Flow rate scale
E. pH scale (not used)
F. *Close Graph* button
G. Time scale
H. Temperature graph
I. Liquor flow graph

Temperature scale—appears along the left side of the graph display. The range is always from the freezing point of water to the boiling point, but the temperature unit can be either Celsius or Fahrenheit, according to how the Mentor controller is configured (see Section 3.7.2.11 "Units Tab").

Batch number—the unique identifier for the batch displayed. This number is automatically generated by the Mentor controller and applies to only one batch, even in a system with multiple tunnel washers.

Module number—module of the CBW® washer. Each module is represented; the horizontal space attributed to the data from a module corresponds to the number of minutes the batch was in each module. A module represented by a noticeably wider space usually indicates that the tunnel entered a hold condition while the displayed batch was in the "wider" module.

Flow—the liquor flow through each module, in gallons per minute or liters per minute. Collection of liquor flow data requires Bürkert modulating valves and flow meters (see the related section in document BIPCUC04 or Section 5.1.3.2).

pH scale—not used

Close Graph button—closes the graph window and returns the user to the *Select Batch* screen, shown in Figure 126.

Time scale—minutes and half-minutes. The vertical rules on the graph indicate module boundaries, not time increments.

Temperature graph—displays the liquor temperature encountered by this batch in each module.

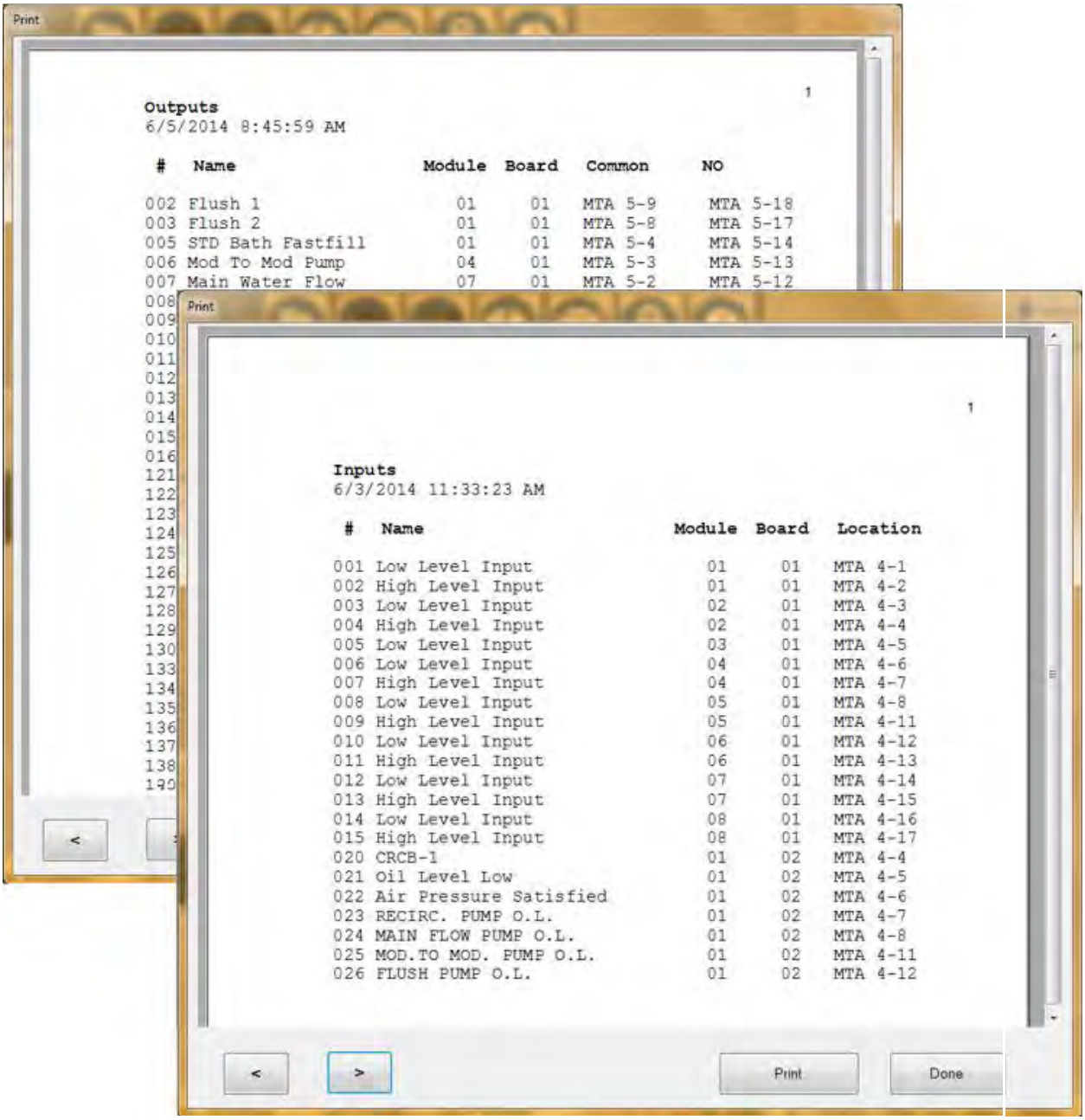
Flow graph—displays the liquor flow rate—in gallons per minute or liters per minute—measured in each module with a flow meter. Measurements in modules without flowmeters are based on the value determined when some previous batch passes through a module with a flowmeter. No flow (*0*) usually indicates a standing bath module.

7.2.5. Print I/O Reports

Input and output reports record input and output assignments. This information can be used to return a tunnel washer to service after certain service procedures if the electronic backup is not available.

Use the procedure described in Section 6.3.2 "Programming Microprocessor Inputs" to assign Mentor inputs. Use the procedure described in Section 6.3.3 "Assigning Outputs and Functions" to assign Mentor outputs.

Figure 128: Typical Mentor Outputs and Inputs Report



— End of BICCNO01 —

Chapter 8
Troubleshooting

BICCNT02 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

8.1. Summary of Error and Warning Messages

The purpose of this section is to define error messages which may be encountered.

8.1.1. Error Messages

Air Pressure Low—Insufficient pressure in the incoming compressed air line was detected when transfer was desired. Tunnel holds at transfer.

All Rails Empty—No bags were detected on any rails in the rail system when the Mentor™ rail sequencer scanned the rails. The tunnel stops. Correct the condition, then press *Ctrl + D* to restart the tunnel.

CBW Water Level Low—A bath level lower than low level was detected in one or more modules when transfer was desired. The tunnel holds at transfer.

Check CBW Load Chute—An obstruction was detected in the CBW® load chute. The tunnel holds at transfer.

Cleanout in Progress—Applies only to workwear machines. A manual module purge was detected. The tunnel holds at transfer.

Cold Restart in Progress—Tunnel holds until all desired temperatures are achieved.

Communications Failure—A peripheral circuit board did not respond to the processor board. The tunnel stops. The Mentor™ controller also displays "Peripheral Board xxH not Responding."

Drive System xy zz—A rotation limit switch (proximity switch) input was not made within the configured time. The tunnel stops.

Electronic Chem Error: Check Chemical System—The chemical system for the tunnel washer signaled an error.

Fill Tank Level/Temp—Bath level or temperature was not satisfied in an overhead fast fill tank when transfer was desired. The tunnel holds at transfer.

Invalid Customer Code—A customer number higher than 999 was received by the controller. Tunnel holds at transfer.

Limit Switch xy zz—Two or more of the four rotation limit switch (proximity switch) inputs were made simultaneously. This is an invalid condition which causes the tunnel to stop.

Load Device Not Ready—This error message applies only if no Miltrac™ loading is configured. The loading device had not yet signaled that it was ready to discharge when the tunnel was ready to transfer. The tunnel holds at transfer.

Load Eye was Blocked—Applies only when load fault error detection is enabled with "Max Time to Clear or Block Eye." Goods were detected in the load chute during transfer when an empty pocket was expected. The tunnel holds at the start of count-up.

Load Not Allowed—This error applies only if Miltrac Loading and Discharge is configured. The loading device had not yet signaled that it was ready to discharge when the tunnel desired to transfer. The tunnel holds at transfer.

Loading Aborted—This error applies only if Miltrac Loading and Discharge is configured. There are two possible causes for this error: 1) The Miltrac™ controller had not yet signaled the Mentor™ controller to proceed with transfer when the tunnel desired to transfer, so the tunnel holds at transfer, or 2) the Miltrac™ controller had not yet acknowledged that transfer is complete when the Start Flush After Transfer output timer expired, so the tunnel holds at the start of count-up.

Low Flow in Module xx—Applies to PulseFlow® tunnels only. The flow rate in the module is less than the configured value of the *Pulse Flow Rate Error Percentage* program constant. The tunnel holds at transfer.

Modules Not Aligned—Applies to 76028 and 76039 CBW® models only. A rotational misalignment of the cylinders in adjoining units was detected. Tunnel stops.

No Bag Ready—No bag was detected at the position above the load chute (the discharge position) when the tunnel desired to transfer. The tunnel holds at transfer.

No Connection to Rail System Computer—The connection between the Mentor controller and the rail system controller was lost.

No Connection to Receive Device Computer—The connection between the Mentor controller and the receive device controller was lost.

Oil Level Low—Inadequate oil was detected in the chain oiler reservoir. Tunnel holds at transfer.

Operator Hold Switch—An operator-initiated hold was detected when the tunnel desired to transfer. The tunnel holds at transfer.

Overtime on Level Temp—The required bath level and/or temperature was not detected when the time permitted to achieve these parameters expired. The tunnel holds at the start of count-up. Occasional occurrence and self-correction is normal. Press *Ctrl + D* to clear immediately.

Power Failure—Power up following a power loss was detected, thus the Mentor™ controller always displays this error at daily start-up. Normally, no troubleshooting is required. The message clears when the tunnel is started with *Ctrl + D*.

Press Not Free—Applies only if *data pass* is enabled. The press, centrifugal extractor, or wet goods conveyor had not yet signaled that it was ready to receive when the tunnel was ready to transfer. The tunnel holds at transfer.

Pulse Flow Error: High Level Still Made in Module xx—Applies to PulseFlow® tunnels only. High level was still made in this module after a PulseFlow operation. This error appears after the tunnel transfers and prevents additional transfers until the level goes below high. This is a self-clearing error.

Receive Device Not Ready—This error message applies only if Miltrac Discharge Only or Miltrac Loading and Discharge is configured. The Miltrac™ controller had not yet signaled that it is ready to receive when the tunnel desired to transfer. The tunnel holds at transfer.

Reuse Tank Level Low—A water level lower than low level was detected in the reuse tank when transfer was desired. The tunnel holds at transfer.

Reuse Tank Temp Low—Applies only to optional reuse steam. The temperature in the reuse tank was too low when transfer was desired. The tunnel holds at transfer.

Too Long to Block Eye—Applies only when load fault error detection is enabled with "Max Time to Clear or Block Eye." Goods were expected to enter the tunnel, but were not detected in the load chute during the time specified by "Max Time to Clear or Block Eye." The tunnel holds at the start of count-up.

Too Long to Clear Eye—Applies only when load fault error detection is enabled with "Max Time to Clear or Block Eye." Goods were still detected in the tunnel load chute after the time specified by "Max Time to Clear or Block Eye" expired. The tunnel holds at the start of count-up.

Waiting for Cooldown—Applies to optional reuse cooldown only. Too high a temperature was detected in the reuse tank when transfer was desired. Tunnel holds at transfer.

8.1.2. Warning Messages

Circuit Breaker Trip in Module xx Control Box—The indicated module control box lost power. Equipment on this module will not function.

Circuit Breaker Trip in Module xx Rinse Zone Interface Box—The rinse zone flow splitter lost power. Associated pumps will not run.

Circuit Breaker Trip in Reuse Interface Box—Reuse or Flush interface box lost power. Pump will not function.

Circuit Breaker Trip in Standard Output Box—The standard output box lost power. These outputs will not function.

Drive Motor Contactor Failure—This error applies to 76032 CBW®s only. A drive motor contactor failed to energize when it should have. Although the tunnel may continue to operate, it is extremely important to have an authorized service technician troubleshoot this warning immediately. A drive motor is likely not functioning, thus overloading and damaging other motors.

Drive Motor Overload Trip in Module xx—A cylinder drive motor overloaded, resulting in a tripped thermal overload. On the 76032 CBW® the motor will be on the indicated module. On a 76028 or 76039 CBW®, the motor will be on the unit that includes the indicated module. Tunnel will not run. Troubleshooting must be done by a qualified service technician.

Load Chute Photoeye Blocked—Appears if the load chute photoeye is still blocked after flushing ends. If this condition is not corrected before the tunnel desires to transfer, the error, "Check CBW Load Chute" occurs, requiring troubleshooting.

Loading Conveyor Overload Trip—A CONWA™ or CONLO™ loading conveyor drive motor overloaded, resulting in a tripped thermal overload. The conveyor will not run. Troubleshooting must be done by a qualified service technician.

Manual Flush Commanded in Module xx—Applies to Workwear machines only. This warning appears when a module purge is detected in the indicated module. If this condition is not corrected before the tunnel desires to transfer, the error "Cleanout in Progress" occurs, requiring troubleshooting.

Peripheral Board xxH Not Responding—The controller lost communication with the peripheral board at address xxH. If this condition is not corrected before the tunnel desires to transfer, the error "Communications Error" occurs, requiring troubleshooting.

Press Pump Overload Trip—This error does not apply to CBW®s originally manufactured with the Mentor™ controller.

Reuse Pump Overload Trip—A Reuse or Flush pump motor overload condition, resulting in a tripped thermal overload, was detected. Pump will not run. Troubleshooting must be done by a qualified service technician.

Rinse Zone Flow Pump Overload Trip in Module xx—A rinse zone flow pump motor overloaded, tripping a thermal overload. The pump will not run. Troubleshooting must be done by a qualified service technician.

Rinse Zone Surplus Pump Overload Trip in Module xx—A rinse zone surplus pump motor overloaded, tripping a thermal overload. The pump will not run. Troubleshooting must be done by a qualified service technician.

Tunnel Power Off—The controller detected the loss of 120VAC control circuit power. The tunnel will not run.

Value for Remote Customer Code Exceeds Limit (999)—Appears if the remote customer code input exceeds the maximum acceptable value of 999. If this condition is not corrected before the tunnel desires to transfer, the error "Invalid Customer Code" occurs, and troubleshooting is required.

Wash Water Flow Lifter Overload Trip in Module xx—A wash water flow lifter pump motor overloaded, tripping a thermal overload. The pump will not run. Troubleshooting must be done by a qualified service technician.

— End of BICCNT02 —

BICCLT02 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

8.2. Drive System and Limit Switch Errors

The tunnel has four proximity-type limit switches to monitor rotation of the cylinder. Each of these limit switches provides a standard input to the Mentor controller, as described in Table 5 below. Select the *Inputs and Outputs* menu from the Mentor operational display to view the status of these switches.

Table 5: Limit Switch Identification

Common Name	Input Number	Schematic Identification
Safety limit switch	0 7	SAFETY
Top dead center limit switch	0 8	TDC
Clockwise limit switch	0 9	CWLS
Counter-clockwise limit switch	1 0	CCWLS

Note 18: Clockwise and counter-clockwise directions are identified by viewing the tunnel from the loading end, looking toward the discharge end.

8.2.1. Interpretation of Error Codes

The Mentor controller tracks the sequence of the limit switches and monitors the time between the actuation of two adjacent switches. If the controller detects a switch out of sequence, it stops the tunnel, sounds the operator signal, and displays a "Limit Switch" error. Because limit switch errors usually indicate that a switch was seen out of sequence, begin troubleshooting by looking for a failure in the limit switch wiring, then look for a failed limit switch.

If any limit switch fails to actuate within the specified time, it stops the tunnel, sounds the operator signal, and displays a "Drive System" error.

Either message is displayed with a four-digit code describing the tunnel status when the error occurred. The first character of the code represents the status of four tunnel conditions: temperature achieved, OK to transfer goods, level achieved, and load conveyor in motion. Use Table 6 to interpret this code. The second character of the code (see Table 7) represents the status of the four limit switches, identified in Table 5. The final two characters together represent the

mechanical status of the machine, including motor direction and the most recent limit switch detected before the error, as described in Table 8.

Table 6: Tunnel Status Codes

Code	Temperature Satisfied	Transfer Allowed	Level Achieved	Load Conveyor Moving
0	No	No	No	No
1	No	Yes	No	No
2	No	No	Yes	No
3	No	Yes	Yes	No
4	Yes	No	No	No
5	Yes	Yes	No	No
6	Yes	No	Yes	No
7	Yes	Yes	Yes	No
8	No	No	No	Yes
9	No	Yes	No	Yes
A	No	No	Yes	Yes
B	Yes	No	No	Yes
C	No	Yes	Yes	Yes
D	Yes	Yes	No	Yes
E	Yes	No	Yes	Yes
F	Yes	Yes	Yes	Yes

Table 7: Limit Switch Codes

Code	Valid Condition	Description
0	Yes	No proximity switches were energized or sensed a target.
1	Yes	Only the SAFETY switch was energized.
2	Yes	Only the top dead center (TDC) switch was energized.
3	No	The SAFETY and the TDC switches were energized simultaneously. No other switches were energized.
4	Yes	Only the clockwise (CWLS) switch was energized.
5	No	The CWLS and SAFETY switches were energized simultaneously. No other switches were energized.
6	No	The CWLS and SAFETY switches were energized simultaneously. No other switches were energized.
7	No	The CWLS, TDC, and SAFETY switches were energized simultaneously. The CCWLS switch was not energized.
8	Yes	Only the CCWLS switch was energized.
9	No	The CCWLS and SAFETY switches were energized simultaneously. No other switches were energized.
A	No	The CCWLS and TDC switches were energized simultaneously.
B	No	The CCWLS, TDC, and SAFETY switches were energized simultaneously.
C	No	The CCWLS and CWLS switches were energized simultaneously. No other switches were energized.
D	No	The CCWLS, CWLS, and SAFETY switches were energized simultaneously. The TDC switch was not energized.
E	No	The CCWLS, CWLS, and TDC switches were energized simultaneously. The SAFETY switch was not energized.
F	No	All four switches were energized simultaneously.
	A condition is not valid if two or more switches are energized at the same time.	

Use the information in Table 7 and Table 8 to determine which limit switch was seen last and which should have been seen next. With this information, you can determine which switch was seen out of sequence or was not seen within the specified time.

Table 8: Machine Status Codes

Code	Description
Reversals Sequence	
0 0	all motors driving baskets clockwise, having just passed switch CCWLS
0 1	all motors continuing to drive baskets clockwise, having just passed switch TDC
0 2	all motors continuing to drive baskets clockwise, having just passed SAFETY
	During 02, the controller decides whether to continue reversals, at which time it goes to code 03, or to commit to transfer, where it goes to code 0C.
0 3	all motors off, baskets coasting clockwise having just passed switch CWLS
0 4	all motors remain off for a period controlled by COAST timer; baskets coast clockwise
0 5	half of motors drive baskets counter-clockwise; other half on after delay in HALFM
0 6	all motors driving baskets counter-clockwise
0 7	all motors continue driving baskets counter-clockwise, having just passed SAFETY
0 8	all motors continue driving baskets counter-clockwise, having just passed TDC
0 9	all motors off, baskets coasting counter-clockwise having just passed switch CCWLS
0 A	all motors remain off for a period controlled by COAST timer; baskets coast counter-clockwise
0 B	half of motors drive baskets clockwise; other half on after delay in HALFM
	From state 0B, machine returns to state 00 as necessary to complete desired rotations.
Transfer Sequence	
0 C	tunnel is committed to transfer; all motors drive baskets clockwise, having just passed CWLS
0 D	all motors drive baskets clockwise, having just passed TDC
0 E	all motors off, baskets coasting clockwise, having just passed TDC
0 F	all motors remain off for a period controlled by machine timer COAST; baskets continue coasting clockwise
1 0	all motors on, driving baskets counter-clockwise for a period determined by BRAKE to stop cylinder coasting
1 1	all motors off for period controlled by PAUSE; baskets at rest
	From state 11, machine returns to state 08 to resume reversals. See explanation on resuming reversals, below.
Start-up or Restart Sequence	
1 2	all motors off; controller waiting for operator to correct error message
1 3	the start command is entered at this instant
1 4	all motors drive baskets counter-clockwise; controller looks for CCWLS and ignores all other switches
	From state 14, machine returns to state 09.

Supplement 5

Resuming Reversals after Transferring

After transferring goods from one module to the next, the machine resumes reversals from state 08. This is a valid action even though the motors start when the baskets are between the safety (SAFETY) and the top dead center (TDC) proximity switches. This action is valid because the TDC switch was the last switch seen by the controller, thus the TDC switch is ignored when the controller should detect it this time. Instead, the controller is looking for the counter-clockwise (CCWLS) proximity switch.

8.2.2. Testing Limit Switches

Use the information below and the tables in this document to test the proximity switches.

1. Turn tunnel power OFF at the Mentor controller, but leave console power ON.

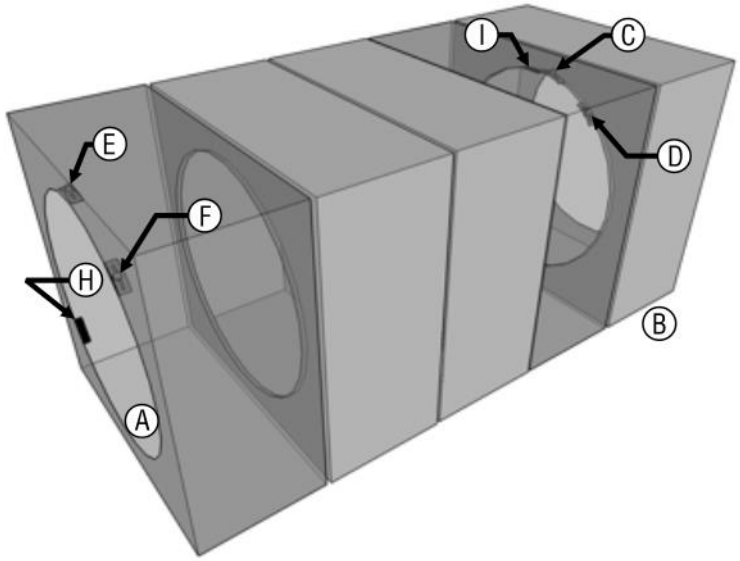
WARNING 6: Entangle and Crush Hazards—Guards, covers, and panels—Operating the machine with any guard, cover, or panel removed exposes moving components.

- Do not service the machine with power on except when explicitly called for in the service instructions. Use extreme care when working near moving components.
- Do not attempt unauthorized servicing, repairs, or modification.
- Know the location of the main machine disconnect and use it in an emergency to remove all electric power from the machine.

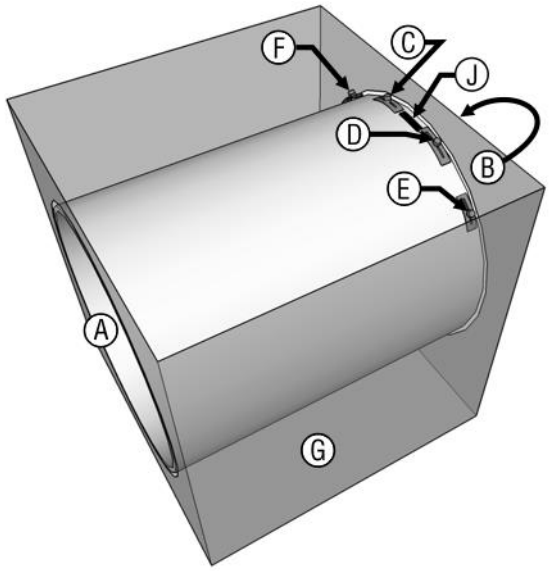
2. The LED light on a properly functioning limit switch will illuminate when a piece of steel is held near the end of the limit switch opposite the lead wire, and extinguish when the metal target is moved away. If the LED does not illuminate when the metal is near, the limit switch may be faulty, or faulty wiring is not allowing power to the switch.

Figure 129: Limit Switch and Target Locations

Tunnels with Individual Modules



Tunnels with Multi-module Sections



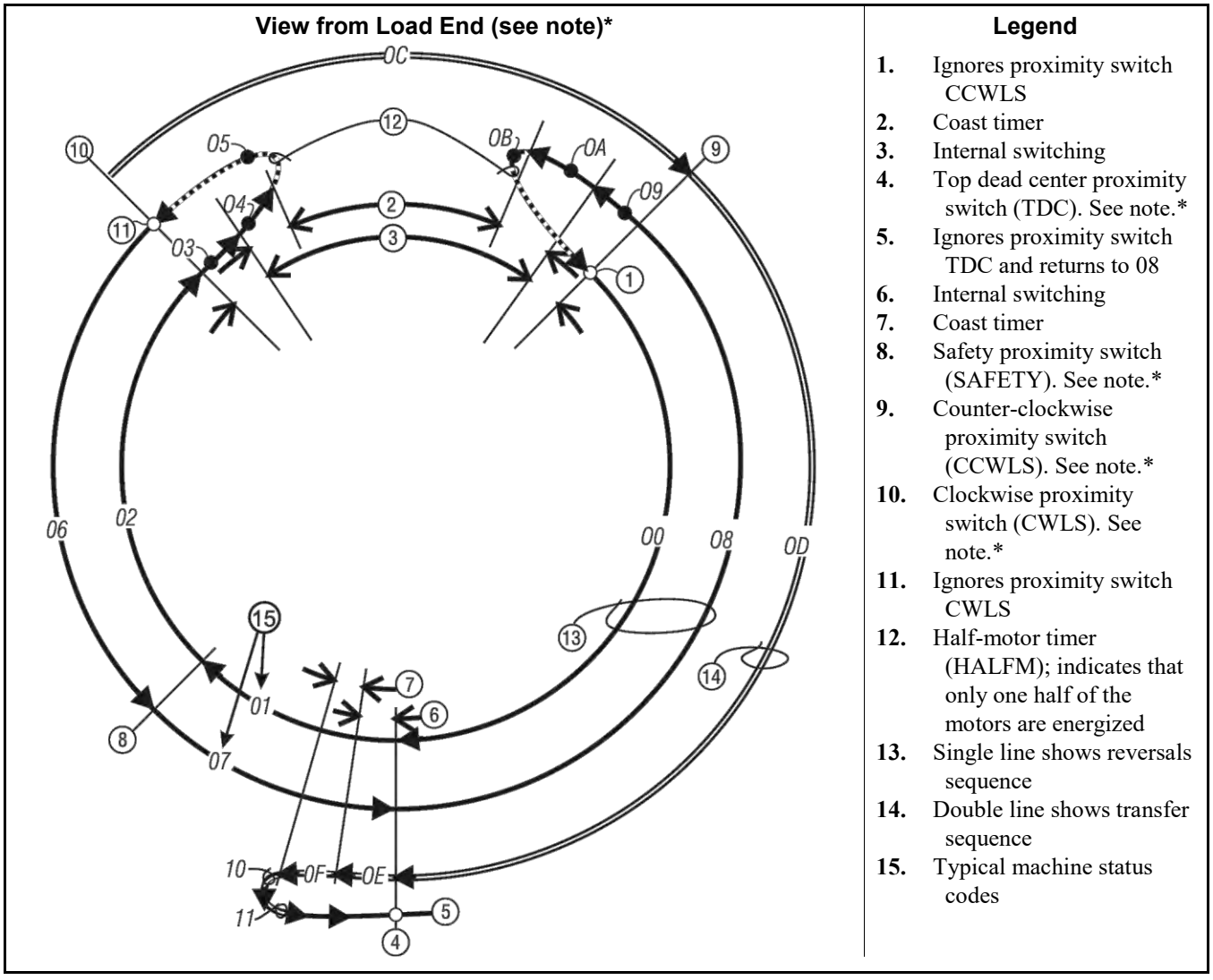
Legend

- **A.** Load end of tunnel
- **B.** Discharge end of tunnel
- **C.** Top dead center (TDC) proximity switch
- **D.** Safety (SAFETY) proximity switch
- **E.** Clockwise (CWLS) proximity switch
- **F.** Counter-clockwise (CCWLS) proximity switch
- **G.** First module or section of tunnel
- **H.** Reversals target (machines with individual modules only)
- **I.** Transfer target (machines with individual modules only)
- **J.** Target for all proximity switches (machines with multi-module sections only)

3. If the LED on the proximity switch goes off and on as the steel substitute target is removed and replaced near the end of the switch, suspect faulty wiring between the switch and the Mentor console. Test for faulty wiring by opening the *Standard and Direct Inputs* page from the *Inputs and Outputs* menu on the Mentor operational display. A green indicator light on the display next to the input name on the *Standard and Direct Inputs* page indicates that the input is present, while a red indicator light means that the input is not present. For the rotation proximity switches, the display should show a green light when the substitute target is held near the switch. If the light on the proximity switch operates as described in the previous step, but the display indicator does not change from red to green, suspect a loose or imperfect connection in the circuit between the proximity switch and the Mentor console.
   Use the schematic wiring diagrams to trace and repair the wiring between tunnel modules, between the first tunnel module and the Mentor console, within the console, and on the CPU board.

4. If the display indicator is red even when the light on the limit switch is illuminated, there is a short circuit between the limit switch and the Mentor console. Refer to the schematics to troubleshoot this circuit.
5. If the limit switch appears to function properly according to the *Standard and Direct Inputs* page, but the error message still appears when the machine is running, either the switches or targets are out of adjustment or the timers are incorrectly programmed.
    a. To check for proximity switches or targets out of adjustment, rotate the cylinders **clockwise as viewed from the load end** by manually turning the interconnecting drive shaft. This procedure may require two or more people. Stop at each point where a target is aligned with a switch.

Figure 130: Cylinder Rotation Diagram



* NOTE: This diagram illustrates how the machine status codes occur as a result of input signals from the limit switches. Although the placement of limit switches and targets varies with different CBW models, their locations are such that the sequence and timing of input signals is virtually identical on all CBW models. Any correlation between the limit switch locations shown here and the physical locations of these switches on your machine is coincidental.

b. If the LED on a switch does not illuminate, adjust the switch and the target so the switch properly senses the target. Ensure that the target will not strike **this or any other limit switch** during operation.

CAUTION 7: Machine Damage Hazards—Proximity switches will likely be destroyed if struck by the steel target.

- When adjusting either the target on any module, ensure that the target will not strike or touch any other proximity switch on that module.

c. Use the *Output Timers* page (Configuration/Operating Parameters/Output Timers) from the Mentor operational display to check the programming of the timers. Compare the values of these timers with the sample values shown in Table 9. The values in the table are not absolute, but will usually provide a good starting point for finer adjustments.

Table 9: Sample Values for Rotation Timers

Timer Name	Suggested Value or Range
Top dead center to SAFETY	1.5 seconds
Counter-clockwise to top dead center	6.0 seconds
Motor brake at top dead center	0.3 to 1.0 seconds
Half motor start time	0.5 seconds
Clockwise to counter-clockwise	4.5 to 6.5 seconds
Max time to start rotation	14.0 seconds
Pause at top dead center	4.0 to 5.0 seconds
Motor coast before reversal	1.5 seconds
Motor coast (anti-plug)	1.3 seconds

6. If the limit switch circuits were traced as explained in the earlier steps and no problems were found, suspect a faulty CPU processor board.

— End of BICCLT02 —

Chapter 9
Supplemental Information

BIPCPR01 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

9.1. Electrical Connections for the PulseFlow Devices

The PulseFlow tunnel washer requires one high-speed digital-to-analog board for each two pumps. The machine also requires one high-speed 8-output/16-input board.

- The PulseFlow pumps are numbered according to the c-bits assignments. The pump that is controlled by the c-bit with the lowest number is Pump 1.
- For each pump, one digital-to-analog output controls the inverter, and one high-speed input is the counter for the flow meter.

Table 10: Flow Meter Inputs (8-output/16-input Board at 81H)

Device	Connection
Pump 1	MTA4-1
Pump 2	MTA4-2
Pump 3	MTA4-3
Pump 4	MTA4-4
Flush Pump	MTA4-18

Table 11: Inverter Outputs (Digital-to-Analog Boards at 31H and 32H)

Device	Connection
Pump 1	Board 31H MTA43-3
Pump 2	Board 31H MTA43-1
Pump 3	Board 32H MTA43-3
Pump 4	Board 32H MTA43-1
Common	MTA43-6,7,8,9,10

— End of BIPCPR01 —

BIC7UR01 (Published) Book specs- Dates: 20180425 / 20180425 / 20180425 Lang: ENG01 Applic: CCN

9.2. How to Update the Processor Board Software

This document tells how to update the software in processor boards with Milnor® part number 08BSPG1T.

9.2.1. The ___.*BIN* File

The ___.BIN file contains the software for the processor board. To update the processor board software, you will copy a new version of this file to the board.

Copy the CBW.BIN (or other ___.BIN file) to a known location on the computer that runs the Mentor controller software.

Tip: For devices other than CBW® tunnel washers, copy the ___.BIN file to a Microsoft Windows computer that can be connected to the device with a USB cable.

9.2.2. Connecting the Mentor PC to the 08BSPG1T Processor Board

Connect a USB cable between the computer and the device processor board. The required cable is shown in Figure 131. The connector on the processor board is shown in Figure 132.

Figure 131: PC-to-Processor Board USB Cable (Milnor part number 08PCUSBGAB)

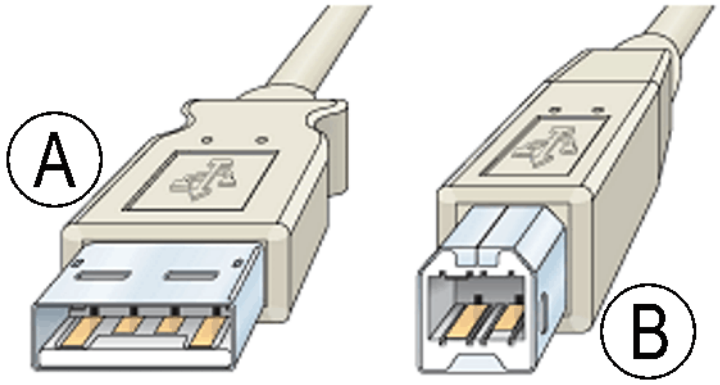
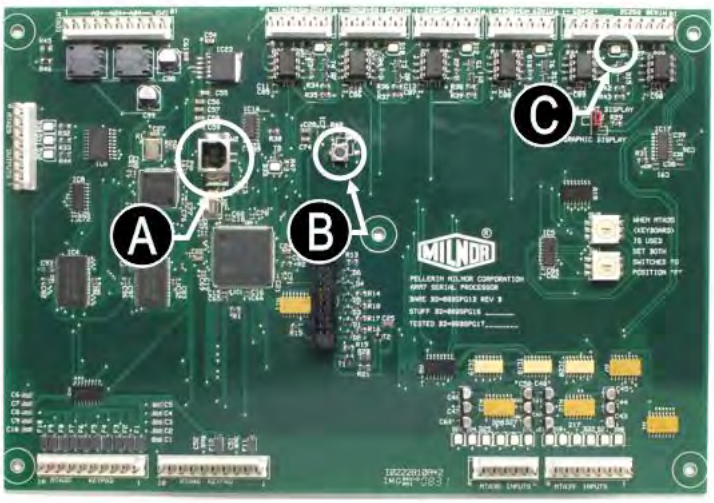
Cable Ends	Legend
	**A.** Type A connector for computer **B.** Type B connector for 08BSPG1T processor board

Figure 132: Processor Board 08BSPG1T

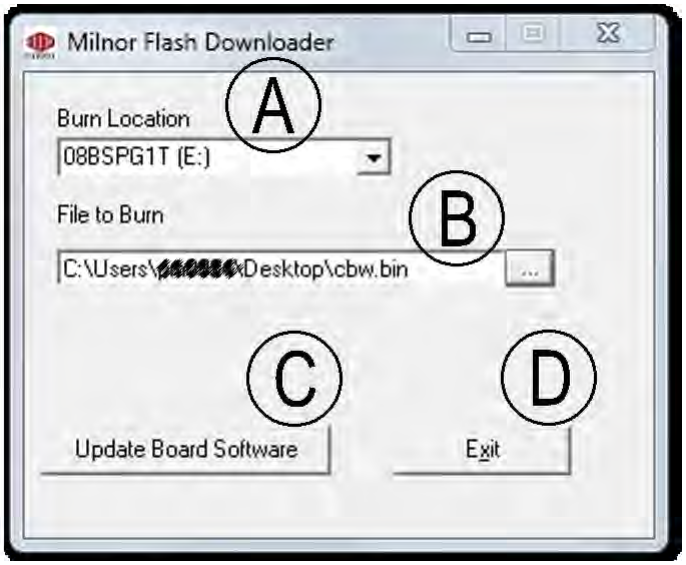
Components	Legend
	**A.** USB Type B connector **B.** Reset switch **C.** MTA30 indicator light

9.2.3. The *MilFlash* Milnor® Flash Downloader Application

The Milnor® Flash Downloader application (MilFlash) uses the USB cable to send the selected ___.BIN file to the processor board.

Figure 133: The MilFlash Application

Screen Image

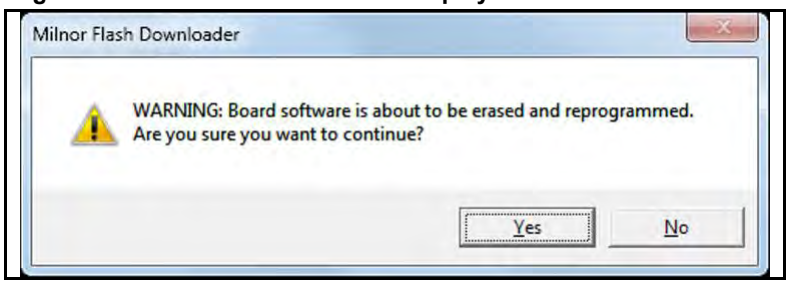


Legend

- **A.** Location of 08BSPG1T processor board
- **B.** Location of ___.BIN file to transfer
- **C.** *Transfer* button
- **D.** *Exit* button

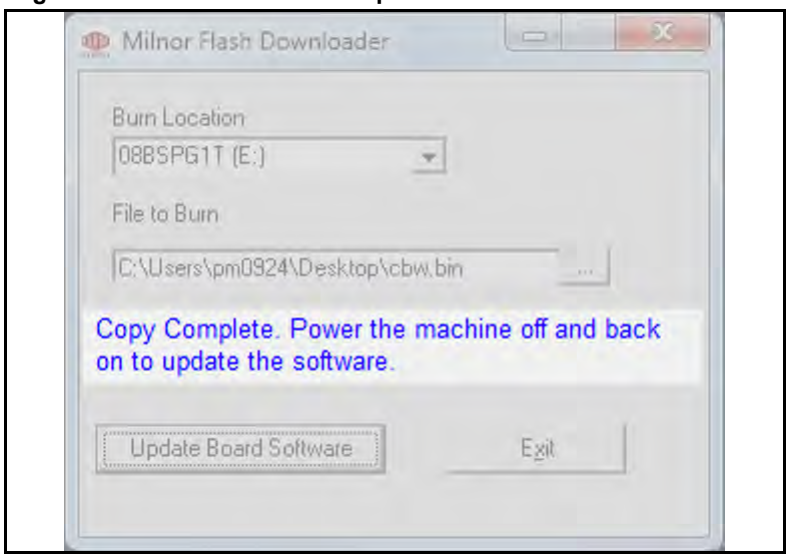
1. Start the Milnor® Flash Downloader application. If the application icon is not visible on the Windows desktop, navigate to `C:\Program Files (x86)\Milnor\` and double-click on `MilFlash.exe`.
2. Set processor board as the *Burn Location* (the target destination).
3. Set the file ___.BIN file described in Section 9.2.1 "The ___.*BIN* File" as the *File to Burn* (the source file).
4. Click the *Upload Board Software* button to begin the process to transfer the ___.BIN file to the processor board.
5. Confirm your decision to replace the ___.BIN file in the processor board with the new file (Figure 134).

Figure 134: Transfer Confirmation Display



6. Click the *Exit* button when the application shows that the transfer is complete (Figure 135).

Figure 135: File Transfer is Complete



7. Press the *Reset* button on the processor board (Figure 132) to restart the processor board.
8. Wait 10 to 15 seconds for the update to complete.The update is complete after the light for MTA30 (Figure 132) comes on and then goes off.

— End of BIC7UR01 —

9.3 HELMS Data Interface

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This document describes how to connect a Milnor® CBW® tunnel washer to a chemical vendor controller with a HELMS data interface in the field.

9.3.1. Requirements

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The interface described in this document requires the following software and hardware:

- Mentor® controller software must be version 3.2 or later
- Tunnel washer processor board software must be 25704 or later
- Milnor® 6-output board solid state (part number 08BN6OBT) must be present in the system

9.3.2. Wiring

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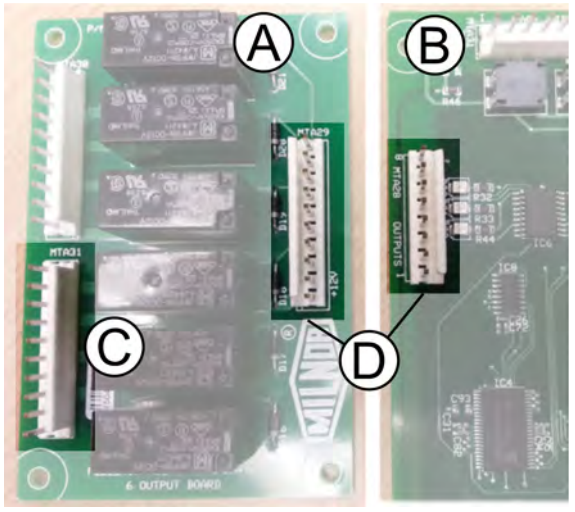
See schematic W9CBW3NBB in schematic manual ME76CBW3AE for diagrams of the HELMS interface wiring.

Figure 136. HELMS Interface Wiring



Legend

A . . . Milnor® 6-output board (08BN6OAT)

B . . . Milnor® processor board

C . . . Connection point between the chemical vendor controller and the Milnor® 6-output board

D . . . Connection point between the Milnor® 6-output board and the Milnor® processor board

9.3.2.1. Connections Between Milnor® Processor Board and 6-output Board

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- Connect MTA28-4 on the processor board and MTA29-4 on the output board.
- Connect MTA28-5 on the processor board and MTA29-5 on the output board.
- Connect MTA28-7 on the processor board and MTA29-9 on the output board.
- Connect MTA28-8 on the processor board and MTA29-10 on the output board.

9.3.2.2. Connections Between Milnor® 6-output Board and a Chemical Vendor Controller

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- Connect MTA31-8 on the output board and the DATA terminal on the chemical vendor controller.
- Connect MTA31-5 on the output board and the CLOCK terminal on the chemical vendor controller.
- Connect MTA31-6 on the output board and the 24 volts DC terminal on the chemical vendor controller.
- Connect MTA31-9 on the output board and the 24 volts DC terminal on the chemical vendor controller.

9.3.3. Signals

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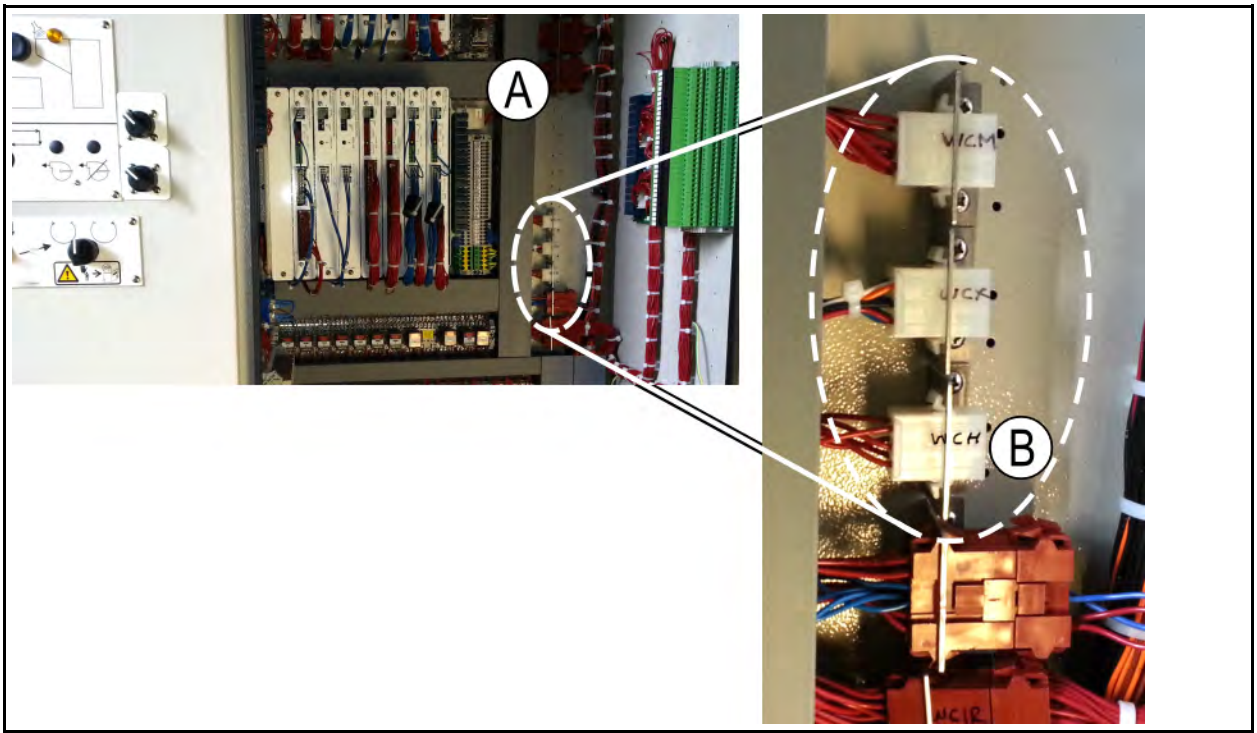
This system requires six signals:

Run This signal originates at the Milnor® equipment. The source is a control bit programmed with op code 03. The init code, hold code, and on-time are ignored. This signal is ON when the tunnel washer is not in a hold condition.

Transfer This signal originates at the Milnor® equipment. The source is a control bit programmed with op code 00, init code H, and on-time of 10 seconds. This signal is ON for 10 seconds when the tunnel washer transfers.

Drop Bag This signal originates at the Milnor® equipment. The source is a relay connected to the START CONVEYOR output of the tunnel washer. The relay gives the Drop Bag signal to both the loading system and the chemical vendor controller. The START CONVEYOR output is MTA5-4 and MTA5-14 on the board at address 80. These pins are wired to terminals WCH-5 and WCH-6.

Figure 137. Location of WCH-5 and WCH-6



Legend

A . . . Right control box on tunnel washer

B . . . Connector WCH

Clock This signal originates at the Milnor® equipment. The source is pin MTA31-5 on the Milnor® 6-output board. This is the clock pulse used to send data to the chemical vendor controller.

Data This signal originates at the Milnor® equipment. The source is pin MTA31-8 on the Milnor® 6-output board. This is the pulsed data output to the chemical vendor controller.

Tunnel to Hold This signal originates at the Milnor® equipment. The source is a control bit programmed with op code 03. The init code, hold code, and on-time are ignored. This signal is ON when the tunnel washer is not in a hold condition.

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