Published Manual Number: MTCP1R02

- **Specified Date: 20150826**
- **As-of Date: 20150826**
- **Access Date: 20150826**
- **Depth: Detail**
- **Custom: n/a**
- **Applicability: CP1**
- **Language Code: ENG01, Purpose: publication, Format: 1colA**

Technical Reference—

Mark VI Single Stage Press Controller

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

Applicable Milnor® products by model number:

MP1540CL MP1540CR MP1540L- MP1540R- MP1550CL MP1550CR MP1550L- MP1550R- MP1601CL MP1601CR MP1601LF MP1601R- MP1601RT MP1602CL MP1602CR MP1602LF MP1602RT MP1603CL MP1603CR MP1603L- MP1603R- MP1604CL MP1604CR MP1604L- MP1604R- MP1A03CL MP1A03CR MP1A03L- MP1A03R-

Preface

BICP1K02 (Published) Book specs- Dates: 20150826 / 20150826 / 20150826 Lang: ENG01 Applic: CP1

i. About the Single Stage Press Controller Manual

i. 1. Scope

This manual provides commissioning, programming, operating, and troubleshooting instructions for Milnor® single stage press controllers with graphic display panel and a software datecode of 21000 or later. Refer to additional documentation provided with the machine for more information. Replacement documentation is available from the Milnor® parts department.

i. 2. The Normal Display At Start-Up

The start-up display sequence for the Milnor® single stage press controller is described in Section 3.1. “Mark VI Press Normal Operation”.

i. 3. If this Manual Does Not Have the Necessary Data [Document BIUUUD17]

This manual has the best data that was available when your machine was made. If you cannot find the necessary data:

- **Are you looking for data about a component not made by Milnor® but used on your machine—for example, a motor or a brake caliper?** We usually do not put the instructions of component manufacturers in Milnor manuals. You can find some of these instructions in the part of the Milnor website that gives maintenance data (`http://www.milnor.com/tkbsearch18.asp`). You can also find instructions for many components on the manufacturers' websites.
- **Are you looking for data about a Milnor component on your machine that this manual does not give?** If we get better data or more data after the manual is available, we will add it to a newer version of the manual. Speak with the Milnor Customer Support group. They can give you newer instructions if they are available or help you if not.

i. 4. 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.

i. 5. Trademarks of Pellerin Milnor Corporation [Document BIUUUD14]

These words are trademarks of Pellerin Milnor Corporation:

Table 1: Trademarks

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

— End of BICP1K02 —

BIUUUK06 (Published) Book specs- Dates: 20150826 / 20150826 / 20150826 Lang: ENG01 Applic: CP1

ii. 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 —

BICP1S01 (Published) Book specs- Dates: 20150826 / 20150826 / 20150826 Lang: ENG01 Applic: CP1

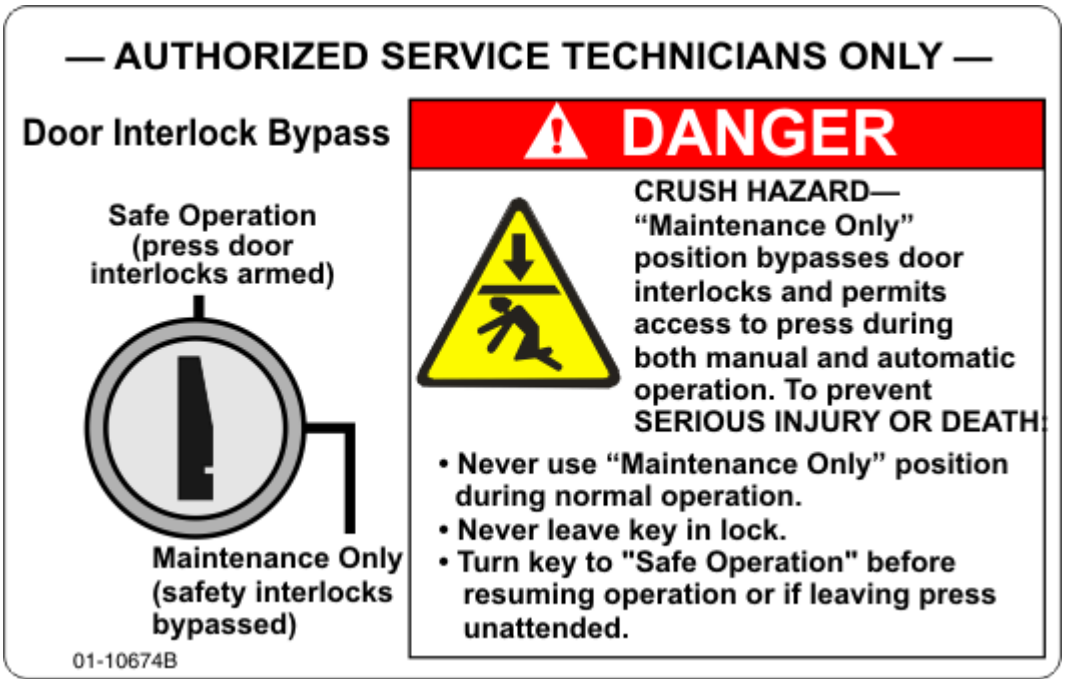
iii. SAFETY ALERT for Owner/Managers and Maintenance Personnel: Using the Door Interlock Bypass Key Switch

The hand-operated access doors on this machine are equipped with safety lockout switches that disable the machine if a door is opened. The Door Interlock Bypass key switch permits bypassing this safety feature to allow access to certain moving parts during required maintenance procedures. This key switch, located inside the low voltage control box, is shown in Figure 1.

DANGER 1: Crush Hazard—The “Maintenance Only” position bypasses door interlocks and permits access to moving parts during both manual and automatic operation. **To prevent serious injury or death**, comply with, or ensure compliance with the following:

- **Never use the machine for normal operation with this switch in the “Maintenance Only” position.**
- **Never use this switch to clear faults or for any operational function.**
- **Use this switch *only* if you are a trained, authorized service technician**, and only when performing maintenance that requires immediate access to moving parts normally shielded by the doors.
- Always turn the switch to the “Safe Operation” position **and remove the key** before resuming normal operation or stepping away from the machine.
- Keep the Door Interlock Bypass key secured away from machine operators and all other personnel who do not fully understand the results of using it.
- Keep all electrical and control cabinets closed and securely latched. Keep control cabinet keys away from untrained employees.

Figure 1: Door Interlock Bypass Key Switch and Safety Placard



— End of BICP1S01 —

Table of Contents

Sections	Figures, Tables, and Supplements

Sections	Figures, Tables, and Supplements
1.1.5.1. *Press is Loaded* switch	
1.1.5.2. *Fault Recovery* switch	
1.1.6. *Lamp Test* switch (optional)	Figure 8: *Lamp Test* switch
1.1.7. Gauge Cluster	Figure 9: Gauge Cluster
1.1.7.1. System Pressure Gauge	
1.1.7.2. Ram Relief Pressure Gauge	
1.1.7.3. Can Relief Pressure Gauge	
1.1.8. Microprocessor Interface Controls	
1.1.8.1. Keypad	
1.1.8.2. Keyswitch	
1.1.8.3. Display	
1.1.8.4. Printer/Download Connection	
Chapter 2. Programming	
2.1. Programming the Single Stage Press Controller (Document BICP1P09)	Figure 10: *Programming Menu, 0 = Return to Run Mode*
2.1.1. Entering the Program Menu	Figure 11: Typical Displays in Manual and Automatic Modes
2.1.2. Safely Exiting the Program Menu	
2.1.3. 1=Add, Change, or Delete Press Code (Document BICP1P10)	
2.1.3.1. Selecting a Press Code to Add, Delete, or Change	Figure 12: *Add/Change Press Code* Selected
	Figure 13: *1=Add/Change Press Code* Page
2.1.3.2. Naming a Press Code	
2.1.3.3. Deleting a Press Code	
2.1.3.4. Programming a Press Code	
2.1.3.4.1. About the Programming Screen	Figure 14: *Programming Decisions* Page Elements
2.1.3.4.2. Press Code Decisions	Supplement 1: About the *End* Codes
	Supplement 2: About the Ram Command™ Feature
	Figure 15: Comparison of Normal and Slow Programs
	Table 3: Typical Press Code for Walk-off Mats
	Table 4: Typical Press Codes for Towels and Uniforms
2.1.4. 2=Copy Press Code (Document BICP1P11)	Figure 16: *2 = Copy Press Code* Selected
	Figure 17: *Select Source* Page
	Figure 18: *Target Number* Prompt
	Figure 19: *Copy OK* Message

Sections	Figures, Tables, and Supplements

Sections	Figures, Tables, and Supplements
3.2.6.10. Cycling the Press	Figure 70: *Cycle Press* Screen
3.2.7. View Status of Microprocessor Inputs	Figure 71: Typical Inputs Display for Input/Output Board
	Figure 72: Inputs Display for Microprocessor Board

Sections	Figures, Tables, and Supplements
5.5.2.4. 80186 Processor Boards	Figure 93: 08BSPET 80186 Processor Board Figure 94: 08BSPE1T 80186 Processor Board Figure 95: 08BSPE2T 80186 Processor Board
5.5.2.5. How to Use the Display Module Update Routine (Document BICWCM01)	Figure 96: Mark VI Graphic Display (washer-extractor shown)
5.5.2.5.1. Why is this Necessary?	
5.5.2.5.2. What is the Procedure?	Figure 97: Typical *Firmware Mismatch* screen Figure 98: Firmware Update in Progress Supplement 4: Details of the Update Routine
5.6. Hardware Components of Serial Microprocessor Controllers (Document BICMDF01)	
5.6.1. General	
5.6.2. Microprocessor Components	
5.6.2.1. Keypad or Keyboard	
5.6.2.2. Keyswitch	
5.6.2.3. Display	
5.6.2.4. Power Supply	
5.6.2.5. Central Processing Unit (CPU) Board	
5.6.2.6. Memory Expansion Board	
5.6.2.7. Battery	
5.6.2.8. Opto-Isolator Board	
5.6.2.9. Input/Output Board	
5.6.2.10. Output Board	
5.6.2.11. Resistor Boards	
5.6.2.12. Temperature Probe	
5.6.2.13. 8 Output/16 Input Chemical Flow Meter Board	
5.6.3. Serial Communications Port	Table 30: Board Application by Device (Part A) Table 31: Board Application by Device (Part B)
5.6.4. Assigning Board Addresses	Table 32: Rotary Switch Settings
5.7. Summary of Milnor® Allied Interface Capability, Single Stage Press (Document BICALC13)	
5.7.1. How Batch Data Travels Through a System	
5.7.2. Batch Data Signals	Table 33: Batch Data-passing Capacity for Milnor® Allied Interfaces
5.7.3. Operational Signals	Table 34: Operational Functions and Available Signals

Chapter 1
Commissioning

BICP1O02 (Published) Book specs- Dates: 20150826 / 20150826 / 20150826 Lang: ENG01 Applic: CP1

1.1. Mark VI Single Stage Press Controls and Switches

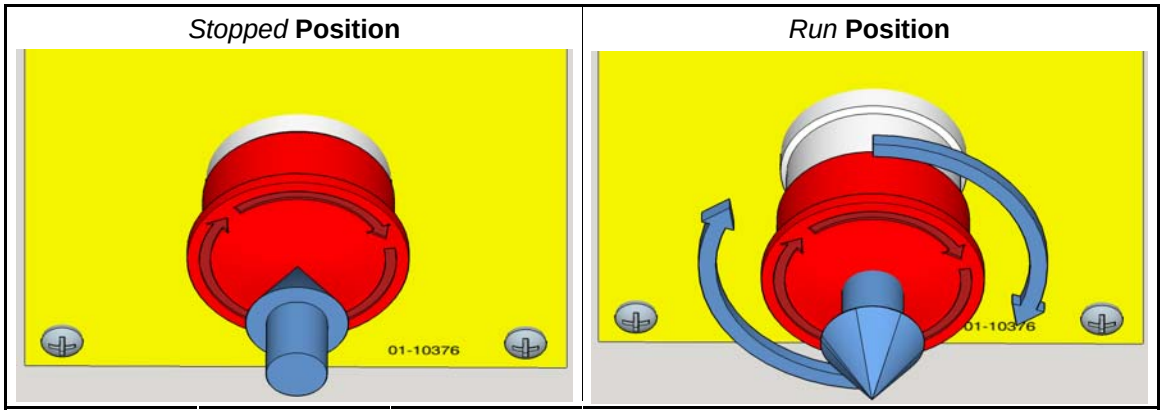
User controls are of two types—electro-mechanical controls (switches, buttons, and status lights) and microprocessor interface controls (display, keypad, keyswitch, and printer/download connection). Controls are mounted on one or more nameplates on the machine or on a separate electric box.

> **Note 1:** Do not attempt to use your machine merely by referring to the descriptions of controls. Read the operating, programming, and troubleshooting instructions throughout this and the operator manual.

1.1.1. *Emergency Stop* switch

This switch disables the 3-wire circuit and stops operation, but does not remove power from the control system. This switch locks in when pressed, so you must turn it slightly to allow it to return to the normal position for machine operation. All *emergency stop* switches on the machine operate the same; press any *emergency stop* switch to halt machine operation.

Figure 2: Emergency Stop switch



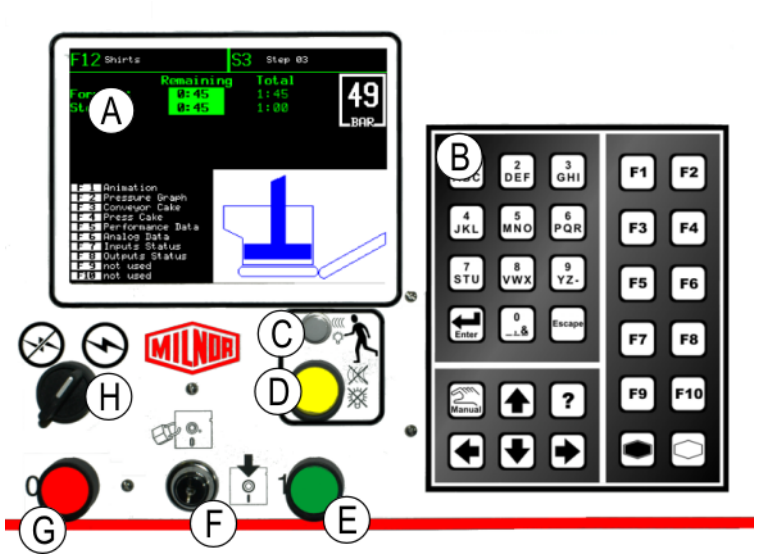
Notice 2: Press the *emergency stop* button immediately in an emergency situation. This disables the 3-wire circuit but maintains power to the microprocessor controller.

1.1.2. Main Control Panel

The main control panel (Figure 3) contains all switches and other controls necessary to operate the machine and monitor automatic operation.

Figure 3: Main Switch Panel

Switch Panel



Legend

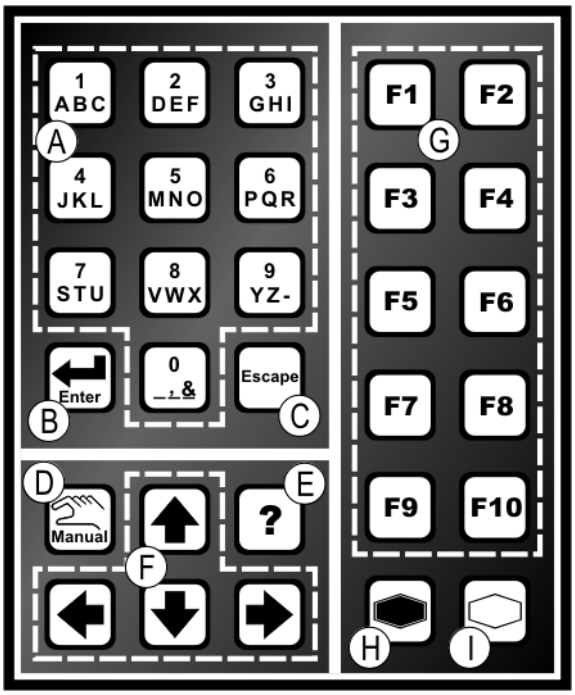
A. Display
B. Keypad
C. *Operator Signal* lamp
D. *Signal Cancel* button
E. *Start* button
F. *Run/Program* keyswitch
G. *Stop* button
H. *Master* switch

1.1.2.1. Display—The press display is a graphic display panel, as shown in Figure 3.

Display or Action	Explanation
`Does the PRESS have a cake? (0 = No 1 = Yes) 1`	This is how a typical display prompt is depicted in this manual.
BDVFD	This notation in wiring diagrams refers to the display.

1.1.2.2. Keypad—The press keypad—shown in Figure 4—has 30 keys.

Figure 4: 30-button keypad

Illustration	Legend
	**A.** Alpha-numeric keys **B.** Enter key **C.** Escape key **D.** Manual function key **E.** Help key **F.** Cursor movement keys **G.** Function keys **H.** Closed logo key **I.** Open logo key

Display or Action	Explanation
	This is how keypad entries are depicted. See Section 1.1.8 "Microprocessor Interface Controls" for a more detailed explanation.
KBMP	This notation in wiring diagrams refers to the keypad.

1.1.2.3. *Operator Signal* **lamp**—The *operator signal* lamp illuminates when the press needs the attention of an operator. This light may be accompanied by a flashing beacon near the top of the press and an audible horn.

Display or Action	Explanation
	In this manual, this symbol represents the *operator signal* lamp, flashing beacon, and audible horn.
ELSG	This notation in wiring diagrams refers to the *operator signal* lamp on the main switch panel.
ELSGF	This notation in wiring diagrams refers to the *operator signal* beacon mounted on top of the control box.
EBSG	This notation in wiring diagrams refers to the *operator signal* horn.

1.1.2.4. *Signal Cancel* **switch**—The *signal cancel* switch is a momentary pushbutton switch which makes an input to the microprocessor controller to end the operator signal.

Display or Action	Explanation
	This symbol represents the *signal cancel* switch in this manual.
SHSC	This notation in wiring diagrams refers to the *signal cancel* switch.

1.1.2.5. *Start* **switch**—When power is enabled through the master switch and all safety conditions are met for the machine to run, this momentary pushbutton switch allows machine operation. Pressing this switch closes contacts in relay CRS+, which remain closed as long as the three-wire circuit is intact.

Display or Action	Explanation
	This symbol represents the *start* switch in this manual.
SHS+	This notation in wiring diagrams refers to the *start* switch.
SHS+R	This notation in wiring diagrams refers to the *remote start* switch, which serves the same purpose as SHS+. *Remote start* switches may be mounted on the side of the machine opposite the main switch panel, and/or on auxiliary switch panels at other locations on the machine.

1.1.2.6. *Run/Program* **keyswitch**—The *run/program* keyswitch helps prevent unauthorized programming by removing a microprocessor input required to modify the contents of the memory on the microprocessor controller.

Display or Action	Explanation
	This symbol represents the *run/program* keyswitch in the *Run* position, as during normal operation. The key can only be removed from the switch in this position.
	This symbol represents the *run/program* keyswitch in the *Program* position.
SKPRO	This notation in wiring diagrams refers to the *run/program* keyswitch.

1.1.2.7. *Stop* **switch**—The *stop* switch disables the 3-wire circuit and stops operation, but does not remove power from the control system. This is the same function as the *emergency stop* switch, but the stop *switch* resets immediately when the button is released. Operation of the *emergency stop* switch is described more completely in Section 1.1.1 "*Emergency Stop* switch".

Display or Action	Explanation
	This symbol represents the *low air pressure indicator* lamp in this manual.
SHSO	This notation in wiring diagrams refers to the *stop* keyswitch.

1.1.2.8. ***Master* switch**—The *master* switch controls power to the machine control circuit. When the *master* switch is off, the entire control circuit is disabled, i.e., the microprocessor controller is not powered.

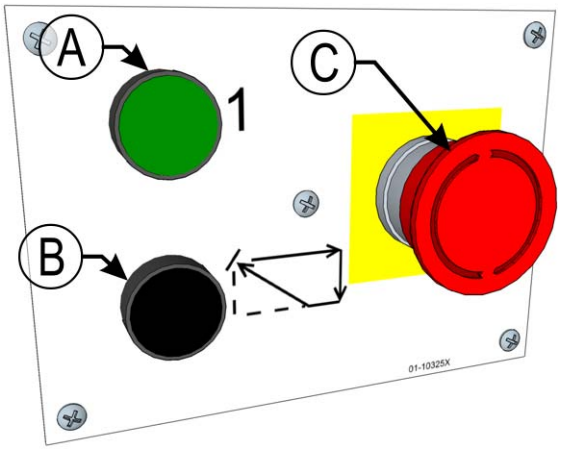
Display or Action	Explanation
	This symbol represents the OFF position of the *master* switch in Milnor® documents other than electrical wiring diagrams.
	This symbol represents the ON position of the *master* switch in Milnor® documents other than electrical wiring diagrams.
SHSMA	In wiring diagrams the *master* switch is item SHSMA.

1.1.3. *Stop/Fault Recovery* Controls

This control plate contains a *start* switch, a *fault recovery* switch, and an *emergency stop* switch.

Figure 5: *Stop/Fault Recovery* **Controls**

Control Panel



Legend

A. *Start* switch (see Section 1.1.2.5)

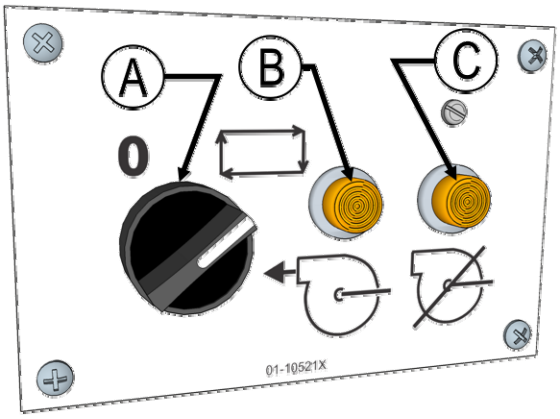
B. *Fault Recovery* switch (see Section 1.1.5.2)

C. *Emergency Stop* switch (see Section 1.1.1)

1.1.4. *Reuse Pump* Controls

The reuse pump sends water extracted by the press back to the washer, where the water is used to flush goods down the load scoop and to fill the first module. The press microprocessor control turns this pump on and off as necessary to move the water and minimize the time the pump runs dry. The two-position switch allows a person to disable the pump, and the two indicator lamps help determine if the pump is running, or not running when it should run.

Figure 6: Reuse Pump Controls

Control Panel	Legend
	**A.** *Pump Off/Automatic* switch **B.** *Pump Running* lamp **C.** *Pump Disabled* lamp

1.1.4.1. ***Reuse Pump Off/Automatic* switch**—The pump off/automatic switch allows the operator to disable the reuse pump, primarily for maintenance.

Display or Action	Explanation
0	This symbol represents the *Off*—or disabled—switch position.
	This symbol represents the *Automatic operation* switch position. In this position, the controlled component operates under the control of another component, usually the microprocessor.
SHPRP	In wiring diagrams the *Reuse Pump Off/Automatic* switch is item SHPRP.

1.1.4.2. ***Pump Running* lamp**

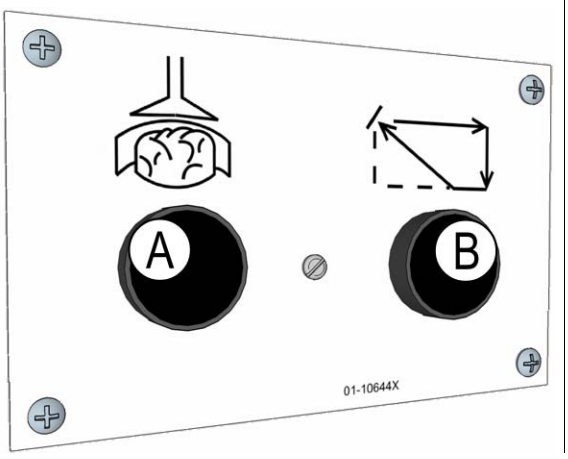
Display or Action	Explanation
	This symbol represents the *Pump Running* lamp in this manual. The lamp is illuminated when the reuse pump is running.
ELPRP	This symbol represents the *Pump Running* lamp in the wiring diagrams.

1.1.4.3. ***Pump Disabled* lamp**

Display or Action	Explanation
	This symbol represents the *Pump Disabled* lamp in this manual. The lamp is illuminated when the reuse pump did not run after operation was commanded, which is an error condition. The most common cause of this error is a tripped reuse pump motor overload.
ELPTT	This symbol represents the *Pump Disabled* lamp in the wiring diagrams.

1.1.5. *Press is Loaded/Fault Recovery* controls

Figure 7: Press Loaded/Fault Recovery Controls



Legend

A. *Press is Loaded* switch
B. *Fault Recovery* switch

1.1.5.1. *Press is Loaded* **switch**—The *press is loaded* switch provides an input to the microprocessor controller to indicate that the press contains a load and should prompt the operator for cake data.

Display or Action	Explanation
	This symbol indicates the *press is loaded* switch in this manual.
SHPL	This notation in wiring diagrams refers to the *press is loaded* switch.

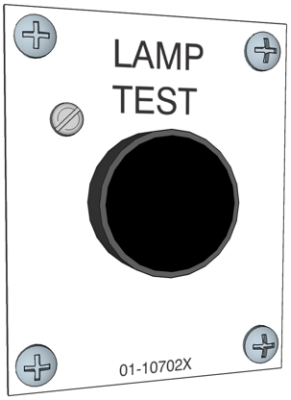
1.1.5.2. *Fault Recovery* **switch**—The *fault recovery* switch makes a momentary input to the microprocessor controller to indicate that the cause of the previous fault has been cleared. This microprocessor input signals the microprocessor that it is safe to resume operating when the operator presses the *start* switch.

Display or Action	Explanation
	This symbol represents the *fault recovery* switch in this manual.
SHRF	This notation in wiring diagrams refers to the *fault recovery* switch.

1.1.6. *Lamp Test* switch (optional)

Certain equipment standards require this momentary pushbutton switch. When it is provided, it is mounted near the main switch panel. When this switch is pressed, all indicator lamps on the switch panel are illuminated, allowing the operator to check for malfunctioning bulbs.

Figure 8: *Lamp Test* **switch**

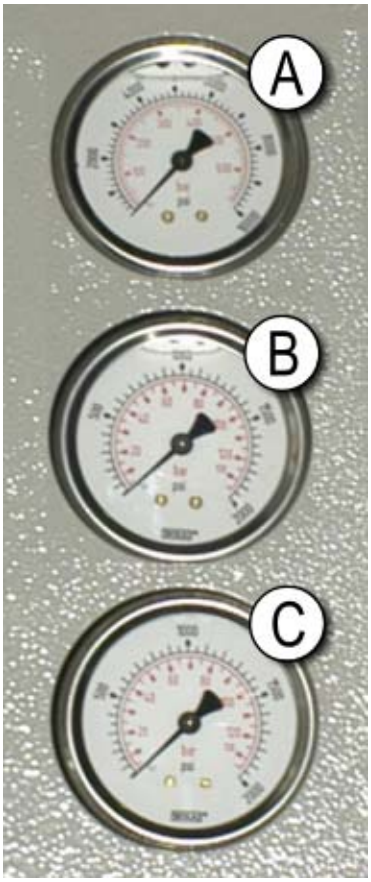


1.1.7. Gauge Cluster

The Milnor® single stage press is equipped with three gauges for monitoring pressures in the hydraulic system. The arrangement of these gauges is shown in Figure 9.

The gauges described here are for maintenance purposes only. See the service manual for more details.

Figure 9: Gauge Cluster

Gauges	Legend
	**A.** *System* pressure gauge **B.** *Ram Relief* pressure gauge **C.** *Can Relief* pressure gauge

1.1.7.1. System Pressure Gauge—The top gauge is used for setting the idle pressure, pump compensation pressure, first and second stage motor horsepower, proportional valve maximum pressure, and system relief pressure.

1.1.7.2. Ram Relief Pressure Gauge—The middle gauge is used to set the ram relief pressure and second stage motor horsepower.

1.1.7.3. Can Relief Pressure Gauge—The lower gauge is used to set the can relief pressure.

1.1.8. Microprocessor Interface Controls

These controls, shown in Figure 3, include the keyswitch, display, and keypad located on the main nameplate, and the printer/download connection located on its own nameplate. These controls permit the user to pass data to and from the microprocessor controller.

The keystrokes below are examples of the format used in this manual. When one or more keystrokes are required to perform an action, they will be shown and described like this.

Display or Action	Explanation
, Enter	Turn the keyswitch clockwise to *program* ( ), then press and release the *Enter* key.
, Enter	Turn the keyswitch counterclockwise to *run* ( ), then press and release the *Enter* key.
↑	Press and release the up arrow key.
↑ / ↓	A slash between symbols means use either key shown. The *up* and *down* arrow keys are often shown this way (e.g., scroll up or down the menu choices).
6, ↑, 5, ↑, 4, 9	Typical example of a **word entry** (spells out “POLY”). In word (alphanumeric) data fields, press the *left* or *right* arrow key to move left or right to the next character position. Press each key until the desired characters appears (e.g., press 6 until “P” appears). A comma between symbols means press and release each key sequentially.
1 5 5	Typical example of a number entry (enters the value 155). In numeric data fields, the cursor automatically advances to the next character position when each numeral is entered.
4 + 5 + 6	A “+” between symbols means press and hold each key in the order shown until all keys are depressed at the same time, then release all keys.
hold 8 + 1	Key(s) must be held depressed for the intended action to occur. Action will stop when key(s) is (are) released.
<xx> <response> <password>	This is an alternate way of depicting word and number entries when the exact values are determined by the user. <xx> means enter a two digit number. <response> means enter the value prompted for by the display. <password> means enter the password (or numeric passcode).
0	Press and release the “Stop” button (0).
1	Press and release the “Start” button (1).

1.1.8.1. **Keypad**—The 30-key keypad is used for programming, making selections (e.g., selecting formulas in a washer-extractor), responding to display messages, certain normal operating procedures, and manual operation. Applicable procedures are explained in the remainder of this manual and depicted using symbols to indicate pressing keys on the keypad. These symbols are explained above.

1.1.8.2. **Keyswitch**—This key-operated switch provides security for all field-programmed data in memory. With the keyswitch set to "run" ( ) this data cannot be changed. The key cannot be removed in the "program" ( ) position.

CAUTION 3: Data Loss Hazard—Improper use of the keyswitch may corrupt program data.

- Return to the run mode only when the display says *OK Turn Key to Run*.
- Only power *off* or *on* with the keyswitch at *run*.
- Do not leave the key accessible to unauthorized personnel.

1.1.8.3. **Display**—This graphic device displays messages and data entry screens. Screens inform the user of the machine's operating status or alert the user to conditions that must be satisified before operation can continue.

Data entry screens prompt the user to enter data at the keypad. As keys are pressed, the data appears in the data input field on the display. A blinking cursor usually indicates where the next character will be entered.

1.1.8.4. **Printer/Download Connection**—Connect a Milnor®-supplied printer here to print field-programmed data (e.g., formulas) and accumulated data (e.g., count of loads processed), if applicable. Connect a Milnor®-supplied serial downloader here or interconnect between machines to copy field-programmed data between devices. Printing and downloading are explained elsewhere in this manual.

— End of BICP1O02 —

Chapter 2
Programming

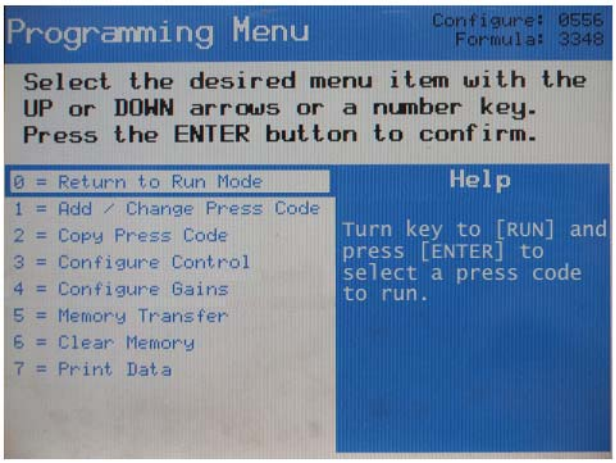
BICP1P09 (Published) Book specs- Dates: 20150826 / 20150826 / 20150826 Lang: ENG01 Applic: CP1

2.1. Programming the Single Stage Press Controller

The *Program* menu of the single stage press controller comprises eight separate options for creating and managing the machine configuration and the formulas used when the single stage press is operating.

0 = Return to Run Mode—described in Section 2.1.2 "Safely Exiting the Program Menu", use this option to return to the *Run* mode from the *Program* menu.

Figure 10: *Programming Menu, 0 = Return to Run Mode*



1 = Add / Change Press Code—described in Section 2.1.3, use this option to create a new single stage press code or to modify or delete an existing press code.

2 = Copy Press Code—described in Section 2.1.4, this option allows the user to copy an existing press code to any press code number that does not contain a press code.

3 = Configure Control—described in Section 2.1.5, use this option to change the configuration parameters for the controller to define the physical machine and set specific user preferences.

4 = Configure Gains—described in Section 2.1.6, this option is used to change the PID values used to control the proportional valve in the press or to reset the gains to their original factory default values.

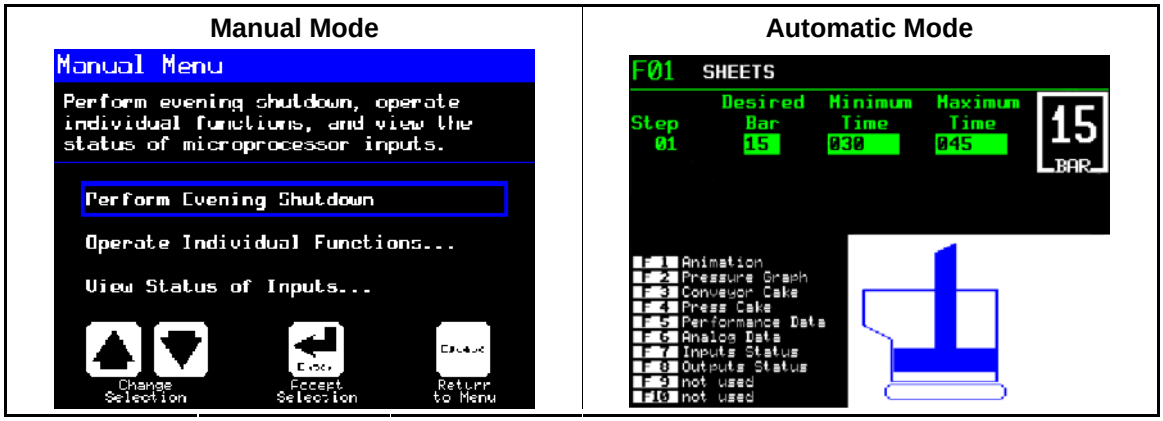
5 = Memory Transfer—described in Section 2.1.7, this option allows copying memory contents of one machine to another machine or between one machine and a networked computer to make the most efficient use of programming time and to protect programmed data from loss.

6 = Clear Memory—described in Section 2.1.8, use this option to clear the controller memory of all programmed press codes and configuration. Machine **configuration** decisions are reset to the default values.

7 = Print Data—described in Section 2.1.9, this option is used to print the configuration data and press codes.

2.1.1. Entering the Program Menu

Figure 11: Typical Displays in Manual and Automatic Modes



Display or Action	Explanation
	The *Program* menu can be accessed from either the *Manual* mode or the *Automatic* mode screens (similar to Figure 11).
⓪	Disables the three-wire circuit.
①=Enable 3-wire Circuit OR THREE WIRE DISABLED	In *Manual* mode, this message appears along the bottom of the display to indicate that the three-wire circuit is disabled. In *Automatic* mode, this message appears across the middle of the display.
🔑 / 🔑 = 🔑	Turn the *Run/Program* keyswitch to access the *Program* menu.
	From the *Program Menu* display shown in Figure 10, select from the eight available options.
↑ / ↓	Use the arrow keys to scroll through the available options, or enter an option number directly from the keypad.
3	Selects option *3* of the *Program* menu (*Configure*).
Enter	With any option selected, this key accesses the option. Some options have introductory screens that present additional decisions, while others begin immediately when the option is accessed.

2.1.2. Safely Exiting the Program Menu

Display or Action	Explanation
	selects option *0* from any other *Program* menu option.
	With item 0 selected, turn the keyswitch to the *Run* position and verify by pressing  .
①=Enable 3-wire Circuit	Press ① to enable the 3-wire circuit.
	Returns to the *Manual Menu*.

CAUTION 4: DATA LOSS HAZARD—Improper use of the *Program/Run keyswitch* may corrupt program data.

- Turn the keyswitch to the *Run* position only when *Program Menu* item 0 (Return to Run Mode) is selected.
- Only power *off* or *on* with the *Program/Run keyswitch* at *run*.
- Do not leave key accessible to unauthorized personnel.

Notice 5: If this is a new processor board, if you suspect program data is corrupt, or if the display says *Clear Memory Now*, choose *6=Clear Memory* (see Section 2.1.8 in this section).

2.1.3. 1=Add, Change, or Delete Press Code [Document BICP1P10]

This menu selection allows you to perform these tasks:

1. Select a press code (described in Section 2.1.3.1)
2. Change the name of the press code (described in Section 2.1.3.2)
3. Delete a press code (described in Section 2.1.3.3)
4. Program values for the press code or change existing values (described in Section 2.1.3.4)

2.1.3.1. Selecting a Press Code to Add, Delete, or Change

—Figure 12 shows the *Programming menu* with the *Add / Change Press Code* option selected. Press  to access the *Add/Change Press Code* option shown in Figure 13.

Figure 12: *Add/Change Press Code* **Selected**

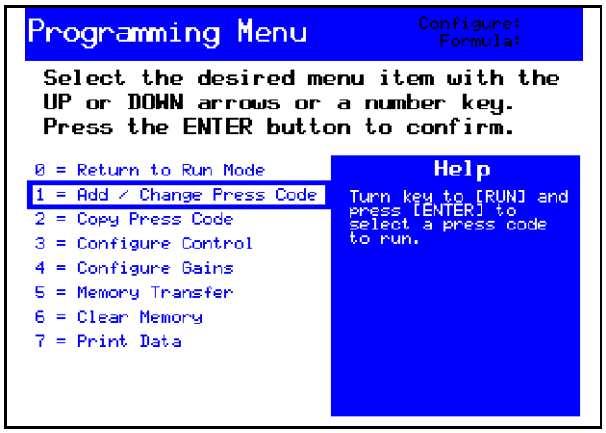
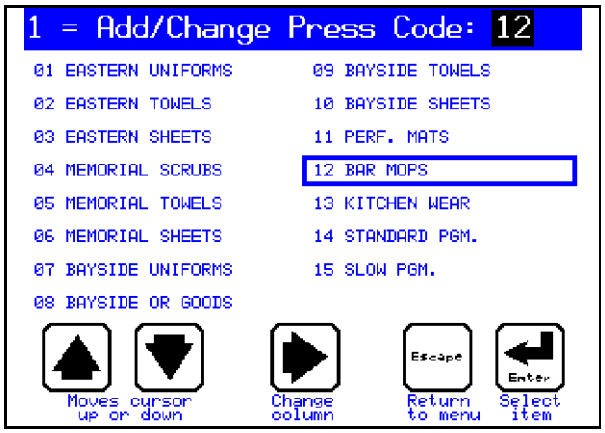


Figure 13: *1=Add/Change Press Code* **Page**



Display or Action	Explanation
1	From the Program Menu, select *1 = Add / Change Press Code*.
Enter	Access *Add/Change Press Code* option (Figure 13).
↑ / ↓ / ← / →	Move the cursor to select a press code number, or enter a number to go directly to that press code.

Tip: Press code numbers without names have not been programmed; these numbers are available for adding press codes. Press codes with names have been programmed and are available for changing or deleting.

Enter	Select a press code,
	or
Escape	return to the *Programming menu* (Figure 12).

2.1.3.2. Naming a Press Code

Display or Action	Explanation

For each press code in the machine, you can program a name up to 10 characters long. The name entered here appears on printed reports (see Section 2.1.9 "7=Print Data"). Use the procedure below to assign names to press codes.

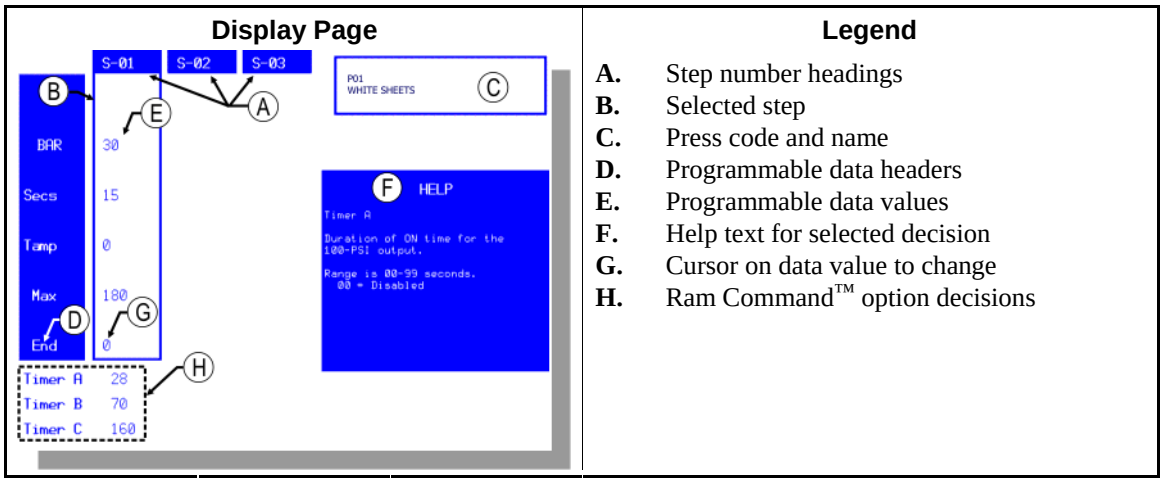
`05 PRSCODE 05`	When a press code is selected, the controller prompts the user for a press code name. The default name for a new press code is "PRSCODE" plus the two-digit press code number.
Enter	Accepts the default press code name,
	or
A, B . . .	use the keypad to change the first character of the press code name.
← / →	Move the cursor to the previous or next character in the name, then change the character at the cursor.
Enter	Accepts the new name and advances to the *programming decisions* page (Figure 14).

2.1.3.3. Deleting a Press Code—To delete a press code, select the press code to be deleted as in Section 2.1.3.1. In step 01 of the press code, enter *00* for the desired pressure and *1* for the *End of Press Code*. From the *End of Press Code* field, press Enter to confirm and delete the press code.

2.1.3.4. Programming a Press Code—A press code describes how the press will process each batch of goods.

2.1.3.4.1. About the Programming Screen—The press code programming screen (Figure 14) simultaneously displays the programmable data for three steps and help information for the selected decision.

Figure 14: *Programming Decisions* **Page Elements**



2.1.3.4.2. Press Code Decisions—A press code is a series of individual steps, each with five parameters. The parameters and their valid ranges are described below.

Display or Action	Explanation
BAR 12	Enter the desired diaphragm pressure for this step, in bar If the *Bar* decision is configured to a value less than the maximum pressure for the press, then the pressure increases linearly over the time configured in the *Secs* decision, below. If the *Bar* decision is configured to the maximum pressure for the press, the modulating valve immediately opens to the maximum valve position.
00 to 40	pressure range for MP1A03 press models

Note 3: A pressure of one bar is approximately equal to one atmosphere (14.5 pounds per square inch).

12	12 bar, example
1	Enter *1* in the first position. The cursor automatically advances to the next digit.
2	Enter *2* in the second position. The cursor automatically advances to the next decision.

Display or Action	Explanation
Secs 000	Enter the **ramp time** to achieve the desired pressure on the goods. Enter this value in seconds.
000 to 999	ramp time range for all press models, in seconds

Display or Action	Explanation
Tamp 0	Enter the desired **tamping procedure**.
0	Do not raise ram. When the tamp code is 0, the press proceeds to the next step without raising the ram.
1	Raise the ram between steps. Ram presses to desired pressure for programmed press time, releases pressure and raises to the *ram in can* position, then moves down to begin the next step.

Display or Action	Explanation
Max 000	Enter the desired **maximum time** for this step in seconds. The step ends after this time expires, regardless of whether or not the desired pressure has been achieved.
001 to 999	maximum step time range for all press models, in seconds

Display or Action	Explanation
End 0	**End of press code.** Enter *1* or *2* if this is the last step in the press code.
0	Another step follows this one.
1	This is the last step in the press code for goods that form solid cakes but might stick to the diaphragm. See Supplement 1 for more information.
2	This is the last step in the press code for goods that discharge cleanly but form cakes which might fall apart, resulting in press or conveyor faults. See Supplement 1 for more information.

Supplement 1

About the *End* Codes

The control provides two *end of press cycle* procedures, described below. Choose the appropriate end code according to the goods processed with each press code.

Use end code 1 for goods that tend to stick in the press and not discharge cleanly. These goods, such as terry towels and thermal blankets, usually form solid cakes, but may stick to the press diaphragm or the inside of the can after the cycle ends. Press faults result when these goods later fall out of the can. This end code reduces press faults by using the ram to push the goods cake out of the can.

1. At the end of the press cycle, the ram moves quickly up to the *unload* proximity switch, then stops.
2. The can begins rising. The stationary ram pushes any goods that are stuck inside the can onto the belt.
3. When the can reaches the *can fully up* proximity switch, the ram rises to the *full up* position.
4. The discharge sequence begins:
   a. The discharge door opens.
   b. The belt runs forward until the discharge end photoeye is blocked and cleared, plus the greater of either two seconds or the configured *Belt Run Time After Discharge* value, indicating that the cake is discharged.
   c. The discharge door closes.
   d. The can is lowered to the fully down position.
5. The press is ready for the next load when the can is fully down and the ram is fully up.

Use end code 2 for goods like poly-cotton sheets or patient gowns, that usually remain on the press belt as the can and ram are lifted. These cakes are more likely to fall apart if they are handled roughly when the press cycle ends, so this end code is designed to maintain the integrity of the cake.

1. At the end of the press cycle, the ram rises slowly off the cake (with the pre-fill valve closed).
2. Three seconds after the ram begins rising, the can begins rising off the press bed.
3. When the can reaches the full up proximity switch, the pre-fill valve opens to allow the ram to rise quickly to its full up position. The ram stops at its unload position if the can is not at the full up position.
4. The discharge sequence begins when the ram is at or above the unload position:
   a. The discharge door opens.
   b. The belt runs forward until the discharge end photoeye is blocked and cleared, plus the greater of either two seconds or the configured *Belt Run Time After Discharge* value, indicating that the cake is discharged.
   c. The discharge door closes.
   d. The can is lowered to the fully down position.
5. The press is ready for the next load when the can is fully down and the ram is fully up.

Supplement 2

About the Ram Command™ Feature

The Ram Command™ optional feature allows precise control over how the ram descends into the press can. For each press code, the Mark VI controller uses the values programmed here (see Figure 14) to reduce quick pressure increases on the goods while the ram descends. This automatic procedure is often used for goods that are prone to microbursting (e.g., barrier materials and high thread-count sheets).

For more information about the optional Ram Command™ feature, see the related section in document BIPPMM24 in the service manual for your machine.

Timer A—Set the value here for the ON-time duration of the **100 PSI** output. The valid range is 000 to 999 seconds. Starting when the ram begins to descend into the can and with both poppet valves closed, the ram is forced down with 100 PSI additional pressure for the

duration of Timer A. Enter 000 to disable the output for this press formula.

Timer B—Set the value here for the ON-time duration of the **250 PSI** output. The valid range is 000 to 999 seconds. Starting when Timer A expires and with both poppet valves closed, the ram is forced down with 250 PSI additional pressure for the duration of Timer B. Enter 000 to disable the output for this press formula.

Timer C—Set the value here for the ON-time duration of the **flow control** output. The valid range is 000 to 999 seconds. Starting when Timer B expires and with both poppet valves closed, the ram is forced down with the standby pressure of the pump for the duration of Timer C. Enter 000 to disable the output for this press formula.

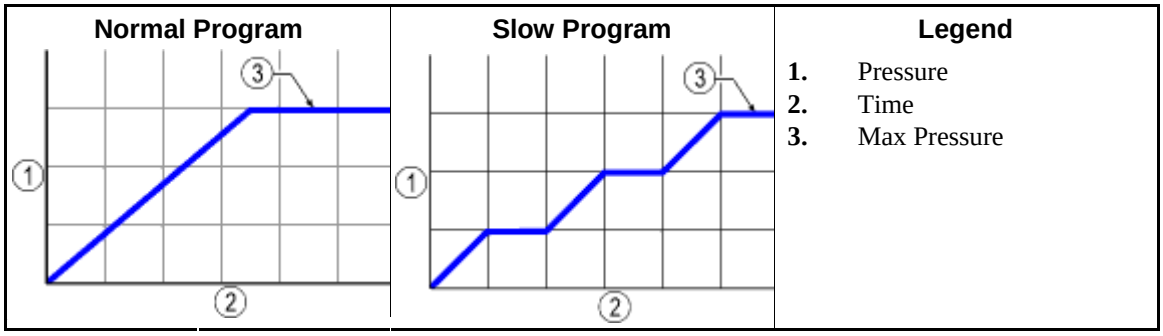
After Timer A, Timer B, and Timer C expire, the two poppet valves open to begin pressurizing the ram cylinder.

When programming the single-stage press, two processes may be used:

- **the normal (single step) program** for cotton and mixed fibers with low polyester content
- **the slow (multiple-step) program** for delicate fibers or polyester cotton blends or plastics that do not allow water to pass through readily and consequently require more time for water to pass through the goods

The *normal* program steadily increases pressure until the desired pressure is achieved, then maintains pressure until desired time expires. The *slow* program steadily increases pressure and holds it for desired time in a series of steps which gradually increase, allowing water to pass through without damaging goods. See Figure 15 for charts of pressure versus time.

Figure 15: Comparison of Normal and Slow Programs



Some typical goods and corresponding press code values:

Table 3: Typical Press Code for Walk-off Mats

	S-01	S-02	S-03	S-04
Bar	7	10	15	20
Secs	10	10	10	30
Tamp	0	0	0	0
Max	10	10	10	40
End	0	0	0	1

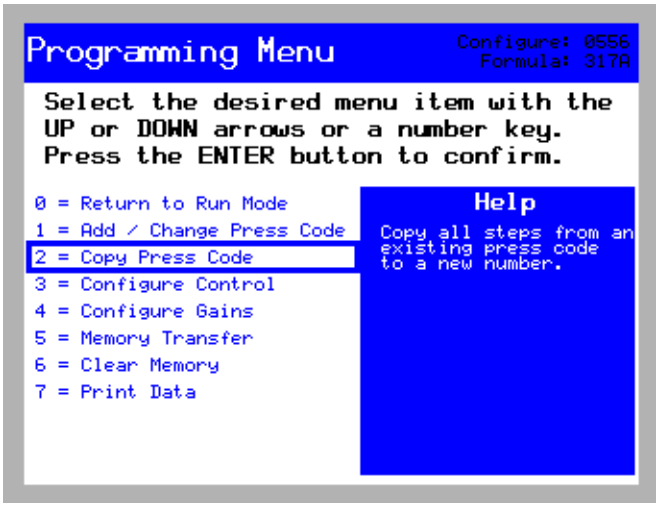
Table 4: Typical Press Codes for Towels and Uniforms

	Cotton Towels	Cotton/Polyester Uniforms
	S-01	S-01
Bar	40	25
Secs	40	40
Tamp	0	1
Max	50	50
End	1	1

2.1.4. 2=Copy Press Code [Document BICP1P11]

Use this option to copy an existing press code to a new press code number.

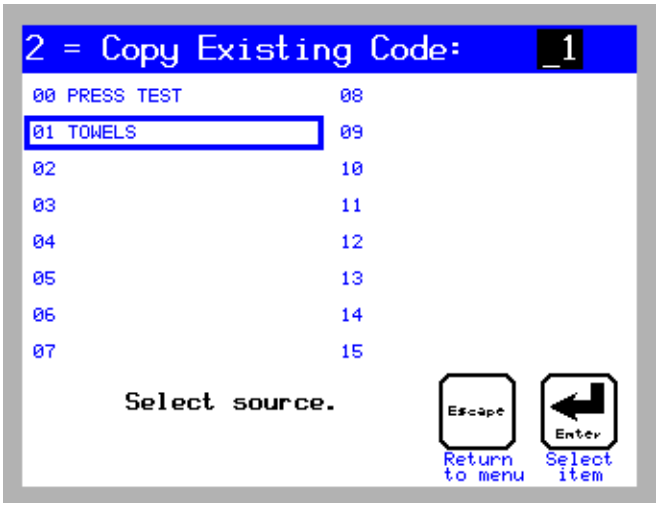
Figure 16: *2 = Copy Press Code* **Selected**



Display or Action	Explanation
Enter	Selects this menu item and displays the *2 = Copy Existing Code* page. The user is prompted to select a source press code to copy (Figure 17).
Escape	At any time during this procedure, this keystroke returns to the previous display or to item *0* of the *Program menu*.
↑ / ↓ / ← / →	Move the cursor box to the *source* press code. The source press code is the code which will be copied to a new location.

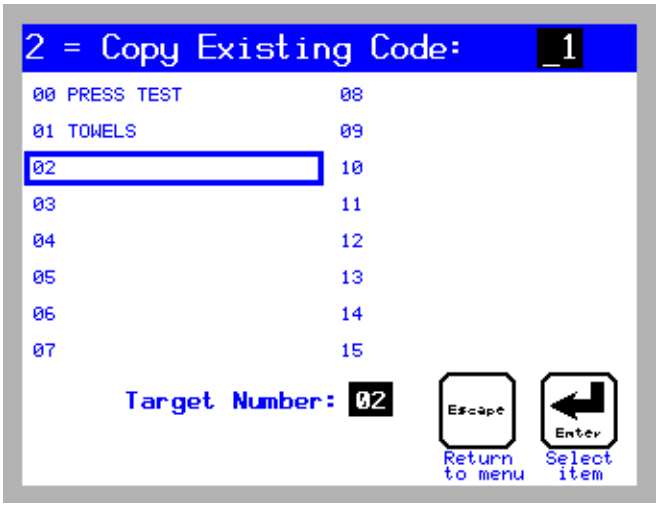
Tip: Press code numbers can also be accessed directly by entering the two-digit number.

Figure 17: *Select Source* **Page**



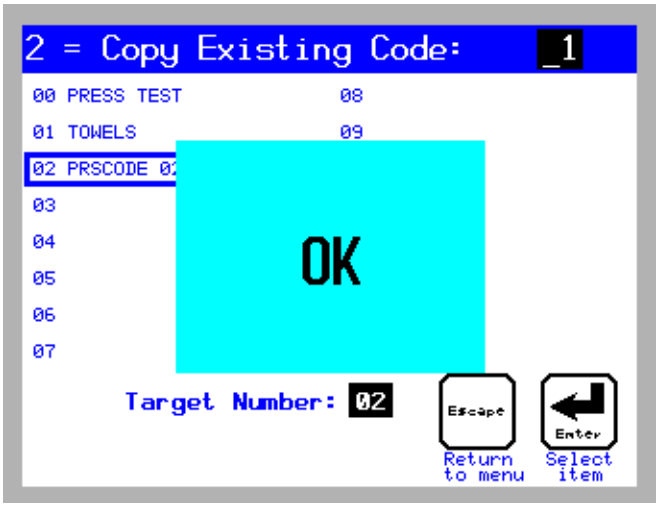
Display or Action	Explanation
Enter	Confirms the selected press code as the **source**. The user is prompted to select a target press code number (Figure 18).
`ERROR: Source is empty`	This message appears momentarily near the bottom of the display if the selected **source** press code is empty. Select another press code as the source.

Figure 18: *Target Number* **Prompt**



Display or Action	Explanation
`Target Number: 00`	This display prompts for the selection of a **target** press code number.
↑ / ↓ / ← / →	Move the cursor box to the **target** press code number, or type a target number directly. The target press code will become a copy of the source press code.
Enter	Confirms the selected press code number as the **target**, copies the source to the target, displays the *Copy OK* message (Figure 19), and returns to item *0* of the *Program menu*.

Figure 19: *Copy OK* **Message**



Display or Action	Explanation
`ERROR: Target not empty`	This message appears momentarily near the bottom of the display if the selected **target** press code is already programmed. Select another press code number as the target.

2.1.5. 3=Configure (and Why it is Necessary) [Document BICP1P12]

The Milnor® Mark VI single stage press controller can control several different models with numerous options. Configuring the controller for the specific machine allows efficient operation and eliminates unneccessary programming decisions. Configuration also allows you to adjust certain operating parameters according to the needs of your specific installation.

From the *Programming Menu*, select menu item *3 = Configure Control* (Figure 20) to configure the controller. Press Enter to advance to the *3 = Configure Control* page (Figure 21).

Figure 20: *Configure Control* **Selected**

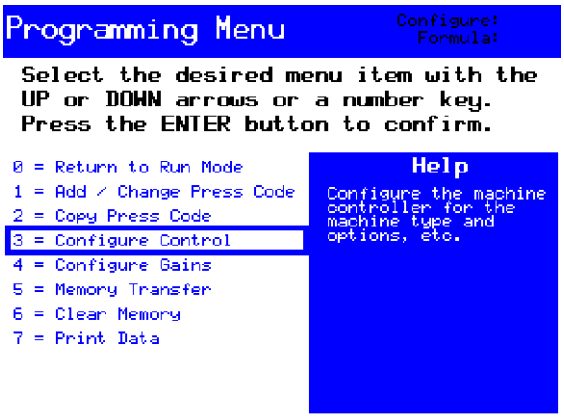
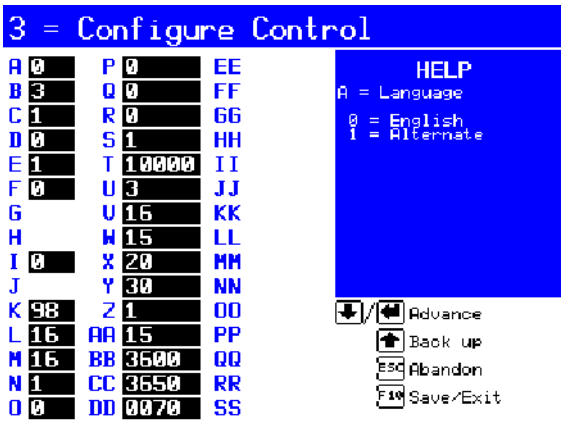


Figure 21: *3 = Configure Control* **Page**



2.1.5.1. When is Configuring Required?

—Your machine was configured when it was tested at the factory, but you should verify that all decisions match your hardware and preferences before putting the machine in service. Make a copy of your machine configuration for future reference.

Tip: Write all configuration values, including your user preferences, in the *Setting* column of Table 5.

Use this menu selection to change your preferences, replace the processor board, or modify the machine hardware.

Table 5: Quick Reference to Configure Decisions

Configure Decision	User- or Hardware Dependent	Setting	Description	Configure Decision	User- or Hardware Dependent	Setting	Description
A	User		Language	Q	User		Receive Device Load Direction
B	Hardware		Machine Type	R	User		Receive Device Load Level
C	Hardware		Load Chute	S	User		Synchronize COINC Transfer
D	Hardware		Load Door	T	User		Compatibility
E	Hardware		Discharge Conveyor	U	User		Loading Time
F	User		Allied Receive	V	User		Belt Run Time
G	User		Allied Weight Inputs	W	User		Time to Block COINC Eye
H	User		Add 1 to Allied Input	X	User		Time to Clear COINC Eye
I	User		Allied Discharge	Y	User		COINC Run Time
J	User		Extra Data Pass	Z	User		Check for Ram at Low Position
K	User		Network String Length	AA	User		Maximum Pressure at Ram Low Position
L	User		Miltrac Address	BB	User		Can Valve Setting
M	User		Mildata Address	CC	User		Ram Valve Setting
N	User		Hold Receive Device	DD	Hardware		Pressure Sensor Zero Offset
O	User		Ignore Single Cake				
P	User		Goods Unit				

2.1.5.2. How to Navigate on the *3 = Configure Control* Page—We designed the configuration screen on the Mark VI controller to make configuring the machine a simple process. A blinking character indicates the cursor position, and the cursor advances automatically when a valid key is pressed in most decisions. All navigation commands are described below.

Display or Action	Explanation
↓ or Enter	Accepts the displayed value and advances to the next decision. Changes are not saved until you press F10 to exit this page.
→	For multi-character fields (e.g., *Network String Length*), accepts the displayed character and advances immediately to the next character.
←	For multi-character fields, moves to the previous character.
↑	Moves the cursor to the previous decision.
Escape	Abandons all changes made during this session and returns to the *Programming Menu* (Figure 20). Changes made during this session are not saved.
F10	Saves all changes and returns to the *Programming Menu* (Figure 20).

2.1.5.3. The Configure Decisions

2.1.5.3.1. A = Language—This decision allows selection of English or the alternate language supplied in the software, if any.

Display or Action	Explanation
0	all prompts appear in English
1	all prompts appear in the alternate language specified when the press was ordered

2.1.5.3.2. B = Machine Type—Select the machine type corresponding to the model number of your machine.

Display or Action	Explanation
00	MP1601 (31 bar)
01	MP1602 (47 bar)
02	MP1603 (35 bar)
03	MP1604 (50 bar)
04	MP1A03 (40 bar)
05	MP1550 (50 bar)
06	MP1540 (40 bar)
07	MP1640 (40 bar)
08	MP1656 (56 bar)
09	MP1A50 (50 bar)
10	MP1556 (56 bar)
11	MP1A56 (56 bar)

2.1.5.3.3. C = Load Chute—Configure as appropriate for your installation.

Display or Action	Explanation
0	press is not equipped with a load chute
1	press is equipped with a load chute

2.1.5.3.4. D = Load Door—Configure as appropriate for your installation.

Display or Action	Explanation
0	press is not equipped with a load door
1	press is equipped with a load door

2.1.5.3.5. E = Discharge Conveyor—Configure as appropriate for your installation.

Display or Action	Explanation
0	press does not control a discharge conveyor
1	press controls a discharge conveyor

2.1.5.3.6. F = Allied Receive—Sets the system protocol for loading. Miltrac loading applies if *Allied Receive = 0.*

Display or Action	Explanation
0	press receives from a Miltrac controlled device. This is the default value.
1	press receives from a non-Miltrac controlled device (allied loading)

2.1.5.3.7. G = Allied Weight Inputs—This decision appears only if Section 2.1.5.3.6 "F = Allied Receive" is *1*.

Display or Action	Explanation
0	no allied weight inputs. This is the default value.
1	press receives weight information from a non-Miltrac controlled device via 12 allied weight inputs. It requires an additional 8/16 board (address = 04H).

2.1.5.3.8. H = Add 1 to Allied Input—This decision appears only if Section 2.1.5.3.6 "F = Allied Receive" is *1*, and only applies to customer code and goods code inputs. Set this value to *1* if the allied output from your loading device is offset by 1.

Display or Action	Explanation
0	No; allied inputs will be processed as received.
1	Yes; add one to the allied input values for goods code and customer code.

2.1.5.3.9. I = Allied Discharge—Sets the system protocol for discharging. Miltrac discharge applies if *Allied Discharge = 0.* Selecting *1* for this decision allows the use of outputs to supply batch data in binary format and disallows Miltrac interfacing with devices on the discharge side of the single stage press.

Display or Action	Explanation
0	press discharges to a Miltrac controlled device. This is the default value.
1	press discharges to a non-Miltrac controlled device (allied discharging)

2.1.5.3.10. J = Extra Data Pass—This decision appears if either Section 2.1.5.3.6 "F = Allied Receive" or Section 2.1.5.3.9 "I = Allied Discharge" decisions are answered "1". *Extra data pass* requires an additional 8/16 board (address = 03H). This provides 6 inputs for goods code, 6 inputs for customer codes, 4 inputs for destination codes and 8 outputs for goods code.

Display or Action	Explanation
0	No; extra data pass is not required
1	Yes; extra data pass is required

2.1.5.3.11. K = Network String Length—This decision applies only to devices in a Milnet or Miltrac system.

Display or Action	Explanation
00	if the system uses Miltrac system version 89100 or later, but before 21000
11, 13	Enter one of these numbers for systems with Milnet versions between 86088 and 86095. If the device does not communicate with the Milnet controller at the first setting chosen, select the other one.
24	if the system uses Miltrac system version 8624C and earlier
30	for Miltrac controllers with version numbers from 89001 to 89018.
97, 98, 99	Enter *97, 98,* or *99* for Milnet or Miltrac systems with version numbers 21000 and later. A value of *97* represents a communication rate of 19.2 kb/s, *98* is 38.4 kb/s, and *99* is 57.6 kb/s.

Tip: Faster communication rates may allow complex systems to communicate on a single Miltrac link, but faster rates are more susceptible to interference from electromagnetic noise in the facility. For best results, choose the fastest communication rate that is reliable in your installation.

2.1.5.3.12. L = Miltrac Address—If either Section 2.1.5.3.6 “F = Allied Receive” or Section 2.1.5.3.9 “I = Allied Discharge” is answered “0”, the single stage press is a Miltrac device requiring an address. This address must be three digits and unique in the Miltrac system. Refer to the Miltrac manual for additional details.

Display or Action	Explanation
000	lowest available address and default value
008	address 008 (example)
255	highest available address

2.1.5.3.13. M = Mildata Address—This display prompts for a single stage press address on the Mildata system.

Display or Action	Explanation
000	lowest available address and default value
016	address 016 (example)
255	highest available address

2.1.5.3.14. N = Hold Receive Device—This decision applies only if Miltrac discharge is enabled (Section 2.1.5.3.9 "I = Allied Discharge"). To determine the correct response to this question, ask "Should the Device receiving goods from the single stage press wait for more than one load before moving?" For example, respond *1* if the receiving conveyor should wait for two or more loads before transferring to a multi-cake dryer. Refer to the Miltrac controller reference manual for more information.

Display or Action	Explanation
0	No; multiple cake discharge is disabled. The press always ends the discharge sequence with the Miltrac state *I'm Finished, Do Not Hold.*
1	Yes; multiple cake discharge is enabled. The press continues receiving new batches and discharging them to the receiving device until it loads a *single* cake or receives the Miltrac command "You're Finished, Do Not Hold."

2.1.5.3.15. O = Ignore Single Cake—This decision causes the press to ignore the single cake flag, and applies only if the press is configured to hold the receiving device (Section 2.1.5.3.14 "N = Hold Receive Device"). Proper operation of this decision requires that the Miltrac controller ignore single cake flags at the x-coordinate of the receiving device. Refer to the Miltrac controller reference manual for more information.

Display or Action	Explanation
0	No; all single cake flags set the Miltrac state of the press to "I'm Finished, Do Not Hold."
1	Yes; if the Miltrac controller is properly configured, the press controller will ignore the *single cake* flag.

2.1.5.3.16. P = Goods Unit—Configure as appropriate for your installation.

Display or Action	Explanation
0	Goods tracked by weight
1	Goods tracked by pieces

2.1.5.3.17. Q = Receive Device Load Direction—This decision applies only if Miltrac discharge is enabled (Section 2.1.5.3.9 "I = Allied Discharge").

Display or Action	Explanation
0	if the receive device runs forward when the single stage press discharges to it. This is the default.
1	if the receive device runs in reverse when the single stage press discharges to it

2.1.5.3.18. R = Receive Device Load Level—This decision applies only if Miltrac discharge is enabled (Section 2.1.5.3.9 "I = Allied Discharge"). Enter the level at which an elevating device accepts a cake from the single stage press. The valid range is 0 to 7.

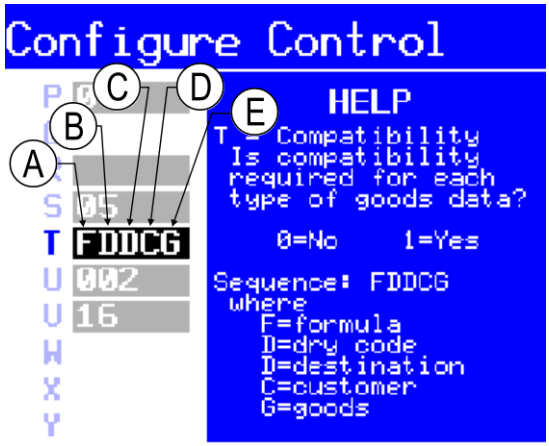
2.1.5.3.19. S = Synchronize COINC Transfer—Appears only if configured for a discharge conveyor (Section 2.1.5.3.5 "E = Discharge Conveyor").

Display or Action	Explanation
0	if the COINC will prepare to transfer as soon as it receives a cake
1	if the COINC will prepare to transfer (i.e., wait to display *Want to Transfer*) only once it has a cake and the main press is prepared to transfer. This allows the shuttle to take two cakes without waiting. If either the COINC cake or the main press cake is a single cake or the two cakes are incompatible (based on Compatibility decision), the press will display *Want to Transfer*.

2.1.5.3.20. T = Compatibility—This decision appears only if *Section 2.1.5.3.19 "S = Synchronize COINC Transfer" = 1*. You must enter either a 0 or 1 for compatibility for each type of goods data. F=Formula; D=Dry code; D=Destination code; C=Customer code; G=Goods code.

Figure 22: *T = Compatibility* **Decisions**

Display Detail



Legend

- **A.** Formula compatibility
- **B.** Dry Code compatibility
- **C.** Destination Code compatibility
- **D.** Customer Code compatibility
- **E.** Goods Code compatibility

Display or Action	Explanation
0	compatibility is not required for this type of goods data
1	compatibility match is required for this type of goods data

2.1.5.3.21. U = Loading Time—Enter the amount of time (in seconds) that the press waits for loading before bringing the ram down.

Display or Action	Explanation
00	0 seconds (minimum time)
05	5 seconds (default value)
30	30 seconds (maximum time)

Tip: Field experience indicates that the best value for this decision is about 4 seconds. This time usually allows the water to drain from the press load chute before the ram moves down. The reference manual for the Mentor® controller describes the interaction between this configure decision and the *Pause at Top Dead Center* rotation timer.

2.1.5.3.22. V = Belt Run Time After Discharge—Set this value to the time (in seconds) for the belt to run after the cake clears the eye. Belt runs for 2 seconds if this value is less than 2.

Display or Action	Explanation
00	0 seconds (minimum and default time; belt runs 2 seconds)
99	99 seconds (maximum time)

2.1.5.3.23. W = Time for Cake to Block COINC Eye—This decision only appears if configured for a discharge conveyor (Section 2.1.5.3.5 "E = Discharge Conveyor"). Set to maximum time (in seconds) for a cake discharged from the press to block the eye.

Display or Action	Explanation
000	0 seconds (minimum and default time)
255	255 seconds (maximum time)

2.1.5.3.24. X = Time for Cake to Clear COINC Eye—This decision only appears if configured for a discharge conveyor (Section 2.1.5.3.5 "E = Discharge Conveyor"). Set to maximum time (in seconds) for a cake discharged from the COINC to clear the eye.

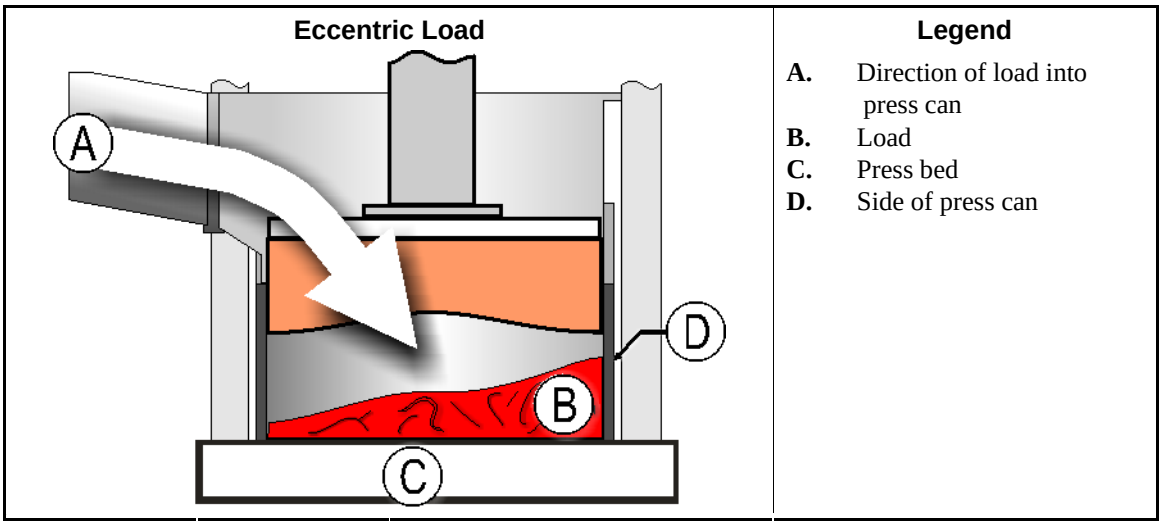
Display or Action	Explanation
00	0 seconds (minimum and default time)
99	99 seconds (maximum time)

2.1.5.3.25. Y = COINC Run Time After Discharge—This decision only appears if configured for a discharge conveyor (Section 2.1.5.3.5 "E = Discharge Conveyor"). Time for COINC to run after a cake clears the eye.

Display or Action	Explanation
00	0 seconds (minimum and default time)
99	99 seconds (maximum time)

2.1.5.3.26. Small Load Detection Decisions

Figure 23: Typical Eccentric (Small) Load



2.1.5.3.26.1. Z = Check for Ram at Low Position—This decision determines whether the controller monitors proximity switch PXSL to determine if the load in the can is a *small load.*

Display or Action	Explanation
0	Ignore proximity switch PXSL. All press codes will be executed as programmed.
1	Monitor proximity switch PXSL and restrict the maximum membrane pressure to the value configured in Section 2.1.5.3.26.2 "AA = Maximum Pressure at Ram Low Position" if the load is determined to be a small load (if PXSL is cleared during the press cycle).

2.1.5.3.26.2. AA = Maximum Pressure at Ram Low Position—This decision appears only if the Section 2.1.5.3.26.1 "Z = Check for Ram at Low Position" configure decision is enabled (*1=Yes*). Set a maximum membrane pressure which the controller will not exceed if a *small load* is detected.

Display or Action	Explanation
00	Minimum value; goods will not be pressed
20	Example; do not allow membrane pressure to exceed 20 bar if proximity switch PXSL is cleared during the press cycle (if this is a *small load*). This is the default setting.
30	Maximum value; do not allow membrane pressure to exceed 30 bar if this is a small load.

2.1.5.3.27. BB = Can Valve Setting—Enter a value to determine how much to open the proportional valve when moving the can.

Display or Action	Explanation
0000	fully closed
0600	Example. See Supplement 3.
4095	fully open

Note 4: The factory setting for both *BB = Can Valve Setting* and *CC = Ram Valve Setting* is as follows:

Supplement 3

About *BB = Can Valve Setting* and *CC = Ram Valve Setting*

The factory setting for both of these configure decisions is as follows:

MP40_ (14" ram) = 0800
MP56_ (16" ram) = 0400
MP1A_ (17" ram) = 0600

This value must open the valve enough to raise the ram but not so much that the relief valve trips or the oil over-heats if the ram must stay up for several minutes during a cycle.

2.1.5.3.28. CC = Ram Valve Setting—Enter a value to determine how much to open the proportional valve when moving the ram.

Display or Action	Explanation
0000	fully closed
0600	Example. See Supplement 3.
4095	fully open

2.1.5.3.29. DD = Pressure Sensor Zero Offset—This decision can be used to compensate for certain pressure transducers whose minimum output value is non-zero. This value is preset at the factory so that the display reads zero at zero pressure.

Display or Action	Explanation
0000	Minimum and default value. Enter this value for use with pressure transducers providing a 0-5 VDC output.
0070	Enter this value for use with pressure transducers providing a 0.1-5.1 VDC output.

2.1.6. 4=Configure Gains [Document BICP1P13]

The PID gains are used to control the proportional valve in the press. Optimum values were determined at the Milnor® factory and are shown here. These values are automatically inserted when memory is cleared or when gains are defaulted. Use this option to modify these values in consultation with the Milnor® factory.

Figure 24: *Configure Gains* **Selected**

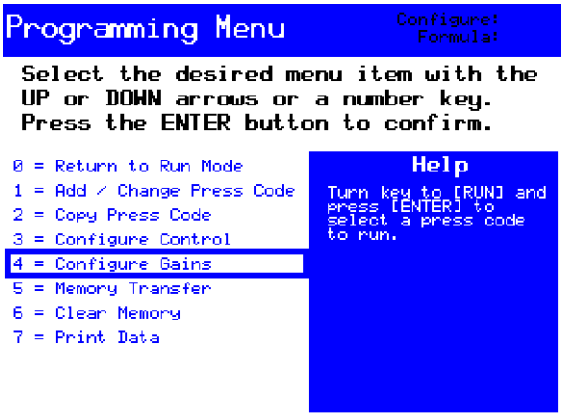


Figure 25: *4 = Configure Gains* **Page**

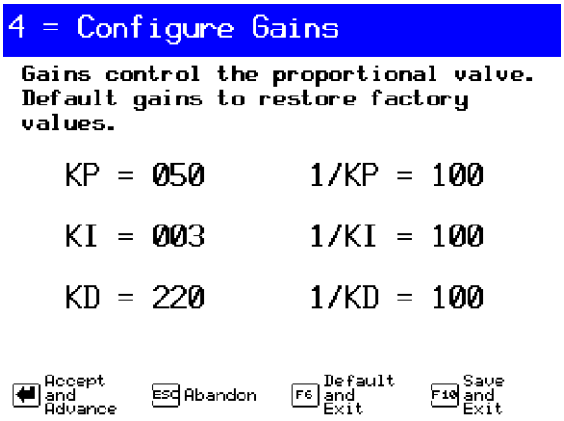


Figure 24 shows the *Program Menu* with the *Configure Gains* option selected. Press Enter to access the *Configure Gains* option.

When the *4 = Configure Gains* page appears, use the keypad to edit the *KP* value, then press Enter to advance to the next value (*1/KP*).

Display or Action	Explanation
Enter	accepts the current value and advances to the next value.

Tip: Press F10 to accept the entered values and return to the *Programming Menu*.

Escape	abandons all changes made during the current session and returns to the *Programming Menu*
F6	sets all gains to the factory default values and saves them, then returns to the *Programming Menu*

2.1.7. 5 = Memory Transfer [Document BICP1P17]

With the Milnor® Mark VI controller, you can transfer formulas from a personal computer running Milnor's programmer software, between machines, or between the machine and a personal computer that's part of a Mildata network. You can also transfer machine configuration data between machines or a machine and a computer running the programmer software, but configuration data should only be transferred if the machines are nearly identical with respect to both hardware and software. See Table 6 for guidelines on when data can be safely transferred between devices.

The specifications for cables and other devices used for memory transfer, as well as general instructions, are described in Section 5.2. "Construction of External Serial Link Cables".

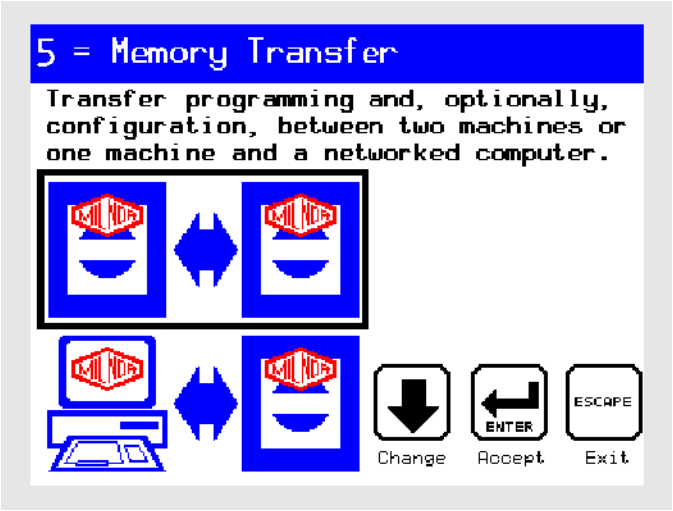
Table 6: Memory Transfer Guidelines

Similarity between Sending and Receiving Machines			OK to transfer		
Software	**Basic model**	**Options**	**Safe to transfer formulas?**	**Safe to transfer configure?**	**Actions after transferring**
Identical	Identical	Identical	Yes	Yes	none
Identical	Identical	Different	Yes	Maybe	Verify configure data
Identical	Different	Different	Yes	No	Reconfigure, then verify formulas
Different	Doesn't matter	Doesn't matter	No	No	Formula and configure data are invalid

2.1.7.1. **Transfer between Two or More Machines**—If your facility has two or more similar machines (see Table 6) which share identical formulas, you can save time by programming all the formulas in one machine and transferring the programmed formulas directly to the other machines.

1. Connect the necessary cable between the microprocessor control boxes of each machine. Use the external connector labelled .
2. Use ↑ or ↓ to select the *machine-to-machine* (upper) graphic, then press Enter. Figure 26 illustrates this screen.

Figure 26: *Machine-to-Machine* **Memory Transfer Selected**



3. If necessary, use ↑ or ↓ to select *Slave*, then press Enter.

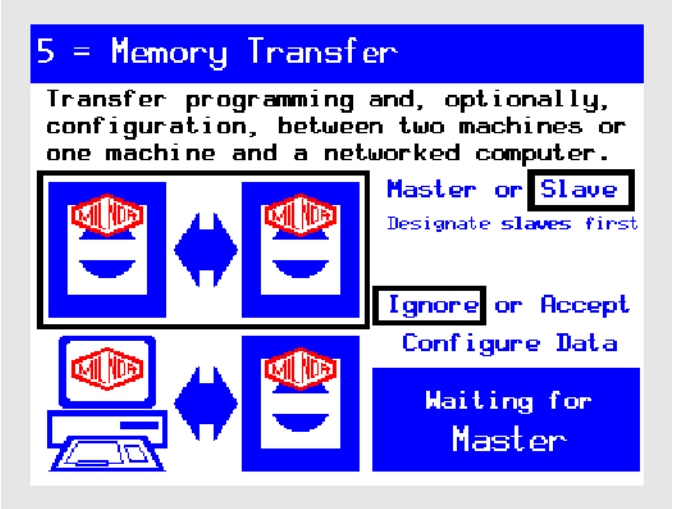
   Master—the machine with the good data. Data transfer begins immediately when a *Master* machine is designated. For this reason, designate all *Slave* machines that should receive the data before designating a *Master*. **The** *Master* **device always sends its data to the** *Slave* **device.**

   Slave—the machine with bad data, or with no information at all. Specify all machines that should receive the data as *Slaves* before designating the *Master* machine. **The** *Slave* **device always receives data from the** *Master* **device.**

4. Use ↑ or ↓ to choose to *Ignore* or *Accept* the configure data from the *Master* machine, then press Enter. See Note 5.

5. When the *Slave* machine is designated, “Waiting for Master” appears in the lower right area of the display (see Figure 27).

Figure 27: Typical Display on *Slave* Machine while Waiting

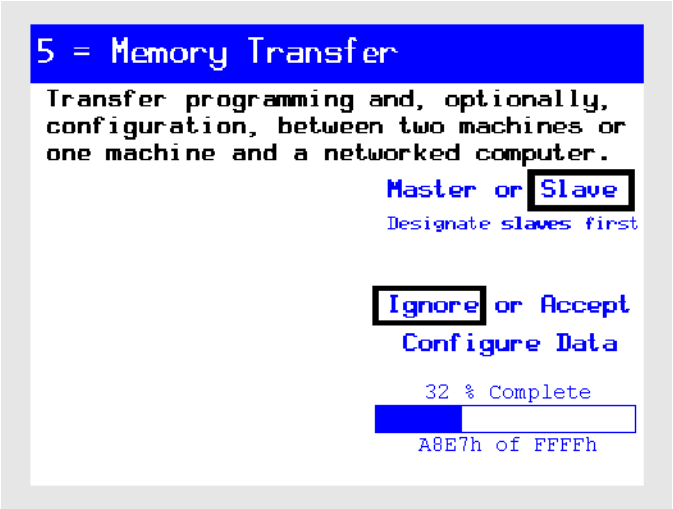


Notice 6: Data transfer begins immediately when a *Master* device is designated. If the *Slave* devices aren't ready when you designate the *Master*, set up the *Slave* and try again..

6. Designate the machine with the good data as the *Master*, then press Enter to begin transferring data. The progress meter in the lower right part of the display shows the percent of the data transfer that's completed, as well as the last memory address (in hexadecimal format) transferred. A progress meter, shown in Figure 28, also appears on the *Slave* device during transfer.

> **Note 5:** The *Master* device always sends the same amount of data, which includes the configure data. The *Slave* device also receives configure data, but discards it if “Ignore Configure Data” is selected.

Figure 28: Transfer in Progress (Typical Display)



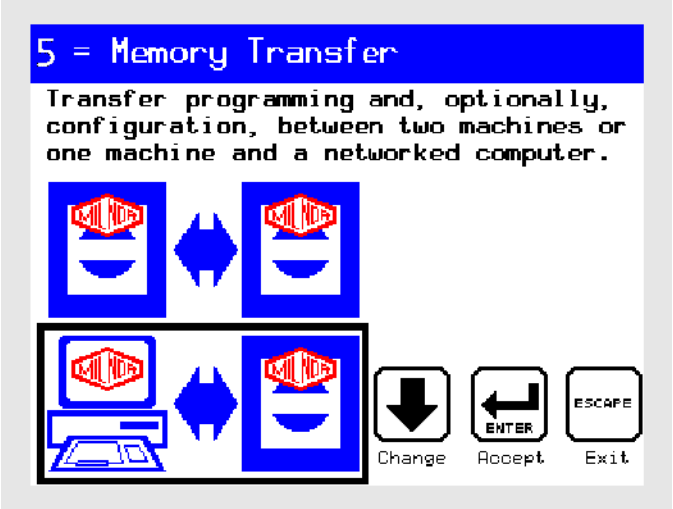
7. When prompted, after all data is transferred, press Enter to return to the *Programming menu*, then disconnect and store the cables.

2.1.7.2. Transfer between *Machine Programmer* and Machine—Milnor can provide Machine Programmer software which allows you to configure and program virtual machines on a personal computer, then transfer the pre-programmed data directly into one or more machines. The machine is considered the *Slave* device when the "good" data is on the personal computer. Remember, the *Slave* device always receives the data.

This computer software also allows you to copy the formulas and configuration from a machine to the personal computer for storage or modification. The machine is considered the *Master* device when it contains the "good" data.

1. Connect the necessary cable between the serial port of the personal computer and the microprocessor control box on the machine. The connector on the machine is labelled .
2. Use ↑ or ↓ to select the *computer-to-machine* (lower) graphic, then press Enter. Figure 29 illustrates this screen.

Figure 29: *Computer-to-Machine* **Transfer Selected**

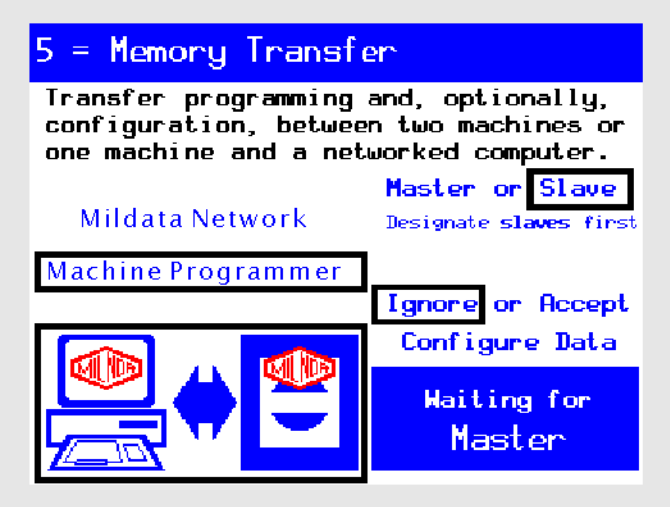


3. Refer to either Section 2.1.7.2.1 "Transferring from Computer to Machine" or Section 2.1.7.2.2 "Transferring from Machine to Computer" for further instructions.

2.1.7.2.1. Transferring from Computer to Machine

1. If necessary, use ↑ or ↓ to select *Slave*, then press Enter.
2. Use ↑ or ↓ to choose to *Ignore* or *Accept* the configure data from the *Master* machine, then press Enter. See Note 5.
3. Use ↑ or ↓ to choose *Machine Programmer*, then press Enter.

Figure 30: *Computer-to-Machine* **Transfer Selected, Machine Waiting as** *Slave*



4. On the personal computer, start the Machine Programmer software.
5. In the Machine Programmer software, select *Programmer*, then the machine type.
6. Click on the *Download* tab.
7. If necessary, select the appropriate machine group, software version, and machine profile.
8. Click the *Download* button below the machine profile list to begin transferring data.
9. When prompted, after all data is transferred, press Enter to return to the *Programming menu*, then disconnect and store the cables.

2.1.7.2.2. Transferring from Machine to Computer

1. On the personal computer, start the Machine Programmer software.
2. In the Machine Programmer software, select *Programmer*, then the machine type.
3. In the Machine Programmer software, select *Groups*, then *Upload Data from Machine*. The Machine Programmer indicates that it is “Waiting for 'MASTER' machine to start uploading.”
4. Use ↑ or ↓ to choose *Machine Programmer*, then press Enter.
5. At the machine, use ↑ or ↓ to select *Master* to begin transferring data. The progress meter in the lower right part of the display shows the percent of the data transfer that's completed, as well as the last memory address (in hexadecimal format) transferred.
6. When prompted, after all data is transferred, press Enter to return to the *Programming menu*, then disconnect and store the cables.

2.1.7.3. Transfer from Mildata Computer to Machine—If the machine is part of a Milnor® Mildata® network, it is good practice to transfer the most important formulas (up to 16) to the protected formula memory in the press. This practice allows production to continue with established formulas even if the Mildata network is not available. This safeguard does not affect machine operation in any way when the Mildata network is available.

Notice 7: When the Online Communicator component of the Mildata software is running on the Mildata computer, you can send data from the Mildata computer to the machine. However, you can not send data in the reverse direction.

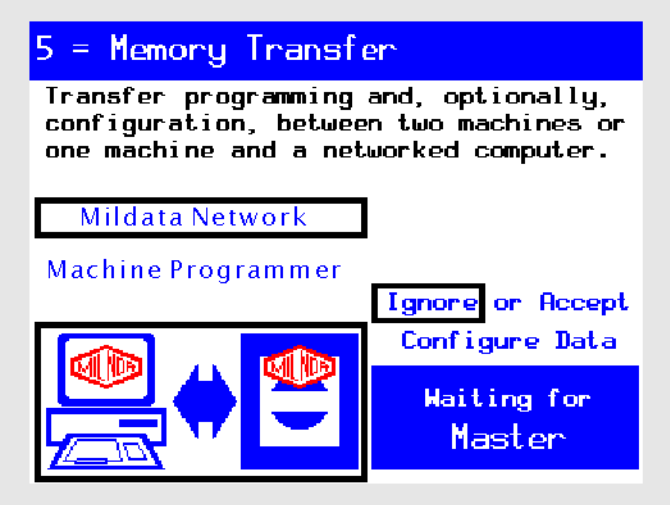
- Shut down the Online Communicator software and use the procedure described in Section 2.1.7.2.2 “Transferring from Machine to Computer” to send data from the machine to a computer with Mildata present.

1. At the machine, use ⬆ or ⬇ to select the *computer-to-machine* (lower) graphic, then press Enter. Figure 29 illustrates this screen.
2. Use ⬆ or ⬇ to choose *Mildata Network*, then press Enter.

   Note 6: When the Online Communicator component of the Mildata system is running, the Mildata computer is always the *Master*, and the machine is always the *Slave*.

3. Use ⬆ or ⬇ to choose to *Ignore* or *Accept* the configure data stored on the Mildata computer, then press Enter. See Note 5.

Figure 31: Typical Mildata-to-Machine Transfer Screen

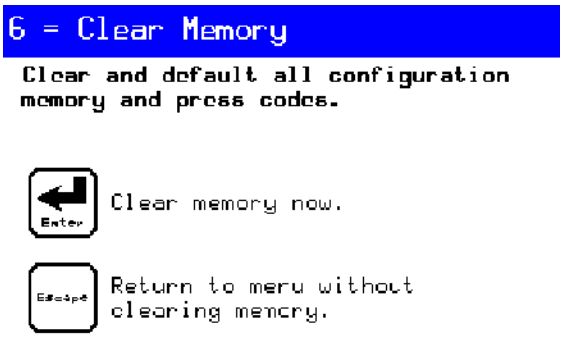


4. Data transfer begins automatically. The progress meter in the lower right part of the display shows the percent of the data transfer that's completed, as well as the last memory address (in hexadecimal format) transferred.
5. When prompted, after all data is transferred, press Enter at the machine to return to the *Programming menu*.

2.1.8. 6=Clear Memory [Document BICP1P15]

Use this selection to voluntarily clear all formulas from the machine controller and set all configuration decisions to their default values.

Figure 32: *Clear Memory* **Screen**

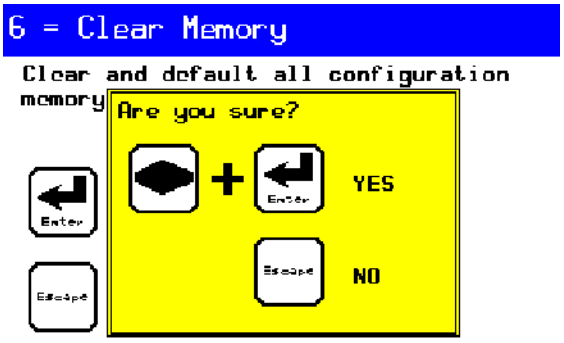


Display or Action	Explanation
Escape	Returns to the main *Programming Menu* from either the *Clear Memory* screen or the *confirmation* ("Are you sure?") screen.
Enter	Prepares the machine for clearing memory. The next screen will prompt you to confirm your choice or cancel the procedure.

From the *confirmation* screen (Figure 33):

Display or Action	Explanation
+ Enter	Clears memory immediately.

Figure 33: *Confirmation* **Screen**

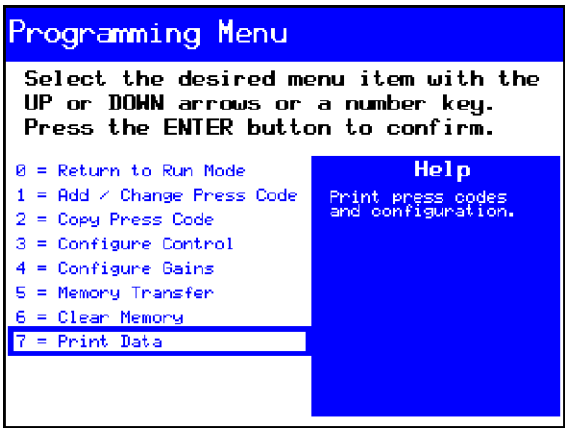


2.1.9. 7=Print Data [Document BICP1P16]

The *Print Data* menu selection allows printing formula and configuration data (see Figure 34). Before proceeding, verify that the printer is connected and on line.

Figure 34 shows the *Program* menu with the *Print Data* option selected. This selection is used for printing formula and configuration data. Before proceeding, verify that the printer is connected and on line.

Figure 34: Programming Menu, *7=Print Data* **Selected**



Press Enter to access this selection.

Enter the current date and time if the prompt appears (see Figure 35).

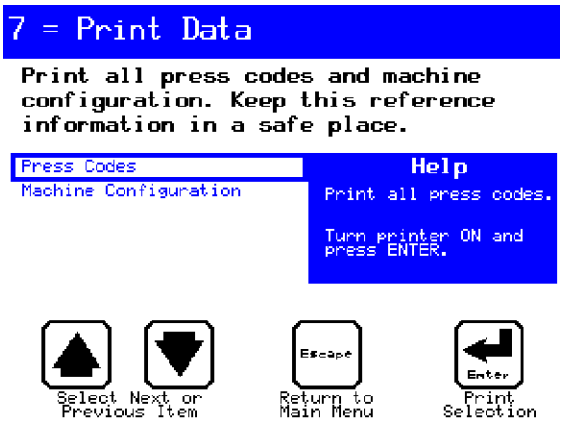
Figure 35: *Date and Time* **Window**

Display or Action	Explanation
0 1 Enter	Enters month (e.g., January) and advances cursor to first position of *Day* field.
1 6 Enter	Enters day of month (e.g., 16) and advances cursor to first position of *Year* field.
2 0 0 7 Enter	Enters year (e.g., 2007) and advances cursor to first position of *Time* field.
0 7 4 5 Enter	Enters the time (e.g., 07:45) and advances to the next screen.

2.1.9.1. Press Codes—Use this procedure to print the programmed press codes:

1. Select the *Press Codes* option (Figure 36).

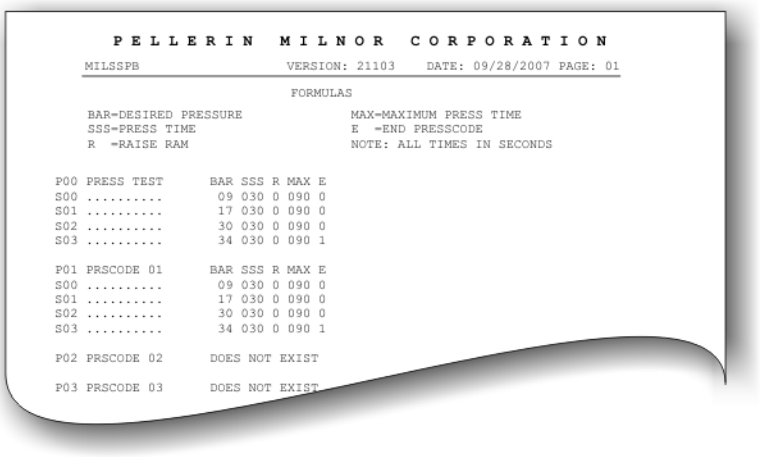
Figure 36: Print Data Menu, *Press Codes* Selected



2. Turn on the printer.
3. Press Enter.

   The result looks similar to Figure 37.

Figure 37: Typical Formula Printout



PELLERIN MILNOR CORPORATION

MILSSPB VERSION: 21103 DATE: 09/28/2007 PAGE: 01

FORMULAS

BAR=DESIRED PRESSURE
SSS=PRESS TIME
R =RAISE RAM
MAX=MAXIMUM PRESS TIME
E =END PRESSCODE
NOTE: ALL TIMES IN SECONDS

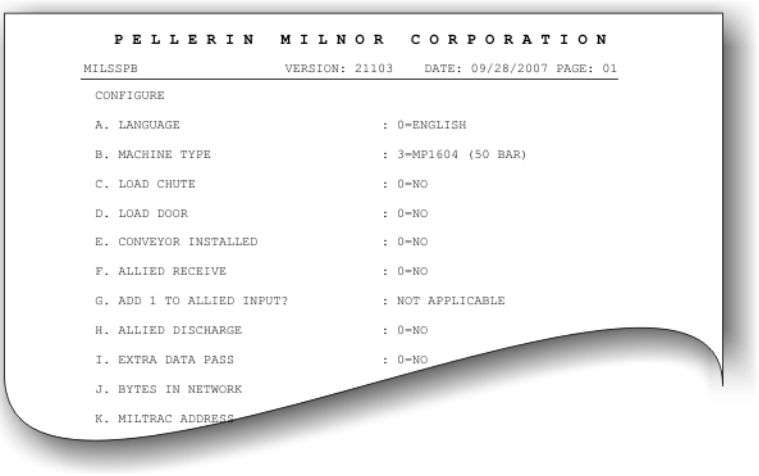
P00	PRESS TEST	BAR	SSS	R	MAX	E
S00	.....	09	030	0	090	0
S01	.....	17	030	0	090	0
S02	.....	30	030	0	090	0
S03	.....	34	030	0	090	1
P01	PRSCODE 01	BAR	SSS	R	MAX	E
S00	.....	09	030	0	090	0
S01	.....	17	030	0	090	0
S02	.....	30	030	0	090	0
S03	.....	34	030	0	090	1
P02	PRSCODE 02	DOES NOT EXIST				
P03	PRSCODE 03	DOES NOT EXIST				

2.1.9.2. **Machine Configuration**—Use this procedure to print the machine configuration:

1. Select the *Machine Configuration* option.
2. Turn on the printer.
3. Press Enter.

The result looks similar to Figure 38.

Figure 38: Typical Configure Printout



P E L L E R I N M I L N O R C O R P O R A T I O N

MILSSPB VERSION: 21103 DATE: 09/28/2007 PAGE: 01

CONFIGURE

A. LANGUAGE	: 0=ENGLISH
B. MACHINE TYPE	: 3=MP1604 (50 BAR)
C. LOAD CHUTE	: 0=NO
D. LOAD DOOR	: 0=NO
E. CONVEYOR INSTALLED	: 0=NO
F. ALLIED RECEIVE	: 0=NO
G. ADD 1 TO ALLIED INPUT?	: NOT APPLICABLE
H. ALLIED DISCHARGE	: 0=NO
I. EXTRA DATA PASS	: 0=NO
J. BYTES IN NETWORK	
K. MILTRAC ADDRESS	

— End of BICP1P09 —

Chapter 3
Operating

BICP1O05 (Published) Book specs- Dates: 20150826 / 20150826 / 20150826 Lang: ENG01 Applic: CP1

3.1. Mark VI Press Normal Operation

3.1.1. Check Switch Settings

Display or Action	Explanation
	Check that the run/program keyswitch is at .
	All emergency stop buttons must be unlatched and in the *ready* position to allow machine operation.
/	Check that the machine master switch is at .

The *firmware version* (Figure 39) display appears immediately when power is applied to the control circuit through the master switch.

Figure 39: *Firmware Version* **display**

3.1.2. Updating the Display Firmware

The microprocessor software and the firmware contained in the display must match. The software and firmware are compared each time the machine powers up. If the machine software was changed, the microprocessor displays a screen similar to Figure 40.

Figure 40: *Update Firmware* **display**

Notice 8: Do Not Interrupt the Update Process—Do not press any key or turn off power to the machine after beginning the update process.

- If you interrupt the update process, special procedures (described in Section 5.5.2.5) may be required to return the machine to service.

Display or Action	Explanation
Enter	Update the display with the correct firmware.

Figure 41: Firmware Update in Progress

The controller automatically restarts when the firmware update process ends.

3.1.3. Starting the Press

The Milnor® copyright display appears after the machine controller verifies that the firmware in the display is the correct version. The copyright display is shown in Figure 42.

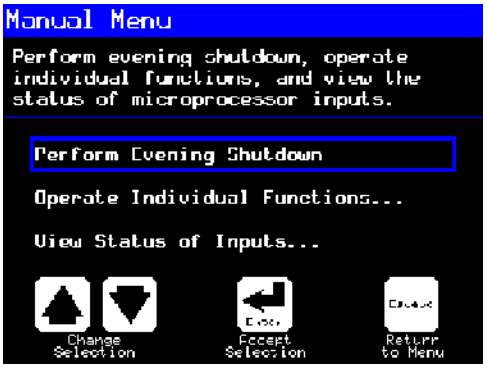
Figure 42: Copyright display

If the controller memory is found to be unreliable when the press starts up, the display will indicate “Configure Checksum Error.” Turn the *run/program keyswitch* to the *Program* position and clear memory when prompted.

The display will indicate a peripheral board failure if the controller can not communicate with a board.

The *Manual Menu* display (Figure 43) appears immediately after the copyright display if the memory is found reliable and all configured boards are communicating with the controller. The *operator alarm* begins sounding.

Figure 43: *Manual Menu* **display**



Display or Action	Explanation
①=Enable 3-Wire Circuit	Appears at the bottom of the display to indicate that the three-wire circuit is disabled.
①	Energizes the press control circuit and silences the *operator alarm*.

Display or Action	Explanation
ESCAPE	Exit *Manual* menu. **Initialization begins. Refer to Chart 1.**

DANGER 9: Crush Hazard—A descending ram will strike and/or crush anyone under it. The ram can descend with power on or off.

- Ensure personnel are clear of the press before operating it in *manual* or *automatic* mode. The ram may move automatically when certain controls are used, such as when ① is pressed or cake data is entered.

Chart 1: The Press Initialization Procedure

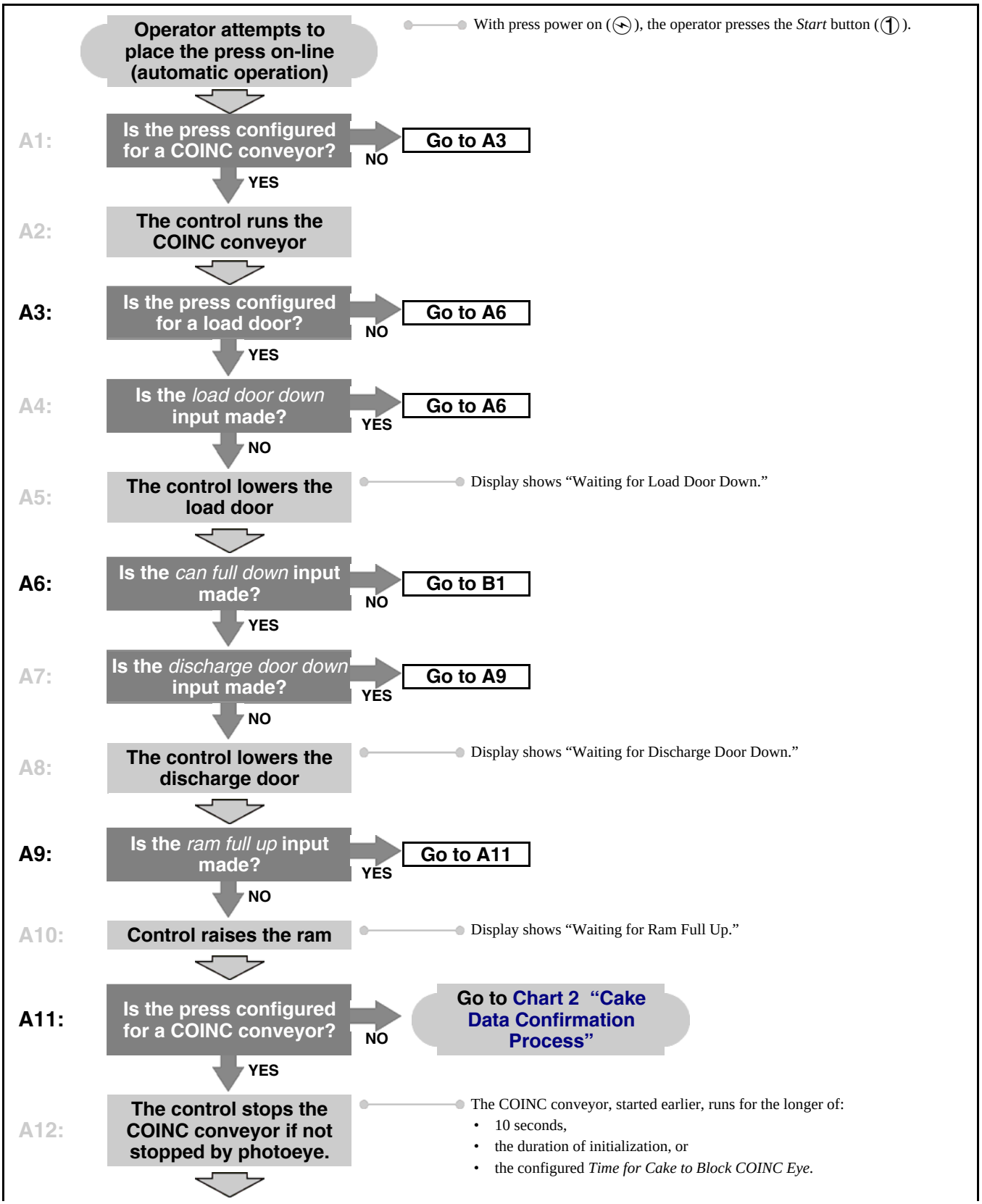
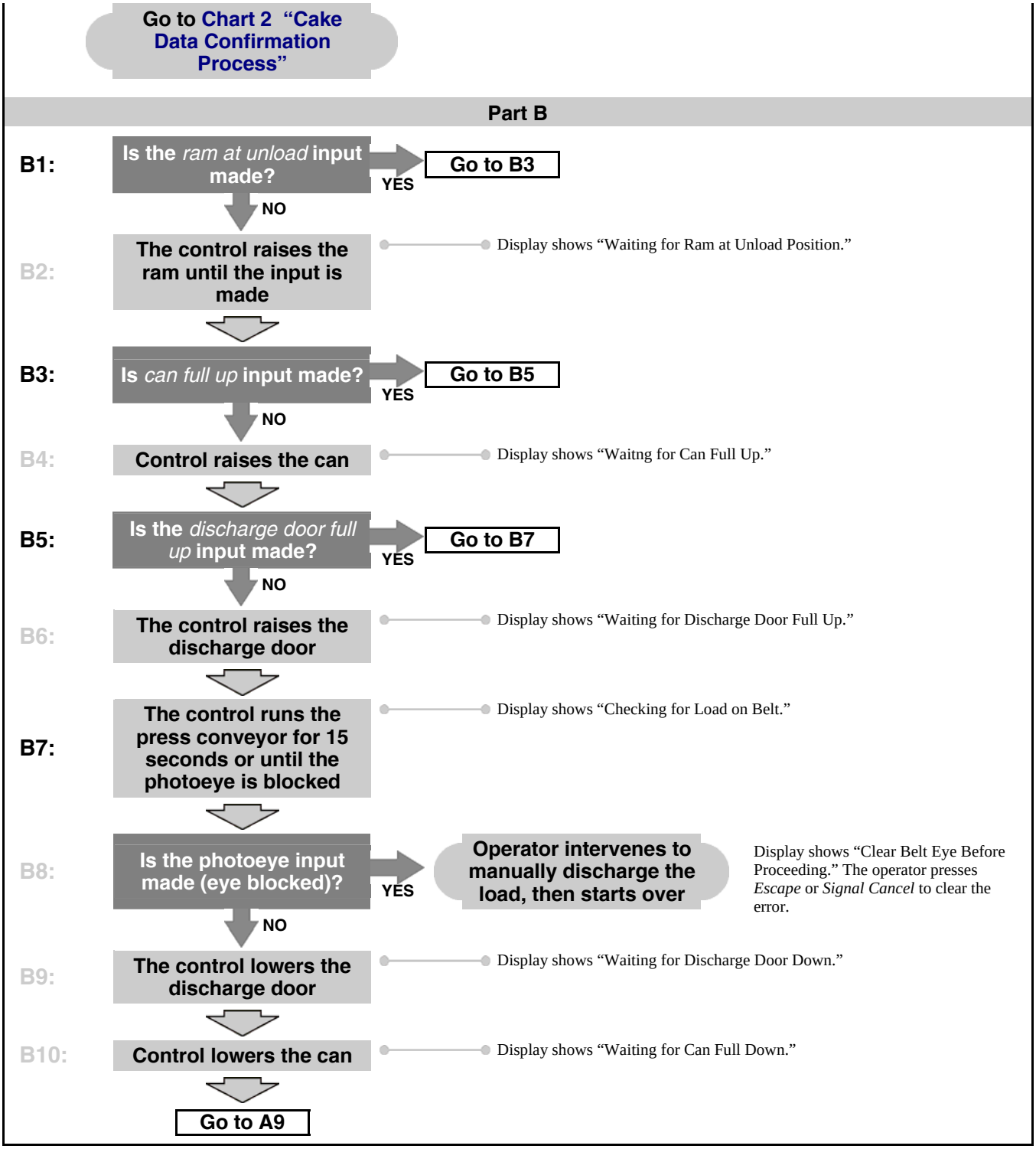


Chart 1: The Press Initialization Procedure



3.1.4. When Cake Data Must be Confirmed

When normal operation resumes following morning start up, a power loss, a three-wire error or any other error (see Section 4.1. "Single Stage Press Error Messages"), or manual intervention, the controller cannot know if goods are present in the press or conveyor. Therefore, the controller

considers the batch codes for these locations unreliable and prompts the user for the information explained below. The cake data confirmation process is outlined in Chart 2.

Chart 2: Cake Data Confirmation Process

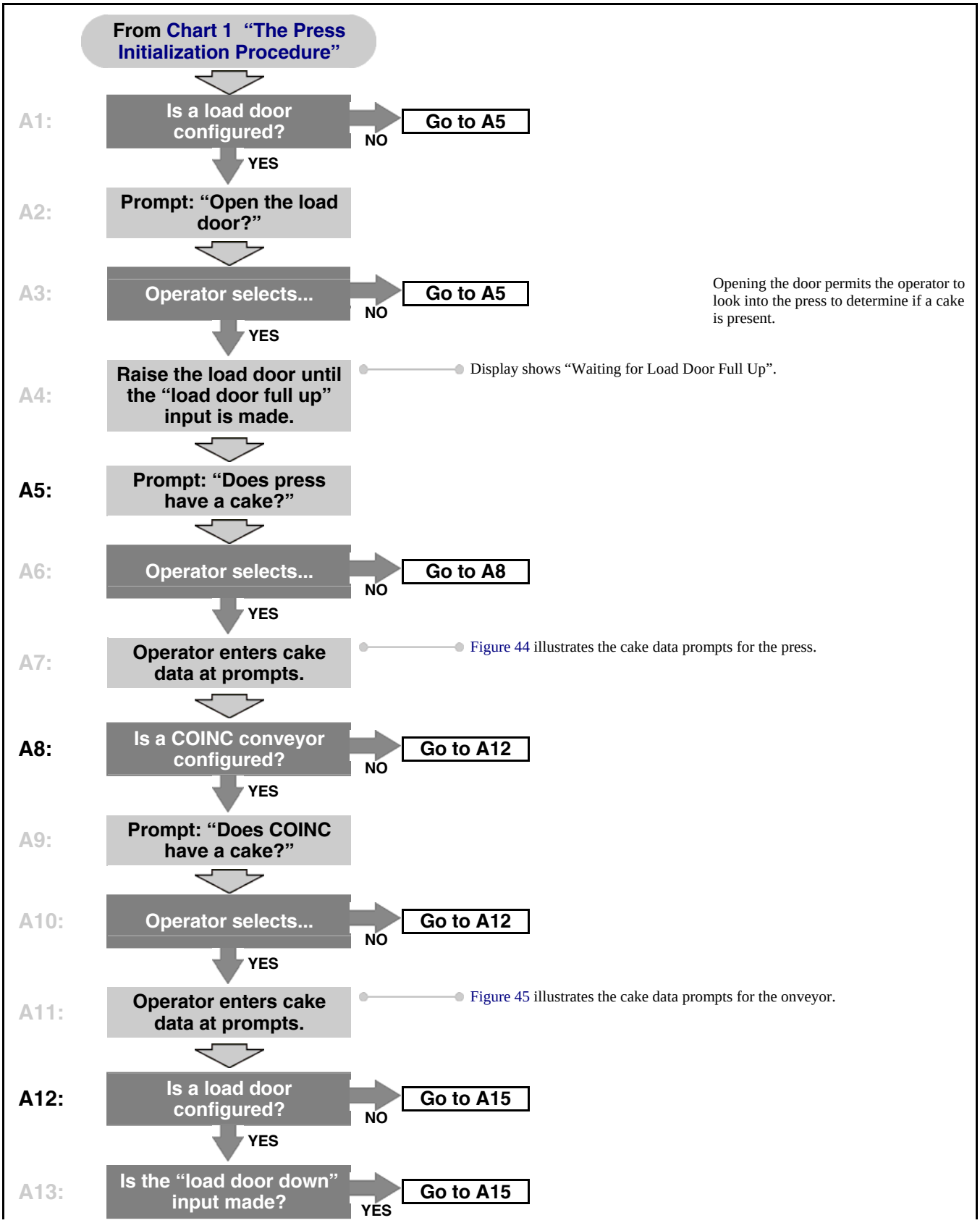
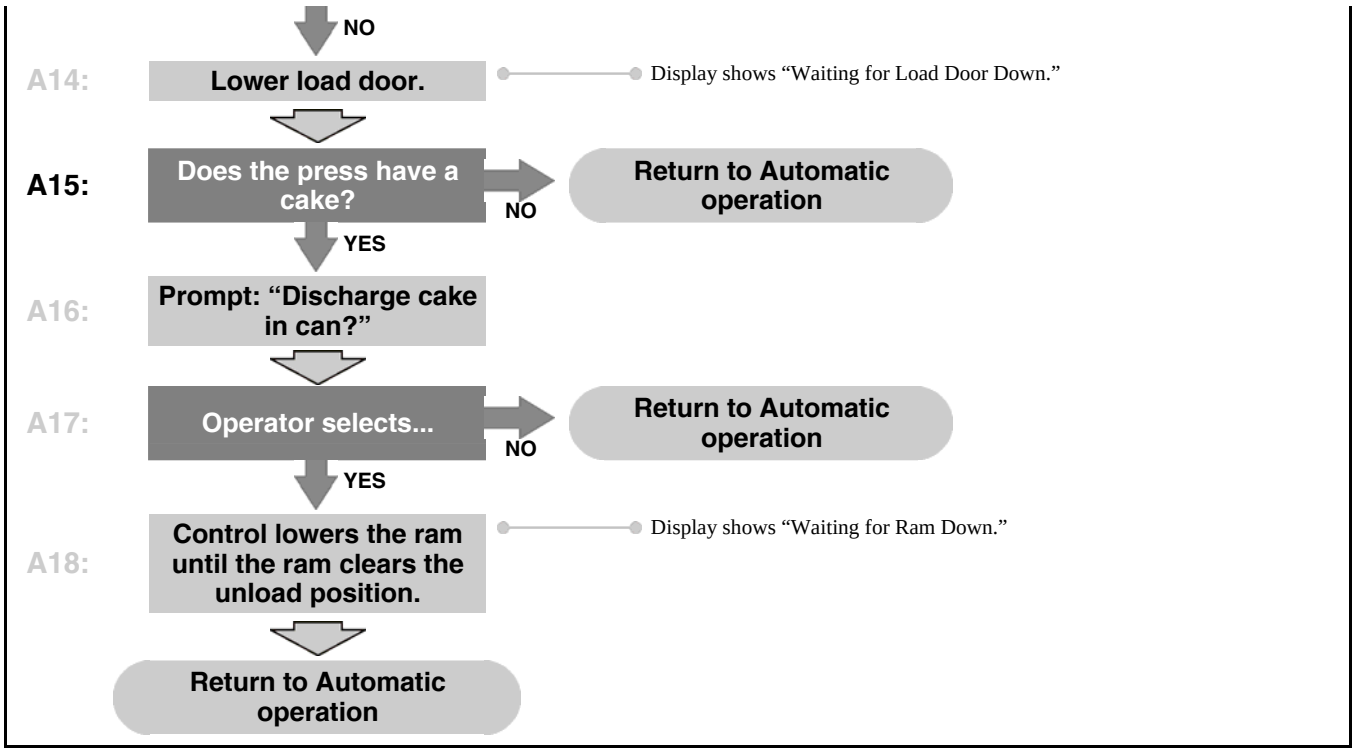
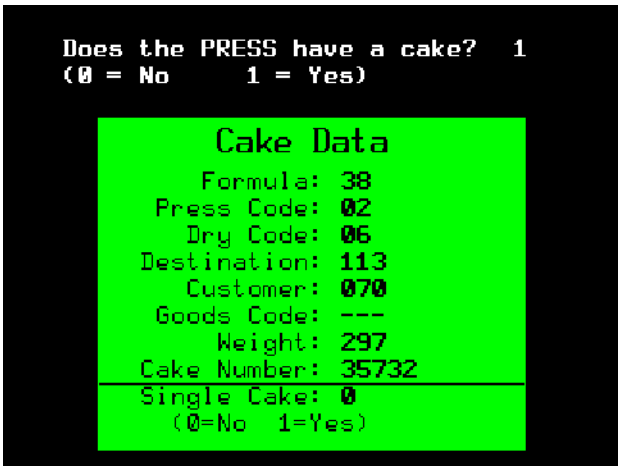


Chart 2: Cake Data Confirmation Process



Display or Action	Explanation
`Does the PRESS have a cake?`	
0	Enter *0* (No) if the press is empty.
1	Enter *1* (Yes) if the press is loaded. The press control will prompt for the correct cake data for the goods in the press, as shown in Figure 44.

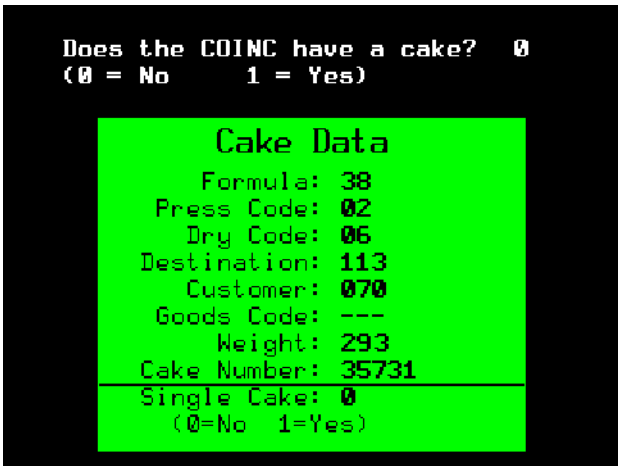
Figure 44: *Cake Data Entry* **Window for Press**



If the press is configured for a discharge conveyor, the COINC loaded prompt appears.

Display or Action	Explanation
`Does the COINC have a cake?`	
0	Enter *0* (No) if the COINC is empty.
1	Enter *1* (Yes) if the COINC is loaded. The press control will prompt for the correct cake data for the goods on the belt, as shown in Figure 45.

Figure 45: *Cake Data Entry* **Window for COINC**



The COINC conveyor returns to automatic operation after cake data is verified. If the COINC conveyor is not loaded, the normal run display appears.

3.1.5. Power Loss or Three-Wire Disabled Condition

If the press loses power or the three-wire circuit is disabled (e.g., an emergency stop switch is pressed), the press stops immediately. Some manual intervention may be required to return the press to operation again, depending on the state of the press at the time of power loss. On power up, the press goes through the display sequence described in Section 3.1.3 "Starting the Press", ending with the *Manual Menu* display.

If the press was discharging when power was lost, the cake must be manually removed from the belt to allow the press to return to automatic operation. If the press is equipped with a COINC conveyor, use *Manual Press Function 3* (Run Belt) to move the cake from the press to the COINC conveyor. The COINC belt stops when the cake blocks the COINC photoeye.

If the press is not equipped with a COINC conveyor, use *Manual Press Function 9* (Track Belt) to move the cake from the press to the receiving device.

When the belt is clear, press the *Escape* button on the keypad to exit the *Manual Menu*. The press will begin the initialization sequence described in Section 3.1.6, then prompt the operator for cake data for any goods which may be in the press or on the COINC belt. The press returns to automatic operation after cake data entry is complete.

3.1.6. The Press Initialization Procedure

The normal operating mode of this machine is fully automatic. After the machine is set for automatic operation, a new load and corresponding batch codes pass from the loading device to

the press each time the loading device (usually a CBW® tunnel washer) is ready to discharge and the press is ready to receive. Before a new load is received, the cake of processed goods is discharged to a storage belt or the receiving shuttle, freeing the machine for the next load.

CAUTION 10: Multiple Hazards—Careless operator actions can kill or injure personnel, damage or destroy the machine, damage property, and/or void the warranty.

CAUTION 11: Electrocution and Electrical Burn Hazards—Contact with electric power can kill or seriously injure you. Electric power is present inside the cabinetry unless the main machine power disconnect is off.

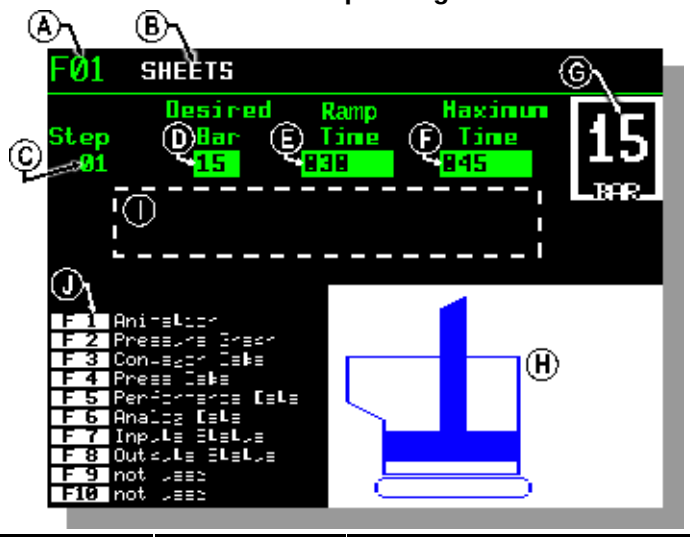
- Do not unlock or open electric box doors.
- Know the location of the main machine disconnect and use it in an emergency to remove all electric power from the machine.
- Do not service the machine unless qualified and authorized. You must clearly understand the hazards and how to avoid them.

3.1.7. Using the Normal Run Display

In the normal automatic operating mode, the operator only needs to monitor the press for load errors and ensure that the desired pressure is achieved. Figure 46 illustrates the important elements of the display during normal operation, which are described in Section 3.1.7.1 through Section 3.1.7.10.

Figure 46: Normal Run Display

Press Operating



Legend

A.	Press code
B.	Press code name
C.	Current step number
D.	Desired pressure in bar
E.	Ramp time (seconds)
F.	Maximum press time (seconds)
G.	Current pressure in bar
H.	Animation and graphing region
I.	Message region
J.	Display options help

3.1.7.1. Press code number—Valid press codes are 00 through 15. When the press receives a batch, the loading device passes a press code number to the press, along with other batch data, either through Miltrac or allied data inputs. The press executes the press code that corresponds to the press code number it receives from the loading device.

3.1.7.2. Press code name—The press code name is stored in the press controller and corresponds to the press code number.

3.1.7.3. **Current step number**—Press formulas may include multiple steps, as when pressure is gradually increased. The step number increments at the beginning of each step.

3.1.7.4. **Desired pressure in bar**—This field displays the programmed membrane pressure for this step, as measured in bar.

$$1\ bar = 0.9872\ atmosphere = 1 \times 10^5\ N/m^2 = 14.504\ PSI$$

3.1.7.5. **Ramp time** —This timer corresponds to the time to achieve the desired pressure. The timer starts counting down when membrane pressurization starts.

3.1.7.6. **Maximum press time** —This timer begins counting down when membrane pressurization begins. The step ends when this timer expires, even if the desired pressure has not been achieved.

3.1.7.7. **Current pressure in bar**—This field displays the current membrane pressure.

3.1.7.8. **Message region**—During normal operation, this area of the display shows text messages describing the current operational state or error condition of the press.

3.1.7.9. **Alternate Displays [Document BICP1O07]**—When the press is running a press code, additional operating data are available through the keypad function keys. The menu of available display options is shown in Figure 47.

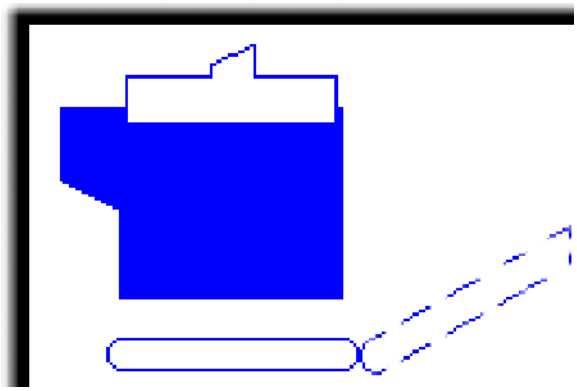
Figure 47: Display Options Menu

3.1.7.9.1. Animation and Graphing Region—This region of the display shows an animation of the operating press or a line graph of the membrane pressure.

3.1.7.9.1.1. Press Animation

Display or Action	Explanation
F1	Display a graphic representation of the major press components. Each component is outlined when the component is stationary,or solid blue when the component is moving under power.

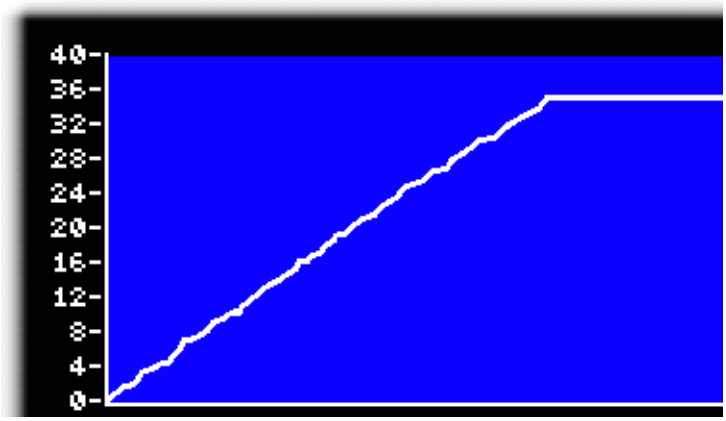
Figure 48: Typical Animation Screen



3.1.7.9.1.2. Pressure Graph

Display or Action	Explanation
F2	Display a graph of membrane pressure over time. Graphing begins when the operator presses F2 and ends when the graph is replaced by the animation (when the operator presses F1). The graph displays a maximum of two minutes before older values scroll off the left side of the window. A new pressure reading is plotted about every half second.

Figure 49: Diaphragm Pressure Graph



3.1.7.9.2. Conveyor and Press Cake Data—These options display data about the cake on the discharge conveyor and in the press. In normal operation this data comes to the press controller from the Miltrac network. If the press prompts for goods data at startup, this information is entered by the operator.

Display or Action	Explanation
F3	Display cake data for the cake on the discharge conveyor, as shown in Figure 50. Data includes wash formula, dry code, destination, customer code, and goods code. This information is available only if the press is configured for a discharge conveyor.
F4	Display cake data for the cake in the press (Figure 51). Data includes wash formula, dry code, destination, customer code, and goods code.
Escape	Return to the selection menu.

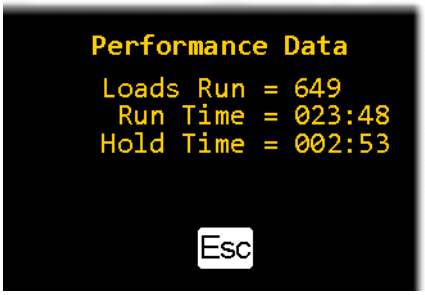
Figure 50: Conveyor Cake Data

Figure 51: Press Cake Data

3.1.7.9.3. Performance Data

Display or Action	Explanation
F5	Display performance data for the press. Data includes loads processed, total processing time, and total hold time.
F5 + 4 + 6	Clear press performance data.
Escape	Return to the selection menu.

Figure 52: Performance Data



3.1.7.9.4. Analog Data—This display shows the digital readings of the analog input and analog output boards corresponding to the input from the hydraulic pressure transducer and the output to the proportional card.

Display or Action	Explanation
F6	Display analog data for the press. The Analog Values display comprises both the digital counts and the corresponding computed values for input channels 0, 1, and 2 on the analog-to-digital (A/D) board, as well as the digital-to-analog (D/A) board output.
Escape	Return to the selection menu.

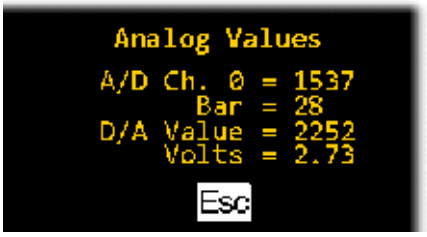
A/D Channel 0—digital counts related to the analog input from the pump pressure transducer. This input provides an indirect measurement of diaphragm pressure in bar, based on the applied pump pressure.

Bar—approximate pressure in bar at the diaphragm as calculated from the analog-to-digital channel 0 counts.

D/A Value—digital counts related to the analog output to the proportional card. This output provides an analog signal in volts to regulate the proportional valve.

Volts—approximate analog output in volts calculated from the digital-to-analog value.

Figure 53: Analog Data



3.1.7.9.5. Inputs and Outputs Status—This selection allows you to view the on/off status of each microprocessor input, with each page displaying the inputs present on the processor board (page 2) or one of four 8-output/16-input boards (pages 0, 1, 3, and 4). Refer to Table 7 through Table 10 and Section 4.3..

Display or Action	Explanation
F7	displays the first page of microprocessor input signals
F8	displays the first page of outputs
+	indicates an input to the microprocessor that is made (grounded) or an output that is turned on (enabled)
–	indicates an input to the microprocessor that is not made (open) or an output that is turned off (disabled)
→	displays the next page of inputs or outputs
←	displays the previous page of inputs or outputs
Escape	Return to the selection menu.

Figure 54: Inputs Status Page 0

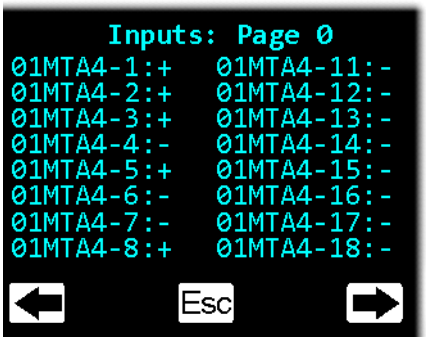


Figure 55: Outputs Status Page 2

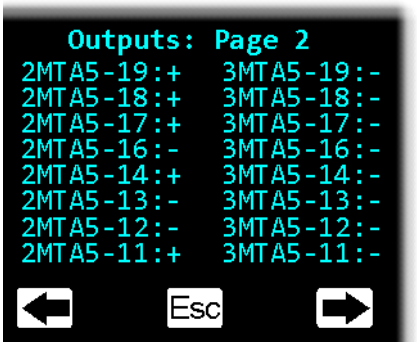


Table 7: Standard and Direct Inputs (Pages 0, 1, and 2)

Page 0		Page 1		Page 2	
Connector-Pin	**Input Name**	**Connector-Pin**	**Input Name**	**Connector-Pin**	**Input Name**
1MTA4-1	Three-wire enabled	2MTA4-1	Press code bit 0	MTA39-5	Load chute full up
1MTA4-2	Ram inside can	2MTA4-2	Press code bit 1	MTA39-4	Load chute full down
1MTA4-3	Ram full down	2MTA4-3	Press code bit 2	MTA39-3	Customer code bit 6
1MTA4-4	Can full up	2MTA4-4	Press code bit 3	MTA39-8	Customer code bit 7
1MTA4-5	Can full down #1	2MTA4-5	Ram at unload	MTA39-7	Load scoop blocked
1MTA4-6	Discharge photoeye	2MTA4-6	Can full down #2	MTA39-6	Don't discharge
1MTA4-7	Discharge door full up	2MTA4-7	Dry code bit 3	n/a	— not used —
1MTA4-8	Discharge door full down	2MTA4-8	COINC photoeye	n/a	— not used —
1MTA4-11	— not used —	2MTA4-11	Reuse tank high level	MTA38-3	Ram full up
1MTA4-12	Start discharge	2MTA4-12	Reuse tank low level	MTA38-2	Program keyswitch
1MTA4-13	— not used —	2MTA4-13	Taut belt	MTA38-1	Signal cancel
1MTA4-14	Single cake	2MTA4-14	Ram at low	MTA38-4	Local/Remote
1MTA4-15	Pass empty	2MTA4-15	Main filter dirty	MTA38-5	Press loaded
1MTA4-16	Dry code bit 0	2MTA4-16	Oil too hot	MTA38-6	Fault recovery
1MTA4-17	Dry code bit 1	2MTA4-17	Oil level low	n/a	— not used —
1MTA4-18	Dry code bit 2	2MTA4-18	Recirc filter dirty	n/a	— not used —

Table 8: Extra Data Pass and Allied Weight Inputs (Pages 3 and 4)

Page 3		Page 4	
Connector-Pin	**Input Name**	**Connector-Pin**	**Input Name**
3MTA4-1	Goods Code Bit 0	4MTA4-1	Allied Weight Bit 0
3MTA4-2	Goods Code Bit 1	4MTA4-2	Allied Weight Bit 1
3MTA4-3	Goods Code Bit 2	4MTA4-3	Allied Weight Bit 2
3MTA4-4	Goods Code Bit 3	4MTA4-4	Allied Weight Bit 3
3MTA4-5	Goods Code Bit 4	4MTA4-5	Allied Weight Bit 4
3MTA4-6	Goods Code Bit 5	4MTA4-6	Allied Weight Bit 5
3MTA4-7	Destination Code Bit 0	4MTA4-7	Allied Weight Bit 6
3MTA4-8	Destination Code Bit 1	4MTA4-8	Allied Weight Bit 7
3MTA4-11	Customer Code Bit 0	4MTA4-11	Allied Weight Bit 8
3MTA4-12	Customer Code Bit 1	4MTA4-12	Allied Weight Bit 9
3MTA4-13	Customer Code Bit 2	4MTA4-13	Allied Weight Bit 10
3MTA4-14	Customer Code Bit 3	4MTA4-14	Allied Weight Bit 11
3MTA4-15	Customer Code Bit 4	4MTA4-15	Goods Code Bit 6
3MTA4-16	Customer Code Bit 5	4MTA4-16	Goods Code Bit 7
3MTA4-17	Destination Code Bit 2	4MTA4-17	— not used —
3MTA4-18	Destination Code Bit 3	4MTA4-18	— not used —

Table 9: Standard Outputs (Pages 0 and 1)

Page 0		Page 1	
Connector-Pins	**Input Name**	**Connector-Pins**	**Input Name**
1MTA5-10 & 5-19	Prefill	11MTA13-09 & 13-19	Press Return Pump
1MTA5-9 & 5-18	Run Belt Reverse	11MTA13-10 & 14-01	Poppet Valve #2
1MTA5-8 & 5-17	Lower Ram	11MTA14-11 & 14-02	Discharge Door Up
1MTA5-7 & 5-16	Raise Ram	11MTA14-12 & 14-03	Discharge Door Down
1MTA5-4 & 5-14	Lower Can	11MTA14-04 & 14-13	Hold Shuttle
1MTA5-3 & 5-13	Raise Can	11MTA14-10 & 14-14	Ram Down Bypass
1MTA5-2 & 5-12	Run Belt Forward	11MTA14-10 & 14-05	— not used —
1MTA5-1 & 5-11	Poppet Valve #1	11MTA14-10 & 14-15	— not used —
11MTA13-01 & 13-11	Operator Signal	11MTA14-10 & 14-06	Customer Code Bit 0
11MTA13-02 & 13-12	Press Free	11MTA14-10 & 14-16	Customer Code Bit 1
11MTA13-03 & 13-13	Desire to Unload	11MTA14-10 & 14-07	Customer Code Bit 2
11MTA13-04 & 13-14	Load Chute Up	11MTA14-10 & 14-17	Customer Code Bit 3
11MTA13-05 & 13-15	Load Chute Down	11MTA14-10 & 14-08	Customer Code Bit 4
11MTA13-06 & 13-16	Discharge Flag Down	11MTA14-10 & 14-18	Customer Code Bit 5
11MTA13-07 & 13-17	Load Flag Down	11MTA14-10 & 14-09	Customer Code Bit 6
11MTA13-08 & 13-18	COINC Belt	11MTA14-10 & 14-19	Customer Code Bit 7

Table 10: Standard Outputs (Pages 2 and 3)

Page 2		Page 3	
Connector-Pins	**Input Name**	**Connector-Pins**	**Input Name**
2MTA5-10 & 5-19	Destination Code Bit 0	4MTA5-10 & 5-19	— not used —
2MTA5-9 & 5-18	Destination Code Bit 1	4MTA5-9 & 5-18	— not used —
2MTA5-8 & 5-17	Destination Code Bit 2	4MTA5-8 & 5-17	— not used —
2MTA5-7 & 5-16	Destination Code Bit 3	4MTA5-7 & 5-16	— not used —
2MTA5-4 & 5-14	Dry Code Bit 0	4MTA5-4 & 5-14	— not used —
2MTA5-3 & 5-13	Dry Code Bit 1	4MTA5-3 & 5-13	— not used —
2MTA5-2 & 5-12	Dry Code Bit 2	4MTA5-2 & 5-12	— not used —
2MTA5-1 & 5-11	Dry Code Bit 3	4MTA5-1 & 5-11	— not used —
3MTA5-10 & 5-19	Goods Code Bit 0	— not used —	— not used —
3MTA5-9 & 5-18	Goods Code Bit 1		
3MTA5-8 & 5-17	Goods Code Bit 2		
3MTA5-7 & 5-16	Goods Code Bit 3		
3MTA5-4 & 5-14	Goods Code Bit 4		
3MTA5-3 & 5-13	Goods Code Bit 5		
3MTA5-2 & 5-12	Goods Code Bit 6		
3MTA5-1 & 5-11	Goods Code Bit 7		

3.1.7.10. **Display options help**—This part of the screen normally contains the list of optional display data. Some elements of display data, especially the machine data and status displays, replace the help text temporarily. Press Escape to restore the help information.

3.1.8. How to Modify a Running Formula

The operator may skip to the next step in a press code even if the desired pressure has not been achieved for the current step.

Display or Action	Explanation
5 + 8 + Enter	Advances the step timer to 000 and starts the next step.

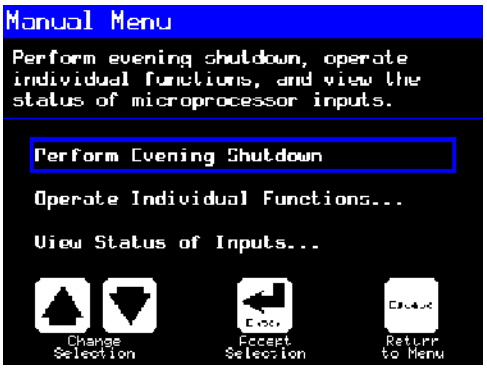
— End of BICP1O05 —

BICP1O06 (Published) Book specs- Dates: 20150826 / 20150826 / 20150826 Lang: ENG01 Applic: CP1

3.2. Manual Operation

The press normally powers up in *Manual* mode (Figure 56).

Figure 56: *Manual Menu* **Display**



Display or Action	Explanation
Manual	accesses *Manual* mode from *Automatic* mode at any time

From the *Manual* menu, select *Perform Evening Shutdown*, *Operate Individual Functions*, or *View Status of Inputs* as desired.

Escape	exits *Manual* mode and returns to *Automatic* mode

3.2.1. How to Adjust Display Brightness

Display or Action	Explanation
F1	From the *Manual Menu* display (Figure 56), this keystroke increases the brightness of the display. Press repeatedly to make the display progressively brighter.
F2	This keystroke decreases the brightness of the display, making it darker. Press repeatedly to make the display progressively darker.

3.2.2. How to Manually Download Display Firmware

Display or Action	Explanation
F4	From the *Manual Menu* display (Figure 56), this keystroke forces an update of the display firmware. **Notice 12: Do Not Interrupt the Update Process**—Do not press any key or turn off power to the machine after beginning the update process. • If you interrupt the update process, special procedures (described in Section 5.5.2.5) may be required to return the machine to service. The controller automatically restarts when the firmware update process ends.

3.2.3. How to View the Firmware Version

Display or Action	Explanation
F7	From the *Manual Menu* display (Figure 56), this keystroke calls the *Firmware Version* display, shown in Figure 57.

Figure 57: *Firmware Version* **Display**

3.2.4. How to View the Software Version

Display or Action	Explanation
F8	From the *Manual Menu* display (Figure 56), this keystroke calls the *Copyright* display, shown in Figure 58.

Figure 58: *Copyright* **Display**

3.2.5. Evening Shutdown Procedure [Document BICP1O08]

The *Perform Evening Shutdown* selection from the *Manual* menu prepares the press for the operator to turn off power. The Evening Shutdown procedure is outlined in Chart 3.

Figure 59: Typical *Evening Shutdown* **Display**

Chart 3: Descriptive Chart for Evening Shutdown

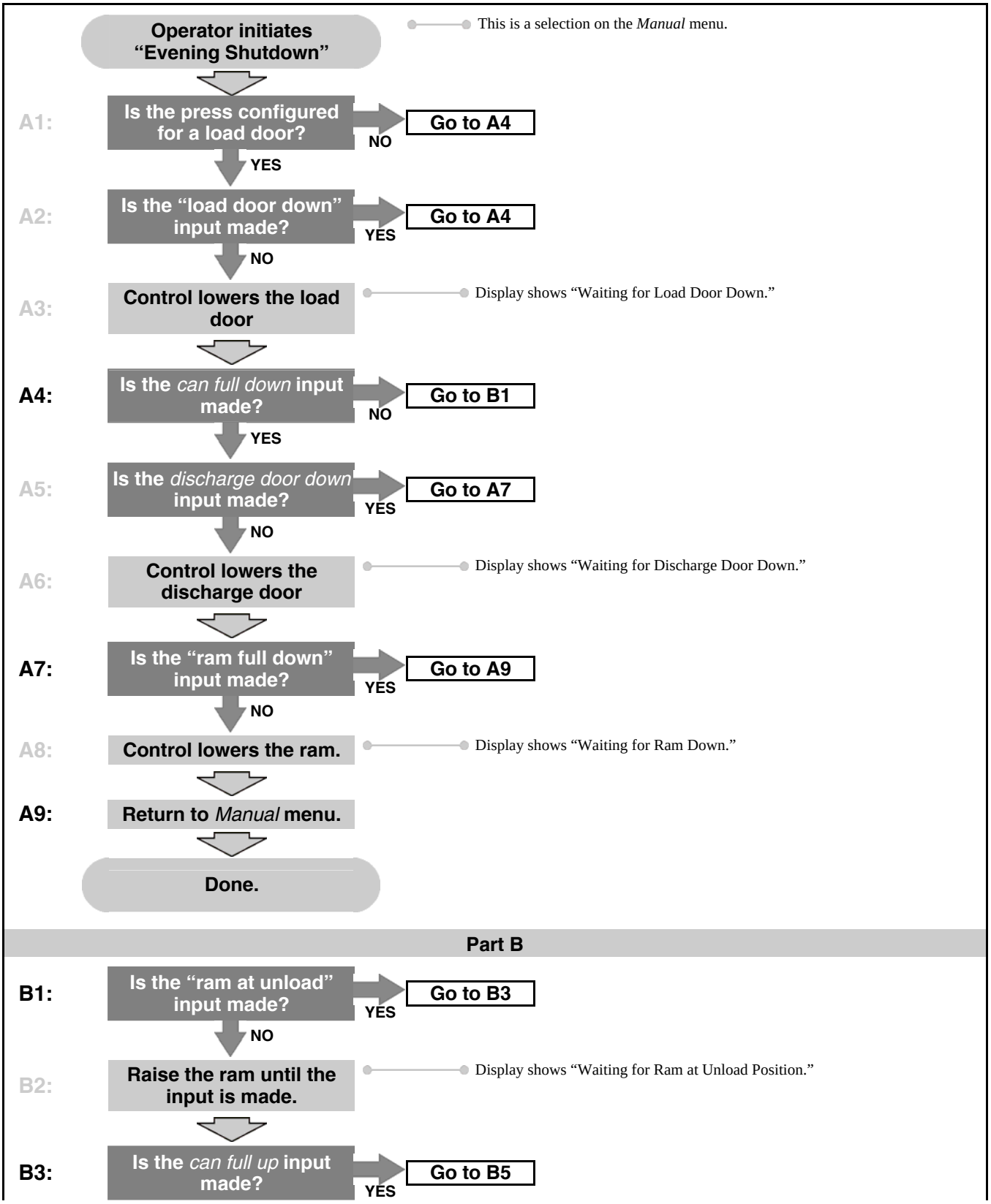
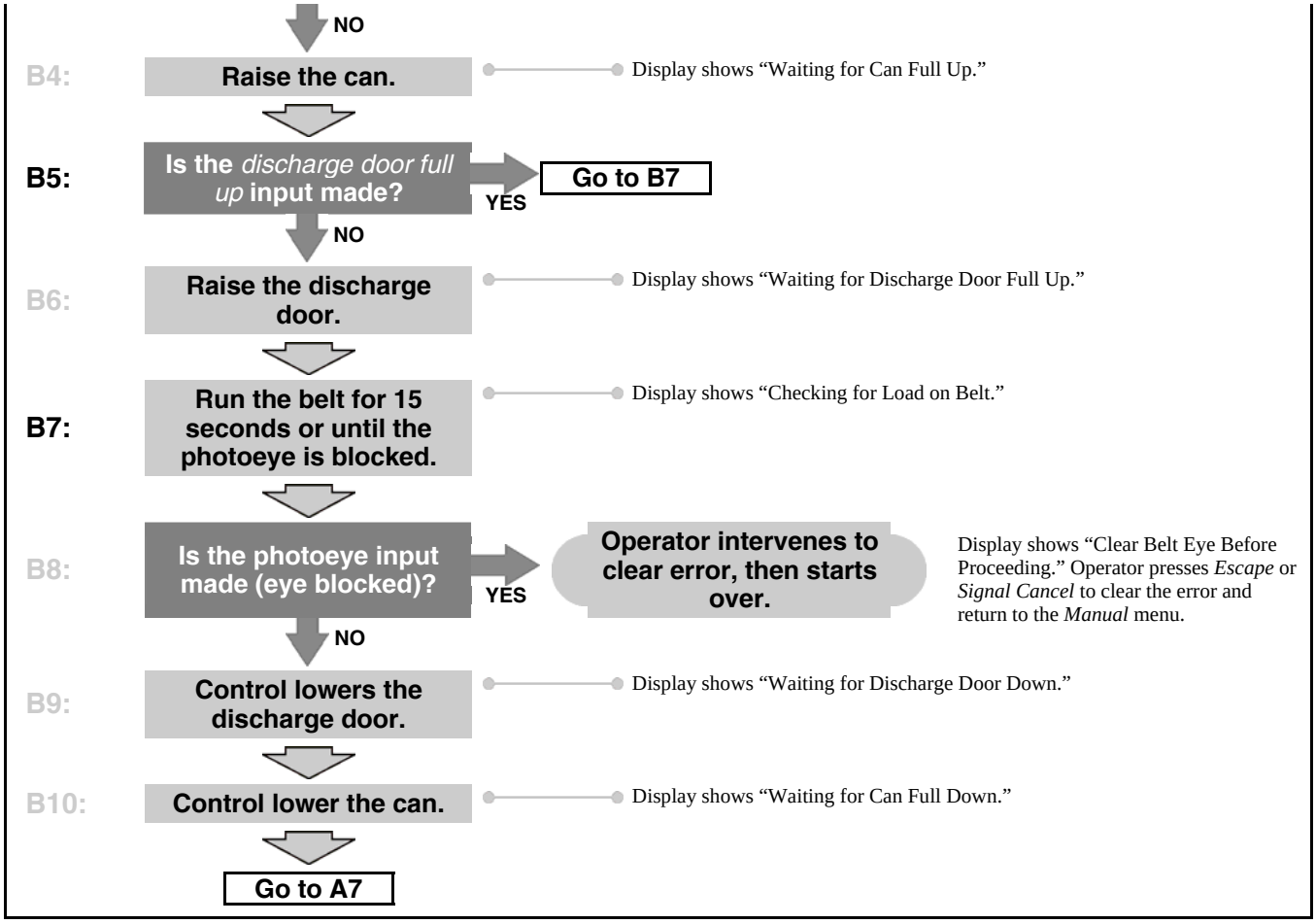


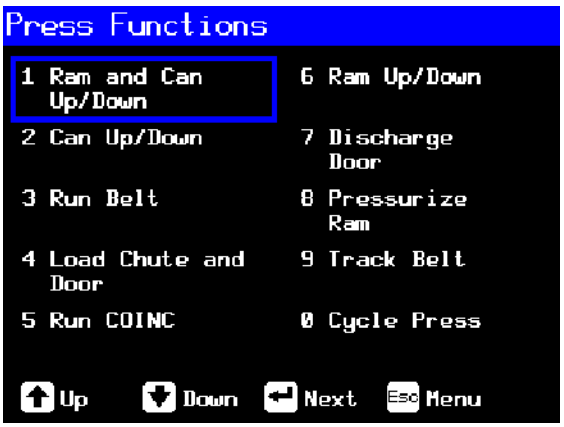
Chart 3: Descriptive Chart for Evening Shutdown



3.2.6. Operate Individual Press Functions

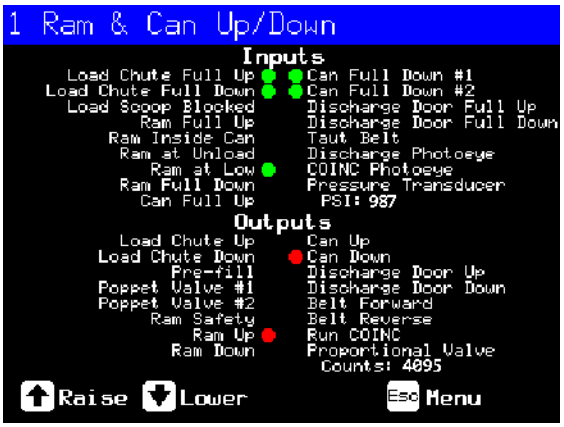
Use the *Press Functions* menu to manually operate the press and to perform maintenance tasks according to the service and maintenance manual.

Figure 60: *Press Functions* **Menu Screen**



3.2.6.1. Operating the Ram and Can—This function raises or lowers the ram while forcing the can down. The belt and the scoop must both be clear of goods when lowering the ram. Pump pressure is not allowed to exceed 1500 psi while lowering the ram.

Figure 61: *1 Ram and Can Up/Down* **Screen**



Display or Action	Explanation
	Raises the ram while driving the can down. The controller displays “Ram Full Up” when the *Ram Full Up* input is made.
	Lowers the ram while driving the can down. The controller displays “Ram Full Down” when the *Ram Full Down* input is made.

Note 7: The controller requires a delay of four seconds after commanding the ram down before the ram can be commanded up.

Escape	Exits this page and returns to the *Press Functions* menu screen (Figure 60).

3.2.6.2. Operating the Can—This function raises and lowers the can. The **belt** must be clear of goods when moving the can down, and the **scoop** must be clear of goods when moving the can up.

Figure 62: *Can Up/Down* **Screen**

Display or Action	Explanation
	Raises the can by actuating the *Can Up* output if all safety conditions are met. The controller displays “Can Full Up” when the *Can Full Up* input is made.
	Lowers the can by actuating the *Can Down* output if all safety conditions are met. The controller displays “Can Full Down” when the *Can Full Down* inputs are made.
Escape	Exits this page and returns to the *Press Functions* menu screen (Figure 60).

3.2.6.3. Running the Belt—This function opens the discharge door and runs the main belt forward and backward. The ram must be above the *Ram Inside Can* position, the can must be raised fully. The COINC runs when the belt is commanded to run forward if the COINC eye is not blocked.

Figure 63: *Run Belt* **Screen**

Display or Action	Explanation
	Automatically raises the discharge door and runs the main belt forward by actuating the *Belt Forward* output if all safety conditions are met. If present, the discharge conveyor belt also runs forward.
	Automatically raises the discharge door and runs the main belt backward by actuating the *Belt Reverse* output if all safety conditions are met. The discharge conveyor belt, if present, does not run when the main belt runs in reverse.
	Exits this page and returns to the *Press Functions* menu screen (Figure 60).

3.2.6.4. Operating the Load Chute or Load Door—This function raises and lowers the load chute.

Figure 64: *Load Chute and Door* **Screen**

Display or Action	Explanation
	Raises the load chute by actuating the *Load Chute Up* output. The controller displays “Load Chute Full Up” when the *Load Chute Full Up* input is made.
	Lowers the load chute by actuating the *Load Chute Down* output. The controller displays “Load Chute Full Down” when the *Load Chute Full Down* input is made.
	Exits this page and returns to the *Press Functions* menu screen (Figure 60).

3.2.6.5. Running the Discharge Conveyor (COINC)—This function runs the inclined discharge conveyor belt in the **forward direction only**. This belt will not run in the reverse direction.

Figure 65: *Run COINC* **Screen**

Display or Action	Explanation
	Runs the discharge conveyor belt forward by actuating the *Run COINC* output.
	Exits this page and returns to the *Press Functions* menu screen (Figure 60).

3.2.6.6. **Operating the Ram**—This function raises and lowers the ram, and provides data used in testing and filling the press diaphragm. The belt and the scoop must both be clear of goods to lower the ram. Pump pressure is not allowed to exceed 1500 psi while lowering the ram.

Figure 66: *Ram Up/Down* **Screen**

Display or Action	Explanation
	Raises the ram by actuating the *Ram Up* output if all safety conditions are met. The controller displays “Ram Full Up” when the *Ram Full Up* input is made.
	Lowers the ram by actuating the *Ram Down* output if all safety conditions are met. The controller displays “Ram Full Down” when the *Ram Full Down* input is made.
	Exits this page and returns to the *Press Functions* menu screen (Figure 60).

3.2.6.7. **Operating the Discharge Door**—This function raises and lowers the discharge door.

Figure 67: *Discharge Door* **Screen**

Display or Action	Explanation
	Opens the discharge door by actuating the *Discharge Door Up* output.
	Closes the discharge door by actuating the *Discharge Door Down* output. The controller displays “Discharge Door Full Down” when the *Discharge Door Down* input is made.
	Exits this page and returns to the *Press Functions* menu screen (Figure 60).

3.2.6.8. **Pressurizing the Ram**—This function pressurizes the ram. The scoop must be clear of goods and the can must be fully down. Pump pressure is not allowed to exceed 1500 psi if the ram is above the *Ram Inside Can* position.

Figure 68: *Pressurize Ram* **Screen**

Display or Action	Explanation
	Drives the ram and can down.
`Pressure Transducer PSI: xxxx`	Value *xxxx* displays the hydraulic pump pressure in pounds per square inch.
`Proportional Valve Counts: yyyy`	Value *yyyy* displays the counts representing the opening of the proportional valve. This value is 4095 while the ram is pressurizing, indicating that the proportional valve is fully open.
	Exits this page and returns to the *Press Functions* menu screen (Figure 60).

3.2.6.9. Tracking the Belt

WARNING 13: Entangle and Sever Hazards—A running belt can entangle, crush, or sever fingers or hands.

This function runs the belt forward to facilitate belt tracking and/or manual cake discharge. This function starts only if the *Can Full Up* input is made.

1. The controller raises the ram to the full up position.
2. The discharge door begins opening when the *Ram Inside Can* input is made.
3. The belt begins running when the *Ram Full Up* input is made.

Figure 69: *Track Belt* **Screen**

Display or Action	Explanation
	Starts the *Track Belt* function. The belt runs until commanded to stop.
	Stops the *Track Belt* function.
	Exits this page and returns to the *Press Functions* menu screen (Figure 60).

3.2.6.10. Cycling the Press

CAUTION 14: Machine Damage Hazards—Operating the press without a load can cause unnecessary wear on machine components.

- Do not pressurize the ram without a load in the press unless necessary for troubleshooting.

This function operates the press through a complete pressing cycle. Before the cycle begins, the two *Can Full Down* inputs must be made and the load scoop must be clear of goods.

Figure 70: *Cycle Press* **Screen**

Display or Action	Explanation
	Starts the press cycle, as described below:

1. The ram descends past the *Ram at Unload* position, where it begins to pressurize.
2. The pump and proportional valves operate to pressurize the ram to the maximum pressure based on the machine model.
3. Pressure is released.
4. The ram is raised until the *Ram Full Up* input is made.
5. The cycle repeats.

	Stops the cycle.
	Prompts to enable *ram break-in*.

> **Note 8:** In normal operation the prefill valve is enabled 1 second after the press controller commands the ram down. When *ram break-in* is enabled, this delay is extended to 20 seconds.

`ENABLE RAM BREAK-IN?` `0=N 1=Y`	Enter *1* when the press is idle in this mode to enable *Ram Break-in*, or enter *0* to disable the break-in feature. If ram break-in is enabled, the user is prompted to re-enable *ram break-in* every time the press control returns to automatic operation. This prompt does not appear if *ram break-in* is disabled. *Ram break-in* is automatically disabled when press power is turned off.
	Prompts to enable *power-down* to use hydraulics to assist the ram into the can without pressurizing.

> **Note 9:** The *Power-down Valve Setting* is the analog output to the proportional valve when the controller commands the ram down. The range is 0000 to 3000.

Power-down is disabled when you exit the *Cycle Press* function.

	Exits this page and returns to the *Press Functions* menu screen (Figure 60).

3.2.7. View Status of Microprocessor Inputs

This selection allows the user to view the status of each microprocessor input. Each input is identified by name and MTA connection. A + indicates the input is grounded; a – indicates the input is open. Page 0 (Figure 71) displays the inputs for input/output board #1. Page 1 displays the inputs for input/output board #2. Page 2 (Figure 72) displays the direct inputs to the microprocessor board. Page 3 displays the inputs for input/output board #3 when the press is configured for Extra Data Pass. Page 4 displays the inputs for input/output board #4 when the press is configured for Allied Weight Inputs.

Figure 71: Typical Inputs Display for Input/Output Board

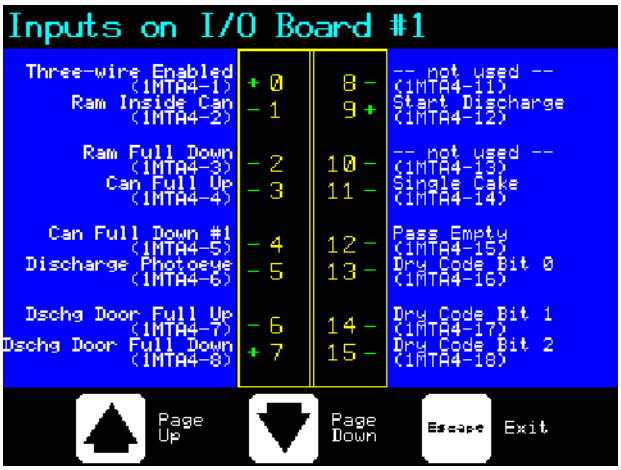
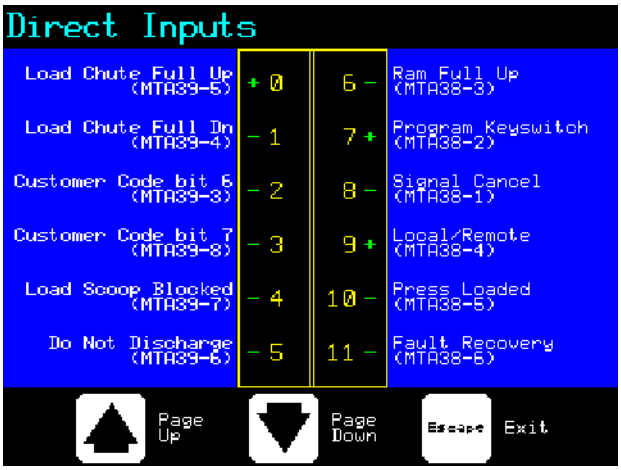


Figure 72: Inputs Display for Microprocessor Board



— End of BICP1O06 —

Chapter 4
Troubleshooting

BICP1T04 (Published) Book specs- Dates: 20150826 / 20150826 / 20150826 Lang: ENG01 Applic: CP1

4.1. Single Stage Press Error Messages

DANGER 15: Crush Hazard—Descending press ram will strike and/or crush anyone under it. Ram can descend with power **on** or **off**.

- Ensure personnel are clear of the press before operating it in *manual* or *automatic mode*. The ram may move automatically when certain controls are used, such as when ① is pressed or cake data is entered.
- Know how to use factory-supplied **emergency stop switches** and where they are located.
- **Lock out**/**tag out** power, lock ram up, and secure factory-supplied safety supports in place before crawling or reaching under the ram.

DANGER 16: Shock Hazard—Contact with high voltage electricity will kill or seriously injure you. High voltage electricity is present in electrical devices on this machine whenever external power is supplied, even if power switches are **off**.

- **Lock out**/**tag out** power at wall disconnect before opening any electrical control box or accessing any other electrical component.
- Always employ the services of a licensed, qualified electrician when troubleshooting the electrical system.

DANGER 17: Crush Hazard—Devices in and above the press move without warning and can entangle, crush or sever limbs on contact.

- Do not reach or lean into the press frame during operation.
- **Lock out**/**tag out** power before touching or reaching into assemblies in or above press frame during service or maintenance.
- Ensure personnel are clear of the press and receiving conveyor before operating either machine.
- Know how to operate factory-supplied **emergency stop switches** and where they are located.
- Close all press side doors and install guards before operating the press.
- Do not climb on press unless press power is **locked out**/**tagged out**.

4.1.1. Error Faults

Error faults are caused by mechanical or electrical malfunctions that produce inputs that should not occur or prevent inputs that should occur during press operation. When an error occurs, the

display alternates between the normal automatic display and a brief description of the malfunction.

Read the safety manual before trying to correct any error and refer to the schematic and parts drawings when necessary. These errors may be caused by failed input devices or output relays on an input/output board or output board. Determine if the appropriate inputs or outputs are being made using the instructions in the related section in document BICP1O01. If you are unable to correct an error or determine the cause of the error from the information in this section, call your dealer service technician or the Milnor® factory for assistance.

Display or Action	Explanation
CAN NOT FULLY RAISED	Indicates the can is not completely up. The error clears automatically if the *can full up* input is made. Possible condition for this error is that the *can full up* switch is malfunctioning or is out of adjustment.

1. Ensure proper actuation of the switch.
2. Adjust or replace the switch if necessary.

CAN NOT FULLY DOWN	Indicates the can is not all the way down. The error clears automatically if **both** *can full down* inputs are made. This error may be caused by the following conditions:

- Goods are under the can edge. Use the gaff hook to remove the goods or other obstruction from under the can after manually raising the can.
- Either or both *can full down* switches are malfunctioning or are out of adjustment.
  1. Ensure the can is down.
  2. Ensure proper actuation of the switches.
  3. Adjust or replace the switches if necessary.

RAM NOT FULLY RAISED	Indicates the ram is not all the way up. The error clears automatically if the *ram full up* input is made. This error may be caused by the following conditions:

- Hydraulic oil pressure is low.
  1. Check oil pipes for leaks and repair or replace as needed.
  2. Verify that the hydraulic pump is operating. Repair or replace as needed.
- *Ram full up* switch is malfunctioning or is out of adjustment.
  1. Ensure proper actuation of the *ram full up* switch per “Setting Single Stage Press Proximity Switch Positions” in the service manual.
  2. Adjust or replace the switch if necessary.

RAM NOT DOWN	Indicates the ram did not clear the *ram inside can* proximity switch, suggesting that the ram did not move down. Pressing once raises the ram. Press again to lower the ram and return to automatic operation. This error may be caused by the following conditions:

- A double or especially large load is in the can. Remove some of the goods from under the ram using the gaff hook supplied by the factory.
- The *ram inside can* switch (*ram half up* input) is malfunctioning or is out of adjustment.
  1. Ensure the ram is below the *ram inside can* position.

Display or Action	Explanation

2. Ensure proper actuation of the switch per “Setting Single Stage Press Proximity Switch Positions” in the service manual.
3. Adjust or replace the switch if necessary.

EYE BLOCKED	Indicates that the discharge photoeye is blocked suggesting that there are goods on the belt. The press cannot bring the can down until this eye is cleared. Press ⌧ to return to automatic operation. This error may be caused by the following conditions:

- There are goods on the end of the belt. Use the gaff hook to clear the goods from the belt.
- The photoeye (*belt eye* input) is malfunctioning or is out of adjustment.
  1. Ensure proper actuation of the photoeye.
  2. Adjust or replace the photoeye if necessary.

RECEIVE FAULT	This error applies to Miltrac loading only. Indicates Miltrac transfer was aborted by the loading device. This usually occurs when the operator powers off the tunnel after it has committed to transfer, but before the transfer has taken place. Pressing ⇗ or ⌧ clears the error and puts the press in *manual mode*.
TRANSFER FAULT PRESS FAULT RECOVERY	This error applies to Miltrac discharge only. Indicates the receiving device aborted the transfer. This usually happens when the receiving device loses the three-wire connection during operation (i.e., a safety plate is kicked, the ⓪ is pressed, power failure, etc). Use the manual controls to move the shuttle back to the receive position. Pressing ⇗ or ⌧ clears the error and puts the press in *manual mode*. Manually discharge goods from the press. Return to *automatic mode* and verify cake data when prompted.
SCOOP BLOCKED	Indicates goods are laying on the load scoop. This usually occurs when the goods are not wet enough to slide down the scoop. Use the gaff hook to clear the scoop and press ⌧ to return to automatic operation.
NO GOODS IN CAN	Indicates the ram cleared the *ram full down* proximity switch suggesting that there is no load in the can when the loading device did not indicate an empty pocket. Pressing ⌧ clears the error and puts the press in *manual mode*. This error may be caused by the following conditions:

- The tunnel transferred an empty pocket which was not properly coded. Ensure that empty pockets are properly coded in the tunnel.
- Cake is undersized. Verify load size and adjust if necessary.
- The tunnel is jammed. See instructions for clearing an obstruction in the tunnel in the tunnel reference manual.
- The *ram full down* switch is malfunctioning or is out of adjustment
  1. Ensure proper actuation of the *ram full down* switch per “Setting Single Stage Press Proximity Switch Positions” in the service manual.
  2. Adjust or replace the switch if necessary.

Display or Action	Explanation
RAM NOT AT UNLOAD POSITION	Indicates the ram did not pass the unload point when the press attempted to raise the ram. The error clears automatically if the *ram at unload* input is made. This error may be caused by the following conditions:

- Hydraulic oil pressure is low.
  1. Check oil pipes for leaks and repair or replace as needed.
  2. Verify that the hydraulic pump is working. Repair or replace as needed.
- *Ram at unload* switch is malfunctioning or is out of adjustment.
  1. Ensure proper actuation of the switch per “Setting Single Stage Press Proximity Switch Positions” in the service manual.
  2. Adjust or replace the switch, if necessary.

LOAD DOOR NOT FULLY OPEN	Applies only to machines equipped with a load door. Indicates the load door was not fully open after the press attempted to raise the load door. After correcting the problem, press ⮌ to return to automatic operation. This error may be caused by the following conditions:

- Load door obstruction. Remove the obstruction and restart the press
- *Load door full up* switch is malfunctioning or is out of adjustment.
  1. Ensure proper actuation of the switch.
  2. Adjust or replace the switch if necessary.

LOAD DOOR NOT FULLY CLOSED	Applies only to machines equipped with a load door. Indicates the load door was not fully closed after the press attempted to lower the load door. After correcting the problem, press ⮌ to return to automatic operation. This error may be caused by the following conditions:

- Load door obstruction. Remove the obstruction and restart the press.
- *Load door full down* switch is malfunctioning or is out of adjustment.
  1. Ensure proper actuation of the switch.
  2. Adjust or replace the switch if necessary.

EYE DID NOT BLOCK	Indicates the cake did not block the photoeye when the press attempted to discharge. The error clears automatically if the *belt eye* input is made. This error may be caused by the following conditions:

- Cake is missing or stuck in can.
- Belt is slipping or failed to run. Inspect the belt and repair as needed.
- Discharge photoeye is malfunctioning or is out of adjustment.
  1. Ensure proper actuation of the photoeye.
  2. Adjust or replace the photoeye if necessary.

Display or Action	Explanation
DISCHARGE DOOR NOT FULLY OPEN	Indicates the discharge door did not fully open when the press attempted to raise the door. The error clears automatically if the *discharge door up* input is made. This error may be caused by the following conditions:

- Dicharge door obstruction. Remove the obstruction and restart the press.
- *Discharge door up* switch is malfunctioning or is out of adjustment.
  1. Ensure proper actuation of the switch.
  2. Adjust or replace the switch if necessary.

DISCHARGE DOOR NOT FULLY CLOSED	Indicates the discharge door did not fully close when the press attempted to lower the door. Pressing once raises the discharge door. Press again to lower the door and return to *automatic* mode. The error also clears automatically if the *discharge door down* input is made. This error may be caused by the following conditions:

- Discharge door obstruction. Remove the obstruction and restart the press.
- *Discharge door down* switch is malfunctioning or is out of adjustment.
  1. Ensure proper actuation of the switch.
  2. Adjust or replace the switch if necessary.

WATER SENSOR DID NOT SENSE GOODS	The water sensor input was not made during loading and the load was not an empty. Press to return to automatic operation.
PRESS CODE XX IS INVALID	Indicates the press received a press code from the loading device for a non-existent formula. This is usually due to a data entry error. Pressing clears the error and puts the press in *manual* mode. Return to *automatic* mode and verify the cake data.
PRESS SHOULD BE EMPTY	Indicates the ram did not clear the *ram full down* proximity switch, suggesting that there is a load in the can when the loading device indicated an empty pocket. Pressing clears the error and puts the press in *manual* mode. This error may be caused by the following conditions:

- The tunnel transferred a cake which was improperly coded as an empty pocket. Check empty pocket programming in the tunnel and make the necessary corrections.
- The ram full down switch is malfunctioning or is out of adjustment.
  1. Ensure proper actuation of the switch per “Setting Single Stage Press Proximity Switch Positions” in the service manual.
  2. Adjust or replace the switch if necessary.

COINC EYE BLOCKED	Applies only to machines equipped with a COINC. Indicates the COINC photoeye did not clear during discharge. This error is enabled only when the configure decision *Time for Cake to Clear COINC Eye* is set to a non-zero value. Pressing clears the error and puts the press in *manual* mode. This error may be caused by the following conditions:

- There are goods on the end of the COINC belt blocking the photoeye. Clear the goods from the belt and restart the press.

Display or Action	Explanation

- The COINC belt is slipping or failed to run. Inspect and repair the belt as necessary.
- The COINC photoeye (*COINC loaded* input) is malfunctioning or is out of adjustment.
  1. Ensure proper actuation of the photoeye.
  2. Adjust or replace the photoeye if necessary.

`RAM NOT FULLY IN CAN` — Indicates the ram failed to clear the *ram at unload position* proximity switch when the press attempted to lower the ram, suggesting that the ram is not fully in the can. The press makes two attempts to lower the ram before signaling the error. Pressing ⮌ clears the error and puts the press in *manual* mode. This error may be caused by the following conditions:

- A double or oversized load is in the can. Remove some of the goods from under the ram using the gaff hook supplied by the factory.
- The *ram at unload* switch is malfunctioning or is out of adjustment.
  1. Ensure the ram is below the unload point.
  2. Ensure proper actuation of the switch per “Setting Single Stage Press Proximity Switch Positions” in the service manual.
  3. Adjust or replace the switch as necessary.

`CAN STUCK DOWN` — Indicates one or both of the *can full down* switches was still made after the press attempted to raise the can. Pressing ⮌ clears the error and puts the press in *manual* mode. This error may be caused by the following conditions:

- Goods stuck in the can preventing the can from moving up. Remove the goods from the can using the gaff hook supplied by the factory.
- One or both of the *can full down* switches are malfunctioning or out of adjustment.
  1. Ensure can is down.
  2. Ensure proper actuation of the switches.
  3. Adjust or replace the switches as necessary.

`UNEXPECTED PRESSURE IN RAM` — Indicates the press detected pressure in the ram before the ram cleared the *ram inside can* proximity switch. Pressing ⮌ clears the error and puts the press in *manual* mode. This error may be caused by the following conditions:

- The ram encountered an obstruction while moving down. Clear the obstruction. Check the pre-fill valve for proper operation before returning the press to automatic operation.
- The pre-fill valve is malfunctioning. Repair or replace as necessary.
- The pressure transducer is malfunctioning. Check the transducer and replace as necessary.
- The *ram inside can* switch (*ram half up* input) is malfunctioning or is out of adjustment.
  1. Check that the ram is above the *ram inside can* position.
  2. Ensure proper actuation of the switch per “Setting Single Stage Press Proximity Switch Positions” in the service manual.
  3. Adjust or replace the switch if necessary.

Display or Action	Explanation
RAM NOT FULLY DOWN	For a *Pass Empty* formula, indicates that the ram did not clear the *Ram Full Down* proximity switch within 20 seconds of passing the *Ram At Unload* proximity switch. This error may also occur if the ram doesn't clear the *Ram Full Down* switch before any programmed *Max Press Time* expires.

4.1.2. Board Failures

Display or Action	Explanation
XXXXXX BOARD FAILED	Indicates a peripheral board is not communicating with the controller. Where <XXXXX> is either *I/O #x, OUT #x, D to A*, or *A to D*. This error may result from incorrectly configuring this machine, having improper address (see schematic) on the board identified, or having one or more loose wire connections to or from the board. Press . Verify that configure decision values match the equipment. Verify that the switches on the board referenced on the display are set to the correct address. Check the wires to and from the board. If the error persists, replace the board.

4.1.3. Switch Faults

The ram and can each have limit switches at both ends of travel (some have one, others two or more in series). If the limit switches on opposite ends of travel are made at the same time (i.e., there are contradicting indications), the microprocessor stops automatic operation and displays a switch fault (SF) error message. The error is usually caused by a switch that was damaged when a moving device exerted too much force on the switch plunger. Usually, the malfunctioning switch is opposite the current position of the moving device. Ensure proper actuation of the switches involved. Adjust or replace the switches if necessary. Once the switch error is cleared, pressing puts the press in *manual* mode.

> **Note 10:** Once a switch fault has been seen by the computer, it is “latched in” or remembered. Therefore, even a momentary switch malfunction will cause a switch fault.

Display or Action	Explanation
CAN UP AND DOWN	The *can full up* and one of the *can full down* inputs were made at the same time.
RAM AT UNLOAD & NOT RAM FULL DOWN	The *ram at unload* input was made while the *ram full down* was not made. The *ram at unload* input implies that the *ram full down* input should also be made.
RAM HALF UP & NOT RAM AT UNLOAD	The *ram half up* input was made while the *ram at unload* input was not made. The *ram half up* input implies that the *ram at unload* input should also be made.
RAM FULL UP & NOT RAM HALF UP	The *ram full up* input was made while the *ram half up* input was not made. The *ram full up* input implies that the *ram half up* input should also be made.
DISCHARGE DOOR UP AND DOWN	The *discharge door up* and *down* inputs were made at the same time.

4.1.4. Miscellaneous Faults

Display or Action	Explanation
`*** TAUT BELT ***` `CHECK BELT ROLLERS`	Goods are wrapped around the drive, tension, and/or tracking roller, between the roller and the underside of the belt. This results in an increased effective roller diameter and increased belt tension. Unless corrected, the increased belt tension can damage the belt or the bearings on either end of the the roller. Observing all safety precautions, remove the wrapped goods from the roller(s) as described in the service manual (see document BIPPMM12 “Clearing Taut Belt Errors”).
`MAIN FILTER DIRTY`	The main oil filter is dirty and needs to be replaced. Replace the filter and return the press to normal operation.
`RECIRC FILTER DIRTY`	The recirculation oil filter is dirty and needs to be replaced. Replace the filter and return the press to normal operation.
`OIL TEMPERATURE HIGH`	The hydraulic oil is too hot. This error shuts down the press. Press  to clear the error display. Wait for the oil to cool and return the press to normal operation.
`OIL LEVEL LOW`	The hydraulic oil level has dropped too low. This error shuts down the press. Press  to clear the error display. Add just enough oil to prevent the error. Start the press and raise the ram. Check oil level with the ram raised and add more oil as necessary.

— End of BICP1T04 —

BICP1T06 (Published) Book specs- Dates: 20150826 / 20150826 / 20150826 Lang: ENG01 Applic: CP1

4.2. Press State Messages

During normal operation, the press controller displays status messages to keep the operator informed about what the press is doing. These messages do not necessarily indicate that an error occurred, but rather that the controller issued a command that can not be completed immediately. For example, it may take the press ram two or more seconds to move from the bottom of its travel to the unload position. In this case, the controller displays “Waiting for Ram at Unload Position” while the ram is rising. When the ram reaches the unload position, another status message appears.

4.2.1. Identification and Location of Switches, Sensors, and Photoeyes

4.2.1.1. Proximity Switches

Figure 73: Ram and Can Proximity Switches

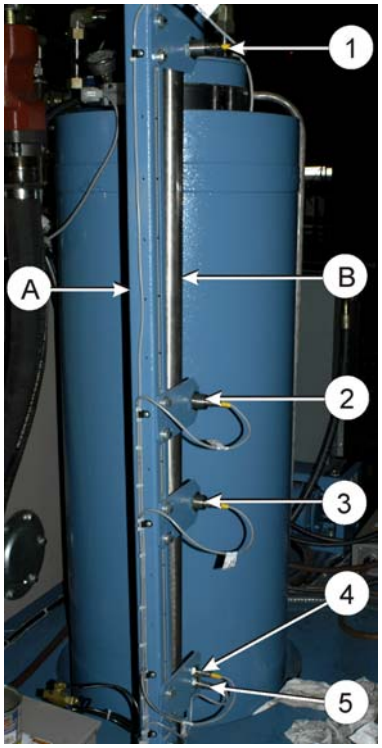
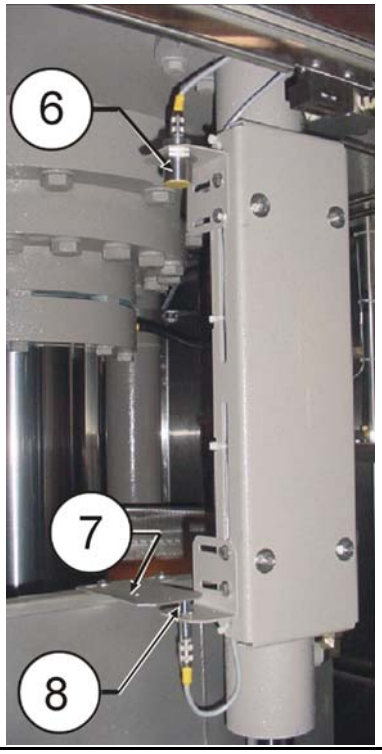
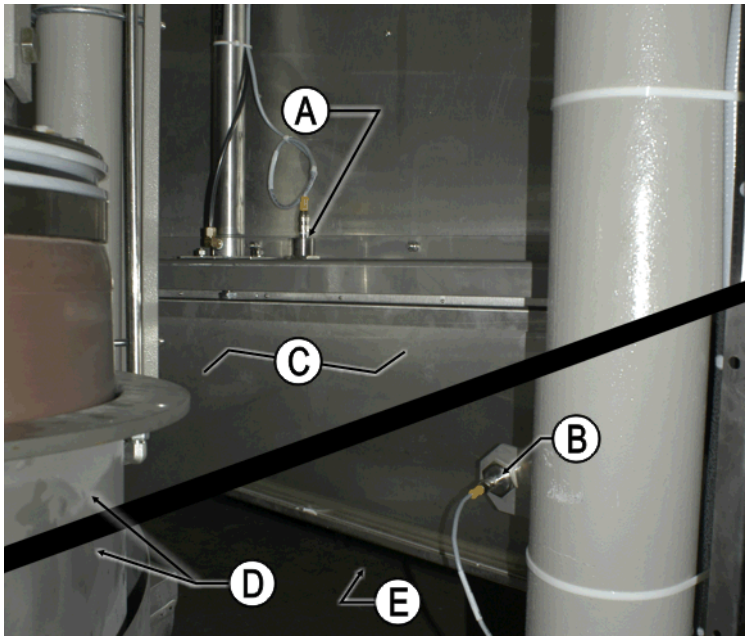
Ram Proximity Switches	Can Proximity Switches	Legend
		**A.** Proximity switch mounting post **B.** Ram guide rod **1.** PXST—Ram full up **2.** PXSM—Ram inside can **3.** PXSU—Ram at unload **4.** PXSL—Ram at low **5.** PXSB—Ram full down **6.** PXCT—Can at top **7.** Proximity switch target **8.** PXCB1 (PXCB2 similar)—Can at bottom

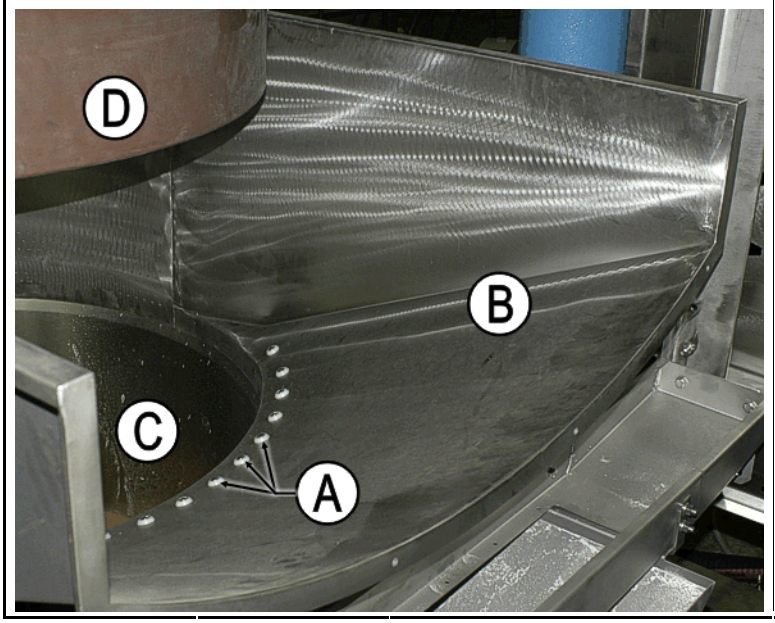
Figure 74: Discharge Door Proximity Switches

Switch Locations	Legend
	**A.** PXDDU—Discharge door up **B.** PXDDD—Discharge door down **C.** Discharge door **D.** Press can **E.** Discharge direction

4.2.1.2. Water Probe Sensors

Figure 75: Load Chute Water Probe Sensors

Sensor Locations



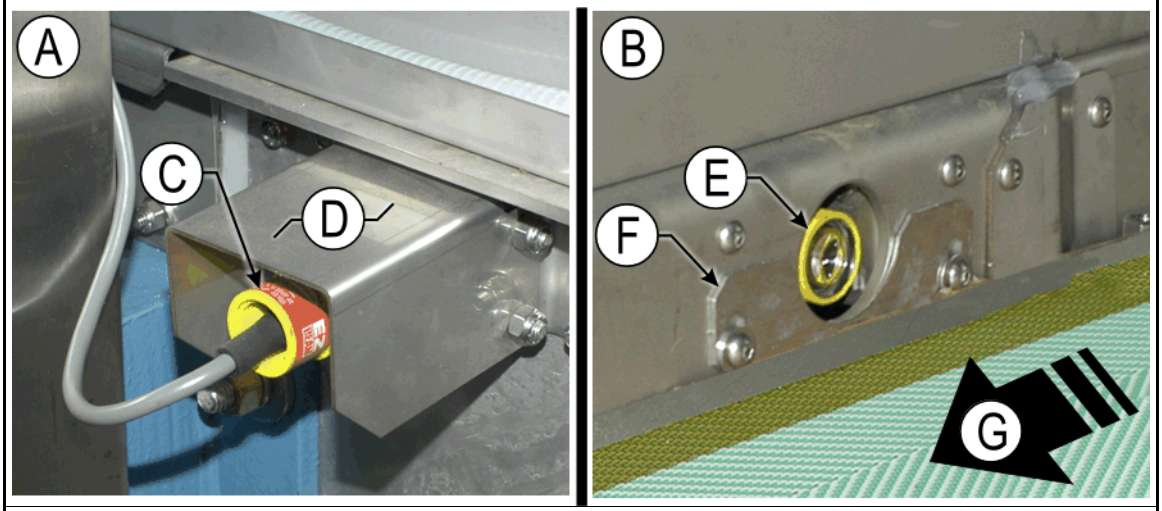
Legend

A. Water probe sensors (MTA39-7)
B. Load chute
C. Press can
D. Press ram

4.2.1.3. Photoeyes

Figure 76: Discharge End Photoeye

Views



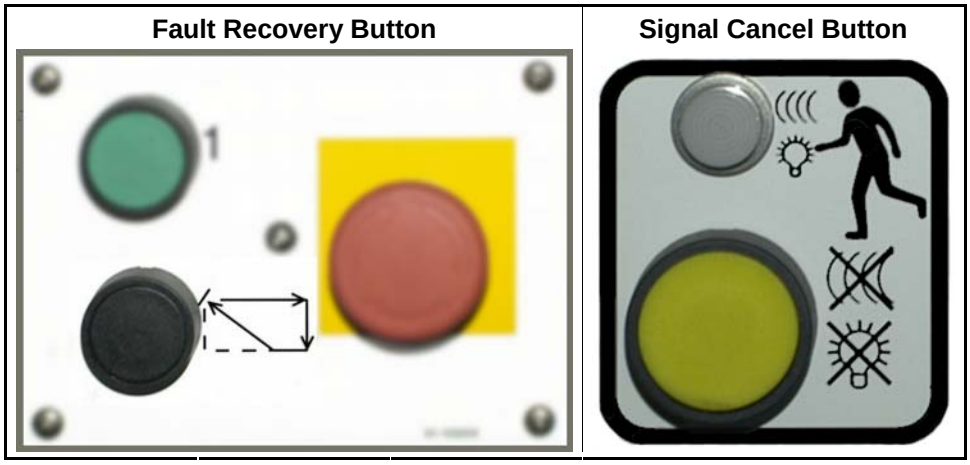
Legend

A. View from outside conveyor side extension
B. View from inside conveyor side extension
C. Photoeye, cable end
D. Protective guard
E. Photoeye, sensing end
F. Photoeye filler plate
G. Discharge conveyor belt and discharge direction

4.2.2. Press States

Display or Action	Explanation
`Checking for Load on Belt`	The press control monitors the input from the discharge end photoeye (Figure 76) while running the belt forward for 15 seconds (belt clear time).
`Clear Belt Eye Before Proceeding`	This message indicates that the discharge end photoeye (Figure 76) was blocked while the press was checking for a load on the belt. Clear the photoeye and press or to continue.
`Decompression Delay - Please Wait`	The press control provides a decompression delay of less than 10 seconds after closing the proportional valve after pressurization.
`Discharging: Wait for Eye Blocked`	The press control looks for the discharge end photoeye input (1MTA4-6) to be made during discharging when the cake initially blocks the photoeye. If the photoeye input is not made before the 15 seconds of belt clear time expires, the control displays “Eye Did Not Block.”
`Discharging: Wait for Eye Clear`	The press control looks for the discharge end photoeye input (1MTA4-6) to clear when the cake is no longer blocking the discharge end photoeye. If the discharge end photoeye input does not clear before the 15 seconds of belt clear time expires, the controld displays “Eye Blocked—Press Fault Recovery.” Clear the photoeye and press or (Figure 77) to continue.

Figure 77: Fault Recovery and Signal Cancel Buttons



Display or Action	Explanation
`Loading`	The press is receiving a load.
`Press [Fault Recovery] to lower door`	This message appears with either of two additional messages: “Load Door Not Fully Closed” and “Discharge Door Not Fully Closed.”
`Press [Fault Recovery] to lower ram`	This message appears with either of two additional messages: “Ram Not Down” and “Scoop Blocked.”
`Waiting for Can Up`	The press can is rising to the full up position, the top of travel. This position is determined by the *Can Full Up* input on 1MTA4-4. This input is made when proximity switch PXCT is actuated by the proximity switch target (Figure 73).
`Waiting to Discharge`	The press formula is finished and the press is waiting for the receiving device to get ready.

Display or Action	Explanation
`Ready to Discharge`	The press can and ram are up, the discharge door is open, and the press is waiting for the signal to start the discharge sequence.
`Waiting for Can Full Down`	The press can is descending to the press bed. This position is achieved when both proximity switches PXCB1 and PXCB2 see the target at the top of the can (Figure 73), making the *Can Full Down #1* input on 1MTA4-5 and the *Can Full Down #2* input on 2MTA4-6. Both inputs are required to declare the can full down.
`Waiting for Can Full Up`	The press can is ascending to the full up position, the top of travel. This position is achieved when proximity switch PXCT sees the target at the top of the can (Figure 73), making the *Can Full Up* input on 1MTA4-4.
`Waiting for Load`	The following conditions have been achieved, and the press is ready to accept a batch: • The ram is fully up, indicated by the presence of the *Ram Full Up* input on MTA38-3. • The can is fully down, indicated by the presence of the *Can Full Down #1* input on 1MTA4-5 and the *Can Full Down #2* input on 2MTA4-6.
`Waiting for Ram at Unload Position`	The press ram is rising to the unload position in preparation to discharge. The unload position is achieved when proximity switch PXSU sees the guide rod (Figure 73), making the *Ram at Unload* input on 2MTA4-5.
`Waiting for Ram Down`	The ram is moving to the fully down position as part of the *night shutdown* procedure.
`Waiting for Ram Full Up`	The press ram is rising to the full up position, the top of travel. This position is determined by the *Ram Full Up* input on MTA38-3. The *ram full up* is achieved when proximity switch PXST sees the guide rod (Figure 73).

Display or Action	Explanation
`Waiting for Belt to Finish Discharging`	This message appears for two seconds during discharge, while the belt is running after the cake clears the discharge end photoeye (Figure 76).

Display or Action	Explanation
`Waiting for Discharge Door Full Up`	The discharge door is ascending to the full up (open) position. Proximity switch PXDDU makes the *Discharge Door Full Up* input on 1MTA4-7 when the door is at the top of its travel. The belt under the can will not run until the discharge door is fully open.
`Waiting for Discharge Door Down`	The belt has discharged the cake and stopped running, and the discharge door is descending to the full down (closed) position. Proximity switch PXDDD makes the *Discharge Door Full Down* input on 1MTA4-8 when the door is at the bottom of its travel. The can will not descend until the discharge door is fully closed.

— End of BICP1T06 —

BICP1T05 (Published) Book specs- Dates: 20150826 / 20150826 / 20150826 Lang: ENG01 Applic: CP1

4.3. Device Inputs and Outputs

Use these tables along with troubleshooting procedures in this manual and electrical circuit diagrams in the schematic/electrical parts manual for the machine to diagnose errors.

4.3.1. Inputs

Direct inputs (see Table 11) bypass the serial link to enter the processor board directly. All other standard and allied data inputs (see Table 12 through Table 15) originate at 8-output/16-input boards and are transmitted to the processor board via the serial link.

Table 11: Direct Inputs

Input Name	Connector and Pin	Display Reference		Connector and Pin	Input Name
Load Chute Full Up	MTA39-5	0	6	MTA38-3	Ram Full Up
Load Chute Full Down	MTA39-4	1	7	MTA38-2	Program Keyswitch
Customer Code Bit 6	MTA39-3	2	8	MTA38-1	Signal Cancel
Customer Code Bit 7	MTA39-8	3	9	MTA38-4	Local/Remote
Load Scoop Blocked	MTA39-7	4	10	MTA38-5	Press Loaded
Do Not Discharge	MTA39-6	5	11	MTA38-6	Fault Recovery

Table 12: 8-Output/16-Input Board 1 (Standard Inputs)

Input Name	Connector and Pin	Display Reference		Connector and Pin	Input Name
Three-wire Enabled	1MTA4-1	0	8	1MTA4-11	— not used —
Ram Inside Can	1MTA4-2	1	9	1MTA4-12	Start Discharge
Ram Full Down	1MTA4-3	2	10	1MTA4-13	— not used —
Can Full Up	1MTA4-4	3	11	1MTA4-14	Single Cake
Can Full Down #1	1MTA4-5	4	12	1MTA4-15	Pass Empty
Discharge Photoeye	1MTA4-6	5	13	1MTA4-16	Dry Code Bit 0
Discharge Door Full Up	1MTA4-7	6	14	1MTA4-17	Dry Code Bit 1
Discharge Door Full Down	1MTA4-8	7	15	1MTA4-18	Dry Code Bit 2

Table 13: 8-Output/16-Input Board 2 (Standard Inputs)

Input Name	Connector and Pin	Display Reference		Connector and Pin	Input Name
Press Code Bit 0	2MTA4-1	0	8	2MTA4-11	Reuse Tank Level High
Press Code Bit 1	2MTA4-2	1	9	2MTA4-12	Reuse Tank Level Low
Press Code Bit 2	2MTA4-3	2	10	2MTA4-13	Taut Belt
Press Code Bit 3	2MTA4-4	3	11	2MTA4-14	Ram at Low
Ram at Unload	2MTA4-5	4	12	2MTA4-15	Main Filter Dirty
Can Full Down #2	2MTA4-6	5	13	2MTA4-16	Oil Too Hot
Dry Code Bit 3	2MTA4-7	6	14	2MTA4-17	Oil Level Low
COINC Photoeye	2MTA4-8	7	15	2MTA4-18	Recirculation Filter Dirty

Table 14: 8-Output/16-Input Board 3 (Extra Data Pass Inputs)

Input Name	Connector and Pin	Display Reference		Connector and Pin	Input Name
Goods Code Bit 0	3MTA4-1	0	8	3MTA4-11	Customer Code Bit 0
Goods Code Bit 1	3MTA4-2	1	9	3MTA4-12	Customer Code Bit 1
Goods Code Bit 2	3MTA4-3	2	10	3MTA4-13	Customer Code Bit 2
Goods Code Bit 3	3MTA4-4	3	11	3MTA4-14	Customer Code Bit 3
Goods Code Bit 4	3MTA4-5	4	12	3MTA4-15	Customer Code Bit 4
Goods Code Bit 5	3MTA4-6	5	13	3MTA4-16	Customer Code Bit 5
Destination Code Bit 0	3MTA4-7	6	14	3MTA4-17	Destination Code Bit 2
Destination Code Bit 1	3MTA4-8	7	15	3MTA4-18	Destination Code Bit 3

Table 15: 8-Output/16-Input Board 4 (Allied Weight Inputs)

Input Name	Connector and Pin	Display Reference		Connector and Pin	Input Name
Allied Weight Bit 0	4MTA4-1	0	8	4MTA4-11	Allied Weight Bit 8
Allied Weight Bit 1	4MTA4-2	1	9	4MTA4-12	Allied Weight Bit 9
Allied Weight Bit 2	4MTA4-3	2	10	4MTA4-13	Allied Weight Bit 10
Allied Weight Bit 3	4MTA4-4	3	11	4MTA4-14	Allied Weight Bit 11
Allied Weight Bit 4	4MTA4-5	4	12	4MTA4-15	Goods Code Bit 6
Allied Weight Bit 5	4MTA4-6	5	13	4MTA4-16	Goods Code Bit 7
Allied Weight Bit 6	4MTA4-7	6	14	4MTA4-17	— not used —
Allied Weight Bit 7	4MTA4-8	7	15	4MTA4-18	— not used —

Tip: Allied data inputs are in binary (power of 2) format. The value of any allied data item is the sum of its individual input values as defined in Table 16 below. Allied weight is displayed in tenths and is obtained by dividing the binary input value by 10.

Table 16: Binary Bit Values

Bit Name	Value	Bit Name	Value	Bit Name	Value
Bit 0	1	Bit 4	16	Bit 8	256
Bit 1	2	Bit 5	32	Bit 9	512
Bit 2	4	Bit 6	64	Bit 10	1024
Bit 3	8	Bit 7	128	Bit 11	2048

4.3.2. Outputs

Outputs are signals from the processor board to other devices and components.

Table 17: 8-Output/16-Input Board 1 (Standard Outputs)

Output Name	Connector and Pin	Display Reference		Connector and Pin	Output Name
Prefill	1MTA5-10 & 5-19	0	4	1MTA5-4 & 5-14	Lower Can
Run Belt Reverse	1MTA5-9 & 5-18	1	5	1MTA5-3 & 5-13	Raise Can
Lower Ram	1MTA5-8 & 5-17	2	6	1MTA5-2 & 5-12	Run Belt Forward
Raise Ram	1MTA5-7 & 5-16	3	7	1MTA5-1 & 5-11	Poppet Valve #1

Table 18: 8-Output/16-Input Board 2 (Standard Outputs)

Output Name	Connector and Pin	Display Reference		Connector and Pin	Output Name
Destination Code Bit 0	2MTA5-10 & 5-19	0	4	2MTA5-4 & 5-14	Dry Code Bit 0
Destination Code Bit 1	2MTA5-9 & 5-18	1	5	2MTA5-3 & 5-13	Dry Code Bit 1
Destination Code Bit 2	2MTA5-8 & 5-17	2	6	2MTA5-2 & 5-12	Dry Code Bit 2
Destination Code Bit 3	2MTA5-7 & 5-16	3	7	2MTA5-1 & 5-11	Dry Code Bit 3

Table 19: 8-Output/16-Input Board 3 (Extra Data Pass Outputs)

Output Name	Connector and Pin	Display Reference		Connector and Pin	Output Name
Goods Code Bit 0	3MTA5-10 & 5-19	0	8	1MTA5-4 & 5-14	Goods Code Bit 4
Goods Code Bit 1	3MTA5-9 & 5-18	1	9	3MTA5-3 & 5-13	Goods Code Bit 5
Goods Code Bit 2	3MTA5-8 & 5-17	2	10	3MTA5-2 & 5-12	Goods Code Bit 6
Goods Code Bit 3	3MTA5-7 & 5-16	3	11	3MTA5-1 & 5-11	Goods Code Bit 7

Table 20: 8-Output/16-Input Board 4 (Allied Weight Inputs)

Output Name	Connector and Pin	Display Reference		Connector and Pin	Output Name
Allied Weight Bit 0	4MTA5-10 & 5-19	0	8	1MTA5-4 & 5-14	Allied Weight Bit 4
Allied Weight Bit 1	4MTA5-9 & 5-18	1	9	4MTA5-3 & 5-13	Allied Weight Bit 5
Allied Weight Bit 2	4MTA5-8 & 5-17	2	10	4MTA5-2 & 5-12	Allied Weight Bit 6
Allied Weight Bit 3	4MTA5-7 & 5-16	3	11	4MTA5-1 & 5-11	Allied Weight Bit 7

Table 21: 24-Output Board 1 (Standard Outputs)

Output Name	Connector and Pin	Display Reference		Connector and Pin	Output Name
Operator Signal	11MTA13-01 & 13-11	0	1	11MTA13-02 & 13-12	Press Free
Desire to Unload	11MTA13-03 & 13-13	2	3	11MTA13-04 & 13-14	Load Chute Up
Load Chute Down	11MTA13-05 & 13-15	4	5	11MTA13-06 & 13-16	Discharge Flag Down
Load Flag Down	11MTA13-07 & 13-17	6	7	11MTA13-08 & 13-18	COINC Belt
Press Return Pump	11MTA13-09 & 13-19	8	9	11MTA13-10 & 14-01	Poppet Valve #2
Discharge Door Up	11MTA14-11 & 14-02	10	11	11MTA14-12 & 14-03	Discharge Door Down
Hold Shuttle	11MTA14-04 & 14-13	12	13	11MTA14-04 & 14-14	Ram Down Bypass
— not used —	11MTA14-10 & 14-05	14	15	11MTA14-10 & 14-15	— not used —
Customer Code Bit 0	11MTA14-10 & 14-06	16	17	11MTA14-10 & 14-16	Customer Code Bit 1
Customer Code Bit 2	11MTA14-10 & 14-07	18	19	11MTA14-10 & 14-17	Customer Code Bit 3
Customer Code Bit 4	11MTA14-10 & 14-08	20	21	11MTA14-10 & 14-18	Customer Code Bit 5
Customer Code Bit 6	11MTA14-10 & 14-09	22	23	11MTA14-10 & 14-19	Customer Code Bit 7

— End of BICP1T05 —

Chapter 5
Supplemental Information

BICUDC01 (Published) Book specs- Dates: 20150826 / 20150826 / 20150826 Lang: ENG01 Applic: CP1

5.1. Serial Memory Storage Device Applications

A serial memory storage device similar to one shown below can be used to store machine configuration and formula data for most current models of Milnor® machines. DIP switches inside the storage device allow you to configure the device to accept data from several different machine types and software versions. Use this document to determine the proper DIP switch setting for your machine. After verifying the switch settings, label the storage device with the date, machine name, and serial number to avoid confusion when the device is needed to restore data to a machine.

Figure 78: Serial Memory Storage Device

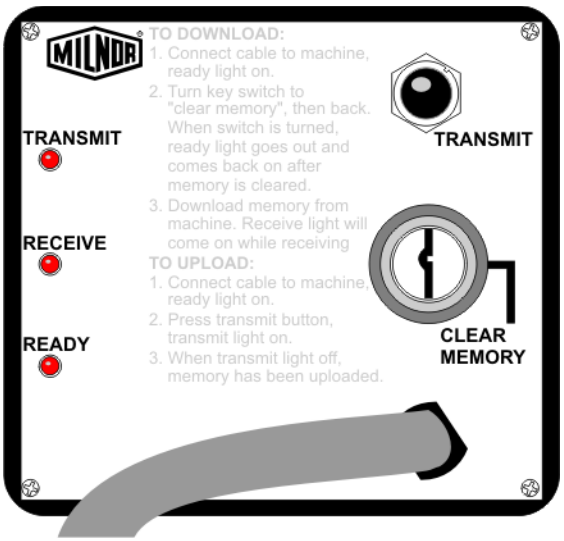


Figure 79: Rear View of Circuit Board

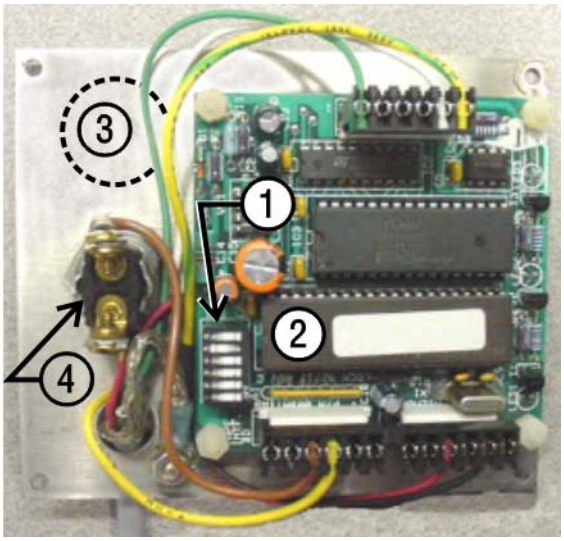
View	Legend
	**1.** DIP switch **2.** Software chip **3.** Location of *Transmit button*, if equipped **4.** Key switch

Table 22: DIP Switch Positions for Machines Requiring an External Transmit Button

Processor Board	Machine Software Versions	DIP Switch Setting
Washer-extractor Models other than Fxx		
8088	All	C
80186	98000-98003	C
	98004-99004	not supported
	99005-9900B	D
	20000-20003	D
FxW, FxP, FxN, FxS, and FxR Washer-extractor models		
8088	All	C
80186	98000-98003	C
	98004-98009	not supported
	9800A-9800H	D
	20000-2000B	D
	2100F and later	D
Textile and Dye Machine Models		
8088	All	C
80186	95000-95305M	C
	95305N-95306	D
	20000-20004	D
Dryer Models		
8088	All	C
80186	All	C
Centrifugal Extractor Models		
8088	All	C
80186	All	C
Single-station Press Models		
8088	All	C
80186	All	C
Key:		
A	All switch positions OFF	
B	Position 4 ON; all others OFF	
C	Position 5 ON; all others OFF	
D	Positions 1 and 5 ON; all others OFF	
E	Positions 4 and 5 ON; all others OFF	

— End of BICUDC01 —

BICWUC01 (Published) Book specs- Dates: 20150826 / 20150826 / 20150826 Lang: ENG01 Applic: CP1

5.2. Construction of External Serial Link Cables

This document provides information for on-site fabrication of certain types of serial communication cables. An individual machine can be connected to certain makes and models of serial printer (see Note 11) using the printer cable described in Section 5.2.2.2. Programmable data can be transferred between compatible machines or between a machine and a Milnor serial memory storage device (see Note 12), using the download cables described in Section 5.2.2.3 and

Section 5.2.2.4 respectively. These cable(s) connect to the cabinet-mounted 9-pin DIN type receptacle shown in Figure 80 and may be installed temporarily or permanently, as appropriate.

If the machine is connected to a Mildata® or Drynet (dryer/shuttle controller) network (see Note 13), downloading is more likely to be handled by these products. Another Milnor document—Section 5.4. "On-Site Installation and Troubleshooting of Permanent Serial Communication Cables"—describes the permanent cables needed to communicate across a Mildata, Drynet, or Miltrac™, network. In the unlikely event that personnel will want to download data via the download cables described herein, rather than via Mildata, all energized machines on the Mildata network will receive the downloaded data. **Turn off power to any machines to which you do not wish to download.**

Note 11: The currently approved printers and printer configuration settings are provided in Section 5.3. "Printer Requirements and Settings". A pre-assembled machine-to-printer cable similar to the cable described here, is available from Milnor (P/N 10YMK2PNTR).

Note 12: The Milnor serial memory storage device (also known as a download box) contains nonvolatile memory to hold a back-up copy of the programming and configuration data for **one machine**. This data is transferred between the machine and the memory storage device via the DIN receptacle on the machine. Two models are currently available: KXMIC00507 and KXMIC00508. The already wired cable and DIN connector are included as part of the memory storage device. Consult the Milnor Service department to determine the correct device for a particular application.

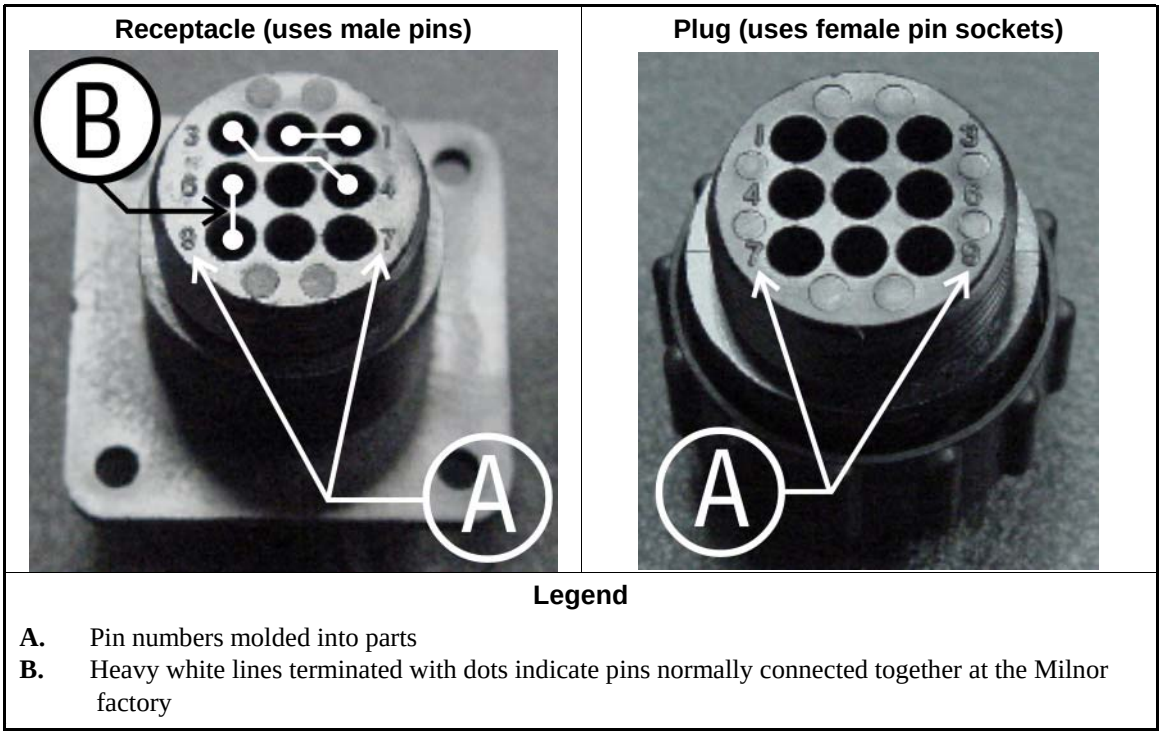
Note 13: Mildata is Milnor's PC-based product for centralized data collection, productivity analysis, report generation, formula development and data downloading. Drynet permits supervisory and manual functions for a group of dryers and the shuttle that serves them to be performed from a central PC.

Applicable machines are provided with a single DIN receptacle for both downloading and printing. Only one function at a time (downloading or printing) can be performed using this connection.

5.2.1. Pin Identification

The download and printing functions use different data communication lines, but the DIN receptacle on the machine contains all of the pins used for either function. Figure 80 illustrates the DIN receptacle (which uses male pins) and the mating plug (which uses female pin sockets), each viewed from the **wire entry** side. The receptacle is normally installed and wired at the Milnor factory. The plug and female pin sockets for customer use are provided in a bag inside the electric box. Table 23 shows the function of each pin.

Figure 80: 9-Pin DIN Connector Pin Identification (from wire entry side of connectors)



Legend

A. Pin numbers molded into parts

B. Heavy white lines terminated with dots indicate pins normally connected together at the Milnor factory

Table 23: External Serial Link Pin Assignments

Pin Number	Function	Receptacle Wiring (inside electrical enclosure)	
		Wire Number	Color Code
1	Serial low	DLL	Blue and black
2			
3	Serial high	DLH	Blue and red
4			
5	Clear to send (used for printing only)	CTS	Blue and orange
6	Electronic ground	2G	Blue and white
9			
7	Transmit data (used for printing only)	TXD	Blue and orange
8	+5 volts DC (used for serial memory storage device only)	V1	Blue

CAUTION 18: Risk of damage to electronic components—Pin 8 is only used to supply +5VDC power to the download box and will damage components in both devices if not properly connected

- Never connect pin 8 to any other pin in the connector, a printer, or another machine.

5.2.2. How to Wire the Cables

Because the DIN receptacle is wired to support different functions and because the data transferred across these cables can be corrupted by electrical noise, follow these instructions carefully.

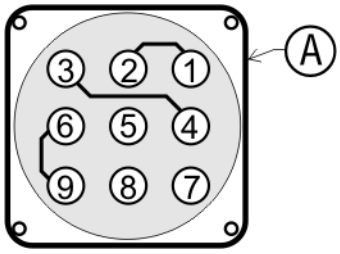
5.2.2.1. Cable Specifications—Multi-conductor shielded cable that meets the following minimum requirements must be used in the applications covered herein. Conforming cable may be purchased from Milnor (P/N 09V300A04S) or purchased from another source:

- Jacket: 600VAC insulation
- Shielding: braided, tinned copper, minimum 85 percent coverage
- Four conductors with these specifications:
  - » Conductive material: Tinned copper, 20 AWG
  - » Insulation: 300VAC, color coded
  - » Preferred colors: red, black, green and white

5.2.2.2. Connecting a Machine to a Printer for "Print Data"—Many Milnor microprocessor-controlled machines allow permanent or temporary connection of a serial printer for generating printed copies of formulas or status reports during operation. Figure 81 shows how to wire the machine-to-printer cable. Milnor has tested and approved certain printers for this application (see Note 11).

Figure 81: Wiring Diagram for Cable to Connect a Machine to a Printer

Receptacle

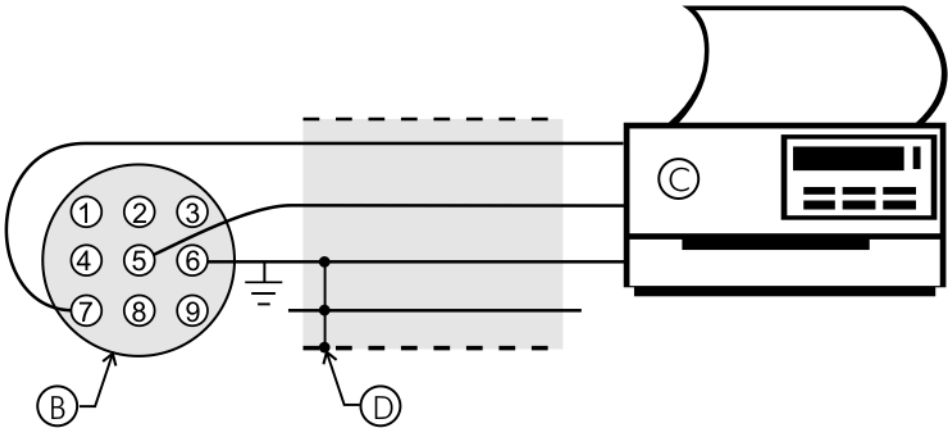


Legend

A. Receptacle (with male pins). Pin functions are as follows:
- **5.** Clear to send (CTS).
- **7.** Transmit data (TXD)
- **6&9.** Ground. This application only uses Pin 6.
- **1&2.** Not used in this application
- **3&4.** Not used in this application
- **8.** Not used in this application. See caution statement **18** .

B. Plug (with female pin sockets)
C. Approved serial printer (see Note 11)
D. Tie shield and spare conductor(s) on this end of cable to ground. Leave unconnected on other end.

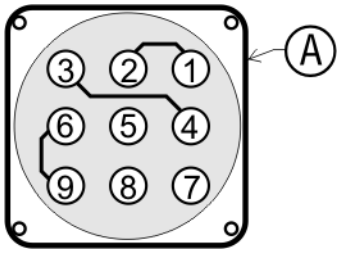
Cable Wiring



5.2.2.3. Connecting Two or More Machines for Machine-to-machine Transfer—Figure 82 shows how to wire a cable to connect a bank of identical machines (the Figure 82 example shows connections for four machines) so that data programmed on one machine in the group can be downloaded to all other machines simultaneously. This cable is referred to as a daisy chain because it runs in segments from machine to machine, connecting all machines in the group.

Figure 82: Wiring Diagram for Cable to Connect Two or More Machines

Receptacle On Each Machine



Legend

A. Receptacle on machine (with male pins). Pin functions are as follows:
- **1&2.** Serial low
- **3&4.** Serial high
- **6&9.** Ground
- **5&7.** Not used in this application
- **8.** Not used in this application. See caution statement **18** .

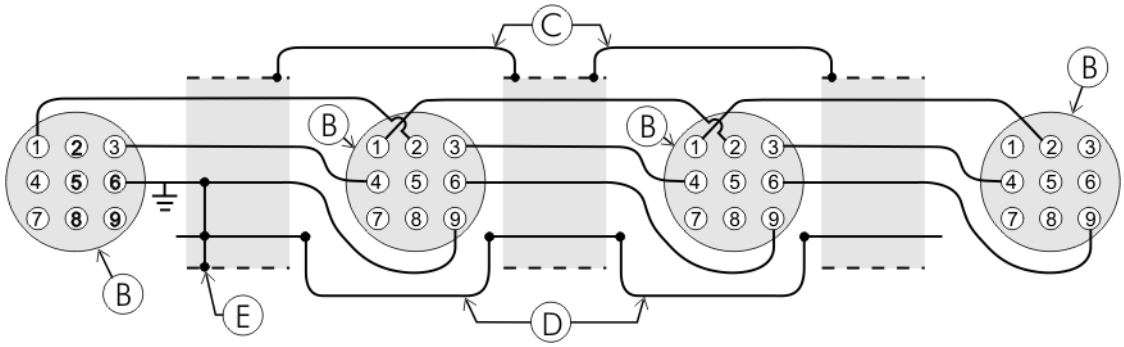
B. Plug on cable (with female pin sockets)

C. Connect together each segment of shield so that it has continuity across entire daisy chain.

D. Connect together each segment of an unused conductor so that it has continuity across entire daisy chain.

E. Tie shield and spare conductor(s) on one end of daisy chain to ground. Leave unconnected on other end of daisy chain.

Cable Wiring



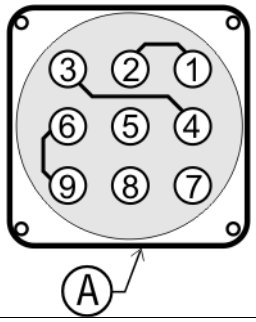
The internal connections on each receptacle (machine) between pins 1 and 2, 3 and 4, and 6 and 9 make it easier to wire the cable because it is not necessary to jumper these pins together on the cable. However, this also means that every plug on the daisy chain must be plugged into a receptacle. Otherwise, the serial low, serial high, and ground conductors will not have continuity across the entire daisy chain and some machines will not receive data.

Rules and details about downloading among machines are fully described in the programming section of the reference manual.

5.2.2.4. Connecting a Machine to a Serial Memory Storage Device—The cable used with the serial memory storage device (download box) available from Milnor, see Note 12, is permanently attached to the storage device. Cable fabrication, as shown in Figure 83, is not required except for replacing a damaged cable. The memory storage device is the only application in which the power conductor (Pin 8) is used.

Figure 83: Wiring Diagram for Cable to Connect a Machine to a Serial Memory Storage Device

Receptacle

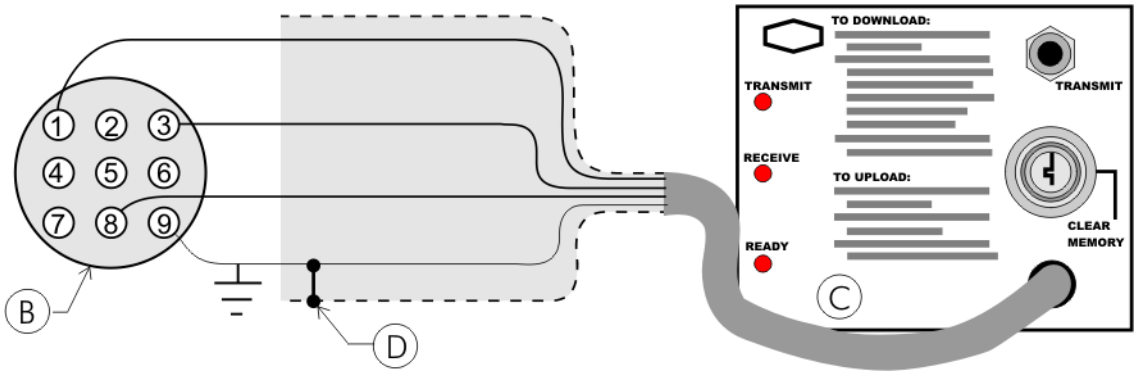


Legend

A. Receptacle on machine (with male pins). Pin functions are as follows:
- **1&2.** Serial low. This application only uses Pin 1.
- **3&4.** Serial high. This application only uses Pin 3.
- **6&9.** Ground. This application only uses Pin 9.
- **5&7.** Not used in this application.
- **8.** +5VDC. Provides power to memory storage device.

B. Plug on cable (with female pin sockets)
C. Memory storage device (front panel may be different)
D. Tie shield on this end of cable to ground. Leave unconnected on other end.

Plug and Storage Device



— End of BICWUC01 —

BICWUI01 (Published) Book specs- Dates: 20150826 / 20150826 / 20150826 Lang: ENG01 Applic: CP1

5.3. Printer Requirements and Settings

Notice 19: Because of the many differences among printer makes and models, Milnor® cannot ensure suitability or troubleshoot printers other than those described in this document (or certain older approved models), with the required interface cable.

5.3.1. Cable Requirements

The printer must be connected to the printer port on the machine using the appropriate one of the following Milnor® interface cables:

Table 24: Milnor® Printer Cables

Printer Cable Part Number	Description
10YMK2PNTR	100-formula washer-extractor, dryer, extractor, and Miltron (CBW) controllers
10YCBWPNTR	Non-serial Miltron (CBW) controller
08MPSERCBL	Mentor (CBW) and Mildata controllers

5.3.2. Configuring the Citizen GSX-190 Printer

Table 25 lists the required settings for this printer model to work properly with Milnor® equipment. To print the current settings stored in your printer, move the *Menu* slide switch on the

printer to the *VuePrint* position, then hold the *Print* button for three seconds. Hold the *Menu* button for three seconds to enter the *VuePrint* menu system to make changes.

Table 25: Required Settings for Citizen GSX-190 Printer

Menu	Data Field	Value	Menu	Data Field	Value
Install 1	Ribbon	Normal	Character	Slash zero	Off
	A.S.F.	Off		Character set	Graphics
	Emulation	Epson		Intl character set	U.S.A.
Print Style	Font	Draft		Code page	U.S.A.
	Emphasized	Off	Install 2	Tear off	Off
	Pitch	10 characters per inch		Paper out	Enable
	Font lock	Off		Auto linefeed	Off
Page Layout	Line spacing	6 lines per inch		Copy mode	Off
	Form length	Letter		Envelope	Off
	Page skip	Off	Serial I/F	Baud rate	9600
Print Mode	NLQ Dir	Uni-directional		Parity	Even
	Graphic Dir	Uni-directional		Data bits	8 bits
				Stop bits	1 bit
				Protocol	DTR

5.3.3. Configuring the Epson LX300 Printer

The Epson model LX300 printer was supplied by Milnor® prior to March 2001 to print data from microprocessor controllers with printing functions. When shipped from Milnor®, this printer was configured to operate correctly with Milnor® equipment. If the printer is replaced or must be reconfigured for any reason, refer to the user's guide and the following table.

Table 26: Required Settings for Epson LX300 Printer

Data Field	Value	Data Field	Value
Character spacing	10 characters per inch	Tractor	Single
Shape of zero	0	Interface	Serial
Skip over perforation	Off	Bit rate	9600 bps
Character table	PC 437	Parity	Even
Auto line feed	Off	Data length	8 bits
Page length	11 inches	ETX/ACT	On
Auto tear off	Off		

5.3.4. Previous Printer Models

The Epson LX300 printer replaced the Epson LX-810, which replaced the Epson LX-800. For information on these older printer models, request document MSSM0251AE from the Milnor factory.

— End of BICWUI01 —

BICCUC01 (Published) Book specs- Dates: 20150826 / 20150826 / 20150826 Lang: ENG01 Applic: CP1

5.4. On-Site Installation and Troubleshooting of Permanent Serial Communication Cables

Permanent serial communication cables are those that must be connected directly to microprocessor boards via MTA connectors on the board, not those installed via cabinet-mounted DIN receptacles provided for customer use (see BICWUC01 “Construction of External Serial Link Cables”). Permanent serial cables should be installed only by trained technicians.

Miltrac™, Drynet (dryer/shuttle controller) and Mildata®, whether provided separately or included with MultiTrac™, each requires its own serial communication wiring to link the controller with its subordinate machines. Portions of this wiring must be fabricated and installed on site. The portions that do not need to be field installed are those where several components to be connected are located on equipment shipped as a single unit. For example, in systems where the processor boards for all dryers and shuttles are located in a central controls mounting panel (belt box), the corresponding Miltrac data lines on each board are wired together at the Milnor factory. The field wiring need only connect to one of these boards.

All devices connected to a central controller share the same serial port on that controller. Cable routing has no bearing on the ability of the central controller to distinguish devices (this is handled by identification codes preset on each device and configured in the controller software). Hence, the devices can be connected to the controller either via direct controller-to-machine (“home run”) wiring or via “daisy chaining”.

5.4.1. “Home Run” Versus “Daisy Chain” Wiring

home run (recommended)—a method of linking several devices (machines) to a central controller by running a separate serial cable from the controller to each device. With this method, all serial high lines are spliced together on the controller end, as are all serial low lines.

daisy chain (discouraged)—a method of linking several devices (machines) to a central controller by running a single, segmented cable from device to device, throughout the entire bank of devices. Each serial port on a Milnor processor board has two internally-connected pins dedicated to each data line. Serial low is pins 1 and 2 and serial high is pins 3 and 4. In most cases, all four pins, as well as two unused pins (5 and 6) comprise a single, six-pin MTA connector (see Figure 84 in Section 5.4.3.1). By convention, the incoming daisy chain segment is brought in on pins 1 and 3 and the next daisy chain segment begins on pins 2 and 4.

When wired properly, either method is acceptable. However, the home run method is preferred and this is the method on which system cable diagrams prepared by Milnor are now based. Although the daisy chain approach often requires less cable, it has a major disadvantage in troubleshooting. If a wiring problem occurs anywhere along the daisy chain, all downstream machines (on the side opposite the central controller from the problem) are affected. When one or more machines are not responding properly because of a wiring problem on an upstream machine such as an “open” in a line, reversed serial high and serial low lines, or a faulty ground, the problem is often difficult to identify. With the home run approach, such a wiring problem will only affect the one machine served by the offending cable.

5.4.2. Specifications and Requirements

Because the interconnected devices may be at different ground potentials and because the field-installed cabling is particularly susceptible to electrical noise, specific cabling material and grounding procedures must be adhered to.

5.4.2.1. **Cable Specifications**—Most new CBW systems include MultiTrac®. MultiTrac always includes PC Miltrac (the Miltrac controller) and Online Communicator software (the Mildata data collection function). In most cases, optional Drynet (the Dryer/Shuttle controller) is also provided. Each of these controllers requires a separate serial link to communicate with its subordinate machines. Miltrac and Online Communicator typically communicate with every Milnor machine in the system. Drynet communicates with every Milnor dryer and shuttle. Hence, it is convenient to run a six-conductor serial communication cable (three serial links) between the MultiTrac console and each dryer and shuttle, and a four- or six-conductor cable between MultiTrac and every other Milnor machine. Cables serving this purpose must conform to the following specification:

- Two twisted pair (four-conductors) or three twisted pair (six-conductors), as follows:
  - » Conductive material: Tinned copper, 18 AWG (1.0mm²)
  - » Insulation: 300VAC, color coded
  - » Positive wire identification by color coding and/or wire number.
- Shielding: Braided tinned copper or foil, minimum 85% coverage
- Jacket: 600VAC insulation

Cables meeting the above specification are available from Milnor, as follows:

Four-conductor—P/N 09V300B04S
Six-conductor—P/N 09V300B06S

5.4.2.2. **Conduit Requirements**—Consult local codes to determine any requirement to run serial communication cables within conduit. In the absence of such a requirement, consider cable protection, and in any case observe the following precaution:

CAUTION 20: Risk of Bad Data—Inadequate shielding against electrical noise can trigger false signals.

- Do not run serial cables adjacent to, or in the same conduit with wires that provide motor power or similar. It is permissible to run serial cables in the same conduit with Milnor control circuit conductors (DC and/or AC), and with control circuit ground (earth) conductors used to ground the various controllers together.
- If serial cables are run in a cable tray, insure the tray does not also contain wires for motor power or similar **and that such conductors are not subsequently added**.

5.4.2.3. **Grounding the Controllers**—Connect the high voltage control circuit ground terminals (normally pin 2F) together in all controllers to be linked via a serial cable or via any other control conductors. Use 14AWG (2.5mm²) conductors with 600VAC insulation.

CAUTION 21: Risk of component damage and warranty loss—Powering up machines before controller-to-controller grounds are properly established will burn out microprocessor boards and void the warranties.

- Install secure grounds as described above before first applying power.

5.4.2.4. **Grounding the Shield and Unused Wires**—Ground the serial cable shield and unused wires as follows, to obtain the best protection against electrical noise and to counteract any tendancy of the spare wires to act as antennas.

5.4.2.4.1. If the "Home Run" Method Is Used—Splice together the shields and any spare wires for all cables where they converge inside the MultiTrac console or central controls mounting panel (belt

box). Connect the spliced shields and wires to signal ground (normally pin 2G or pin 7) within the cabinet. On the opposite end of each cable, leave the shields unconnected and individually cap or tape each spare wire.

5.4.2.4.2. If the “Daisy Chain” Method Is Used

1. Connect together the abutting ends of the shield at each location where the daisy chain segments meet (at each intermediate device), but do not connect them to anything else. The objective is to achieve continuity in the shield across the entire length of the daisy chain. If a segment enclosed in an electric box (a factory installed segment) falls **in the middle** of the daisy chain, install a wire inside the electric box to connect the incoming shield to the outgoing shield. Do not ground the shield inside this box.
2. Do the same as above for each spare wire.
3. On the end of the daisy chain that connects to the system controller, connect the shield and spare wires to signal ground (normally pin 2G or pin 7) within the controller's electric box.
4. On the opposite end of the daisy chain, leave the shield unconnected and individually cap or tape each spare wire.

5.4.3. Connecting the Serial Link To Subordinate Devices (Machines)

WARNING 22: Electrocution and Electrical Burn Hazards—Contact with electric power can kill or seriously injure you. Electric power is present inside the cabinetry unless the main machine power disconnect is off.

- Do not service the machine unless qualified and authorized. You must clearly understand the hazards and how to avoid them.

5.4.3.1. Identifying Serial Ports—As shown in Figure 84, labels imprinted on the processor board (e.g., “1MTA32 RS485 #1”) identify the serial ports. By convention, Milnor dedicates the same serial ports on different devices to certain functions (see Table 27). For example, the software for every Milnor machine that can function as a Miltrac device (press, centrifugal extractor, shuttle, dryer, etc.) is written to communicate with Miltrac via the serial port at MTA32. However, do not rely solely on the convention shown in Table 27. Always consult the system connection instructions in the device or system controller schematic manual to confirm serial link connection points.

Table 27: Serial Port Dedicated Uses

Serial Port Identification				Serial Port Function
8088 Board	**Serial Link #**	**80186 Board**	**Serial Link #**	
n/a	--	MTA29	4	Textile machines: Chemflow boards
				CBWs: peripheral boards (second port)***
				Dryers, shuttles: Drynet (dryer/shuttle controller)
				All others: not used
MTA30* (RS232) or** MTA30* (RS485)	4	MTA30* (RS232)	--	Printer****
		MTA30* (RS485)	--	Serial display (on devices so equipped)
MTA32	1	MTA32	1	Miltrac
MTA33	2	MTA33	2	Peripheral boards
MTA34	3	MTA34	3	Mildata / download****

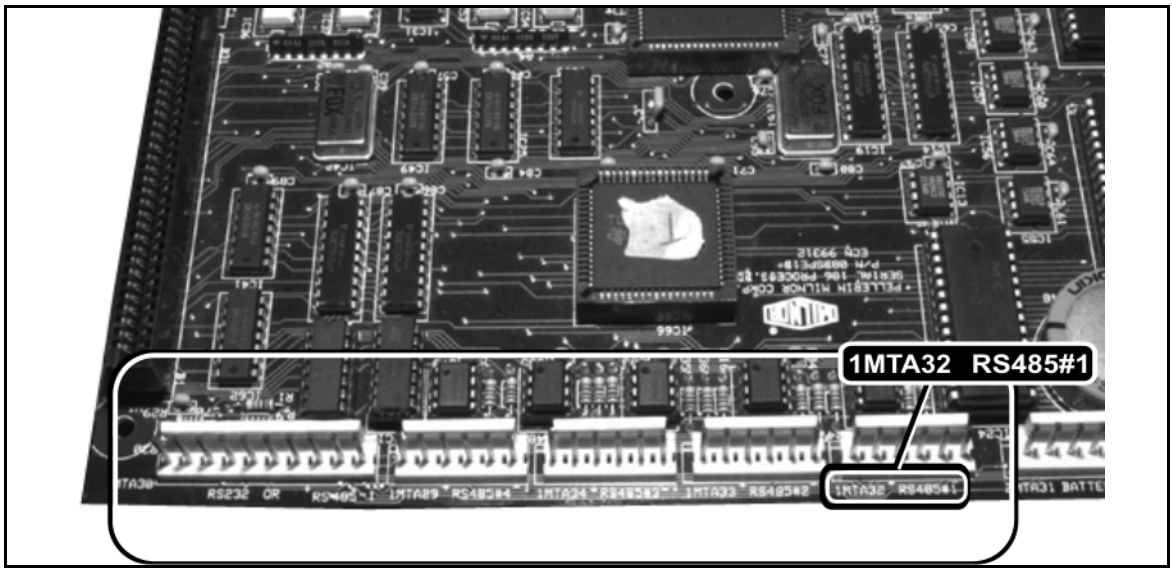
* MTA30 is a 10 pin connector. Pins 1 through 4 are dedicated to the RS485 port and pins 5 through 10 are for the RS232 port.

** On the 8088 processor board, either port, but not both, can be used. On the 80186 board, both ports are available.

*** On the CBW, this provides a second serial port for communication with the peripheral boards. Dividing the connections between two ports speeds communication in longer tunnels with many peripheral boards.

**** Typically, the MTA30 RS232 port and MTA34 are factory wired to different pins on the same cabinet-mounted DIN receptacle, for printer and download access (see BICWUC01 "Construction of External Serial Link Cables").

Figure 84: Serial Ports on Processor Board



5.4.3.2. Wiring the Serial Low and Serial High Lines—On a serial port's MTA connector, pins 1 and 2 are serial low and pins 3 and 4 are serial high (on serial ports with six pin MTA connectors, pins 5 and 6 are unused). By convention, Milnor wires the incoming serial link segment (the line coming from the system controller) to pins 1 and 3, and, when daisy chaining, it wires the outgoing serial link segment (the line that continues the daisy chain) to pins 2 and 4. For Miltrac, Milnor uses a black or blue and black striped wire for serial low and a red or blue and red striped wire for serial high (see Note 14), and recommends following this convention in the field. In any event, the serial low and serial high wires must not get crossed, as this will prevent the system from functioning.

Milnor P/N ZXUUACSIIA consists of a bag of connector components. One or more of these are provided for systems installations. The MTA connectors needed for on site fabrication of the serial cables are included in the bag.

> **Note 14:** For daisy chain segments completely enclosed within an electric box or cabinet, it is not necessary to use cable as specified above. The enclosure provides sufficient shielding from electrical noise. For these segments Milnor normally uses individual wires—black or blue/black for serial low and red or blue/red for serial high.

5.4.4. Connecting the Serial Link to the System Controller

The hardware and wiring used to terminate a Miltrac, Drynet, or Mildata/Online Communicator (Mildata) serial link at the system controller changes on occasion, with developments in the various controllers. The connections, as of this writing, are described here. However, refer to the schematic manual and any other documentation provided with the controller, which may reflect more recent changes.

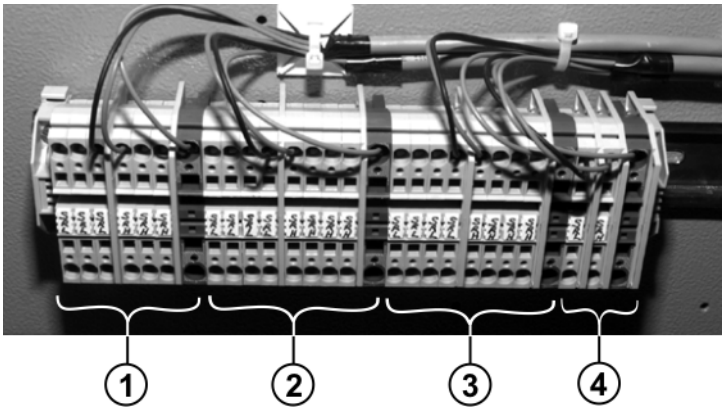
If the “home run” wiring method is used, it is unlikely that there will be a sufficient number of terminals at the controller end to accommodate all of the incoming lines. In this case, splice all corresponding lines from each device (such as Miltrac serial high) at the controller end, to a single conductor which will be used to make the connection to the system controller.

5.4.4.1. MultiTrac (containing Online Communicator, Miltrac, Optional Drynet, and Optional Device Master)—MultiTrac consolidates Online Communicator (which performs the Mildata data collection function), and the Miltrac, optional Drynet, and optional Device Master controllers. The MultiTrac console, which houses the MultiTrac PC and various machine controls, also provides a centralized location for connecting the serial cables associated with each of these control systems (see Note 15). Serial link connections are made on a single IEC terminal block in the lower front compartment (see Figure 85). Multiple serial low (SRL) and serial high (SRH) pins are provided for each type of serial link. Any pin in the group for that serial link may be used for the serial low and serial high conductors, respectively. The shield and any unused wires must be grounded within the MultiTrac cabinet only, as previously stated. Connect the shield and any unused wires to any ground pin on the terminal block in Figure 85.

> **Note 15:** The PC Device Master option utilizes a microprocessor controller as well as the PC Device Master software running on the MultiTrac PC. The only serial link required for Device Master is one that connects the microprocessor controller with the MultiTrac PC. However, because the Device Master microprocessor controller is also located in the MultiTrac cabinet, this serial link is wired at the factory.

Figure 85: MultiTrac Connection Points for Miltrac, Drynet, Mildata and Device Master Serial Links

IEC Terminal Block for Serial Link Connections



Legend

1. Drynet (dryer/shuttle controller)
2. Miltrac
3. Mildata
4. Device Master (see Note 15)

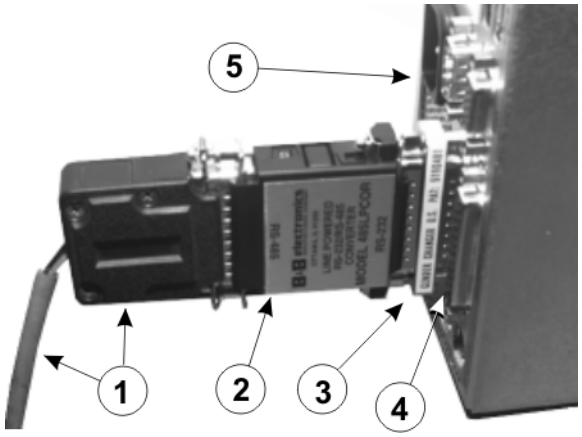
5.4.4.2. **Mildata PC With MultiTrac**—If the installation includes MultiTrac, the Mildata serial communication lines from each machine do not connect directly to the Mildata PC. Rather, they connect to the MultiTrac PC, where the Online Communicator software performs the Mildata data collection function (see Note 16). The data is shared with the Mildata PC via a standard PC networking connection using CAT 5 cabling.

> **Note 16:** In older MultiTrac installations, the MultiTrac-to-Mildata link functions like a daisy chain segment and the cabling connects to the Mildata PC as described in Section 5.4.4.3 above.

5.4.4.3. **Mildata PC Without MultiTrac**—If the system does not include MultiTrac, the Mildata PC typically uses Com 1 to communicate with the devices in the Mildata network, although this is configurable. The various components needed to adapt this port to the incoming serial link (e.g., gender converter, RS232-to-RS485 converter, wiring harness) are provided with the PC. The assembled components, as currently used, are shown in Figure 86. The last component in this group, and the one that the incoming Mildata serial link connects to is a 9 pin male DIN connector. A 9 pin female DIN connector and pins are provided in a bag with the PC, for field wiring. When the Mildata daisy chain is fabricated on site, the female DIN connector is wired to the end of daisy chain closest to the PC. Depending on the distance, the customer may want to fabricate an extension cable with the appropriate 9 pin DIN connectors on each end to run between this point and the PC.

Figure 86: Serial Link-To-Com Port Adapters on Mildata PC

Assembled Components



Legend

1. Wire harness with 25-pin connector, one end (shown) and 9-pin male DIN connector, other end (not shown)
2. RS232-to-RS485 adapter
3. Gender converter
4. Com port on PC
5. Rear of Mildata PC

5.4.4.4. Older Drynet (Dryer/Shuttle) Controller—Older dryer/shuttle controllers consist of a dedicated PC with Drynet software and some machine controls (i.e., Power switch, Start and Stop buttons for each dryer and shuttle) mounted in a free-standing cabinet. On these units, the Drynet serial link is connected directly to a com port on the Drynet PC in the same manner as described in Section 5.4.4.3 for a Mildata PC without MultiTrac.

5.4.4.5. Older Miltrac Controller—The older Miltrac is a microprocessor controller with a processor board similar to that used in machines (see Section 5.4.4.1 for PC Miltrac). The board contains serial ports accessed via MTA connectors the same as on the processor boards used by machines. As with machine processor boards, 1MTA32 is dedicated to Miltrac serial communication. However, on the Miltrac processor board, a second port: 1MTA33, is also dedicated to Miltrac communication, to speed communication in larger Miltrac systems. Miltrac controlled devices 0 through 19 must communicate with 1MTA32 and devices 20 through 39 must communicate 1MTA33 via a separate serial link. Note that regardless which port on the Miltrac processor board a device communicates with, the Miltrac serial port on the device's own board is always 1MTA32.

5.4.5. Troubleshooting Reminders for the “Daisy Chain” Method

When troubleshooting communication problems in a system that uses daisy-chaining, the technician will often want to isolate certain devices for testing by disconnecting the serial link from the other devices. Remember that continuity in each of the two serial lines across the entire serial link is provided by the internal connections between pins 1 and 2 (serial low) and between pins 3 and 4 (serial high) on each board. As soon as you remove an MTA connector from the board, the link is broken not only to this machine but to all machines downstream of this connection point (on the side opposite the system controller). If you only want to remove one machine from the link, you must jumper pins 1 and 2 together and pins 3 and 4 together on the removed MTA connector so the downstream machines will remain connected.

— End of BICCUC01 —

BICMUM01 (Published) Book specs- Dates: 20150826 / 20150826 / 20150826 Lang: ENG01 Applic: CP1

5.5. How to Upgrade Microprocessor EPROM Chips

Milnor® microprocessor software is continually upgraded to improve performance and maximize efficiency. Depending on the software change, the new software EPROM (Erasable, Programmable Read-Only Memory) chips may be offered for sale or for no charge to the customer. When a set of these chips is changed in the field, ensure that the software version being installed matches the machine hardware, and that the chips are installed in the proper socket positions and orientation.

5.5.1. How to Change EPROMs

WARNING 23: Electrocution and Electrical Burn Hazards—Contact with electric power can kill or seriously injure you. Electric power is present inside the cabinetry unless the main machine power disconnect is off.

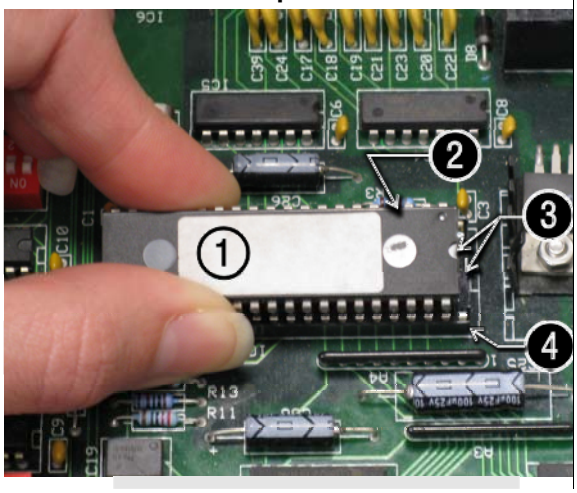
- Do not attempt unauthorized servicing, repairs, or modification.
- Abide by the current OSHA lockout/tagout standard when lockout/tagout is called for in the service instructions. Outside the USA, abide by the OSHA standard in the absence of any other overriding standard.

5.5.1.1. Remove and Replace EPROM Chips

1. Make sure all power to the machine is off.

2. Locate the chips as described in Section 5.5.2 "Location of EPROM Chips". Note the orientation of the chips as shown in the figure(s) below.
3. Use a chip removal tool or another small flat tool to carefully remove each EPROM chip from its base. Be sure to note the numerical order of each chip and the orientation to the key notch on the socket.
4. Install new chips, making sure the key notch on each chip is properly oriented and that all pins enter the proper holes in the socket, as shown in Figure 87. If necessary, slightly bend the pins on the EPROM chip to align the pins with the holes in the socket. After inserting each chip, verify that all pins are seated in the socket.

Figure 87: EPROM Chip Identification and Installation

EPROM Chip and Socket	Legend
	**1.** Label—shows the software version and date code **2.** EPROM chip **3.** Key notch **4.** EPROM socket

CAUTION 24: Machine Damage Hazards—Incorrectly installing any EPROM chip may destroy or damage the chip or cause the machine or the display to operate erratically.

- Match each chip with its corresponding socket. Each EPROM chip will operate in only one socket, although it may physically fit into others.
- Align each chip so every pin mates with the correct hole in the socket.

5.5.1.2. Verify Proper EPROM Chip Installation

—After installing new EPROM chips, apply power to the machine and turn the machine on. If the chips are properly installed, the display will continue with the normal display sequence when powering up. If the display is blank or appears unusual, **immediately** turn the machine off and verify that the chips are correctly oriented in the sockets.

5.5.2. Location of EPROM Chips

Depending on machine model and type, the microprocessor may be an Intel 8085, Intel 8088, or Intel 80186. Each microprocessor board requires at least one EPROM chip for proper operation, but these chips may be located differently on each type of processor board. The following information describes the location and arrangement of the EPROM chips on each type of board, as well as the favored location for checking the voltages required by each type of board.

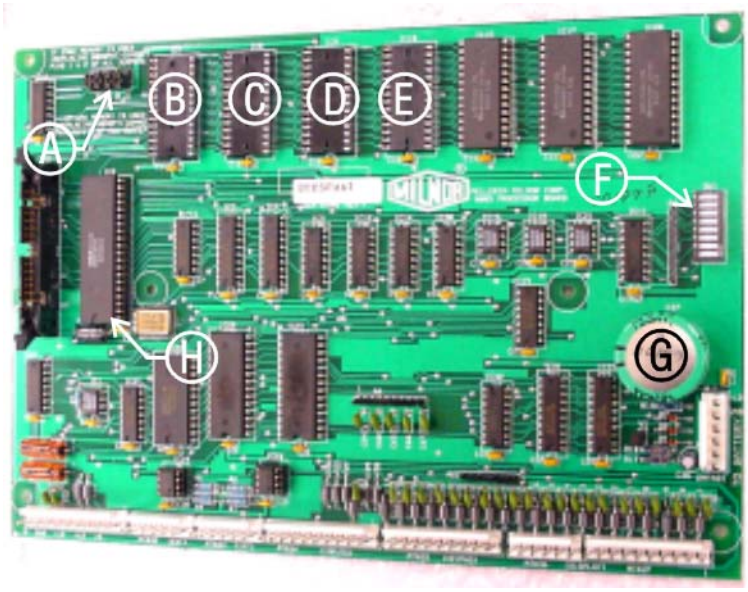
Table 28: Processor Boards and Applications

Processor Part Number	Typical Machine Applications	Comments
08BNCMPAD_	System 7 (e.g., 30015M5G)	
08BN785A_	30-inch E-P Plus	
08BN788A_	---see above---	
08BH18EP_	36- and 42-inch E-P Plus	20 MHz; brown output and chemical connectors
08BH18EPA_	---see above---	15 MHz; brown output and chemical connectors
08BH18EPB_	---see above---	15 MHz; white output and chemical connectors
08BH18EPC_	---see above---	11 MHz
08BH18EPD_		20 MHz; white output and chemical connectors
		8085 non-serial
08BSP___	Mark 2 washer-extractors, etc.	8085 serial with 4 EPROMs
08BSPA___	Mark 2 textile machines	8085 serial with 2 EPROMs
08BSPAA_	replacement for 08BSP_ and 08BSPA_	uses jumpers on processor board to match EPROM type
08BSPC_		Revisions A through D use same software; revision E software is different
08BSPD_	tunnel washers (with expanded memory board)	8088 serial with 2 EPROMs; same as Rev. E of 08BSPC_
08BSPDA_		8088 serial with 4 EPROMs; expanded memory added to processor board
08BSPE_		80186 serial with 1 EPROM and 4 UART chips
08BSPE1_		80186 serial with 1 EPROM and 1 quad-UART chip
08BSPE2_	Mark 6 devices (with graphic display)	
08BT168A_	E-P OneTouch (e.g., 30015T5E)	

5.5.2.1. **8085 Processor Boards (except Coin Machines)**—See Figure 90. Install EPROM #1 at the end of the row nearest the corner of the board, then #2, #3, and #4. Chip #4 goes next to the two chips soldered to the board. See Figure 89 for where to check for proper voltages.

Figure 88: Replacement Processor Board

08BSPAA_

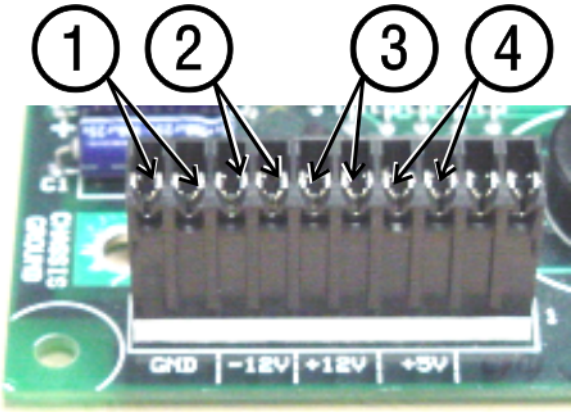


Legend

A. Jumpers for setting EPROM capacity
B. EPROM socket 1
C. EPROM socket 2
D. EPROM socket 3
E. EPROM socket 4
F. DIP switch
G. Capacitor
H. Microprocessor

Figure 89: Where to Check Processor Board Voltages

Typical MTA-31

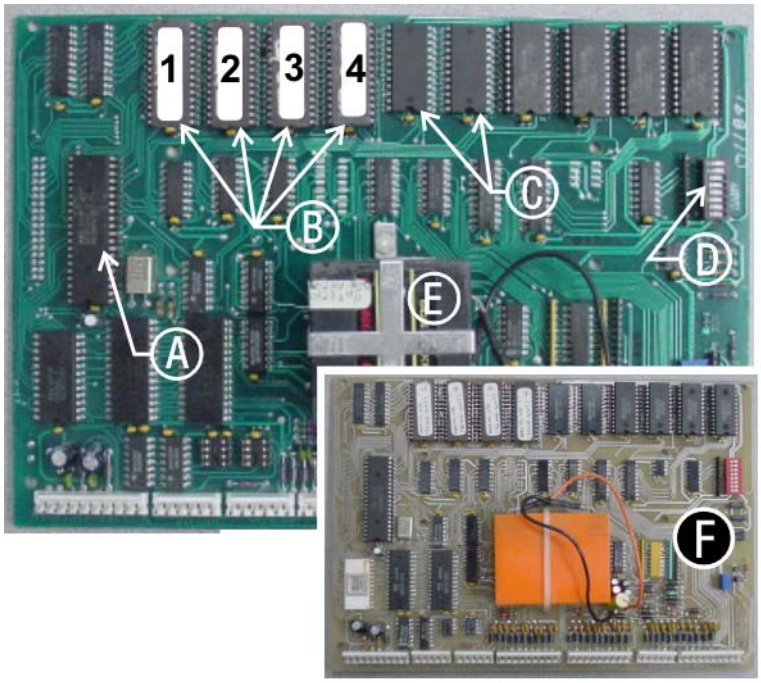


Legend

1. Ground (Earth)
2. Negative 12VDC
3. Positive 12VDC
4. Positive 5VDC

Figure 90: 8085 Processor Boards (Except Coin Machine)

Typical 08BSP_ and 08BSPx_ Processor Boards



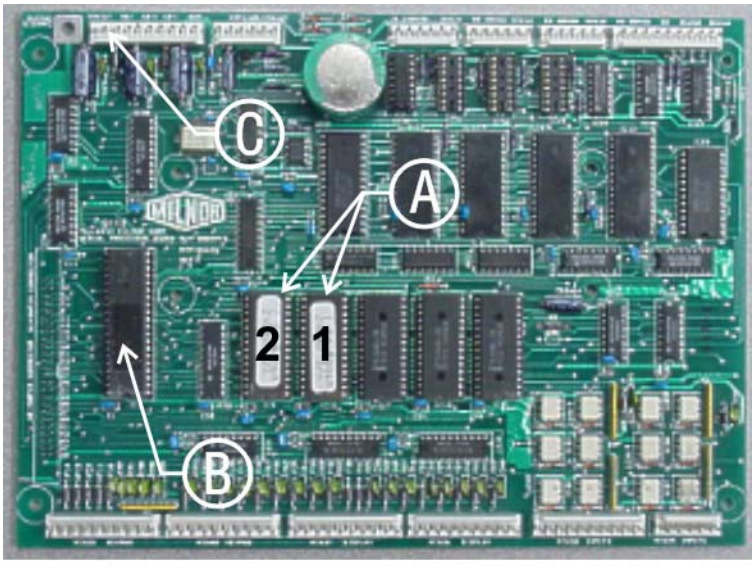
Legend

A. 8085 microprocessor chip
B. EPROMs
C. Soldered chips
D. DIP switch
E. Battery
F. 08BSPB_ processor board

5.5.2.2. 8088 Processor Boards without Memory Expansion Board—See Table 29 "EPROM Locations for 8088 Processor Applications" and Figure 92. If the set consists of only one EPROM, install it in socket A of Figure 92 . If two EPROMs comprise the set, install EPROM #2 in socket A and EPROM #1 in socket B. Always install the highest numbered EPROM in socket A. If the set consists of more than two EPROMs, a memory expansion board must be present in the machine along with the processor board.

Figure 91: Typical 8088 Processor Board without Memory Expansion Board

08BSPC_ Processor Board



Legend

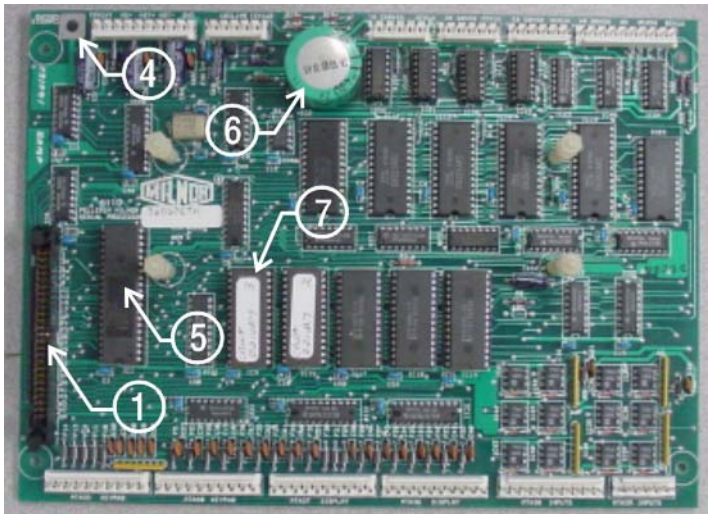
A. EPROMs
B. 8088 processor chip
C. MTA31 for voltage verification

Table 29: EPROM Locations for 8088 Processor Applications

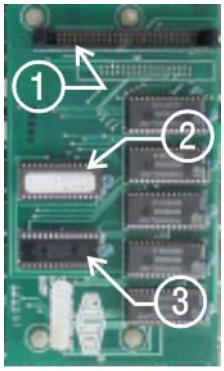
	EPROM Location by Socket			
EPROMS in Set	**A**	**B**	**IC-1**	**IC-2**
4 chips	4	3	2	1
3 chips	3	2	1	—
2 chips	2	1	—	—
1 chip	1	—	—	—

Figure 92: 8088 Processor Board and Optional Memory Expansion Board

8088 Processor Board



Memory Expansion Board



Legend

1. Connector, memory board to processor board
2. Socket IC1
3. Socket IC2
4. Chassis ground
5. 8088 microprocessor chip
6. Capacitor
7. Highest numbered EPROM

5.5.2.3. **8088 Processor Boards with Memory Expansion Board**—See Table 29 and Figure 92. If the EPROM set consists of three or more EPROMs, install the two highest numbered EPROMs (e.g., #3 and #4 of a four-chip set) on the processor board, with the highest numbered EPROM (EPROM #4 of a four-chip set) in socket A, and the EPROM with the second highest number (EPROM #3 of a four-chip set) in socket B. Install the remaining EPROM(s) on the memory expansion board with the highest numbered of the remaining EPROMs (e.g., EPROM #2 of a four-chip set) in socket IC-1 on the memory expansion board and EPROM #1 in socket IC-2.

5.5.2.4. **80186 Processor Boards**—This processor board (see Figure 93) is used on all Milnor® system controllers (Miltron™, Mildata®, etc.) equipped with a color monitor. It is also used on fully-programmable washer-extractors, textile processing machines with software version 95000 and later, and other models. The single EPROM on this board is located in socket IC-2.

Tip: For maximum reliability and to minimize the chances of the processor board resetting due to low voltage, adjust the power supply voltage for 80186 processors to 5.10 VDC at the processor

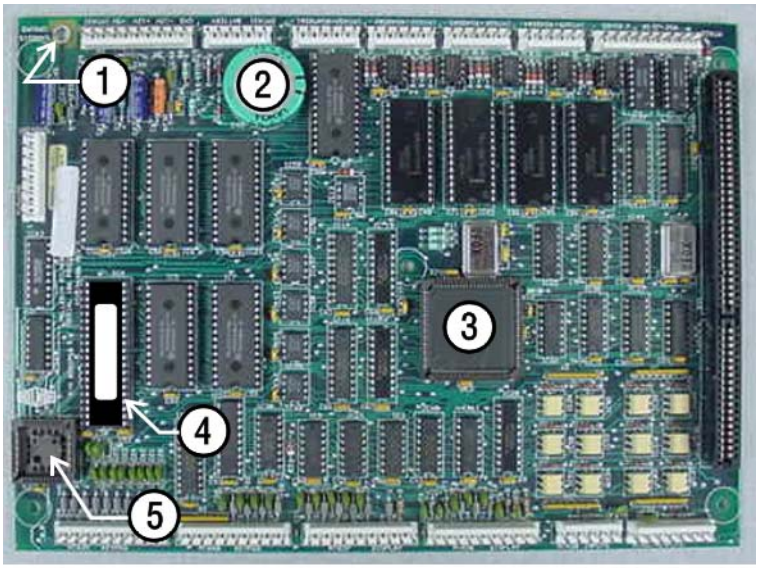
board.

There are three major revisions of this board, all of which have Milnor part numbers starting with “08BSPE”. If the seventh character is a “1” (one), the board is a later version with a single four-channel communications chip. If the seventh character of the part number is any letter, the board is an earlier version with four one-channel communications chips.

The third version of 80186 processor board—with part number “08BSPE2_”—can be configured via a jumper on the board (shown in Figure 95) to operate either a vacuum fluorescent **text** display, or a flat panel **color graphic** LCD display. The jumper controls the serial communications port on MTA30.

Figure 93: 08BSPET 80186 Processor Board

Overview

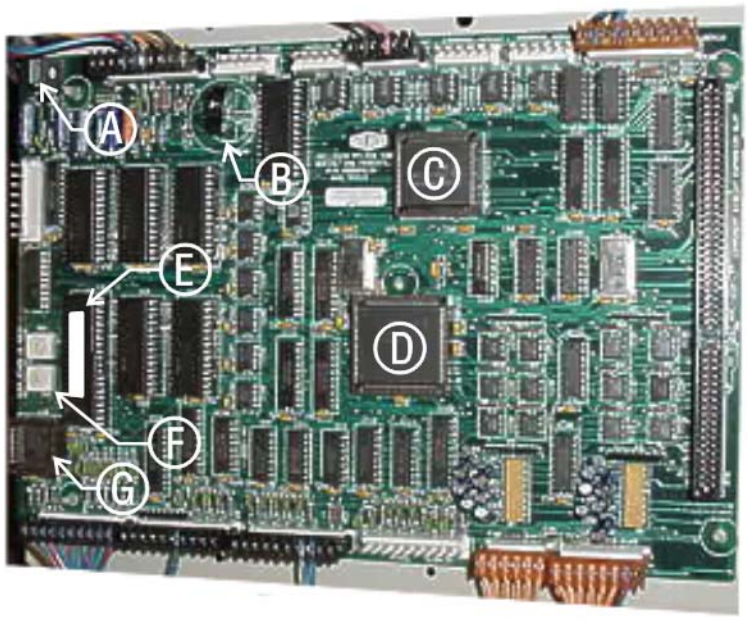


Legend

1. Chassis ground
2. Capacitor
3. 80186 microprocessor chip
4. EPROM in socket IC-2
5. ROM socket (empty except in Japan)

Figure 94: 08BSPE1T 80186 Processor Board

Overview

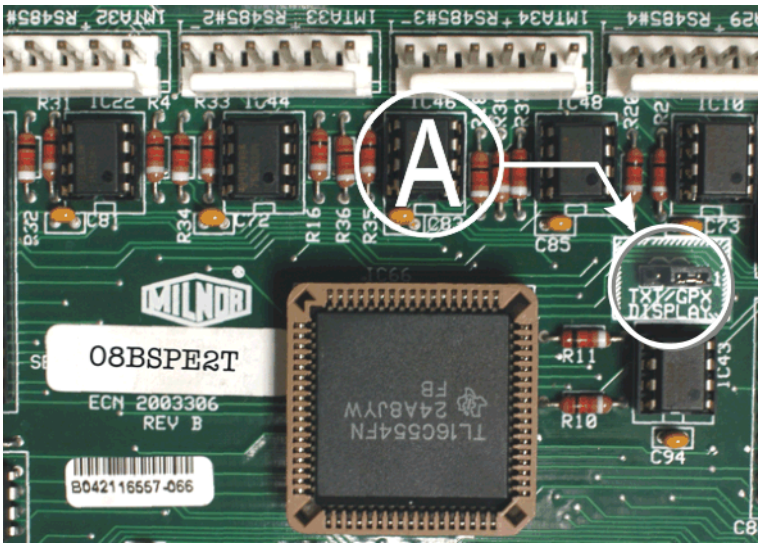


Legend

A. Chassis ground
B. Capacitor
C. Quad-UART chip
D. 80186 microprocessor
E. EPROM
F. Rotary DIP switches for keypad
G. ROM socket (empty except in Japan)

Figure 95: 08BSPE2T 80186 Processor Board

Detail



Legend

A. Jumper for selecting display type

5.5.2.5. How to Use the Display Module Update Routine [Document BICWCM01]—All Milnor® models which use a graphic display similar to the one shown in Figure 96 require that the display module firmware match the machine controller software. Press controller software WUMILSSPB/21100 and later contains an automatic routine to update the display module firmware if necessary. In most cases, this is a one-time process that does not need to be repeated unless the machine software is updated or a different language set is installed.

Figure 96: Mark VI Graphic Display (washer-extractor shown)

This information does not apply to machine models which use a text display (either two or four lines of 20 characters each).

5.5.2.5.1. Why is this Necessary?—The graphic display on models with the Mark VI control system must quickly display the changing status of the operating machine. To reduce the amount of time spent transmitting graphics that might be repeated many times during a machine cycle, the information required to display any screen is separated between the *machine controller* and the graphic *display module*.

The display module contains the necessary *graphic elements*,—used like building blocks—for all the display screens. These elements include text, boxes, and lines, each with a specific element number and location on the display. This is the *firmware*.

The machine controller *software* monitors the machine and the user controls, and issues commands to peripheral boards. The controller contains a list of all the element numbers, but it doesn't know where on the screen the element will appear because the location is stored in the display module. When the machine controller software is running, the controller issues commands to the display module to display certain elements.

With each new version of machine controller software, new graphic elements may be needed to display information or prompt the user. Because the machine controller calls each graphic element by number, new elements may change the element numbers for all the subsequent elements in the list, causing unpredictable display behavior. Therefore, the machine controller software and display module firmware must always be compatible.

Tip: The first five characters of the version number for both the controller software and the display module firmware indicate the revision level. The sixth character, if it exists, indicates the alternate language included in the software. For example, **controller software** WUMILSSPB/211004 is version 21100 of the software with German as the alternate language. The last digit of the **display module firmware** also reflects the alternate language. In this document, the language code is represented by an underscore (_) character.

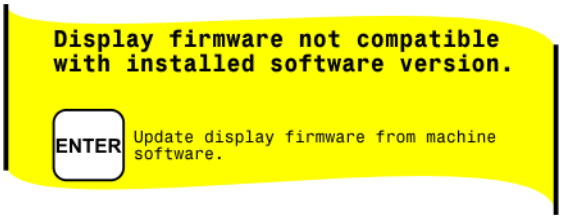
5.5.2.5.2. What is the Procedure?—When the machine powers up, the machine controller tries to read the firmware version number contained in the graphic display module. If the controller receives the appropriate firmware version in response, the machine controller continues the start-up

routine. This routine ends when one of the following three screens is displayed:

- on most washer-extractors, the *Select Local Formula* or *Select Remote Formula* screen,
- on automatically loaded washer-extractors, the *Select Run Mode* screen, or
- on presses, the *Manual Menu* screen.

If the controller does not receive the correct response from the display module, the controller displays a screen similar to Figure 97 and prompts the user to begin updating the display module firmware.

Figure 97: Typical *Firmware Mismatch* screen

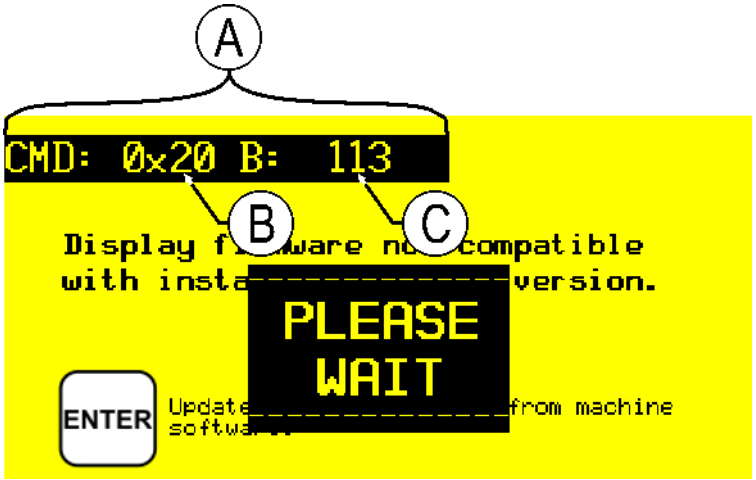


Display or Action	Explanation
	When the screen shown in Figure 97 appears, this key starts the automatic firmware update routine. **Do not turn off power to the machine or otherwise interrupt the routine.**

A screen similar to Figure 98 appears immediately when the update routine begins.

Figure 98: Firmware Update in Progress

Typical screen



Legend

A. Status line indicates update in progress
B. Command indicator
C. Data blocks received

Supplement 4

Details of the Update Routine

The status line near the top of the display contains two types of information about the progress of the update: the *command* and the *block number* received.

1. When the update begins, the status line is `CMD: 0x10 B: 0`. This indicates that a `0x10` command was received to erase the old firmware. The block number remains at 0 until the display module begins receiving the new firmware.
2. Within about one second, the display module will receive and briefly display `0x11`. This

code indicates that the machine controller is verifying that the display module memory is clear and ready to accept the new firmware.

3. When the display module memory is clear, the machine controller begins sending a series of `0x20` commands. Each of these commands contains one *block* (approximately 1 Kb) of the total display firmware. With each block command received and verified at the display module, the block number increases. The total number of blocks received varies according to the software version and language.

   Note 18: You may see the block count pause briefly at any value. This is normal, and indicates that the machine controller and the display module are communicating to correct a block that contained an error.

4. When the display module confirms that it has correctly received the last block, the machine controller resets itself. This causes the display to appear as if machine power were cycled off and on. When the display shows the *Manual menu*, the machine is ready for the operator to command automatic operation.

— End of BICMUM01 —

BICMDF01 (Published) Book specs- Dates: 20150826 / 20150826 / 20150826 Lang: ENG01 Applic: CP1

5.6. Hardware Components of Serial Microprocessor Controllers

5.6.1. General

Milnor® serial microprocessor controls are designed specifically for Milnor® machines and systems. Along with certain external electromechanical relay logic and sensing devices, they control all machine and system functions. **Not every microprocessor controller includes all the components described in this section.**

5.6.2. Microprocessor Components

Note 19: This is a list of all components for Milnor® microprocessor controllers. Not every Milnor® microprocessor controller includes all of the following components.

5.6.2.1. Keypad or Keyboard—Depending upon the model and type of machine, the keypad may have 12, 30, or 58 buttons. The different keypads are not interchangeable.

5.6.2.2. Keyswitch—Selects run/program modes. The key may be removed only when the switch is set to the *Run* position.

CAUTION 25: Prevent Unauthorized Programming—To prevent unauthorized programming, store the programming key so that it is not available to unauthorized personnel. Improper programming can damage equipment and goods.

5.6.2.3. Display—Depending upon the type and model of machine, the display may be either liquid crystal, vacuum fluorescent, or cathode ray tube (CRT), which is a typical computer monitor. Different types of displays are not interchangeable.

Vacuum fluorescent display—The bright green characters on a black background make this display highly visible. This is the most common display for Milnor® washer-extractors, textile machines, and dryers.

5.6.2.4. Power Supply —The power supply converts the alternating current at the control circuit voltage to direct current voltages of 12 volts positive and negative, and 5 volts positive. One or more of these values are adjustable, depending on the specific power supply used in each application.

- The 12 volts positive is used to power all boards other than the microprocessor board. This value is not adjustable.
- The 12 volts negative is used by the analog to digital (A/D) board. This value is not adjustable.
- The 5 volts output powers the microprocessor. This value is adjustable and very sensitive. For devices using microprocessors other than the 80186, the power supply must be adjusted to provide actual voltage of 4.95VDC to 5.10VDC at the microprocessor board. Use an accurate digital voltmeter to measure this value. For devices with 80186 microprocessors, the power supply voltage should be 5.10VDC at the processor board.

A wire of at least 14AWG (2.5 sq mm) must be connected between the ground points on the microprocessor and the peripheral boards. This ground wire is installed at the factory if both enclosures are mounted on the same machine (e.g., washer-extractors). The ground wire must be provided during installation if the microprocessor enclosure and its associated peripheral board enclosures are remote from one another (e.g., dryers).

Some machines, including Milnor® dryers, employ a second identical power supply to provide power for the peripheral boards, which are mounted in an enclosure separate from the microprocessor enclosure.

5.6.2.5. Central Processing Unit (CPU) Board—Also referred to as the microprocessor, the central processing unit processes data received from the various inputs, stores information, and responds to each keypad entry with the appropriate action. It may be mounted in an enclosure separate from its peripheral boards. The CPU board contains EPROMs programmed by the Milnor® factory with fixed instructions (software) that determine how the machine functions. Depending upon machine model/type, the processor chip may one of three Intel models: the 8085, the 8088, or the 80186.

Although the EPROMs do not require battery backup, the CPU board utilizes a battery which normally provides power to retain the user-programmable memory for two to three months without external power.

5.6.2.6. Memory Expansion Board—Increases memory space available to the processor. This board is used with 8088 CPU boards in some applications.

5.6.2.7. Battery—Provides memory retention backup when power is off. The battery is mounted directly on 8085 CPU boards, and mounted separately for 8088 and 80186 CPU boards. A capacitor on the 8088 and 80186 CPU boards provides enough power to retain memory for several hours after the battery has been disconnected. Once fully charged, the battery backup is reliable for two to three months with no power applied.

5.6.2.8. Opto-Isolator Board—Optically isolates inputs to the microprocessor for electronic noise immunity. Opto-isolators are incorporated into the 8088 and 80186 CPU board; thus this separate board is only required for machines employing Intel 8085 CPUs.

5.6.2.9. Input/Output Board—The 16/8 input-output board contains 16 solid-state signal input devices and eight output relays. The input devices are capable of faithfully conducting a low VA 12VDC ground signal to the microprocessor. The output relays are socket-mounted SPDT, 12VDC electromechanical relays with contacts capable of faithfully conducting a maximum of 25VA at 110/120VAC (0.2 ampere or 200 milliamperes at 110/120VAC) or 12.5 VA at 24VAC (0.5 ampere or 500 milliamperes at 24VAC). The output will be either 24VAC or 110/120VAC, depending on the machine model/type.

These outputs and their power source are intended only to drive another relay with higher contact ratings, that in turn may drive a pump, valve, solenoid, etc., from a separate power source. Never use these outputs to directly drive a pump, valve, or solenoid unless the maximum current required never exceeds the above values. Higher ampere or VA loads will burn out traces on the printed circuit board or possibly overload and damage the control circuit transformer.

This board has 25 status lights. The amber light flashes when the board is communicating. Each of the 24 remaining lights represent an input (green lights) or output (red lights) on that board, and illuminates when the corresponding input or output is made. This board has two rotary dials which must be adjusted to set the board's address (see Section 5.6.4 "Assigning Board Addresses" in this document). This board also has convenient test points that can be used to test voltage to the board.

Standard input/output board—used in all devices requiring input/output boards, except those listed below.

High-speed input/output board—used only in the following devices and configurations: E6N, J6N, and T6N washer-extractors equipped with and configured for both variable basket speed and electronic balancing; Milrail configured for high-speed boards, and all configurations of the M7E centrifugal extractor.

5.6.2.10. Output Board—A 24-output board contains 24 output relays identical to those described in Section 5.6.2.9 "Input/Output Board".

5.6.2.11. Resistor Boards—Although visually similar, resistor boards vary according to the application. The different types are clearly marked with part numbers, which are mentioned in the electrical schematic diagrams and are not interchangeable.

5.6.2.12. Temperature Probe—Two types of temperature probes are used, depending on equipment type:

Thermistor temperature probe—a temperature-sensitive resistor whose resistance value changes with respect to temperature; uses include washer-extractors, textile machines, and tunnel systems.

5.6.2.13. 8 Output/16 Input Chemical Flow Meter Board—This board is used with the metered chemical injection option on textile machines. Eight outputs and eight counters respectively are assigned to chemical valves and chemical flow meters. Two of the counters are non-isolated direct inputs to the microprocessor on this board and are capable of counting pulses of 0 to 5VDC at a frequency of up to 10kHz. The remaining six counters are optically isolated from the peripheral board microprocessor and are capable of counting pulses from 0 to 12VDC at a frequency up to 150 Hz.

5.6.3. Serial Communications Port

All Milnor® serial microprocessors have a serial port with a nine-pin receptacle and plug to communicate with other devices via one of several special serial cables. If supported by the

software, downloading and printing of data is accomplished through this port. These actions are described in the programming section of this manual.

For more information on the various separate serial cables required for these functions, see Section 5.2. “Construction of External Serial Link Cables”, if applicable.

Table 30: Board Application by Device (Part A)

Device		Board Name: CPU	Input/Output	Output	Analog to Digital	Digital to Analog	CRT	Opto-isolator	Temperature Sensing Resistor	Gas Valve Resistor	Steam Valve (4-20mA)	Thermocouple Signal Conditioner	Chemical Flow Meter	Rotation Safety	Weight Scale Interface
CBW System*	Number	1	2		1		1								1
	Note(s)		+	1	9										5
Device Master*	Number	1	2				1								
	Note(s)		1	1											
Miltrac*	Number	1					1								
	Note(s)														
VERTSTO	Number	1	2				1								
	Note(s)														
Linear COSTA	Number	1	1												
	Note(s)		1												
Link Master	Number	1													
	Note(s)														
Textile*	Number	1	1	2	1	1			1		1				
	Note(s)				4								1		

Notes:

*	Intel 80186 central processing unit
1	Boards can be added for options
2	Used on steam dryers with temperature control, and all gas dryers
3	Used on washer-extractors with temperature option
4	Analog to digital boards vary according to application. See the descriptions of these boards elsewhere in this section.
5	Required for weighing conveyors on tunnel washing systems
6	Required for reuse/cooldown and/or overhead fill tanks on tunnel washing systems
7	Mark I washer-extractor control used Intel 8085 central processing unit
8	Notes 3 and 4 apply
9	One board required per each 8 modules (see also Notes 1, 4, 5, and 6)
10	Two boards required, plus one additional board per module

Table 31: Board Application by Device (Part B)

Device		CPU	Input/Output	Output	Analog to Digital	Digital to Analog	CRT	Opto-isolator	Temperature Sensing Resistor	Gas Valve Resistor	Steam Valve (4-20mA)	Thermocouple Signal Conditioner	Chemical Flow Meter	Rotation Safety	Weight Scale Interface
COBUC	Number	1	2												
	Note(s)		1	1											
COSHA	Number	1	2												
	Note(s)		1												
Dryer	Number	1	2	1	1	1				1		1		1	
	Note(s)				4	2				2	2				
Extractor	Number	1	2	1											
	Note(s)		1	1											
Press	Number	1	2	1	1										
	Note(s)		1	1											
W/E (Mark I)	Number	1	1	1	1			1	1						
	Note(s)	7	1	1	8	1									
W/E (Mark II-VI)	Number	1	1	1	1	1								1	
	Note(s)		1	1	8	1			1						

Notes:

*	Intel 80186 central processing unit
1	Boards can be added for options
2	Used on steam dryers with temperature control, and all gas dryers
3	Used on washer-extractors with temperature option
4	Analog to digital boards vary according to application. See the descriptions of these boards elsewhere in this section.
5	Required for weighing conveyors on tunnel washing systems
6	Required for reuse/cooldown and/or overhead fill tanks on tunnel washing systems
7	Mark I washer-extractor control used Intel 8085 central processing unit
8	Notes 3 and 4 apply
9	One board required per each 8 modules (see also Notes 1, 4, 5, and 6)
10	Two boards required, plus one additional board per module

5.6.4. Assigning Board Addresses

The input/output board, output board, analog to digital board, and digital to analog board each have two rotary switches which establish the address for each board. This allows each board to communicate serially with the microprocessor in its device while sending and receiving its own messages. In a battery of machines, the rotary switches are identical for each identical peripheral board in each identical machine (e.g., the first input/output board (I/O-1) in each washer-extractor has identical rotary switch settings). When a microprocessor must communicate with a higher level control (e.g., when all dryers communicate with the MilData® system), the higher level control must know the address of each microprocessor. For 8088 microprocessors, the high level control knows the address of each device because that information was established during configuration (e.g., see *Miltrac Address* configure decision in the programming manual for any device that communicates with Miltrac).

Table 32: Rotary Switch Settings

Board		Washer-Extractor	VERTSTO	Extractor	Two-Stage Press	One-Stage Press	Linear COSTO	Textile	Dryer	Device Master	COBUC	COSHA
Analog to Digital	SW2	2*			2	2		2	2			
	SW1	1*			1	1		1	1			
Digital to Analog	SW2	3*				3		3	3			
	SW1	1*				1		1	1			
Input/Output #1	SW2	0	0	0	0	0	0	0	0	0		
	SW1	1	1	1	1	1	1	1	1	1		
Input/Output #2	SW2	0*	0	0*	0	0	0*	0*	0	0	0	0
	SW1	2*	2	2*	2	2	2*	2*	2	2	2	2
Input/Output #3	SW2			0*	0*	0*				0*	0*	0*
	SW1			3*	3*	3*				3*	3*	3*
Input/Output #4	SW2			0	0*					0*	0*	0*
	SW1			4	4*					4*	4*	4*
Output #1	SW2	1		1	1	1		1	1	1*		
	SW1	1		1	1	1		1	1	1*		
Output #2	SW2	1*		1*	1*			1		1*		
	SW1	2*		2*	2*			2		2*		
Output #3	SW2	1						1*		1*		
	SW1	3						3*		3*		

Notes:

* Optional boards

1 See schematics for rotary switch positions on tunnel washer system devices.

— End of BICMDF01 —

BICALC13 (Published) Book specs- Dates: 20150826 / 20150826 / 20150826 Lang: ENG01 Applic: CP1

5.7. Summary of Milnor® Allied Interface Capability, Single Stage Press

A Milnor system machine may need to load from, or discharge to a non-Milnor machine. This document summarizes allied interface capability for the Milnor system machine equipped with Mark 5 microprocessor or later controls, as of this writing (see Note 21).

Note 20: Refer to the document "About Milnor® Allied Interfaces for Automated Laundering System Machines" for a general explanation of allied interfaces. Refer to "Milnor® Allied Interface Specifications and Signals" for technical information needed to implement an allied interface.

Note 21: The allied interfaces offered by Milnor are continually evolving and the available signals can vary from one software version (date code) to another. Milnor Tehnical Support can assist in determining data-passing capacities for specific software versions.

5.7.1. How Batch Data Travels Through a System

The types and ranges of batch codes that the devices within an automated laundering system can handle depend on both the individual device controller and the means of communication used to pass this data from device to device. Generally, allied interfaces provide less capacity then the Miltrac controller because they are much more limited by hardware constraints and are developed on an as-needed basis. You will notice in Table 33 that certain types of codes and code ranges do not carry over from device to device, or even from the loading to the discharge interface within the same device. Keep in mind that both down stream and upstream of a given allied interface, data will most likely be passed not via an allied interface, but rather, by the Miltrac controller or a similar system controller supplied by another equipment manufacturer. As of this writing, Miltrac is capable of passing the following codes and code ranges throughout the entire system (among all Miltrac devices): 256 formula codes, 16 press/extract codes, 16 dry codes, 256 goods code, 1000 customer codes, 64 destination codes, 1000 weight values, 256 cake numbers, and the following flags: single cake, empty load, low pressure, third pressure, no pressure.

5.7.2. Batch Data Signals

This section summarizes the types and number of batch codes for which, as of this writing, batch data allied interface signals are available. As shown in Table 33, the signals that carry batch data are divided into two general categories, those that pass multi-digit batch codes (e.g., drycode) in binary, and must therefore, function in groups and those that pass a single on/off value (e.g., the "new customer" code).

Both the need for, and the specific use that any type of batch code serves can vary significantly from one installation to another. Signals traditionally used for certain batch codes can sometimes be adapted to new types of batch data. The following are the batch codes traditionally associated with allied interfaces and their traditional definitions.

Formula code—identifies the wash formula used in the tunnel. Although in some systems, the wash formula may affect post-wash processing, formula codes are passed to post-wash devices primarily for accounting and record-keeping purposes (see Note 22).

Extract code—Sometimes called press code, this identifies the extract formula, if a Milnor centrifugal extractor is used, or the press formula, if a Milnor single stage press is used (see Note 22). Extract codes do not apply to the Milnor two-stage press which does not have formulas as such, but can be made to vary the pressure of the main bell via the Low, 3rd, and No Pressure (on/off) signals.

Note 22: Although formula code and extract code are technically different things, they can be thought of as the same by programming the Milnor centrifugal extractor or single stage press so that the proper extract formula is invoked by a formula code of the same number. For example, program extract code 05 so that it is the proper extraction process for batches processed with formula code 05. Then simply pass the formula code to the extractor or single stage press as the extract code.

Dry code—identifies the drying formula to be used in the drying or conditioning equipment.

Cooldown code—identifies the cooldown procedure to be used in the dryer.

Customer code—identifies the customer (commercial laundry) or department (institutional laundry) the batch belongs to.

Goods code—in older Milnor CBW®'s (with Miltron™ controllers), identifies a subset of a general class of goods. All batches conforming to the general class are processed using the same wash formula. But each specific goods code within that class causes variations in processing, essentially extending the range of available wash formulas. Although in some systems, the goods code may affect post-wash processing, goods codes are passed to post-wash devices primarily for accounting and record-keeping purposes.

Destination code—identifies a storage location within the laundry to send the load.

Weight—the dry, soiled weight of a batch, as measured by a weighing device, such as a weighing type load conveyor, upstream of the tunnel. Although in some systems, weight may affect post-wash processing, weights are passed to post-wash devices primarily for accounting and record-keeping purposes.

Cake Number—in older Milnor CBW®'s (with Miltron™ controllers), this is an identification number associated with each batch. The Miltron automatically assigns the numbers 000 to 255 in sequence and starts over at 255. As indicated in Table 33, allied signals are not currently available on any machine for passing this code.

New formula—indicates that the batch being transferred was processed using a different formula than the previous batch (see Note 23).

New customer—indicates that the batch being transferred belongs to a different customer than the previous batch (see Note 23).

> **Note 23:** The intent of both of these signals is to provide a means of segregating batches with different formula, goods, and/or customer codes, in post-dry. They are typically used in systems that are not capable of passing (or do not need to pass) formula, goods, or customer codes. Depending on the specific situation, the signal would be actuated by the washer whenever the formula, goods, and/or customer code changes. In the Milnor dryer controller, the “new customer” signal causes the customer code to increment by one (e.g., from 07 to 08). In such a system, the value of the customer code is irrelevant, but changing it signals downstream devices not to combine these loads.

Single cake—also called “small load” or “little load”, this signal tells a shuttle to deliver, and a multi-cake dryer to accept this cake (load) by itself. This is usually done when the cake that follows belongs to a different customer and the goods should not be intermingled.

Empty load—also called “empty pocket” or “pass-empty”, this signal tells the receiving device that it will not receive any goods with the batch data it is receiving. Empty pockets are sometimes used in the tunnel to perform a cleaning process or to segregate goods from incompatible baths.

Low (main) pressure—tells the Milnor two-stage press to use the lowest main bell pressure (see Note 24).

3rd (main) pressure—tells the Milnor two-stage press to use a lower than normal main bell pressure (see Note 24).

No (main) pressure—tells the Milnor two-stage press to use no main bell pressure (see Note 24).

> **Note 24:** If the Low, 3rd, and No pressure signals are all off, the press will use standard (high) main bell pressure.

Table 33: Batch Data-passing Capacity for Milnor® Allied Interfaces

Data Format-->	Numeric: Groups of signals pass multi-digit batch codes in binary (number of available batch codes shown)									Non-Numeric: One signal passes a single on/off value (X indicates signal is available)				
Code Name--> Type of Interface	Form-ula code	Press/ Ex-tract code	Dry code	Cool-down code	Cust-omer code	Goods code	destin-ation code	weight (tenths of units)	Cake num-ber	New form-ula	New cust-omer	Single cake	Empty load	Low, 3rd, No press-ure*
Single Stage Press														
Loading		16	16		256	64	16				X	X	X	
Discharge			16		256	256	16				X			
* Low, 3rd, and No Pressure are three separate signals.														

5.7.3. Operational Signals

A set of generic functions can be defined that encompasses most operational information that might be needed for any interface. The generic functions are helpful in understanding interfacing in general, even though it is usually possible to successfully interface any two specific machines using only a few of these functions. Table 34 lists the generic functions and which corresponding signals are actually provided on the device(s).

The generic functions only describe the general purpose for a signal. A given signal may have a more specific meaning pecular to the device. The signal names are taken from the schematics (may be abbreviated) and may vary from device to device. As shown in Table 34, the generic functions can be grouped into three categories: directional functions, transfer functions, and confirmation functions.

Directional functions apply specifically to communication with the shuttle or COBUC and tell the shuttle / COBUC where it must travel to align with the device it will receive from or discharge to. These are all inputs to the shuttle / COBUC and include the following:

2nd level—The shuttle/COBUC must elevate to the higher of two possible levels. 2nd level is usually referred to in the documentation as “level 1” (the first level is level 0).

opposite side—The shuttle must run its belt(s) backwards because the device it is receiving from or discharging to is on the opposite side of the rail from normal. See Note 25.

> **Note 25:** Although the Mark 5 COBUC controls provide a signal for this function, it is not needed because the COBUC can only receive and discharge forward.

at left—The shuttle/COBUC must traverse leftward.

at right—The shuttle/COBUC must traverse rightward.

Transfer functions either declare that the device is now in a certain state with respect to transfer, or request that the other device achieve a certain state. The transfer functions include:

early call—applies only to communication between the tunnel and a Milnor centrifugal extractor. This function tells the extractor to end the current cycle in preparation for transfer if minimum extract time has elapsed. The Milnor extractor input is called end extract.

discharge desired—There are actually two possible functions: 1) Allied discharge desired (loading interface input) which tells the Milnor device that the allied loading device is or soon will be ready to send a batch to it, and 2) Milnor discharge desired (discharge interface output) which tells the allied discharge device that the Milnor device is or soon will be ready to send a batch to it.

load desired—There are actually two possible functions: 1) Milnor load desired (loading interface output), which tells the allied loading device that the Milnor device is or soon will be ready to receive a batch from it, and 2) allied load desired (discharge interface input), which tells the Milnor device that the allied discharge device is or soon will be ready to receive a batch from it.

loading mode—tells the receiving device to perform the actions that facilitate receiving. In the centrifugal extractor, the input is called start extractor and causes the load door to open or the load chute to lower, and the cylinder to turn. In the dryer, the input is called dryer is loading and causes the load door to open and the cylinder to turn.

discharge allowed—There are actually two possible functions: 1) allied discharge allowed (loading interface input), which tells the Milnor device that the allied loading device can now send, and 2) Milnor discharge allowed (discharging interface output), which tells the allied discharge device that the Milnor device can now send.

load allowed—There are actually two possible functions: 1) Milnor load allowed (loading interface output), which tells the allied loading device to begin sending, and 2) allied load allowed (discharge interface input), which tells the Milnor device to begin sending.

Confirmation functions provide information on the completion status of transfer and include the following:

transfer not completed—not an error condition (see below) but simply the inverse of transfer completed.

error: cancel transfer—says that an illegal condition was detected when transfer was attempted and to stop the transfer. Currently, this function is only provided as an allied output/Milnor input signal.

data valid—tells the Milnor device (in a loading interface) or the allied discharge device (in a discharge interface) that batch data are set and should now be read. See Note 26.

transfer completed—says that all goods have been transferred. The signal usually passes from discharging device to receiving device. Hence, this is usually an input signal in a loading interface and an output signal in a discharging interface. However, the Milnor shuttle is also capable, via the belt photoeyes, of detecting when it has received a complete load. So if needed, it can communicate this information (in the opposite direction) to the loading device. The signal name varies, depending on the device and type of interface. See Note 26.

> **Note 26:** In most cases, an explicit data valid signal is not needed because another operational signal serves this purpose. Where the data valid signal is not provided, the various tables of non-numeric signals in the document "Milnor® Allied Interface Specifications and Signals" indicate which signal should be used for this purpose.

Table 34: Operational Functions and Available Signals

Function Type-->	Directional Functions				Transfer Functions						Confirmation Functions			
Function Name--> Type of Interface	2nd level	Oppo-site side	At left	At right	Early call	Dis-charge desired	Load desired	Load-ing mode	Dis-charge al-lowed	Load al-lowed	Trans-fer not com-plete	Error: cancel trans-fer	data valid	trans-fer com-plete
Single Stage Press														
Loading										output: press free				input: press loaded
Dis-charge						output: desires to unload				input: start dis-charge		input: don't dis-charge		

— End of BICALC13 —