Published Manual Number/ECN: MATPRESSCE/2018103A

- **Publishing System: TPAS2**
- **Access date: 03/06/2018**
- **Document ECNs: Latest**

Technical Reference

Mark III, Mark IV, and Mark V Press Controller

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

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

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MATPRESSCE/18103A

PELLERIN MILNOR CORPORATION
LIMITED STANDARD WARRANTY

We warrant to the original purchaser that MILNOR machines including electronic hardware/software (hereafter referred to as "equipment"), will be free from defects in material and workmanship for a period of one year from the date of shipment (unless the time period is specifically extended for certain parts pursuant to a specific MILNOR published extended warranty) from our factory with no operating hour limitation. This warranty is contingent upon the equipment being installed, operated and serviced as specified in the operating manual supplied with the equipment, and operated under normal conditions by competent operators.

Providing we receive written notification of a warranted defect within 30 days of its discovery, we will at our option repair or replace the defective part or parts, FOB our factory. We retain the right to require inspection of the parts claimed defective in our factory prior to repairing or replacing same. We will not be responsible, or in any way liable, for unauthorized repairs or service to our equipment, and this warranty shall be void if the equipment is tampered with, modified, or abused, used for purposes not intended in the design and construction of the machine, or is repaired or altered in any way without MILNOR's written consent.

Parts damaged by exposure to weather, to aggressive water, or to chemical attack are not covered by this warranty. For parts which require routine replacement due to normal wear such as gaskets, contact points, brake and clutch linings, belts, hoses, and similar parts the warranty time period is 90 days.

We reserve the right to make changes in the design and/or construction of our equipment (including purchased components) without obligation to change any equipment previously supplied.

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BIUUUD19 (Published) Book specs- Dates: 20081231 / 20081231 / 20081231 Lang: ENG01 Applic: UUU

How to Get the Necessary Repair Components

This document uses Simplified Technical English.
Learn more at http://www.asd-ste100.org.

You can get components to repair your machine from the approved supplier where you got this machine. Your supplier will usually have the necessary components in stock. You can also get components from the Milnor® factory.

Tell the supplier the machine model and serial number and this data for each necessary component:

- The component number from this manual
- The component name if known
- The necessary quantity
- The necessary transportation requirements
- If the component is an electrical component, give the schematic number if known.
- If the component is a motor or an electrical control, give the nameplate data from the used component.

To write to the Milnor factory:

Pellerin Milnor Corporation
Post Office Box 400
Kenner, LA 70063-0400
UNITED STATES

Telephone: 504-467-2787
Fax: 504-469-9777
Email: parts@milnor.com

— End of BIUUUD19 —

Trademarks

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

Table 1 Trademarks

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

End of document: BNUUUU02

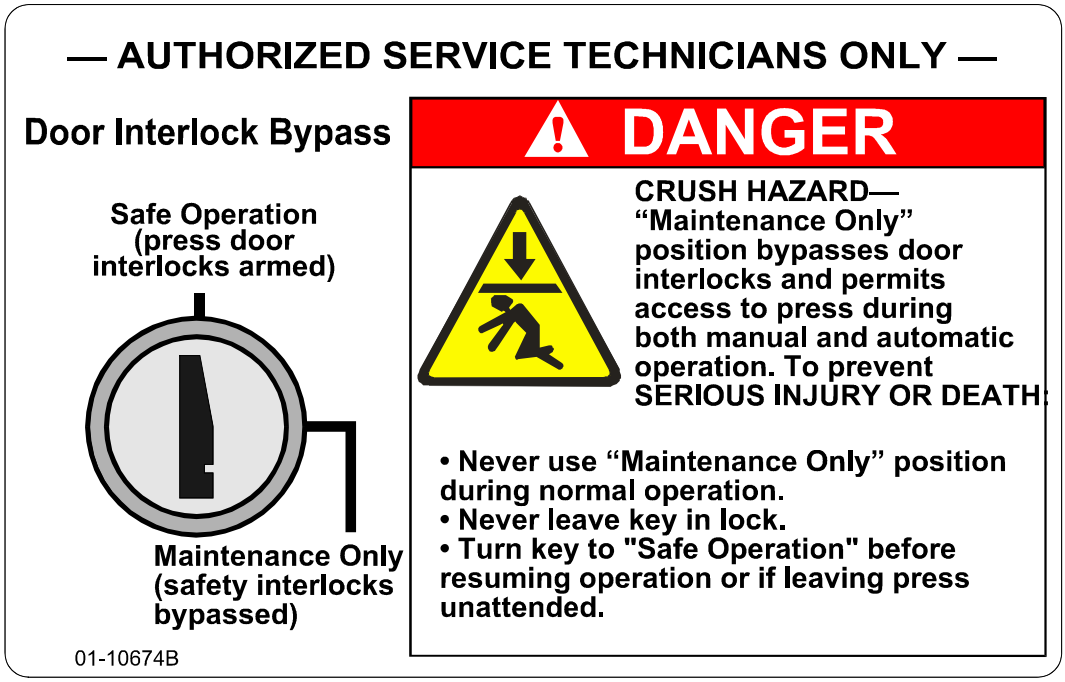
SAFETY ALERT for Owner/Managers and Maintenance Personnel: Using the Door Interlock Bypass Key Switch

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 —

Commissioning 1

Important Owner/User Information—Machines with a Keypad

Take the following important steps before placing this machine in operation:

1. Ensure safety of laundry personnel.
2. Protect against data loss.
3. Customize data (configure, formula, and productivity data).

1. Ensure Safety of Laundry Personnel

Ensure that all personnel who will operate or maintain this machine read the safety manual **before permitting them access to the machine**. Ensure that all user manuals are available to the appropriate personnel and that all precautions explained in the safety and other user manuals are observed.

2. Protect Against Data Loss

Follow the safeguards listed below to protect against data loss caused by human tampering, electromagnetic interference (EMI), physical damage to the data storage medium, or loss of power to random access memory (RAM).

1. Keep the *Run/Program* keyswitch set to *run* () and secure the keys. Users must understand proper use of this control. See "ABOUT THE USER CONTROLS. . ." (see Table of Contents).
2. Keep all electric box doors closed and locked. Secure the keys.
3. Leave machine power on for 48 hours before customizing data. This fully charges the microprocessor battery, which will then supply power to the RAM for 90 days even if machine power is off.
4. Replace the battery board every five years. A capacitor on the processor board can supply power to the RAM for several hours with the battery removed.
5. Keep electronic back-up data and/or a printed record of all field-programmed data (e.g., wash formulas, configure values, step names, chemical names) in case of data loss. See the instructions for downloading and printing this data if the machine has this capability.
6. For machines that accumulate productivity data (e.g., count of loads processed), transcribe any needed data frequently, as described in the instructions for data accumulation.

3. Customize Data

3.1. When to Customize Data

- When commissioning the machine
- When restoring a machine to service after a lengthy shutdown
- When required by error message
- After replacing the CPU board
- After upgrading software (replacing EPROMs)
- After adding or removing optional equipment

3.2. What Customizing Requires—Verify configuration. Program formulas and clear productivity data, if applicable. See the programming and operating sections in this manual for instructions.

3.3. Data Accessibility—Configure and formula data can only be altered while the keyswitch is in the *program* position (data is keyswitch-protected). Producitvity data, because it is accumulated in the run mode, cannot be keyswitch-protected and is accessible to anyone. Data is accessible to the extent described in the following table:

Table 1: Data Type and Accessibility

			Ways Data Can Be Used and Altered				
			Data can be read	Data can be over-written	Data can be up/downloaded	Data can be cleared	Contents after clearing
Type of Data		**Machines Data Applies To**					
Configure Data		dryer (includes gains)	Yes	Yes	Yes	Yes	example values
		shuttle, single-stage press	Yes	Yes	No	Yes	zeros
		two-stage press, Cobuc, Linear Costo, discharge sequencer	Yes	Yes	No	No	n.a.
		washer (and textile)-extractor, centrifugal extractor	Yes	Yes	Yes	No	n.a
Formula Data	**step, chemical names**	washer (and textile)-extractor	Yes	Yes	Yes	Yes	example values
	formulas	washer (and textile)-extractor, centrifugal extractor, dryer	Yes	Yes	Yes	Yes	empty
Productivity Data		washer (and textile)-extractor, centrifugal extractor, dryer	Yes	No	No	Yes	empty

3.4. If Data Becomes Corrupt—If the microprocessor senses that data is unusable or unreliable, an error message will appear (usually at power-up), possibly preventing machine operation. The consequences and appropriate actions for each error message are explained in the troubleshooting instructions. Follow these instructions exactly to ensure that corrupt data is completely eliminated and replaced with valid data. Failure to do so may result in unsafe operation or machine damage.

— End of BICM3K01 —

BICPUK01 (Published) Book specs- Dates: 20030708 / 20030708 / 20030708 Lang: ENG01 Applic: CP2

About the User Controls—Machines with a Keypad

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 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. Electro-Mechanical Controls

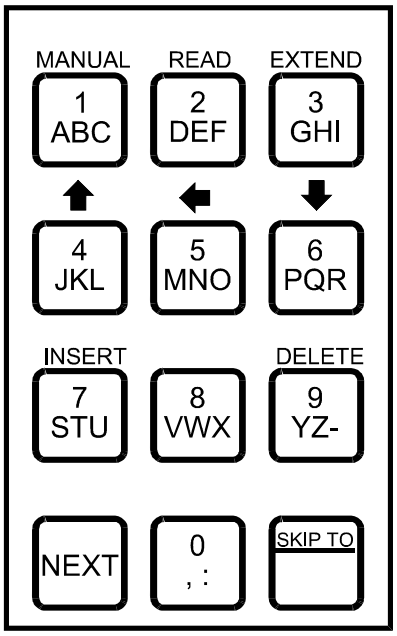
Electro-mechanical controls vary with machine model and are explained in the machine-specific operator manual furnished with the machine.

2. Microprocessor Interface Controls

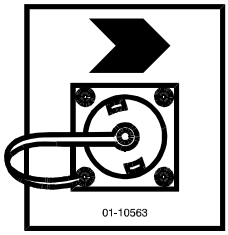
These controls, shown in Figure 1, include the keyswitch, display and keypad located on the main nameplate (position on nameplate varies), and the printer/download connection, located on its own nameplate. These controls permit the user to pass data to and from the microprocessor controller.

Figure 1: Microprocessor Interface Controls

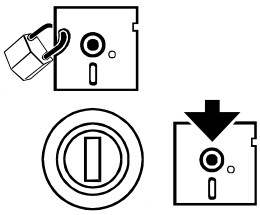
1. Keypad



2. Printer Download Connection



3. Keyswitch



4. Display

Legend

1. User input to microprocessor controller.
2. Connection for serial printer.
3. Allows the user to modify configuration and programming.
4. Output from control system to user.

Display or Action	Explanation
[key] , [NEXT]	Turn the keyswitch clockwise to *program* ([key]) then press and release the *Next* key.
[key] , [NEXT]	Turn the keyswitch counterclockwise to *run* ([key]) then press and release the *Next* key.
[↑]	Press and release the key shown.
[↑] / [↓]	A slash between symbols means use either key shown. The *up* and *down* arrow keys are often shown this way (i.e., 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 *up* or *down* arrow key to move right or left 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 alternative 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).

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

CAUTION [1]: 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.

2.2. Display—This two-line device displays messages and data entry screens. Messages inform the user as to 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 always shows where the next character will be entered.

2.3. Keypad—The 12-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.

2.4. Printer/Download Connection (if so equipped)—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, if applicable, are explained elsewhere in this manual.

— End of BICPUK01 —

BIUUUK05 (Published) Book specs- Dates: 20050112 / 20050112 / 20050117 Lang: ENG01 Applic: CP2

Definitions of Terms and Abbreviations

CPU (central processing unit)—integrated circuit component, usually an Intel 8088 and its ancillary devices, that interprets programming instructions and inputs to the microprocessor and provides outputs to other devices

CCW—counterclockwise cylinder rotation, as viewed from the load end; see also CW

checksum—one of several numbers generated by the control that represents the amount of data in a specific memory area; any change in a checksum indicates that data has changed

configure—microprocessor programming for various software and hardware options on the machine

control—an electrical enclosure, usually housing a keypad, at which the user commands actions and programs the machine; also includes all electromechanical devices on the machine involved with its operation; also referred to as "controller"

CPU—central processing unit; the main computer chip in a microprocessor control system that processes data, as well as the board on which the CPU chip is mounted

cycle—operations undertaken in a specific order to process goods; a cycle normally ends with the device ready to accept another load

daisy chain—method of linking two or more serial type microprocessor controls with one four-conductor shielded cable. All data passes via this cable, regardless of which machines are communicating.

default password—see **Password, default**

default value—value used by the microprocessor control if no other value has been set by the programmer

DIP switches—dual in-line package switches; a row of (usually six or eight) miniature switches in a single housing used to permanently select or configure certain options on microprocessor boards; on Milnor® microprocessor controls these switches are used most often to specify the communications address for each machine in a system

discretionary data field—any field in the microprocessor control system that can be updated through the keyboard or keypad; also, a machine configuration field, such as temperature units, that is not limited by hardware or equipment in the machine

display—the component by which the machine provides data to the operator; the component may be one of several types, including vacuum fluorescent or liquid crystal (two lines of 20 alpha-numeric characters), color graphic liquid crystal (320 pixels by 240 pixels), or CRT monitor of various resolutions.

door, manual—machine door which is opened and closed by hand, without power assistance

door, power operated—machine door which is normally operated through electro-mechanical controls rather than manually; usually, the machine must be energized for the door to operate

download—process of transferring data, usually configuration and programming instructions, from a machine to another machine or to a memory storage device

EPROM—erasable programmable read-only memory; the portion of some Milnor® microprocessor control systems used to store the fixed instructions (software) that determine how the machine functions

extraction—the removal of excess water from goods discharged from the tunnel washer

extractor, press—see **Press**

formula—instructions used by the machine control to operate motors, valves, and other components during a standard cycle

formula code—see **Code, formula**

goods—articles processed or conveyed by a machine

hardware—electronic boards that control the machine

input, direct—signals that enter the processor board directly; direct inputs are provided by switches on the machine, including limit switches, the *Signal Cancel* button, and the *Run/Program* keyswitch

input, standard—signals to the microprocessor controller that certain standard conditions exist; these inputs enter the processor board through the standard input/output board(s); include *Bag Ready*, *Load Conveyor Ready*, and remote customer and goods codes, etc.

load—the amount of goods, measured by weight or pieces, that a machine normally handles during a cycle

loading device—in a system, this is the device which loads another device; example: a shuttle may be the loading device for a dryer

loading direction—the direction the goods are loaded into or onto a device

MMQ—minutes, minutes, and quarter minutes (e.g., 043 = 4 minutes and 45 seconds); see also **SS** and **SSS**

model—designation of machine without regard to options; for most devices, the model includes some dimensional representation of the effective machine size

motor contactor box—enclosure containing the high voltage motor contactors

permanent press—a fabric or finish which is heat-set after the article is manufactured to minimize wrinkling and to retain creases

press—extraction device to which the tunnel may pass batches. In two-stage presses, extraction is by squeezing goods under pneumatic (pre-press) pressure, then hydraulic (main bell) pressure. In single stage presses, only hydraulic pressure is used.

press pressure—force used by a press during the extraction process; also, a code that identifies the one of up to four optional pressures that the Milnor® press should apply to the batch being processed

program mode—mode which allows programming of wash formulas, dry cycles, and other discretionary data; see also **Run mode**

run mode—mode of operation that allows devices to run automatically; see also **Program mode**

software—fixed information contained in EPROMs (programming by Milnor®) or on disk files that determines how a machine or computer operates

SS (SSS)—seconds, i.e., "SS" means two digits (usually 00-99 seconds), "SSS" means three digits (usually 000-255 seconds); see also **MMQ**

three-wire circuit—circuit that provides control power for all machine functions; any of several safety devices in the three-wire circuit will open the circuit and stop machine operation if a malfunction is detected; once open, the three wire circuit can only be closed by manual intervention and then only if the condition that opened the circuit is rectified

toggle switch—one of several types of hand-operated switches with a single operating lever that can be moved to two or more positions (e.g., the *Master* switch)

trickle charge—process of slowly and continuously charging a microprocessor backup battery during machine operation to maintain a full charge

— End of BIUUUK05 —

Programming 2

C

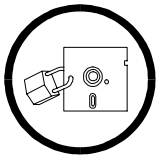
PROGRAMMING AND CONFIGURING THE MARK III, IV, AND V PRESS CONTROLLER

In the press, both programming and configure decisions are accessed in the program mode (i.e., *Program/Run keyswitch* is at). *Programming decisions* influence several operating parameters and must correspond with the tunnel minimum and maximum transfer rates. These decisions may be changed at the user's discretion, using the programming information provided here (see "The Programming Decisions," in this section). *Configure decisions* influence how the press interfaces with the Miltrac "traffic-cop" or with the controller for allied goods-handling devices before and after the press. Therefore, the values for these decisions must match the presently installed configuration of the entire interconnected laundry system. Because configure decisions are discrete to the specific machine and laundry system, they should only be changed if options are later added or removed. Although the press is programmed and configured at the Milnor® factory, all programming and configure decision values must be checked for accuracy at installation.

Programming and Configure Decisions

Programming Decisions	Configure Decisions	
00=LANGUAGE	**07**=ALLIED RECEIVE	**17**=RECEIVE DEV LOAD DIR
01=XTRA PRE PRESS TAMPS	**08**=ALLIED DISCHARGE	**18**=RECEIVE DEV LOAD LEV
02=PRE PRESS MIN TIME	**09**=MILTRAC ADDRESS	**19**=PASS EMPTY ERR CHECK
03=MAIN PRESS MIN TIME	**10**=MILDATA MACHINE	**20**=TEMPERATURE UNIT
04=MAIN PRESS MAX TIME	**11**=CONVEYOR CONNECTED	**21**=MAX WATER TEMP
05=VOLUME PUMP TIME	**12**=LOAD DOOR	**22**=MIN WATER TEMP
06=WAIT FOR DIAPHRAGM UP	**13**=DISCHARGE DOOR	**23**=SYNCRONIZE COINC XFR
	14=2 CAKES IN PRE PRESS	**24**=BYTES IN NETWORK
	15=HOLD RECEIVE DEVICE	**25**=EXTRA DATA INPUTS
	16=WEIGHT OR PIECES	**26**=EXTRA DATA OUTPUTS

⚠ CAUTION ⚠



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

- ☞ **Return to run mode only when the cursor is on the left side of the display.**
- ☞ **Only power *off* or *on* with the *Program/Run keyswitch* at *run*.**
- ☞ **Do not leave key accessible to unauthorized personnel.**

NOTE: If you suspect program data is corrupt or the display says *Check Configure Before Proceeding*, see the *Check Configure Before Proceeding* explanation in "MARK III, IV, AND V PRESS ERRORS."

Accessing Programming and Configure Decisions

Set *Manual/Automatic switch* to *automatic* and *Master switch* to *on.* Control power is energized, the operator alarm sounds, and the power up displays appear. See "RUNNING THE . . . PRESS IN AUTOMATIC," (see Table of Contents).

When the display=

```
RETURN TO AUTOMATIC
00
```

NEXT **Prompts**

```
PRESS 'START' FOR
AUTOMATIC OPERATION
```

Displays programming *decision 00.*

```
LANGUAGE
00
```

Underline indicates cursor position. Select 1 of 27 menu items (00-25) by number, or press NEXT to access the decisions in numerical order.

① **Cancels operator alarm**, leaving controller in program mode.

<xx> **Selects programming/configure decision xx**, where <xx> is the decision number.

example: 0, 3 =

```
MAIN PRESS MIN TIME
03
```

NEXT **Accesses selected decision for viewing/changing the presently commanded value,** example:

```
MAIN PRESS MIN TIME
ENTER SECONDS    300
```

<x>, NEXT **Enters a new value**, where <x> is a one, two, or three digit number depending on the decision, **and displays the next programming/configure decision.**

NEXT, NEXT **Accesses the next programming/configure decision, then its commanded values**. Scrolls through each programming/configure decision and its commanded value if pressed repeatedly.

For Safe Return to Run Mode From Program Mode

If the commanded value of a programming/configure decision is displayed, such as

```
ALLIED DISCHARGE?
0=NO 1=YES          0
```

NEXT **Accepts the displayed value and displays the next programming/configure decision** (in this example, *decision 09*).

```
MILTRAC ADDRESS
09
```

, NEXT (at any display where only the decision name and number, but not its commanded value, appear) **Returns to the run mode.**

```
RETURN TO AUTOMATIC
00
```

NEXT Prompts

```
PRESS 'START' FOR
AUTOMATIC OPERATION
```

The Programming Decisions

The commanded tunnel transfer rate paces the press and allows efficient system operation when the programming decision values properly correspond with the shortest tunnel transfer rate. The programming values recommended below support an 80-second transfer rate. Adjust *decision 02* as explained below so the press is ready to accept a new load each time the tunnel is ready to transfer. Otherwise, the tunnel will hold and production will suffer.

Number	Data Display	Range	Explanation
00	LANGUAGE 0	0-4	Language in which software displays will appear. **0**=English, **1**=French, **2**=Dutch, **3**=Spanish, **4**=Italian, and **5**=German
01	XTRA PRE PRESS TAMPS NUMBER OF TIMES 0	0-3	Additional number of times (0-3) pre-press will tamp goods *before* the final, mandatory tamp. **Recommended setting is 0. NOTE:** If *configure decision 12 (2 cakes in pre press) = 1*(*yes*), the pre-press will tamp after each cake is received.

Each additional tamp requires approximately ten seconds. Additional tamps may delay transferring the tamped load to the main press in time for the pre-press to accept a new load as soon as the tunnel is ready to transfer. This will cause the tunnel to hold. However, additional tamps may increase water removal from certain goods types, and may also reduce press faults by better compressing the goods before transfer to the main press.

02	PRE PRESS MIN TIME ENTER SECONDS 015	000-999	Minimum time (000-999 seconds) pre-press tamper will press goods at the final, mandatory tamp (excluding tamper down/up travel time). Set to shortest duration needed to ensure adequate water removal. **Recommended setting is 015.**

Once the commanded minimum time expires, the pre-press is permitted to transfer if the main press is ready. Otherwise, the pre-press will continue to press until it can transfer. This decision ensures an adequate pre-press time in the unlikely event that the tunnel is ready to transfer "too soon" (e.g., if the press, with a load in the pre-press, is powered up shortly before the tunnel is ready to transfer). Setting the value too low may remove too little water from the goods in such a situation. Setting the value too high may increase press cycle time, causing tunnel holds. Each time the tamper tries to tamp goods, the pre-press tamper will descend up to two extra times if the load is too high for the tamper to make the *two-thirds down switch* (this also occurs for any extra tamps configured). See "RUNNING THE . . . PRESS IN AUTOMATIC."

03	MAIN PRESS MIN TIME ENTER SECONDS 017	000-999	Minimum time (000-999 seconds) main press will press goods. Determine this value with this formula:

shortest commanded tunnel transfer rate	e.g., 80
– *Volume Pump Time* (decision 04)	-25
– 32 seconds if 60Hz **or** 38 seconds if 50Hz	-38
appropriate *Main Press Minimum Time*	17

This value determines the minimum time the pressure pump will continue to run after *Volume Pump Time* expires. With an adequate air supply (pressure and quantity), the press requires 32 seconds (60Hz) or 38 seconds (50Hz) to prepare for main pressing (i.e., to release the main bell locks, bring bell up, draw diaphragm up, move sled forward, deposit goods, return sled home, and lower and lock main bell in place). **Determine this value by subtracting *Volume Pump Time* plus 32 or 38 seconds from the shortest tunnel transfer rate.**

Decision 03 ensures an adequate main pressing time in the unlikely event that the tunnel is ready to transfer "too soon" (e.g., if the press, with a load in pre-press, is powered up shortly before the tunnel is ready to transfer). Lowering this value may cause the first cake immediately after such a situation to be wetter-than-normal. Raising this value too high will increase total press cycle time, causing tunnel holds.

04

MAIN PRESS MAX TIME
ENTER SECONDS 300

000-999 Maximum time (000-999 seconds) main press will press goods. **Recommended setting is 300 or the longest tunnel transfer time plus 30 seconds.**

This decision determines the maximum time the pressure pump is allowed to run. Normally, this value influences press operation only when the tunnel is not ready for transfer at the expected time, as when there is a shortage of goods to load into the tunnel, etc. When the pressure pump turns off, the press waits to transfer the cake (time represented by SWT on normal automatic display; see "RUNNING THE . . . PRESS IN AUTOMATIC"). Setting this value too high may waste resources by running the pump when little or no more water can be extracted from the goods.

05

VOLUME PUMP TIME
ENTER SECONDS 025

000-999 Time (000-999 seconds) volume pump will run to refill the main bell. Set to minimum time required to pump enough water into the main bell. **Recommended setting is 025.**

When this time expires, the pump turns off, the *volume pump to dome ball valve* closes, and *Main Press Minimum Time* begins. The pressure pump continues to run, as it has since the volume pump began running, until *Main Press Maximum Time* expires or the pre-press is ready to transfer (i.e., after the *Main Press Minimum Time* and *Pre-press Minimum Time* have been satisfied). Once the pressure in the bell exceeds the maximum pressure the volume pump can exert, the volume pump check valve closes to prevent the pressure pump output from flowing back through the volume pump. *If the check valve is operating correctly*, the bell pressure rises as fast as the pumps can fill the main bell to press water from the goods. Therefore, setting this value too high will not inhibit the build up of pressure from the pressure pump. However, it will increase total press cycle time unless *Main Press Minimum Time* is reduced.

06

WAIT FOR DIAPHRAM UP
ENTER SECONDS 20

20-60[D] Time (12-60 seconds) allowed for diaphragm to draw up. **Recommended setting is 20.** [D]=discretionary.

This decision determines how long (once the bell begins rising) the volume pump runs with the *suction to main press valve* open to draw up the diaphragm. Once the bell is fully up, the sled moves under the bell, but does not open its doors to deposit its load until this time expires. Once the bell begins descending, the volume pump further draws up the diaphragm to help accept any additional flow of water out of the bell should a large load push up against an incompletely drawn up diaphragm. Setting this value too low prevents the diaphragm from rising enough for the next cake to fit under it, possibly causing the goods pile to collapse or the resulting pressure in the bell to "blow out" the diaphragm as the bell descends. (Diaphragm "blow out" can appear as if the diaphragm has fallen out.) Setting the value higher than the time required to raise the bell and move the sled forward will lengthen the total press cycle time and may cause a tunnel hold. After the bell is down and locked, the *suction to main press valve* closes and the *volume pump to main press valve* and *pressure pump to main press valve* open to permit both pumps to fill the bell.

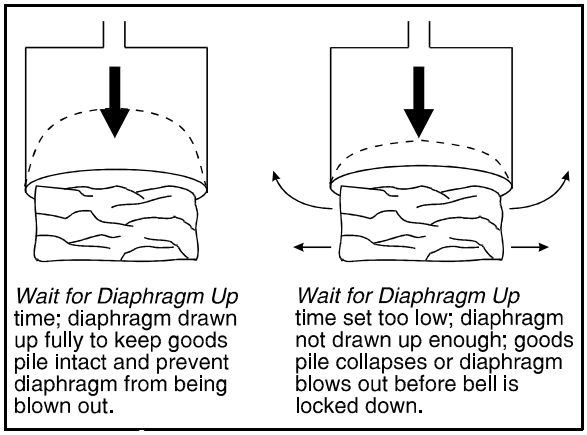


FIGURE 1 (MSOPD436CE)
Drawing the Diaphragm Up

The Configure Decisions

NOTICE

Configure decisions are discrete to specific machines and laundry systems and, once properly set, should be changed only if options are later added or removed. Write the value for each decision on the Press Programming/Configure Values record provided at the end of this section. Keep the record and this manual in a safe place.

Number	Data Display	Range	Explanation
07	ALLIED RECEIVE 0=NO 1=YES 0	0-1	**0**=Disables allied loading. **1**=Enables allied loading. See "INTERFACING MILNOR® PRESSES WITH ALLIED (NON-MILNOR®) SYSTEMS."
08	ALLIED DISCHARGE 0=NO 1=YES 0	0-1	**0**=Disables allied discharge. **1**=Enables allied discharge. See "INTERFACING MILNOR® PRESSES WITH ALLIED (NON-MILNOR®) SYSTEMS."
09	MILTRAC ADDRESS ENTER ADDRESS 000	000-255	Miltrac address for press (may vary at each laundry). See Miltrac manual.
10	MILDATA MACHINE 0=NO 1=YES 0	0-1	**0**=Press does not communicate with Mildata®. **1**=Press communicates with Mildata®, and this display appears: MILDATA ADDRESS 001 At this display, a Mildata® address (000-255) must be assigned. See Mildata® manual.
11	CONVEYOR CONNECTED 0=NO 1=YES 0	0-1	**0**=Press does not control a COINC (single cake storage conveyor) at the discharge end. **1**=Press controls a COINC (single cake storage conveyor) at the discharge end.
12	LOAD DOOR 0=NO 1=YES 0	0-1	**0**=Load door not supplied. **1**=Load door supplied.
13	DISCHARGE DOOR 0=NO 1=YES 0	0-1	**0**=Discharge door not supplied. **1**=Discharge door supplied.
14	2 CAKES IN PRE PRESS 0=NO 1=YES 0	0-1	**0**=Press can take only one cake in the pre-press. **1**=Press can take two cakes in the pre-press.
15	HOLD RECEIVE DEVICE 0=NO 1=YES 0	0-1	**0**=Release receiving device (after the COINC, if any) once it has accepted a single cake. **1**=Hold receiving device (after the COINC, if any) from departing until it has received the appropriate number of cakes (determined by shuttle/conveyor configuration).

Number	Data Display	Range	Explanation
16	WEIGHT OR PIECES 0=WEIGHT 1=PIECES 0	0-1[D]	**0**=Miltrac tracks goods by weight. **1**=Miltrac tracks goods by pieces. Value entered here valid only if loading system appropriately equipped.
17	RECEIVE DEV LOAD DIR 0=FORWARD 1=REV 0	0-1	**0**=Receiving device runs forward when press discharges to it. (This is the normal configuration.) **1**=Receiving device runs in reverse when press discharges to it. If receiving device is a Milnor® shuttle, see the programming information in the shuttle programming, operating, and troubleshooting manual.
18	RECEIVE DEV LOAD LEV ENTER LEVEL (0-7) 7	0-7	Load level for the receiving device. The level at which an elevating receiving device accepts the cake from the press or the COINC (if any). If the receiving device is a Milnor® shuttle, see the programming information in the shuttle programming, operating, and troubleshooting manual.
19	PASS EMPTY ERR CHECK 0=NO 1=YES 1	0-1[D]	**0**=Press does not check for errors when passing empty pockets. **1**=Press checks for errors when passing empty pockets. It signals an error if *no load under bell photo-eye* is blocked when intentionally empty pocket is under main bell. It also signals if photo-eye is not blocked when a load should be under main bell. This feature helps recognize a tunnel blockage in the early stages. See "MARK III, IV, AND V PRESS ERRORS" and the Miltron® programming manual.
20	TEMPERATURE UNIT 0	0-1	**0**=Press tank water temperature displayed in Farenheit. **1**=Press tank water temperature displayed in Centigrade.
21	MAX WATER TEMP ENTER TEMP (°F) 130	115-145	Maximum temperature of water in press tank. If temperature exceeds configured maximum temperature, water is added until temperature reaches configured minimum temperature. **Recommended setting is 130.**
22	MIN WATER TEMP ENTER TEMP (°F) 115	115-145	Minimum temperature of water in press tank. If temperature exceeds configured maximum temperature, water is added until temperature reaches configured minimum temperature. **Recommended setting is 115.**

D=discretionary. All other configure decisions are dictated by the machine or system features.

23

```
SYNCRONIZE COINC XFR
0=NO 1=YES          0
```

0-1

0=The COINC will prepare to transfer as soon as it receives a cake.
1=The COINC will prepare to transfer (i.e., wait to display *Want to Transfer*) only once it has a cake and the pre-press and main press are 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*.

This decision appears only if *decision 23* (*Syncronize COINC Xfr)=1*(*yes*)

```
COMPATIBILITY   FDDCG
0=N/A 1=MATCH   00000
```

0-1 (each)

Enter the compatibility code desired for each type of data (0=match not required, 1=match required). The compatibility set in the press must match the compatibility set for the shuttle in Miltrac.
F=Formula
D=Dry code
D=Destination code
C=Customer code
G=Goods code

This decision appears only if software is Mark IV or V.

24

```
BYTES IN NETWORK
00
```

00,11, 24,30

00=Miltrac system version 89100 or later
11=Milnet system
24=Miltrac system version 8624 and earlier
30=Miltrac system version 89001 and earlier

B
C

25

```
EXTRA DATA INPUTS
0=NO 1=YES          0
```

0-1

0=No extra data inputs (no additional boards) are provided for transferring goods, customer, formula, and weight codes during allied loading.
1=Extra data inputs (additional boards) are provided for transferring goods, customer, formula, and weight codes during allied loading.

This decision appears only if *decision 25* (*Extra Data Inputs*)=1 (*yes*).

26

```
EXTRA DATA OUTPUTS
0=NO 1=YES          0
```

0-1

0=No extra data outputs (no additional boards) are provided for transferring goods, customer, formula, and dry codes during allied discharge.
1=Extra data outputs (additional boards) are provided for transferrring goods, customer, formula, and dry codes during allied discharge.

Press Programming/Configure Values

The programming/configure values below correspond to how this specific machine was equipped when installed and how it operates with its interfacing devices. Changes in options on this machine or its interfacing devices may require changing these values. Keep this record of values and this manual in a safe place.

B 00 (LANGUAGE) =_____

01 (XTRA PRE PRESS TAMPS) =_____

02 (PRE PRESS MIN TIME) =_____

03 (MAIN PRESS MIN TIME) =_____

04 (MAIN PRESS MAX TIME) =_____

05 (VOLUME PUMP TIME) =_____

06 (WAIT FOR DIAPHRAGM UP) =_____

07 (ALLIED RECEIVE) =_____

08 (ALLIED DISCHARGE) =_____

09 (MILTRAC ADDRESS) =_____

10 (MILDATA MACHINE) =_____

B 11 (CONVEYOR CONNECTED) =_____

12 (LOAD DOOR) =_____

13 (DISCHARGE DOOR) =_____

14 (2 CAKES IN PRE PRESS) =_____

15 (HOLD RECEIVE DEVICE) =_____

16 (WEIGHT OR PIECES) =_____

17 (RECEIVE DEV LOAD DIR) =_____

18 (RECEIVE DEV LOAD LEV) =_____

19 (PASS EMPTY ERR CHECK) =_____

20 (TEMPERATURE UNIT) =_____

21 (MAX WATER TEMP) =_____

22 (MIN WATER TEMP) =_____

23 (SYNCRONIZE COINC XFR) =_____

24 (BYTES IN NETWORK) =_____

25 (EXTRA DATA INPUTS) =_____

26 (EXTRA DATA OUTPUTS) =_____

Operating 3

PRESS CYCLE OPERATION

The press cycle involves the operation of both the pre-press and main press. A batch of goods being discharged from a tunnel will be received in the pre-press where it will be lightly pressed in preparation for the main press. That same batch will then be transferred to the main press for pressing, discharged onto a conveyor, and shuttled to a dryer.

Pre-press Operation

Pre-press operation involves the *tamper full up switch, tamper two thirds down switch, tamper down low pressure valve, tamper high pressure valve,* and *configure decisions 01 and 02* (*Xtra Pre Press Tamps* and *Pre Press Min Time*).

After the tunnel discharges a load of goods into the pre-press, the tamper descends at low pressure. Once the *tamper two thirds down switch* is made, the tamper continues to descend under high pressure. If the *tamper two thirds down switch* is not made in three tries, an error occurs. See "MARK III, IV, AND V PRESS ERRORS." Once the tamper makes the *tamper two thirds down switch*, the tamper remains down for five seconds. After the tamper has pressed five seconds, if it does not rise and make the *tamper full up switch* within ten seconds, an error occurs. The value entered for *Pre Press Tamping* dictates the number of times this descent and rise will occur. If *Xtra Pre Press Tamps* is configured for 0, the press only performs one mandatory pre-press operation controlled by *Pre Press Minimum Time* described here.

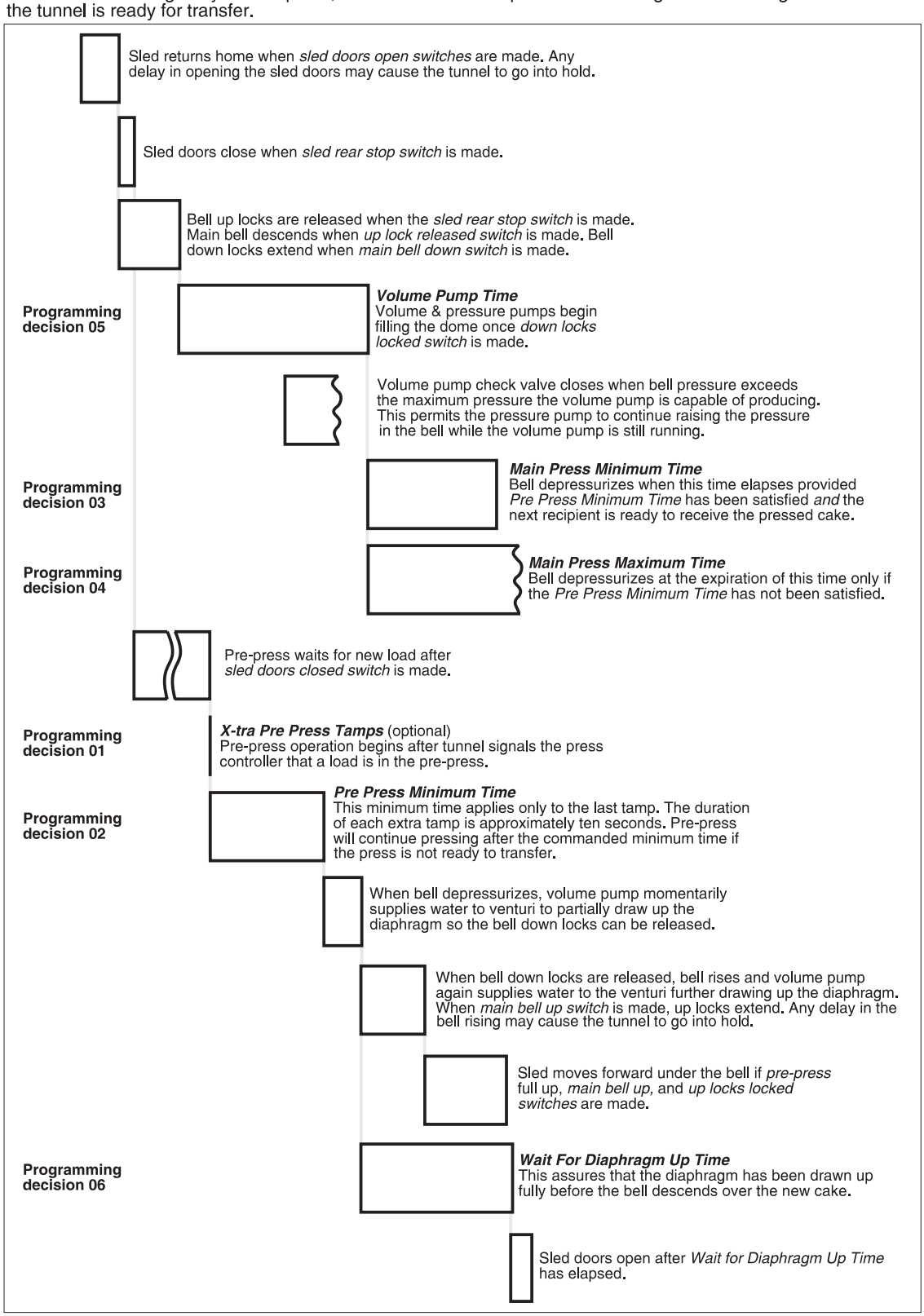
After the pre-press tamps are completed, the tamper descends for the mandatory pre-press operation. The tamper descends as described above, but presses goods for the configured *Pre Press Minimum Time*. As with the other tamps, if the *tamper two thirds down switch* is not made in three tries, an error occurs. If the press is ready for transfer when *Pre Press Minimum Time* expires, the tamper rises. If the tamper does not rise and make the *tamper full up switch* in ten seconds an error occurs. If the goods cannot be transferred after *Pre Press Minimum Time* expires, the pre-press tamper remains down until the tunnel is ready to transfer the next batch of goods.

Main Press Operation

Main press operation involves the *bell full up switch, bell full down switch, down locks released switch, down locks locked switch, up locks released switch, up locks locked switch,* and *configure decisions 03, 04, and 05* (*Main Press Minimum Time, Main Press Maximum Time,* and *Volume Pump Time,* respectively).

After the sled leaves a load of goods under the main press bell, the bell descends. When the *bell full down switch* is made, the down locks lock (If this does not happen in ten seconds, an error occurs; see "MARK III, IV, AND V PRESS ERRORS."). After the *down locks locked switch* is made, the volume pump time counts down. After this time expires, the minimum press time counts down. When this time expires, the press transfers the load if possible. If it is unable to transfer the load (i.e., the tunnel or pre-press is not able to transfer or the shuttle cannot receive) the main press bell continues to press until *Maximum Press Time* expires or the press can transfer the load, whichever occurs first. When the main press is ready to transfer or when *Maximum Press Time* expires, the down locks release, the main bell rises until the *bell full up switch* is made and the up locks lock. If the *up locks locked switch* is not made within ten seconds, an error occurs. See "MARK III, IV, AND V PRESS ERRORS." The sled moves forward pushing out the just pressed goods and deposits the just pre-pressed goods. The sled then returns home.

Set programming decision values based on your minimum tunnel transfer rate and the recommended decision values in "PROGRAMMING AND CONFIGURING THE MARK III, IV, AND V PRESS CONTROLLER." If there is no blockage beyond the press, this ensures that the press can discharge and receive goods each time the tunnel is ready for transfer.



RUNNING THE MARK III PRESS IN AUTOMATIC

Normal Automatic Operation

The press normal operating mode is fully automatic. Once set for automatic operation, a new load of one or more cakes (and its batch codes) passes from the tunnel washer to the press each time the tunnel is ready to discharge and the press is ready to receive. Before a new load is received, the pre-pressed goods are moved to the main press as already pressed goods are discharged, freeing the pre-press for the next load.

⚠ DANGER ⚠

CRUSH HAZARD—Descending press main bell or pre-press tamper will strike and/or crush anyone under it. Main bell and tamper can descend with power on or off.

- ☞ **NEVER crawl or reach under the press main bell during press operation. Use factory-supplied gaff hook to access any object under the main bell or tamper.**
- ☞ **Know how to use factory-supplied *emergency stop switches* and where they are located.**
- ☞ **Lock *off* and tag out power and secure factory-supplied safety supports in place before crawling or reaching under the main bell. See instructions on machine tag for safety support installation instructions.**
- ☞ **Lock *off* and tag out power before reaching under the tamper.**
- ☞ **Ensure personnel are clear of the press before operating it in *manual* or *automatic mode.* The main bell or tamper may move automatically when certain controls are used, such as when ① is pressed or cake data is entered.**

The Power Up Sequence

Set *Manual/Automatic switch* to *automatic.*

Master switch on	Energizes control power, but not press power. *Operator alarm* sounds (until ① is pressed) and the power up displays appear as shown at right.	`COPYRIGHT PELLERIN MILNOR 1990`	Copyright statement (appears one or more times)
		`ALL RIGHTS RESERVED 'PRESS' 90101`	Number at lower right is software date code.
		`RETURN TO AUTOMATIC 00`	
NEXT	Prompts	`PRESS 'START' FOR AUTOMATIC OPERATION`	If ① has not already been pressed.

① Energizes press power and silences *operator alarm*. Initialization begins.

WAITING FOR DIAPHRAM TO SUCK UP	Appears until the diaphragm draws up. This display and other initialization displays will vary during each start up based on the press position at start up.
WAITING FOR MAIN DOWN LOCK TO RETRACT	Appears until the main bell down lock retracts.
WAITING FOR MAIN BELL TO GET UP	Appears until the main bell is full up.
WAITING FOR MAIN UP LOCK TO CLOSE	Appears until the main bell is locked up.

Other initialization messages include *Waiting For Load Door To Close*, *Waiting For Main Up Lock To Open*, *Waiting For Prepress To Get Up*, *Waiting For Sled To Get Home*, and *Waiting For Sled Doors To Close*.

The controller prompts

```
DOES PRE PRESS  HAVE
A CAKE? 0=NO 1=YES 1
```

Default=*1*(yes). If yes, see "When Cake Data Must Be Confirmed" in this section. If no, operation continues as follows.

0, NEXT The controller prompts

```
DOES MAIN PRESS HAVE
A CAKE? 0=NO 1=YES 1
```

Default=*1*(yes). If yes, see "When Cake Data Must Be Confirmed" in this section. If no, operation continues as follows.

0, NEXT The controller prompts

```
DOES CONVEYOR HAVE
A CAKE? 0=NO 1=YES 1
```

Default=*1*(yes). If yes, see "When Cake Data Must Be Confirmed" in this section. If no, the normal run display appears.

Normal Run Display

Either of the normal run displays, shown here, remains on the screen when the press is in automatic operation. The top line of the display indicates the category of the values shown on the second line. See explanation below.

```
MPSC P PTR LOAD C ER
2700 2 061 0383 - 00
```

```
MPSC P SWT LOAD C ER
2700 2 012 0383 - 00
```

MPSC Represents the internal state of the software and is used by the Milnor® factory for software diagnostics: ***M***-main press state, ***P***-pre-press state, ***S***-shuttle state, ***C***-conveyor state.

P Represents main bell *pressure*
0=standard pressure
1=no pressure
2=3rd pressure (low pressure)
3=low pressure (lowest pressure)

PTR Represents *press time remaining*. Counts down from the total of configured volume pump time plus configured minimum press time (see "PROGRAMMING . . . PRESS CONTROLLER" (see Table of Contents)) to show how many more seconds the main press must maintain pressure. If the receiving device or loading device is not ready when *PTR* counts down to 000 (i.e., the press has finished pressing for minimum time), *XXX* is displayed until the press main bell has maintained pressure up to the maximum press time configured (see "PROGRAMMING . . . PRESS CONTROLLER"), then *SWT* begins.

SWT Represents *system wait time* (in seconds). Indicates the time since maximum press time expired, and the press could not transfer goods because the receiving device is not ready, the pre-press did not finish tamping its load, or the pre-press did not receive a new load.

LOAD Represents the number of *loads* processed since the last time it was cleared. See "Viewing Operating Performance Display" in this section.

C Represents whether pre-press is prepared to receive a load (C corresponds with condition c on the Milnor® CBW®).
+ =pre-press is available to receive a load
– =pre-press is not available to receive a load

ER Represents possible *error* conditions.

00=No Error
01=Bell Not Down
02=Not Used
03=Bell Fault—Not Up and Locked
04=Bell Not Clear
05=Pre-press Fault
06=Pre-press Not Fully Up
07=Sled Fault—Not Fully Forward
08=Slow Clutch Switch for Brake Disabled
09=Sled Fault—Door is Not Fully Open
10=Sled Fault—Not Fully Back
11=Discharge Fault—Shuttle Left Too Soon
12=Sled Doors Not Fully Closed
13=Downlock Fault
14=Load Door Not Fully Open
15=Load Door Not Fully Closed
16=Discharge Door Not Fully Open
17=Discharge Door Not Fully Closed
18=High Water Level Without Low Level

See "MARK III, IV, AND V PRESS ERRORS" for further explanation of these conditions.

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 "MARK III, IV, AND V PRESS ERRORS"), or manual intervention, the controller cannot know if goods are present in the pre-press, main press, or conveyor. Therefore, the controller considers the batch codes for these locations unreliable and prompts the user for the information explained below.

⚠ DANGER ⚠

CRUSH HAZARD—Descending press main bell or pre-press tamper will strike and/or crush anyone under it. Main bell and tamper can descend with power on or off.

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

Responding to Prompts for Press Cake Information

PRE-PRESS CAKE DATA

To verify pre-press information, the controller prompts

```
DOES PRE PRESS  HAVE
A CAKE? 0=NO 1=YES 1
```

Default=*1(yes).*

If *1*(*yes*) and two cakes are allowed in pre-press (based on *configure decision 12*), display=

```
NUMBER OF CAKES IN
PRE-PRESS ?       1
```

If *0*(no), the controller prompts for MAIN PRESS CAKE DATA.

1 ABC, **NEXT** or **NEXT** Tells the press that goods are still present in the pre-press and prompts

```
ENTER FORMULA
FOR PRE PRESS    XXX
```

Where *XXX* is the wash formula. Change number if necessary.

After wash formula is entered and **NEXT** is pressed, similar questions are asked about the dry code, destination, customer, goods code, pieces or soil weight (based on *configure decision 14*), and cake number of the goods.

<xxx>, **NEXT** Enters the cake number of the goods and prompts

```
PRE PRESS = SINGLE
CAKE? 0=NO 1=YES  0
```

Default=*0(no).* Entering *1(yes)* prevents this cake from being combined with any other. This decision will also affect all cake-combining devices that receive cakes after the press.

```
PRE PRESS
2 3rd PRESSURE
```

Selects the pressure of the load currently in pre-press for when this cake is pressed under the main bell: 0=standard pressure
1=no pressure
2=3rd pressure (low pressure)
3=low pressure (lowest pressure)

MAIN PRESS CAKE DATA

```
DOES MAIN PRESS HAVE
A CAKE? 0=NO 1=YES 1
```

Default=*1(yes)*.

If *0(no)*, the controller prompts for CONVEYOR CAKE DATA.

1 ABC, NEXT or NEXT Tells the press that goods are still present in the main press and prompts

```
ENTER FORMULA
FOR MAIN PRESS   XXX
```

Where *XXX* is the wash formula. Change number if necessary.

After wash formula is entered and NEXT is pressed, similar questions are asked about the dry code, destination, customer, goods code, pieces or soil weight (based on *configure decision 14*), and cake number of the goods.

<xxx>, NEXT Enters the cake number of the goods and prompts

```
MAIN PRESS = SINGLE
CAKE? 0=NO 1=YES 0
```

Default=*0(no)*. Entering *1(yes)* prevents this cake from being combined with any other. This decision will also affect all cake-combining devices that receive cakes after the press.

```
MAIN PRESS
2 3rd PRESSURE
```

Selects the pressure for when this cake is pressed under the main bell: 0=standard pressure
1=no pressure
2=3rd pressure (low pressure)
3=low pressure (lowest pressure)

CONVEYOR CAKE DATA (IF PRESS-CONTROLLED CONVEYOR SUPPLIED)

```
DOES CONVEYOR   HAVE
A CAKE? 0=NO 1=YES 1
```

Default=*1(yes)*.

1 ABC, NEXT or NEXT Tells the press that goods are still present on the conveyor and prompts

```
ENTER FORMULA
FOR CONVEYOR     XXX
```

Where *XXX* is the wash formula. Change number if necessary.

When wash formula is entered and NEXT is pressed, similar questions are asked about the dry code, destination, customer, goods code, pieces or soil weight (based on *configure decision 14*), and cake number of the goods.

xxx, NEXT Enters the cake number of the goods and prompts

```
CONVEYOR   = SINGLE
CAKE? 0=NO  1=YES  0
```

Default=*0(no)*. Entering *1(yes)* prevents this cake from being combined with any other. This decision will also affect all cake-combining devices that receive cakes after the press.

See “Normal Run Display” in this section.

Interruptions in Normal Press Operation

Holds Before the Press—Anytime the flow of goods into the press stops (e.g., there is a hold condition in the tunnel washer), *C* on normal run display shows + (pre-press is available to receive a load) and waits for a load. When flow of goods resumes, processing continues without manual intervention.

Holds After the Press—Anytime the press desires to discharge because the receiving device (e.g., shuttle) is not ready to receive, the following occurs:

1. The press maintains pressure in main bell until *Maximum Press Time* expires.
2. The main press bell depressurizes.
3. *PTR* (press time remaining) on the normal run display changes to SWT (system wait time).

SWT indicates the number of seconds the press has been finished its pressing cycle and ready to transfer, but could not because the receiving device is not ready or the pre-press has not been loaded. When the receiving device is ready and the pre-press is loaded, the press resumes normal operation.

⚠ DANGER ⚠

CRUSH HAZARD—The pre-press tamper or main press bell may slowly descend even with power off or three-wire disabled, crushing anyone under it.

☞ **Never crawl or reach under the main press bell without safety stands in place. Use factory-supplied gaff hook to access any object under the main bell or tamper.**

Power Loss or Three-Wire Disabled Condition—If the press loses power or the three-wire circuit drops out (e.g., an *emergency stop switch* is pressed), the press stops immediately. The press resumes operation, as explained in "The Power Restoration Sequence" in this section, as soon as the three-wire circuit is closed, regardless of how long the press was stopped. See **NOTE** below.

NOTE: It is not usually necessary to load or unload the press before returning it on-line with the controller. Upon restoring power, the press requests cake data and resumes normal automatic operation. It automatically synchronizes with its interfacing devices (e.g., shuttle, continuous batch washer), unless the press was discharging goods from the main press to the press-controlled conveyor (if supplied) at power loss. See "Power Restoration Sequence" in this section.

Power Restoration Sequence

If Power Is Lost Other Than During Discharge—If power is lost anytime during normal operation, except during the discharge of a cake onto the press-controlled conveyor (if supplied), manual intervention is not required to start the press again. Upon powering up the press, the power up display sequence (see "The Power Up Sequence," in this section) appears and water is added to the tank for one minute. If prompts are answered, the diaphragm draws up, the main down locks retract, the press main bell rises and locks, the sled returns to its home position, the conveyor (if supplied) runs forward until the discharge-end photo-eye blocks, and the controller ultimately prompts for cake data (see "When Cake Data Must Be Confirmed" in this section). After cake data is entered, the press will automatically synchronize with its interfacing devices.

If Power Is Lost During Discharge (with a press-controlled conveyor)—If power was lost when the sled was discharging a cake onto the press-controlled conveyor, some manual intervention may be required. When the press is started up, the power up display sequence (see "The Power Up Sequence" in this section) appears and water is added to the tank for one minute. If the prompts are answered, the diaphragm draws up, the main bell down locks retract, the press main bell rises and locks, the sled returns to its home position, and the press-controlled conveyor runs. If goods were pushed far enough by the sled, the conveyor pulls the cake onto the conveyor, and cake data can be answered. However, if the cake is blocking the press discharge-end photo-eye but is not far enough for the conveyor to pull, operate the sled in manual mode to push the goods forward (see "MANUALLY OPERATING AND VIEWING INPUTS . . .") so the running belt can pull the goods onto the conveyor. After the goods are moved and the press is returned to *automatic mode*, the controller prompts for cake data (see "When Cake Data Must Be Confirmed" in this section). After the cake data is entered, the press automatically synchronizes with its interfacing devices.

If Power Is Lost During Discharge (without a press-controlled conveyor)—If power was lost when the sled was discharging onto a conveyor, some manual intervention may be required. When the press is started up, the power up display sequence (see "The Power Up Sequence" in this section) appears and water is added to the tank for one minute. If the prompts are answered, the diaphragm draws up, the main bell down locks retract, the press main bell rises and locks, and the sled returns to its home position. If the cake is blocking the press discharge-end photo-eye but is not far enough for the conveyor to pull, operate the sled in manual mode to push the goods forward (see "MANUALLY OPERATING AND VIEWING INPUTS . . .") so the running belt can pull the goods onto the conveyor (someone may have to operate the belt manually). After the goods are moved and the press is returned to *automatic mode*, the controller prompts for cake data (see "When Cake Data Must Be Confirmed" in this section). After the cake data is entered, the press automatically synchronizes with its interfacing devices.

Viewing Data on the Microprocessor Display During Operation

Viewing Operating Performance Display

The operating performance display is a measure of press operating efficiency. It compares the amout of time power to the press is *on* and how much of that time the press is in *hold*. This display will appear as long as [2 DEF] is held.

When the display=

```
MPSC P PTR LOAD C ER
XXXX X XXX XXXX X XX
```

hold [2 DEF] (*Read*)

```
TOTAL HRS    HOLD HRS
3969         0551
```

TOTAL HRS Total hours press power has been on *since the last time the clock was cleared.*

HOLD HRS Number of hours press was waiting for a load from the CBW® and/or waiting to transfer a load *since the last time the clock was cleared.*

[2 DEF] + [4 JKL] + [6 PQR] Clears the clock, returning both total hours and hold hours to 0000.

Viewing Inputs

The status of input signals into the press controller may be monitored while the press is in operation.

hold 7 STU — Displays 1st 20 inputs (a-p).

```
abcdefghijklmnopqrst
-+-+-+-+-+-+-+-+-+-+
```

"+"= input energized
"-" = input not energized

hold 7 STU **+** SKIP TO — Displays last 20 inputs (A-P).

```
ABCDEFGHIJKLMNOPQRST
-+-+-+-+-+-+-+-+-+-+
```

"+"= input energized
"-" = input not energized

NOTE: The input status display appears as long as the appropriate keys are held.

Standard INPUTS for Press

Display Code	Input Name	Connector/Pin	Display Code	Input Name	Connector/Pin
a	Shuttle is here	1MTA3-10	A	Main press up-lock released	2MTA3-4
b	Three-wire	1MTA3-9	B	Main press down locks are released	2MTA3-3
c	Sled slow to home	2MTA3-8	C	Goods are not under main press	2MTA3-2
d	Low press goods	1MTA3-7	D	No pressure	2MTA3-1
e	Sled slow to main	1MTA3-4	E	Dry code 0	2MTA4-10
f	Main press locked down	1MTA3-3	F	Dry code 1	2MTA4-9
g	Tank water temp. high	1MTA3-2	G	Dry code 2	2MTA4-8
h	Press loaded	1MTA3-1	H	Dry code 3	2MTA4-7
i	Pre-press 2/3 down	1MTA4-10	I	Water level high	2MTA4-2
j	Pre-press up	1MTA4-9	J	New customer	2MTA4-3
k	Fault recovery	1MTA4-8	K	Water level low	2MTA4-4
l	COINC is loaded	1MTA4-7	L	Empty pocket	2MTA4-1
m	Sled doors closed	1MTA4-4	M	Program key	1MTA38-3
n	Sled is home	1MTA4-3	N	Signal cancel	1MTA38-2
o	Sled is under main press	1MTA4-2	O	Brake safety override	1MTA38-5
p	Sled doors open	1MTA4-1	P	Single cake	1MTA38-6
q	Goods cleared main bell	2MTA3-10	Q	Bell has pressure	1MTA38-7
r	Main press locked up	2MTA3-9	R	Customer 6	1MTA39-1
s	Main press up	2MTA3-8	S	Customer 7	1MTA39-6
t	Main press down	2MTA3-7	T	Third pressure	1MTA39-5

NOTE: Optional inputs can not be viewed while the press is in operation.

Viewing Outputs

The status of all output signals from the controller may be monitored while the press is in operation.

hold 8 VWX Displays 1st 20 outputs (a-p).

```
abcdefghijklmnopqrst
-+-+-+-+-+-+-+-+-+-+
```

"+"= output energized
"-" = output not energized

hold 8 VWX + SKIP TO Displays last 20 outputs (A-P).

```
ABCDEFGHIJKLMNOPQRST
-+-+-+-+-+-+-+-+-+-+
```

"+"= output energized
"-" = output not energized

NOTE: The output status display appears as long as these keys are held.

Standard OUTPUTS for Press

Display Code	Output Name	Connector/Pin	Display Code	Output Name	Connector/Pin
a	Move main press up	1MTA5-8	A	Release main press down lock	11MTA16-7
b	Add water	1MTA5-5	B	Suction valve	11MTA16-5
c	Brake	1MTA5-3	C	Release main press up lock	11MTA16-4
d	Press free	1MTA6-10	D	Open sled doors	11MTA16-1
e	Sled back	1MTA6-1	E	Raise load door	2MTA5-8
f	Sled forward	1MTA6-5	F	Lower load door	2MTA5-5
g	Sled slow to home	1MTA6-7	G	Flag down discharge	2MTA5-3
h	Sled slow to main	1MTA6-9	H	Discharge complete	2MTA6-10
i	New customer/formula	11MTA13-8	I	Third pressure valve	2MTA6-1
j	Volume pump	11MTA13-5	J	Pressure valve	2MTA6-5
k	Close sled doors	11MTA13-4	K	Move pre press down	2MTA6-7
l	Pressure pump	11MTA13-2	L	Signal	2MTA6-9
m	Low pressure bypass valve	11MTA14-7	M	Goods code 0	3MTA5-8
n	Run COINC belt	11MTA14-5	N	Goods code 1	3MTA5-5
o	Pre-press tamper full pressure	11MTA14-3	O	Goods code 2	3MTA5-3
p	Move pre-press up	11MTA14-1	P	Goods code 3	3MTA6-10
q	Lock main press down	11MTA15-8	Q	Goods code 4	3MTA6-1
r	Desire to unload	11MTA15-6	R	Goods code 5	3MTA6-5
s	Volume valve	11MTA15-3	S	Goods code 6	3MTA6-7
t	Move main press down	11MTA15-1	T	Goods code 7	3MTA6-9

Viewing Cake Data

hold 3 GHI (*Extend*)

```
   FM DC DT CUS GDS
PR XX XX XX XXX XXX
```

The two letters in the lower left corner indicate which cake this data represents: *PR* = pre-press, *MN* = main press, and *CO* = conveyor.

FM =Formula code
DC =Dry code
DT =Destination code
CUS =Customer code
GDS =Goods code

Press SKIP TO while holding 3 GHI to access the cake data for the main press (*MN*), the conveyor (*CO*), and then the pre-press (*PR*).

Viewing Tank Data

hold 0

```
H2O TEMP (°F)  LO HI
 - 110<119<130  +  -
```

Displays state of the water valve input, the minimum, maximum, and current water temperature, and the states of the low and high level inputs.

H2O =Water valve input state
TEMP (F°) =Water temperature: Minimum<Current<Maximum
LO =State of the low level inputs
HI =State of the high level inputs

RUNNING THE MARK IV AND V PRESS IN AUTOMATIC

Normal Automatic Operation

The press normal operating mode is fully automatic. Once set for automatic operation, a new load of one or more cakes (and its batch codes) passes from the tunnel washer to the press each time the tunnel is ready to discharge and the press is ready to receive. Before a new load is received, the pre-pressed goods are moved to the main press as already pressed goods are discharged, freeing the pre-press for the next load.

⚠ DANGER ⚠

CRUSH HAZARD—Descending press main bell or pre-press tamper will strike and/or crush anyone under it. Main bell and tamper can descend with power on or off.

- ☞ **NEVER crawl or reach under the press main bell during press operation. Use factory-supplied gaff hook to access any object under the main bell or tamper.**
- ☞ **Know how to use factory-supplied emergency stop switches and where they are located.**
- ☞ **Lock *off* and tag out power and secure factory-supplied safety supports in place before crawling or reaching under the main bell. See instructions on machine tag for safety support installation instructions.**
- ☞ **Lock *off* and tag out power before reaching under the tamper.**
- ☞ **Ensure personnel are clear of the press before operating it in *manual* or *automatic mode.* The main bell or tamper may move automatically when certain controls are used, such as when ① is pressed or cake data is entered.**

The Power Up Sequence

Set *Manual/Automatic switch* to *automatic.*

Master switch on

Energizes control power, but not press power. *Operator alarm* sounds (until ① is pressed) and the power up displays appear as shown at right.

```
COPYRIGHT PELLERIN
MILNOR 1990
```

Copyright statement (appears one or more times)

```
ALL RIGHTS RESERVED
'PRESS'       90101
```

Number at lower right is software date code.

```
RETURN TO AUTOMATIC
00
```

NEXT

Prompts

```
PRESS 'START' FOR
AUTOMATIC OPERATION
```

If ① has not already been pressed.

① Energizes press power and silences operator alarm Initialization begins.

WAITING FOR DIAPHRAM TO SUCK UP	Appears until the diaphragm draws up. This display and other initialization displays will vary during each start up based on the press position at start up.
WAITING FOR MAIN DOWN LOCK TO RETRACT	Appears until the main bell down lock retracts.
WAITING FOR MAIN BELL TO GET UP	Appears until the main bell is full up.
WAITING FOR MAIN UP LOCK TO CLOSE	Appears until the main bell is locked up.

Other initialization messages include *Waiting For Load Door To Close*, *Waiting For Main Up Lock To Open*, *Waiting For Prepress To Get Up*, *Waiting For Sled To Get Home*, and *Waiting For Sled Doors To Close*.

The controller prompts

DOES PRE PRESS HAVE A CAKE? 0=NO 1=YES 1	Default=*1*(yes). If yes, see "When Cake Data Must Be Confirmed" in this section. If no, operation continues as follows.

0, NEXT The controller prompts

DOES MAIN PRESS HAVE A CAKE? 0=NO 1=YES 1	Default=*1*(yes). If yes, see "When Cake Data Must Be Confirmed" in this section. If no, operation continues as follows.

0, NEXT The controller prompts

DOES CONVEYOR HAVE A CAKE? 0=NO 1=YES 1	Default=*1*(yes). If yes, see "When Cake Data Must Be Confirmed" in this section. If no, the normal run display appears.

Normal Run Display

Either of the normal run displays, shown here, remains on the screen when the press is in automatic operation. The top line of the display indicates the category of the values shown on the second line. See explanation below.

```
MPSC P PTR LOAD C ER
2700 2 061 0383 - 00
```

```
MPSC P SWT LOAD C ER
2700 2 012 0383 - 00
```

MPSC Represents the internal state of the software and is used by the Milnor® factory for software diagnostics: ***M***-main press state, ***P***-pre-press state, ***S***-shuttle state, ***C***-conveyor state.

P Represents main bell *pressure*
0=standard pressure
1=no pressure
2=3rd pressure (low pressure)
3=low pressure (lowest pressure)

PTR Represents *press time remaining*. Counts down from the total of configured volume pump time plus configured minimum press time (see "PROGRAMMING THE MARK III, IV, AND V PRESS CONTROLLER" (see Table of Contents)) to show how many more seconds the main press must maintain pressure. If the receiving device or loading device is not ready when *PTR* counts down to 000 (i.e., the press has finished pressing for minimum time), *XXX* is displayed until the press main bell has maintained pressure up to the maximum press time configured (see "PROGRAMMING THE MARK III, IV, AND V PRESS CONTROLLER"), then *SWT* begins.

SWT Represents *system wait time* (in seconds). Indicates the time since maximum press time expired, and the press could not transfer goods because the receiving device is not ready, the pre-press did not finish tamping its load, or the pre-press did not receive a new load.

LOAD Represents the number of *loads* processed since the last time it was cleared. See "Viewing Operating Performance Display" in this section.

C Represents whether pre-press is prepared to receive a load (C corresponds with condition c on the Milnor® CBW®).
+ =pre-press is available to receive a load
– =pre-press is not available to receive a load

ER Represents possible *error* conditions.

00=No Error
01=Bell Not Down
02=Not Used
03=Bell Fault—Not Up and Locked
04=Bell Not Clear
05=Pre-press Fault
06=Pre-press Not Fully Up
07=Sled Fault—Not Fully Forward
08=Slow Clutch Switch for Brake Disabled
09=Sled Fault—Door is Not Fully Open
10=Sled Fault—Not Fully Back
11=Discharge Fault—Shuttle Left Too Soon
12=Sled Doors Not Fully Closed
13=Downlock Fault
14=Load Door Not Fully Open
15=Load Door Not Fully Closed
16=Discharge Door Not Fully Open
17=Discharge Door Not Fully Closed
18=High Water Level Without Low Level

See "MARK III, IV, AND V PRESS ERROR MESSAGES" for further explanation of these conditions.

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 "MARK III, IV, AND V PRESS ERROR MESSAGES"), or manual intervention, the controller cannot know if goods are present in the pre-press, main press, or conveyor. Therefore, the controller considers the batch codes for these locations unreliable and prompts the user for the information explained below.

⚠ DANGER ⚠

CRUSH HAZARD—Descending press main bell or pre-press tamper will strike and/or crush anyone under it. Main bell and tamper can descend with power on or off.

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

Responding to Prompts for Press Cake Information

PRE-PRESS CAKE DATA

To verify pre-press information, the controller prompts

DOES PRE PRESS HAVE A CAKE? 0=NO 1=YES 1

Default=*1(yes).*

If *1*(*yes*) and two cakes are allowed in pre-press (based on *configure decision 12*), display=

NUMBER OF CAKES IN PRE-PRESS ? 1

If *0*(no), the controller prompts for MAIN PRESS CAKE DATA.

1 ABC, **NEXT** or **NEXT** Tells the press that goods are still present in the prepress and prompts

ENTER FORMULA FOR PRE PRESS XXX

Where *XXX* is the wash formula. Change number if necessary.

After wash formula is entered and **NEXT** is pressed, similar questions are asked about the dry code, destination, customer, goods code, pieces or soil weight (based on *configure decision 14*), and cake number of the goods.

<XXX>, **NEXT** Enters the cake number of the goods and prompts

PRE PRESS = SINGLE CAKE? 0=NO 1=YES 0

Default=*0(no).* Entering *1(yes)* prevents this cake from being combined with any other. This decision will also affect all cake-combining devices that receive cakes after the press.

PRE PRESS 2 3rd PRESSURE

Selects the pressure of the load currently in pre-press for when this cake is pressed under the main bell:
0=standard pressure
1=no pressure
2=3rd pressure (low pressure)
3=low pressure (lowest pressure)

MAIN PRESS CAKE DATA

		DOES MAIN PRESS HAVE A CAKE? 0=NO 1=YES 1	Default=*1(yes)*.

If *0(no)*, the controller prompts for CONVEYOR CAKE DATA.

1 ABC, NEXT or NEXT	Tells the press that goods are still present in the main press and prompts	ENTER FORMULA FOR MAIN PRESS XXX	Where *XXX* is the wash formula. Change number if necessary.

After wash formula is entered and NEXT is pressed, similar questions are asked about the dry code, destination, customer, goods code, pieces or soil weight (based on *configure decision 14*), and cake number of the goods.

<xxx>, NEXT	Enters the cake number of the goods and prompts	MAIN PRESS = SINGLE CAKE? 0=NO 1=YES 0	Default=*0(no)*. Entering *1(yes)* prevents this cake from being combined with any other. This decision will also affect all cake-combining devices that receive cakes after the press.
		MAIN PRESS 2 3rd PRESSURE	Selects the pressure for when this cake is pressed under the main bell: 0=standard pressure 1=no pressure 2=3rd pressure (low pressure) 3=low pressure (lowest pressure)

CONVEYOR CAKE DATA (IF PRESS-CONTROLLED CONVEYOR SUPPLIED)

		DOES CONVEYOR HAVE A CAKE? 0=NO 1=YES 1	Default=*1(yes)*.
1 ABC, NEXT or NEXT	Tells the press that goods are still present on the conveyor and prompts	ENTER FORMULA FOR CONVEYOR XXX	Where *XXX* is the wash formula. Change number if necessary.

When wash formula is entered and NEXT is pressed, similar questions are asked about the dry code, destination, customer, goods code, pieces or soil weight (based on *configure decision 14*), and cake number of the goods.

xxx, NEXT	Enters the cake number of the goods and prompts	CONVEYOR = SINGLE CAKE? 0=NO 1=YES 0	Default=*0(no)*. Entering *1(yes)* prevents this cake from being combined with any other. This decision will also affect all cake-combining devices that receive cakes after the press.

See “Normal Run Display” in this section.

Interruptions in Normal Press Operation

Holds Before the Press—Anytime the flow of goods into the press stops (e.g., there is a hold condition in the tunnel washer), *C* on normal run display shows + (pre-press is available to receive a load) and waits for a load. When flow of goods resumes, processing continues without manual intervention.

Holds After the Press—Anytime the press desires to discharge because the receiving device (e.g., shuttle) is not ready to receive, the following occurs:

1. The press maintains pressure in main bell until *Maximum Press Time* expires.
2. The main press bell depressurizes.
3. *PTR* (press time remaining) on the normal run display changes to SWT (system wait time).

SWT indicates the number of seconds the press has been finished its pressing cycle and ready to transfer, but could not because the receiving device is not ready or the pre-press has not been loaded. When the receiving device is ready and the pre-press is loaded, the press resumes normal operation.

⚠ DANGER ⚠

CRUSH HAZARD—The pre-press tamper or main press bell may slowly descend even with power off or three-wire disabled, crushing anyone under it.

☞ **Never crawl or reach under the main press bell without safety stands in place. Use factory-supplied gaff hook to access any object under the main bell or tamper.**

Power Loss or Three-Wire Disabled Condition—If the press loses power or the three-wire circuit drops out (e.g., an *emergency stop switch* is pressed), the press stops immediately. The press resumes operation, as explained in "The Power Restoration Sequence" in this section, as soon as the three-wire circuit is closed, regardless of how long the press was stopped. See **NOTE** below.

NOTE: It is not usually necessary to load or unload the press before returning it on-line with the controller. Upon restoring power, the press requests cake data and resumes normal automatic operation. It automatically synchronizes with its interfacing devices (e.g., shuttle, continuous batch washer), unless the press was discharging goods from the main press to the press-controlled conveyor (if supplied) at power loss. See "Power Restoration Sequence" in this section.

Power Restoration Sequence

If Power Is Lost Other Than During Discharge—If power is lost anytime during normal operation, except during the discharge of a cake onto the press-controlled conveyor (if supplied), manual intervention is not required to start the press again. Upon powering up the press, the power up display sequence (see "The Power Up Sequence" in this section) appears and water is added to the tank for one minute. If prompts are answered, the diaphragm draws up, the main down locks retract, the press main bell rises and locks, the sled returns to its home position, the conveyor (if supplied) runs forward until the discharge-end photo-eye blocks, and the controller ultimately prompts for cake data (see "When Cake Data Must Be Confirmed" in this section). After cake data is entered, the press will automatically synchronize with its interfacing devices.

If Power Is Lost During Discharge (with a press-controlled conveyor)—If power was lost when the sled was discharging a cake onto the press-controlled conveyor, some manual intervention may be required. When the press is started up, the power up display sequence (see "The Power Up Sequence" in this section) appears and water is added to the tank for one minute. If the prompts are answered, the diaphragm draws up, the main bell down locks retract, the press main bell rises and locks, the sled returns to its home position, and the press-controlled conveyor runs. If goods were pushed far enough by the sled, the conveyor pulls the cake onto the conveyor, and cake data can be answered. However, if the cake is blocking the press discharge-end photo-eye but is not far enough for the conveyor to pull, operate the sled in manual mode to push the goods forward (see "MANUALLY OPERATING AND VIEWING INPUTS ON THE MARK III, IV, AND V PRESS CONTROL") so the running belt can pull the goods onto the conveyor. After the goods are moved and the press is returned to *automatic mode*, the controller prompts for cake data (see "When Cake Data Must Be Confirmed" in this section). After the cake data is entered, the press automatically synchronizes with its interfacing devices.

If Power Is Lost During Discharge (without a press-controlled conveyor)—If power was lost when the sled was discharging onto a conveyor, some manual intervention may be required. When the press is started up, the power up display sequence (see "The Power Up Sequence" in this section) appears and water is added to the tank for one minute. If the prompts are answered, the diaphragm draws up, the main bell down locks retract, the press main bell rises and locks, and the sled returns to its home position. If the cake is blocking the press discharge-end photo-eye but is not far enough for the conveyor to pull, operate the sled in manual mode to push the goods forward (see "MANUALLY OPERATING AND VIEWING INPUTS ON THE MARK III, IV, AND V PRESS CONTROL") so the running belt can pull the goods onto the conveyor (someone may have to operate the belt manually). After the goods are moved and the press is returned to *automatic mode*, the controller prompts for cake data (see "When Cake Data Must Be Confirmed" in this section). After the cake data is entered, the press automatically synchronizes with its interfacing devices.

Viewing Data on the Microprocessor Display During Operation

Viewing Operating Performance Display

The operating performance display is a measure of press operating efficiency. It compares the amout of time power to the press is *on* and how much of that time the press is in *hold.* This display will appear as long as 2 DEF is held.

When the display=

```
MPSC P PTR LOAD C ER
XXXX X XXX XXXX X XX
```

hold 2 DEF (*Read*)

```
TOTAL HRS    HOLD HRS
3969         0551
```

TOTAL HRS Total hours press power has been on *since the last time the clock was cleared.*

HOLD HRS Number of hours press was waiting for a load from the CBW® and/or waiting to transfer a load *since the last time the clock was cleared.*

2 DEF + 4 JKL + 6 PQR Clears the clock, returning both total hours and hold hours to 0000.

Viewing Inputs

The status of input signals into the press controller may be monitored while the press is in operation.

hold 7 STU — Displays 1st 20 inputs (a-p).

```
abcdefghijklmnopqrst
-+-+-+-+-+-+-+-+-+-+
```

"+" = input energized
"-" = input not energized

hold 7 STU **+** SKIP TO — Displays last 20 inputs (A-P).

```
ABCDEFGHIJKLMNOPQRST
-+-+-+-+-+-+-+-+-+-+
```

"+"= input energized
"-" = input not energized

NOTE: The input status display appears as long as the appropriate keys are held.

Standard INPUTS for Press

Display Code	Input Name	Connector/Pin	Display Code	Input Name	Connector/Pin
a	Shuttle is here	1MTA4-1	A	Main press up-lock released	2MTA4-5
b	Three-wire	1MTA4-2	B	Main press down locks are released	2MTA4-6
c	Sled slow to home	1MTA4-3	C	Goods are not under main press	2MTA4-7
d	Low press goods	1MTA4-4	D	No pressure	2MTA4-8
e	Sled slow to main	1MTA4-5	E	Dry code 0	2MTA4-11
f	Main press locked down	1MTA4-6	F	Dry code 1	2MTA4-12
g	Discharge door up	1MTA4-7	G	Dry code 2	2MTA4-13
h	Press loaded	1MTA4-8	H	Dry code 3	2MTA4-14
i	Pre-press 2/3 down	1MTA4-11	I	Water level high	2MTA4-15
j	Pre-press up	1MTA4-12	J	New customer	2MTA4-16
k	Fault recovery	1MTA4-13	K	Water level low	2MTA4-17
l	COINC is loaded	1MTA4-14	L	Empty pocket	2MTA4-18
m	Sled doors closed	1MTA4-15	M	Program key	1MTA38-3
n	Sled is home	1MTA4-16	N	Signal cancel	1MTA38-2
o	Sled is under main press	1MTA4-17	O	Brake safety override	1MTA38-5
p	Sled doors open	1MTA4-18	P	Single cake	1MTA38-6
q	Goods cleared main bell	2MTA4-1	Q	Bell has pressure	1MTA38-7
r	Main press locked up	2MTA4-2	R	Customer 6	1MTA39-1
s	Main press up	2MTA4-3	S	Customer 7	1MTA39-6
t	Main press down	2MTA4-4	T	Third pressure	1MTA39-5

NOTE: Optional inputs can not be viewed while the press is in operation.

Viewing Outputs

The status of all output signals from the controller may be monitored while the press is in operation.

hold 8 VWX **Displays 1st 20 outputs (a-p).**

```
abcdefghijklmnopqrst
-+-+-+-+-+-+-+-+-+-+
```

"+"= output energized
"-" = output not energized

hold 8 VWX **+** SKIP TO **Displays last 20 outputs (A-P).**

```
ABCDEFGHIJKLMNOPQRST
-+-+-+-+-+-+-+-+-+-+
```

"+"= output energized
"-" = output not energized

NOTE: The output status display appears as long as these keys are held.

Standard OUTPUTS for Press

Display Code	Output Name	Connector/Pin	Display Code	Output Name	Connector/Pin
a	Move main press up	1MTA5-19	A	Release main press down lock	11MTA14-13
b	Add water	1MTA5-18	B	Suction valve	11MTA14-14
c	Brake	1MTA5-17	C	Release main press up lock	11MTA14-5
d	Press free	1MTA5-16	D	Open sled doors	11MTA14-15
e	Sled back	1MTA5-14	E	Raise discharge door	11MTA14-6
f	Sled forward	1MTA5-13	F	Lower discharge door	11MTA14-16
g	Sled slow to home	1MTA5-12	G		
h	Sled slow to main	1MTA5-11	H		
i	Torque safety bypass	11MTA13-11	I		
j	Volume pump	11MTA13-12	J		
k	Close sled doors	11MTA13-13	K		
l	Pressure pump	11MTA13-14	L		
m	Low pressure bypass valve	11MTA13-15	M	Raise load door	2MTA5-19
n	Run COINC belt	11MTA13-16	N	Lower load door	2MTA5-18
o	Pre-press tamper full pressure	11MTA13-17	O	Flag down dis	2MTA5-17
p	Move pre-press up	11MTA13-18	P	Dis. Compl.	2MTA5-16
q	Lock main press down	11MTA13-19	Q	3rd press valve	2MTA5-14
r	Desire to unload	11MTA14-1	R	Press valve	2MTA5-13
s	Volume valve	11MTA14-2	S	Move pp dn	2MTA5-12
t	Move main press down	11MTA14-3	T	Signal	2MTA5-11

Viewing Cake Data

hold 3 GHI (*Extend*)

```
   FM DC DT CUS GDS
PR XX XX XX XXX XXX
```

The two letters in the lower left corner indicate which cake this data represents: *PR* = pre-press, *MN* = main press, and *CO* = conveyor.

FM =Formula code
DC =Dry code
DT =Destination code
CUS =Customer code
GDS =Goods code

Press SKIP TO while holding 3 GHI to access the cake data for the main press (*MN*), the conveyor (*CO*), and then the pre-press (*PR*).

Viewing Tank Data

hold 0

```
H2O TEMP (°F)  LO HI
 - 110<119<130  +  -
```

Displays state of the water valve input, the minimum, maximum, and current water temperature, and the states of the low and high level inputs.

H2O =Water valve input state
TEMP (F°) =Water temperature: Minimum<Current<Maximum
LO =State of the low level inputs
HI =State of the high level inputs

B

MANUALLY OPERATING AND VIEWING INPUTS ON THE MARK III, IV, AND V PRESS CONTROL

The press can be operated manually from the manual menu, which is accessible through the keypad and display at the press microprocessor controller. This may be helpful when recovering from an error fault, particularly if the doors must be open for troubleshooting, etc. See "MARK III, IV, AND V PRESS ERRORS" (see Table of Contents). The manual menu is also used for testing certain press functions and for night shutdown.

The Manual Menu and How To Access It

Available Modes in the Manual Menu

00=RETURN TO AUTOMATIC
01=NIGHT SHUTDOWN
02=OPERATE SLED AND DOORS
03=OPERATE BELL AND PUMPS
04=OPERATE SLED DOORS
05=OPERATE PRE-PRESS
06=OPERATE BELL
07=OPERATE PUMPS
08=OPERATE DOWN LOCKS
09=OPERATE SLED
10=OPERATE LOAD DOOR
11=OPERATE DISCHARGE DOOR
12=BED CLEANOUT
13=VIEW INPUTS
14=VIEW WATER TEMPERATURE

⚠ WARNING ⚠

CRUSH HAZARD—Descending press main bell or pre-press tamper will strike and/or crush anyone under it. Main bell and tamper can descend with power on or off.

- ☞ **NEVER crawl or reach under the press main bell during press operation. Use factory-supplied gaff hook to access any object under the main bell or tamper.**
- ☞ **Know how to use factory-supplied *emergency stop switches* and where they are located.**
- ☞ **Lock *off* and tag out power and secure factory-supplied safety supports in place before crawling or reaching under the main bell. See instructions in installation or service manual for safety support installation instructions.**
- ☞ **Lock *off* and tag out power before reaching under the tamper.**
- ☞ **Ensure personnel are clear of the press before operating it in *manual* or *automatic mode.* The main bell or tamper may move automatically when certain controls are used, such as when ① is pressed or cake data is entered.**

⚠ WARNING ⚠

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 *off* and 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.**

To Access the Manual Menu When *Master Switch* Is *Off*

Set *Manual/Automatic switch* to *manual.*

Master switch on — Energizes control power, but not press power. *Operator alarm* sounds (until SIGNAL CANCEL is pressed) and the normal power up displays appear as explained in "RUNNING THE . . . PRESS IN AUTOMATIC," "The Power Up Sequence."

When display=

```
RETURN TO AUTOMATIC
00
```

0, 2 DEF (example) — Selects *Operate Sled and Doors* (any other function may be selected)

```
OPER SLED AND DOORS
02
```

NEXT — With *Operate Sled and Doors* selected, prompts

```
OPER SLED AND DOORS
UP-FORWARD  DOWN-REV
```

Allows the described manual operation.

To Access the Manual Menu From Automatic Operation

When display=

```
MPSC P PTR LOAD C ER
XXXX X XXX XXX  X XX
```

NOTE: If the pre-press is available to receive a load (i.e., the normal run display shows a + under the *C)*, the controller will pause for 12 seconds before allowing manual operation to ensure the tunnel is not transferring. During these 12 seconds, the controller displays *Waiting After Taking Away Press Free*.

hold SKIP TO + MANUAL — Accesses *manual mode* and displays the manual menu. Automatic operation halts.

```
RETURN TO AUTOMATIC
00
```

The desired function can be selected from here.

0, 2 DEF (example) Selects *Operate Sled and Doors* (any other function may be selected)

```
OPER SLED AND DOORS
02
```

NEXT With *Operate Sled and Doors* selected, prompts

```
OPER SLED AND DOORS
UP-FORWARD  DOWN-REV
```

Allows the described manual operation.

For Quick Return to Automatic Mode From Manual Menu

When any press manual function is accessed (example),

```
OPER BELL AND PUMPS
UP-RAISE  DOWN-LOWER
```

NEXT Returns to that selection on the manual menu (example),

```
OPER BELL AND PUMPS
03
```

0, 0 Returns to first selection in menu,

```
RETURN TO AUTOMATIC
00
```

NEXT Returns to *automatic mode*, and controller prompts the press for initialization (See "RUNNING THE . . . PRESS IN AUTOMATIC," "The Power Up Sequence") and cake data for pre-press, main press, and conveyor (if supplied).

```
DOES PRE PRESS HAVE
A CAKE? 0=NO 1=YES 1
```

NOTE: Provide correct responses for cake data to ensure proper operation, post-wash processing, and accounting. See "RUNNING THE . . . PRESS IN AUTOMATIC," "When Cake Data Must Be Entered."

Selecting and Commanding Manual Press Functions

After accessing *manual mode*,

0, 0 Selects

```
RETURN TO AUTOMATIC
00
```

NEXT Returns press to *automatic mode if Run/Program keyswitch is at run.*

0, 1 ABC Selects

```
NIGHT SHUTDOWN
01
```

NEXT Commands

```
NIGHT SHUTDOWN
IN PROGRESS
```

Sled moves to home position (under pre-press tamper). Main bell descends and down locks extend. This is the desired position when the press is not in operation. Once the press is in this position, the display will return to *Night Shutdown 01*. If the main bell is not down and locked when the press is not operating, water may leak into the diaphragm causing the diaphragm to fall (blow) out.

0, 2 DEF — Selects

```
OPER SLED AND DOORS
02
```

NEXT — Displays

```
OPER SLED AND DOORS
UP-FORWARD  DOWN-REV
```

Allows operator to move the sled and open/close the doors *if the main bell is up and locked and the pre-press is full up.*

↑ Runs sled forward until it is under main bell, then opens doors. Also runs COINC conveyor belt (if supplied) until the photo-eye is blocked.

↓ Returns sled to home position, then closes doors.

0, 3 GHI — Selects

```
OPER BELL AND PUMPS
03
```

NEXT — Displays

```
OPER BELL AND PUMPS
UP-RAISE  DOWN-LOWER
```

Allows operator to operate the diaphragm, main bell, and pressing cycle *if the sled is in home position (under pre-press tamper).*

↑ Raises the main bell if it is down, and draws up diaphragm until the bell is up and locked.

↓ Lowers the main bell if it is up, locks bell down, and initiates a press cycle. Presses for the amount of time configured for *Main Press Maximum Time.*

0, 4 JKL — Selects

```
OPERATE SLED DOORS
04
```

NEXT — Displays

```
OPERATE SLED DOORS
UP-OPEN   DOWN-CLOSE
```

Allows the operator to open/close the sled doors.

↑ Opens the sled door.

↓ Closes the sled door.

0, 5 MNO — Selects

```
OPERATE PRE PRESS
05
```

NEXT — Displays

```
OPERATE PRE PRESS
UP-RAISE  DOWN-LOWER
```

Allows operator to raise/lower pre-press *if the sled is in the home position (under pre-press tamper).* **NOTE:** The pre-press cannot be stopped in mid-position.

hold ↓ Lowers pre-press.

hold ↑ Raises pre-press.

0, 6 PQR — Selects

```
OPERATE BELL
06
```

NEXT — Displays

```
OPERATE BELL
UP-RAISE  DOWN-LOWER
```

Allows operator to raise/lower main bell, retracting the up or down locks as appropriate. **NOTE:** The main press bell cannot be stopped in mid-position.

hold momentarily ↑ — Raises main bell.

hold momentarily ↓ — Lowers main bell *if the sled is in the home position (fully retracted).*

0, 7 STU — Selects

```
OPERATE PUMPS
07
```

NEXT — Displays

```
OPERATE PUMPS
UP-SUCK   DOWN-PRESS
```

Allows operator to draw up the diaphragm or fill the bell *if the sled is in the home position.*

hold ↑ — Draws up the diaphragm.

hold ↓ — Fills the diaphragm *if it is down and locked. Does not move the main bell down or lock it down.*

0, 8 VWX — Selects

```
OPERATE DOWN LOCKS
08
```

NEXT — Displays

```
OPERATE DOWN LOCKS
UP-UNLOCK  DOWN-LOCK
```

Allows operator to retract/extend the down locks.

↑ — Retracts the down locks.

↓ — Extends the down locks *if the main bell is full down.*

0, 9 YZ- — Selects

```
OPERATE SLED
09
```

NEXT — Displays

```
OPERATE SLED
UP-FORWARD  DOWN-REV
```

Allows operator to move sled forward/reverse *if the main press bell is up and locked and the pre-press is up.*

↑ — Moves sled forward.

↓ — Moves sled in reverse.

1 ABC, 0 ␣ : Selects
```
OPERATE LOAD DOOR
10
```

NEXT Displays
```
OPERATE LOAD DOOR
UP=RAISE DOWN=LOWER
```
Allows operator to raise/lower load door, used when the tunnel does not discharge correctly into the press.

↑ Raises load door.

↓ Lowers load door.

1 ABC, 1 ABC Selects
```
OPERATE DISCH. DOOR
11
```

NEXT Displays
```
OPERATE DISCH. DOOR
UP=RAISE DOWN=LOWER
```
Allows the operator to raise/lower discharge door.

↑ Raises discharge door.

↓ Lowers discharge door.

1 ABC, 2 DEF Selects
```
BED CLEANOUT
12
```

NEXT Displays
```
BED CLEANOUT
UP=RAISE  DOWN=LOWER
```
See press bed cleanout procedure in the service manual.

↑ Raises press bell.

↓ Lowers press bell.

Displays
```
BED CLEANOUT
UP=RAISE  SKIPTO=PUMP
```

SKIP TO Runs both the volume and pressure pumps until the press tank is empty.

1 ABC, 3 GHI Selects
```
VIEW INPUTS
13
```

NEXT Displays
```
abcdefghijklmnopqrst
-+-+-+-+-+-+-+-+-+-+
```
"+"= input energized
"-" = input not energized

SKIP TO Displays last 20 inputs (A-P).
```
ABCDEFGHIJKLMNOPQRST
-+-+-+-+-+-+-+-+-+-+
```
"+"= input energized
"-" = input not energized

1 ABC, 4 JKL Selects

```
VIEW WATER TEMP
14
```

NEXT Displays

```
H2O TEMP(°F)   LO HI
 - 110<119<130  +  -
```

Allows the operator to see the minimum, maximum, and current water temperature and the states of the high and low level inputs and the water valve input.

NOTE: Press 0 to view display while machine is running.

Troubleshooting 4

MARK III, IV, AND V PRESS ERRORS

When recovering from error conditions, please observe the following precautions:

⚠ DANGER ⚠

CRUSH HAZARD—Descending press main bell or pre-press tamper will strike and/or crush anyone under it. Main bell and tamper can descend with power on or off.

- ☞ **NEVER crawl or reach under the press main bell during press operation. Use factory-supplied gaff hook to access any object under the main bell or tamper.**

- ☞ **Know how to use factory-supplied *emergency stop switches* and where they are located.**
- ☞ **Lock *off* and tag out power and secure factory-supplied safety supports in place before crawling or reaching under the main bell. See instructions in the installation or service manual for safety support installation instructions.**
- ☞ **Lock *off* and tag out power before reaching under the tamper.**
- ☞ **Ensure personnel are clear of the press before operating it in *manual* or *automatic mode.* The main bell or tamper may move automatically when certain controls are used, such as when ① is pressed or cake data is entered.**

⚠ DANGER ⚠

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 *off* and 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 ⚠

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 *off* and 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 *off* and tagged out.**

Error Faults

Error faults are caused by mechanical or electrical malfunctions that cause inputs that should not occur or a lack of 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. The display flashes every four seconds and the operator signal illuminates and sounds until the malfunction is corrected and in some cases, the *Fault Recovery button* is pressed.

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 the input/output board or output board. Determine if the appropriate inputs or outputs are being made using the instructions in "RUNNING THE . . . PRESS IN AUTOMATIC," "Viewing Data on the Microprocessor Display During Operation" (see Table of Contents). 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.

MPSC P PTR LOAD C ER XXXX X XXX XXXX - 01	E01 BELL NOT DOWN PRESS FAULT RECOVERY

Indicates the main press bell is not completely seated or locked, probably because of one of the following conditions. Observing all safety precautions, determine the cause of the error.

CONDITION	RECOVERY
Goods are under the bell edge.	**1.** Press the *Fault Recovery button*, allowing the bell to raise and lock up. **2.** Use the factory-supplied gaff hook to remove any goods or other obstruction from under the bell. **3.** Once goods are cleared, press the *Fault Recovery* button
The *bell down switch* is malfunctioning.	**1.** Ensure the bell is down. **2.** Ensure proper actuation of the switch per "HOW TO SET LIMIT SWITCHES" in the service manual. **3.** Adjust or replace the switch if necessary.
Up locks are not retracted (unlocked).	**1.** In *manual mode*, command the up locks to retract. **2.** If there is an obstruction preventing the locks from retracting, call your dealer service technician for assistance.
Down locks are not extended (locked).	**1.** In *manual mode*, command the down locks to extend. **2.** If there is an obstruction preventing the locks from extending, call your dealer service technician for assistance.

MPSC P PTR LOAD C ER XXXX X XXX XXXX - 02	Not Used

MPSC P PTR LOAD C ER XXXX X XXX XXXX - 03	E03 BELL FAULT NOT UP AND LOCKED

Indicates the bell is not up and locked, probably because of one of the following conditions. Observing all safety precautions, determine the cause of the error.

CONDITION	RECOVERY
Air pressure is low.	**1.** Verify that air pressure at the machine is within required range. **2.** Verify that the bell-up throttling valve on the discharge end of the press is fully open. **3**. Check for leaks in the air line and repair or replace as needed.
Down lock released switch is malfunctioning.	**1.** Ensure proper actuation of the switch per "HOW TO SET LIMIT SWITCHES" in the service manual. **2.** Adjust or replace the switch if necessary.
Up locks released switch is malfunctioning.	**1.** Ensure proper actuation of the switch per "HOW TO SET LIMIT SWITCHES" in the service manual. **2.** Adjust or replace the switch if necessary.
Main bell is up switch is malfunctioning.	**1.** Ensure proper actuation of the switch per "HOW TO SET LIMIT SWITCHES" in the service manual. **2.**Adjust or replace the switch if necessary.
Up locks locked switch is malfunctioning	**1.** Ensure proper actuation of the switch per "HOW TO SET LIMIT SWITCHES" in the service manual. **2.** Adjust or replace the switch if necessary
Down locks are not retracted (unlocked).	**1.** In *manual mode*, command the down locks to retract. **2.** If there is an obstruction preventing the locks from retracting, call your dealer service technician for assistance.
Up locks are not extended (locked).	**1.** In *manual mode*, command the up locks to lock. **2.** If there is an obstruction preventing the locks from extending, call your dealer service technician for assistance.

MPSC P PTR LOAD C ER XXXX X XXX XXXX - 04	E04 BELL NOT CLEAR PRESS FAULT RECOVERY

Indicates the bell clear photo-eye is blocked, probably because of one of the following conditions. Observing all safety precautions, determine the cause of the error.

CONDITION	RECOVERY
Goods are on the press bed or did not transfer out of press.	**1.** Use the factory-supplied gaff hook to remove the goods from in front of the photo-eye. **2.** Press the *Fault Recovery button*.
The bell clear photo-eye is malfunctioning.	**1.** Ensure the photo-eye is aligned properly and the red light on the photo-eye is blinking very rapidly (see information about setting photosensors in the press installation and service manual). **2.** Ensure the lens and reflector are clean. **3.** Press the *Fault Recovery button*. **4.** If the error messages appear again, replace the *bell clear photo-eye*.

MPSC P PTR LOAD C ER XXXX X XXX XXXX - 05	E05 PRE PRESS FAULT PRESS FAULT RECOVERY

Indicates that the two-thirds down switch was not made when the tamper was tamping. This is probably because of one of the following conditions. Observing all safety precautions, press the *Fault Recovery* button to raise the tamper. Determine the cause of the error.

CONDITION	RECOVERY
Too many goods are in the pre-press.	**1.** Using the factory-supplied gaff hook, remove some of the goods from the pre-press.
The *two-thirds down switch* is malfunctioning.	**1.** Ensure proper actuation of the switch per "HOW TO SET LIMIT SWITCHES" in the service manual. **2.** Adjust or replace the switch if necessary.
The pre-press air pressure regulator is not allowing enough air pressure.	**1.** Ensure that the pre-press air pressure regulator is set to 20-30 PSI. **2.** Set the pressure regulator between 20 and 30 PSI if necessary.
The *spring return shuttle valve* is malfunctioning.	**1.** Inspect the spring return shuttle valve for internal dirt or debris that may restrict motion. **2.** Check quick release valve. **3.** Clean the valve if necessary.

Once the error has been corrected, press the *Fault Recovery* button to lower the tamper.

MPSC P PTR LOAD C ER XXXX X XXX XXXX - 06	E06 PRE PRESS FAULT NOT FULLY UP

Indicates the pre-press full up switch was not made when trying to raise the pre-press tamper. This is probably because of one the following conditions. Observing all safety precautions, determine the cause of the error.

CONDITION	RECOVERY
Goods are preventing the tamper from rising.	**1.** In *manual mode,* raise tamper. **2.** Move the sled back and forth slightly to loosen the jam. **3.** Use the factory-supplied gaff hook to pull the goods out of the jammed area carefully to prevent tearing.
The *pre-press full up switch* is malfunctioning.	**1.** Ensure proper actuation of the switch per "HOW TO SET LIMIT SWITCHES" in the service manual. **2.** Adjust or replace the switch if necessary

MPSC P PTR LOAD C ER XXXX X XXX XXXX - 07	E07 SLED FAULT NOT FULLY FORWARD

Indicates the sled under bell switch was not made or recognized. This is probably the result of one of the following conditions. Observing all safety precautions, turn machine power *off,* insert the safety stands and determine the cause of the error.

CONDITION	RECOVERY
The *under bell switch* is malfunctioning.	**1.** Ensure proper actuation of the switch per "HOW TO SET LIMIT SWITCHES" in the service manual. **2.** Adjust or replace the switch if necessary.
The sled is skewed because it skipped a link in the chain or the chain broke on one side.	**1.** Turn machine power *off* and insert safety stands. **2.** Determine if the chain is broken on either side. **3.** If the sled is skewed, fix the chain. If the chain is broken, repair or replace the chain.

MPSC P PTR LOAD C ER	E08 SL CLUTCH SWITCH
XXXX X XXX XXXX - 08	FOR BRAKE DISABLED

Indicates the *Brake Safety Desired switch* is disabling the brake on the sled. Automatic operation is terminated. Observing all safety precautions, determine the cause of the error.

CONDITION	RECOVERY
Brake Safety Desired switch is *off*.	**1.** Return the *Brake Safety Desired switch* to on.
Brake Safety Desired switch is malfunctioning.	**1.** Ensure that the switch was up in the enable position when the error message appeared. **2.** Electrically inspect the switch. **3.** If the switch or its connections are malfunctioning, replace or repair the appropriate parts.

MPSC P PTR LOAD C ER	E09 SLED FAULT
XXXX X XXX XXXX - 09	DOORS NOT FULLY OPEN

Indicates the sled doors open switch was not made. This is probably due to one of the following conditions. Observing all safety precautions, determine the cause of the error.

CONDITION	RECOVERY
The *sled doors open switches* are malfunctioning.	**1.** Ensure proper actuation of the switch(es) per "HOW TO SET LIMIT SWITCHES" in the service manual. **2.** Adjust or replace the switch(es) if necessary
The door will not open.	**1.** In *manual mode*, move the sled in reverse. **2.** Return it to full forward position and open doors.

MPSC P PTR LOAD C ER XXXX X XXX XXXX - 10	E10 SLED FAULT NOT FULLY BACK

Indicates the sled is home switch was not made. This is probably caused by one of the following conditions. Observing all safety precautions, determine the cause of the error.

CONDITION	RECOVERY
The *sled is home switch* is malfunctioning.	**1.** Ensure proper actuation of the switch per "HOW TO SET LIMIT SWITCHES" in the service manual. **2.** Adjust or replace the switch if necessary.
The sled is skewed because its adjustment slipped, skipped a link in the chain, or the chain broke on one side.	**1.** Turn machine power *off* and insert safety stands. **2.** Determine if the chain is broken on either side. **3.** If the chain is broken, repair or replace the chain as necessary. Call your dealer service technician for assistance. **4.** Adjust the sled and chain tension.

MPSC P PTR LOAD C ER XXXX X XXX XXXX X 11	Not used

MPSC P PTR LOAD C ER XXXX X XXX XXXX - 12	E12 SLED DOORS NOT FULLY CLOSED

Indicates the right door closed switch or left doors closed switch was not made. This is probably caused by one of the following conditions. Observing all safety precautions, turn machine power *off* and insert the safety stands.

CONDITION	RECOVERY
A *door closed switch* is malfunctioning.	**1** .Ensure proper actuation of the switch per "HOW TO SET LIMIT SWITCHES" in the service manual. **2.** Adjust or replace the switch if necessary.
Doors will not close.	**1.** Use the factory-supplied gaff hook to remove any visible obstruction.

MPSC P PTR LOAD C ER	E13 DOWNLOCK FAULT
XXXX X XXX XXXX - 13	PRESS FAULT RECOVERY

Indicates the down lock switch was not made. This is probably caused by one of the following conditions. Observing all safety precautions and without entering the press, see if the locks appear to be locked.

CONDITION	RECOVERY
Goods are under the bell edge.	**1.** Press the *Fault Recovery button*, allowing the bell to raise and lock up. **2.** Use the factory-supplied gaff hook to remove any goods or other obstruction from under the bell. **3.** Once goods are cleared, press the *Fault Recovery* button
The *down lock switch* is malfunctioning.	**1.** Ensure the locks are retracted. **2.** Check air pressure. **3.** Ensure proper actuation of the switch per "HOW TO SET LIMIT SWITCHES" in the service manual. **4.** Adjust or replace the switch if necessary.
The air valve controlling the down locks is failing.	If the down locks are visibly not extended, check the appropriate air valve and replace it if necessary.
Down locks are not extended.	**1.** In *manual mode*, command the down locks to extend. **2.** If there is an obstruction preventing the locks from extending, call your dealer service technician for assistance.

MPSC P PTR LOAD C ER	E14 LOAD DOOR NOT
XXXX X XXX XXXX - 14	FULLY OPEN

Indicates the load door open switch (load door not available on all models) was not made. This is probably caused by one of the following conditions. Observing all safety precautions and without entering the press, see if the load door is open.

CONDITION	RECOVERY
Goods are preventing the door from rising.	**1.** Using the factory-supplied gaff hook, carefully remove goods from the congested area.
The *door full up switch* is malfunctioning.	**1.** Ensure the door is fully up. **2.** Ensure proper actuation of the switch per "HOW TO SET LIMIT SWITCHES" in the service manual. **3.** Adjust or replace the switch if necessary.

MPSC P PTR LOAD C ER XXXX X XXX XXXX - 15	E15 LOAD DOOR NOT FULLY CLOSED

Indicates the load door closed switch is not made. This is probably caused by one of the following conditions. Observing all safety precaution and without entering the press, see if the load door is closed.

CONDITION	RECOVERY
Goods are preventing the door from descending	**1.** Press *Fault Recovery button* to open the load door. **2.** Using the factory-supplied gaff hook, carefully remove goods from the congested area. **3.** Press *Fault Recovery button* to close the load door.
The *door full down switch* is malfunctioning	**1.** Ensure the door is fully descended. **2.** Ensure proper actuation of the switch per "HOW TO SET LIMIT SWITCHES" in the service manual. **3.** Adjust or replace the switch if necessary.

MPSC P PTR LOAD C ER XXXX X XXX XXXX - 16	E16 DISCHARGE DOOR NOT FULLY OPEN

Indicates the discharge door open switch is not made. This is probably caused by one of the following conditions. Observing all safety precautions and without entering the press, see if the load door is open.

CONDITION	RECOVERY
The door full up switch is malfunctioning	**1.** Ensure the door is fully up. **2.** Ensure proper actuation of the switch per "HOW TO SET LIMIT SWITCHES" in the service manual **3.** Adjust or replace the switch if necessary.

MPSC P PTR LOAD C ER XXXX X XXX XXXX - 17	E17 DISCHARGE DOOR NOT FULLY CLOSED

Indicates the discharge door closed switch is not made. This is probably caused by one of the following conditions. Observing all safety precaution and without entering the press, see if the load door is closed.

CONDITION	RECOVERY
Goods are preventing the door from descending	**1.** Press *Fault Recovery button* to open the discharge door. **2.** Using the factory-supplied gaff hook, carefully remove goods from the congested area. **3.** Press *Fault Recovery button* to close the discharge door.
The *door full down switch* is malfunctioning	**1.** Ensure the door is fully descended. **2.** Ensure proper actuation of the switch per "HOW TO SET LIMIT SWITCHES" in the service manual. **3.** Adjust or replace the switch if necessary.

MPSC P PTR LOAD C ER XXXX X XXX XXXX - 18	E18 HIGH WATER LEVEL WITHOUT LOW LEVEL

Indicates the water level high switch was made before the water level low switch was made. This is probably caused by one of the following conditions.

CONDITION	RECOVERY
The *low level switch* is malfunctioning	**1.** Ensure proper actuation of the switch per "HOW TO SET LIMIT SWITCHES" in the service manual. **2.** Adjust or replace the switch if necessary.
The *high level switch* is malfunctioning	**1.** Ensure proper actuation of the switch per "HOW TO SET LIMIT SWITCHES" in the service manual. **2.** Adjust or replace the switch if necessary.

Switch Faults

The press main bell, bell up lock, bell down lock, pre-press, sled, and sled doors 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. For example if *SF4—Pre Press Up and Pre Press 2/3 Down* occurs while the pre-press is in the down position, the pre-press up switch is probably damaged. Any of these errors will cease operation of the press and cause a message to appear on the display.

NOTE: 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.

The switch faults are as follows:

SF1 `SF1 BELL UP AND DOWN` *Bell up switch* and *bell down switch* are both made.

SF2 `SF2 BELL DOWN LOCK LOCKED AND RELEASED` *Bell down lock locked* (extended) *switch* and *bell down lock released* (retracted) *switch* are both made.

SF3 `SF3 BELL UP LOCK LOCKED AND RELEASED` *Bell up lock locked switch* and *bell up lock released switch* are both made.

SF4 `SF4 PRE PRESS UP AND 2/3 DOWN` *Pre-press up switch* and *pre-press two-thirds down switch* are both made.

SF5 `SF5 SLED HOME AND UNDER BELL` *Sled home switch* and *sled under bell switch* are both made.

SF6 `SF6 SLED DOORS OPEN AND CLOSED` *Sled doors open switch* and *sled doors closed switch* are both made.

SF7 `SF7 LOAD DOOR UP AND DOWN` *Load door up switch* and *load door closed switch* are both made.

SF8 `SF8 DISCHARGE DOOR UP AND DOWN` *Discharge door up switch* and *discharge door closed switch* are both made.

RECOVERY: To troubleshoot any of the switch fault errors, observe all safety precautions, and proceed as follows:

1. Locate the limit switches (see the press cable diagram in the schematic manual) for the device named in the error message.
2. Observe the position of the device named in the error message. The damaged switch is probably opposite the current position of the moving device.

3. Inspect the malfunctioning switch for damage, and replace if required (see "HOW TO SET LIMIT SWITCHES" in the service manual).
4. If no damage is found, inspect the limit switch on the other end of travel of the device. Replace this switch if required (see "HOW TO SET LIMIT SWITCHES" in the service manual). If the position of the device is preventing access to this switch, see "MANUALLY OPERATING AND VIEWING INPUTS ON THE MARK III, IV, AND V PRESS CONTROL" to manually move the affected device.
5. Once repairs have been made or if no switch damage is found, press the *Fault Recovery button* to resume operation.

Board Failures

Sometimes input/output boards and output boards fail to operate, requiring the user to replace the entire board. A display similar to this one indicates such a condition.

I/O #x BOARD FAILURE PRESS SIGNAL CANCEL

Indicates that input/output board *x* is not communicating with the controller. This error may result from incorrectly configuring this machine, having improper addresses (DIP switch settings) on the board identified, or having one or more loose wire connections to or from the board.

RECOVERY: Press SIGNAL CANCEL. Verify that configure decision values match the equipment. Verify that the DIP switch on the board referenced in the display message has the correct address. Check the wires to and from the board and secure any loose wire connections. If the error persists, replace the board.

Pass Empty Errors

Sometimes the system controller must allow the tunnel to pass "empty pockets" (i.e., batches without goods). If an empty pocket is not properly coded or a malfunction occurs during transfer (e.g., the main press photo-eye fails), the press does not know how to properly handle the empty pocket. With the press configured to check for pass empty errors (i.e., *configure decision 17*=1, see "PROGRAMMING AND CONFIGURING THE MARK III, IV, AND V PRESS CONTROLLER"), one of these errors will be displayed if a malfunction occurs:

NO CAKE UNDER BELL PRESS FAULT RECOVERY

Indicates that there is no cake under the main bell, and the controller did not indicate this transfer was an empty pocket. This may indicate goods are jamming in the tunnel.

MAIN SHOULD BE EMPTY PRESS FAULT RECOVERY

Indicates that there is a cake under the bell, but the controller indicated it was supposed to be an empty pocket.

RECOVERY: Press the *Fault Recovery button*. The press controller will require verification of cake data for all positions.

Three-Wire Fault

If the three-wire connection drops out during automatic operation this display will appear:

```
PRESS 'START' FOR
AUTOMATIC OPERATION
```

Indicates that one of several conditions occurred:
- The water level in the press tank is too low.
- The sled has malfunctioned (possibly tripping the *torque arm safety switch*).
- The *Stop button* was pressed.
- An *emergency stop button* was pressed.
- A side door was raised.

RECOVERY:

1. If the water level in the press tank is too low, the *Low Water light* on the Fault nameplate illuminates. If this light illuminates, manually add water up to the minimum level with power *locked off* and *tagged out*. Restore power to the press. Once started, the press automatically adds water up to the high level. Anytime this light appears during operation, it indicates a leak or other malfunction preventing the press from normal automatic refilling.

2. If the sled malfunctioned, see instructions in the installation and service manual about how to troubleshoot and recover from sled malfunctions.

3. Ensure that all *Emergency Stop buttons* have been reset and side doors are down.

4. Press *Start*.

Receive Fault

```
RECEIVE FAULT
PRESS FAULT RECOVERY
```

Indicates Miltrac transfer was aborted by the discharging device. This usually occurs when operator powers off the tunnel after it has committed to a transfer, but before the transfer has taken place.

RECOVERY: Press the *Fault Recovery button*.

Data Loss Error

```
CHECK CONFIGURE
BEFORE PROCEEDING
```

Indicates that the memory failed for one of various reasons. See the following sections to determine how this data was lost and prevent any future data loss: “WHAT TO DO FIRST FOR THE PRESS” and “PROGRAMMING AND CONFIGURING THE MARK III, IV, AND V PRESS CONTROLLER,” “How To Avoid Data Loss in the Press Controller.”

RECOVERY: Compare configure values stored in the memory against your desired, recorded, or recommended configure values. Change the values as needed.

Fault Nameplate Indicator Lights

There are five indicator lights on the Fault nameplate (see the descriptions of controls in the reference manual). When one of these lights illuminates, the press stops operating and the operator signal light illuminates. To continue operation, locate and reverse the cause of the illuminating indicator light, then resume operation as described below.

LOW AIR LIGHT—Illuminates when the air pressure to the press is below 45 PSI (3.2 kg/cm3). To recover, increase air pressure to between 85 and 110 PSI (6.0 and 7.7 kg/cm^2). When the light extinguishes, press ① to resume operation.

MOTOR LIGHT—Illuminates when one of the press motors overheats or malfunctions. To recover, press *reset button* for the appropriate motor (determined by opening the electrical box and observing which motor switch was tripped), disable the *Sled Torque Safety switch* using the installation and service manual, or reset the appropriate *Emergency Stop button* depending on the cause of the illuminating light. When the light extinguishes, press ① to resume operation.

WATER TEMP LIGHT—Illuminates when water temperature in the press tank is above setting on the temperature controller. Press will automatically add water until a lower temperature is reached. When the light extinguishes, press ① to resume operation.

LOW WATER LIGHT—Illuminates if press does not have enough water to operate. To recover, manually open the manual fill tank valve, allow the water to reach the top of the tank, then close the valve. When the indicator light extinguishes, press ① to resume automatic operation. Once started (three-wire circuit closed), the press will automatically add water to the high level. Press will not run in manual or automatic mode until error is corrected. If this error occurs at any time other than initial start-up, it indicates a leak or other malfunction preventing the press from its normal automatic refilling.

DOOR OPEN LIGHT—Illuminates when any manually opened sliding door is not fully closed during operation. To recover, verify that no one is inside the press, close the open door(s) and press ①.

Supplemental Information 5

NOTICE

As this manual was being printed, Pellerin Milnor Corporation began a manufacturing change which may affect how this manual applies to your machine. The six-position DIP switch on each printed circuit board is being replaced with two sixteen-position rotary switches. The switches (DIP and rotary) are used to set the logical address for each board that communicates with the microprocessor in the machine, or with a higher-level control system (e.g., a Mildata network).

Because the change to rotary switches corresponds so closely to the release of this manual, we are supplying you with documentation on how to set both types of switches.

If your machine uses printed circuit boards containing one DIP switch, refer to MSFDA401**D**E to set the address on replacement boards. If your machine uses printed circuit boards containing rotary switches, refer to MSFDA401**E**E.

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Hardware Components of Serial Microprocessor Controllers

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.**

2. Microprocessor Components

Note 1: This is a list of all components for Milnor® microprocessor controllers. Not every Milnor® microprocessor controller includes all of the following components.

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.

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

CAUTION 1: 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.

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.

Liquid crystal graphic display—This display is identified by colored characters and graphics, usually on a black or white background. It's currently used only on certain washer-extractor models with the Milnor Mark VI control system.

Liquid crystal text display—This type of display is identified by dark gray characters on a lighter gray background, or by green characters on a dark gray background.

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.

Cathode ray tube (CRT)—The CRT display resembles a television screen in appearance and function. This type of display is most commonly used in Miltrac™ and Mildata® systems, which require the display of graphics such as boxes and lines. It is also used on Milnor CBW® tunnel washers.

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 Milnor™ CBW® system employs two different power supplies to convert alternating current from the control circuit to direct current for the microprocessor and peripheral boards.

2.4.1. Control Console Power Supply—The power supply referenced as ESPS in the schematic

diagrams is a 40-watt power supply located in the Miltron™ or Mentor™ cabinet. It powers the peripheral boards located within this cabinet, including the optional load cell interface board and the analog to digital board for a weighing conveyor, as well as the microprocessor board and the memory expansion board.

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.

In systems operated via the Miltron™ controller, this power supply also provides electricity to the monitor interface board. In Mentor™-controlled tunnel systems, the monitor interface board is contained within the Mentor™ computer enclosure and powered by the computer power supply.

2.4.2. Tunnel Power Supply—The power supply referenced as PSO in the schematic diagrams is a 120-watt unit which powers the peripheral boards located on the tunnel washer. All three voltages output by this device are adjustable.

If adjustment is necessary, set the 5 volts output to provide at least positive 4.8VDC at the electric box on the module farthest from the power supply. This measurement must be made with an accurate digital voltmeter. Verify that the positive and negative 12 volts outputs are set at positive and negative 12.00VDC, respectively.

If the 5 volts reading at the peripheral board nearest the PSO power supply is at least positive 5.25VDC, and the voltage at the peripheral board farthest from PSO is positive 4.8VDC or less, suspect one or more loose connections or inadequate wiring somewhere between the two peripheral boards.

2.5. 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.

2.6. 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.

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

2.8. 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.

2.9. 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.

2.10. 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 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.

2.11. Output Board—A 24-output board contains 24 output relays identical to those described in Section 2.10 "Input/Output Board".

2.12. Analog to Digital Convertor Board—Converts analog voltage signals, such as temperature, to a digital signal that can be utilized by the CPU. Up to a maximum of eight channels may be provided on a single board. Although seemingly identical, the analog to digital boards used to sense air temperature in the dryer, water temperature in washer-extractors and textile machines, water temperature in the tunnel, and weight for a weighing conveyor are all different. The different types are clearly marked with different part numbers, which are mentioned in the wiring diagram set and are not interchangeable.

All analog to digital boards have one status light which flashes when the board is communicating. The board has two rotary dials which must be adjusted to set the board's address (see Section 4 "Assigning Board Addresses"). This board also has convenient test points that can be used to test voltage to the board.

2.13. Digital to Analog Convertor Board—Converts digital signals from the processor to analog signals with voltages between 0 and 5VDC (e.g., provides the analog signal to the dryer gas valve position actuator and dye machine steam position actuator).

This board has one status light which flashes when the board is communicating. The two rotary dials must be adjusted to set the board's address (see Section 4). This board also has convenient test points that can be used to test voltage to the board.

2.14. CRT (Video Display) Board—Receives display instructions from the processor and generates the signals to the video monitor to create the desired displays; used in controllers such as the Miltron™ and Miltrac™ controllers and Device Master™ systems.

CAUTION 2: Avoid Component Damage—The CRT board can be installed backwards, even though the cabinet and bracketry makes this difficult, and labelling on the parent board states the proper orientation. Use care to orient the board correctly, otherwise microprocessor components may be damaged.

CBW® systems with the Mentor™ controller use a standard computer video display adapter, housed within the Mentor™ computer, to transmit signals from the Mentor™ computer to the video monitor. Thus, Mentor™ systems do not have a separate video display board as described here.

2.15. 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.

For temperature-sensing systems—used with analog to digital boards in washer-extractors and dye-extractors as part of temperature-sensing system; not required on tunnel systems because the necessary circuitry is included on other standard CBW® circuit boards.

For modulating gas valves—used with digital to analog boards in the temperature control circuit of gas dryers; converts 0-5VDC to 4-20 milliamperes for controlling the modulating gas valve.

For modulating steam valves—used with digital to analog boards in temperature control circuit of older steam dryers; converts 0-5VDC to 4-20 milliamperes for modulating steam valve. See Section 2.20 "4-20mA Output Board" in this document.

2.16. Signal Conditioner for Thermocouple—Amplifies and filters the output from a thermocouple so an analog to digital board can convert the signal to digital values for the microprocessor.

2.17. Rotation Safety Board—Used in dryers. Reads rotational safety proximity switch to confirm that the basket is turning.

2.18. 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.

Thermocouple temperature probe—a closed loop of two dissimilar metals which produces a voltage with respect to the change in temperature between the two junctions. Thermocouples are used in dryers.

2.19. Weigh Scale Interface Board—In the electrical circuit, this device is between the weighing conveyor (CONWA) load cell and the weighing conveyor analog to digital board. It filters and interprets the signals from the conveyor load cell to the analog to digital board.

2.20. 4-20mA Output Board—Used on newer textile machines and steam dryers with temperature control. See Section 2.15 "Resistor Boards" in this document.

2.21. 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.

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 the related section in document BICWUC01, if applicable.

Table 1: 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 2: 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

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 3: 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 —

Summary of Milnor® Allied Interface Capability, Two 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 2).

Note 1: 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 2: 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.

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 1 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.

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 1, 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 3).

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 3). 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 3: 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 1, 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 4).

New customer—indicates that the batch being transferred belongs to a different customer than the previous batch (see Note 4).

> **Note 4:** 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 5).

3rd (main) pressure—tells the Milnor two-stage press to use a lower than normal main bell pressure (see Note 5).

No (main) pressure—tells the Milnor two-stage press to use no main bell pressure (see Note 5).

> **Note 5:** If the Low, 3rd, and No pressure signals are all off, the press will use standard (high) main bell pressure.

Table 1: 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	Formula code	Press/ Extract code	Dry code	Cool-down code	Customer code	Goods code	destination code	weight (tenths of units)	Cake number	New formula	New customer	Single cake	Empty load	Low, 3rd, No pressure*
2 Stage Press														
Loading	16		16		256	64	16	409.5‡			X	X	X	X
Discharge	16		16		256	256	256				X			
‡ Reads 4096 weight values (0 to 409.5 in tenths).														
* Low, 3rd, and No Pressure are three separate signals.														

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 2 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 2, 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 6.

> **Note 6:** 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 7.

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 7.

Note 7: 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 2: 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
2 Stage Press														
Loading										output: press free				input: press loaded
Dis-charge						output: desires to unload				input: allied can receive load				output: dis-charge com-plete

— End of BICALC13 —

BICMUM01 (Published) Book specs- Dates: 20040817 / 20040817 / 20040817 Lang: ENG01 Applic: CP2

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.

1. How to Change EPROMs

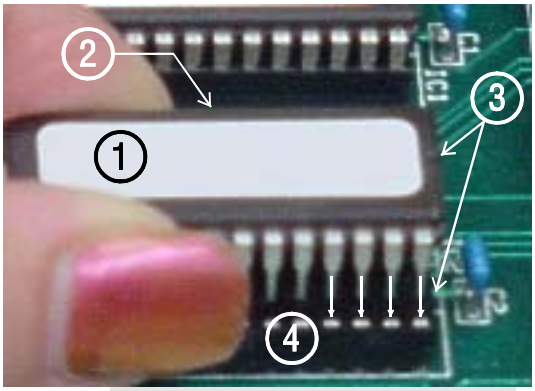
WARNING 1: Electrocution and Electrical Burn Hazards—Contact with high voltage will electrocute or burn you. Power switches on the machine and the control box do not eliminate these hazards. High voltage is present at the machine unless the main machine power disconnect is off.

- Do not attempt unauthorized servicing, repairs, or modification.
- Lock out and tag out power at the main machine disconnect before servicing, or in accordance with factory service procedures.

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 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 1. 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 1: EPROM Chip Identification and Installation

EPROM Chip and Socket	Legend
	**1.** Label **2.** EPROM chip **3.** Key notch **4.** EPROM socket

CAUTION 2: 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.

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, turn the machine off at once and verify that the chips are correctly oriented in the sockets.

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.

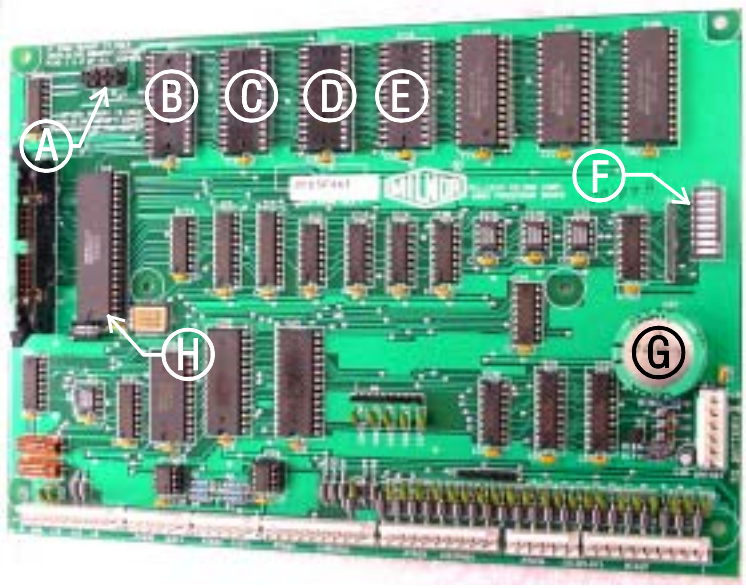
Table 1: Processor Boards and Applications

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)	

2.1. **8085 Processor Boards (except Coin Machines)**—See Figure 4. 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 3 for where to check for proper voltages.

Figure 2: Replacement Processor Board

08BSPAA_

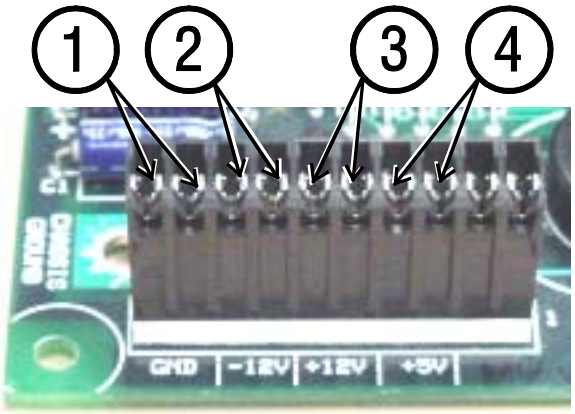


Legend

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 3: Where to Check Processor Board Voltages

Typical MTA-31

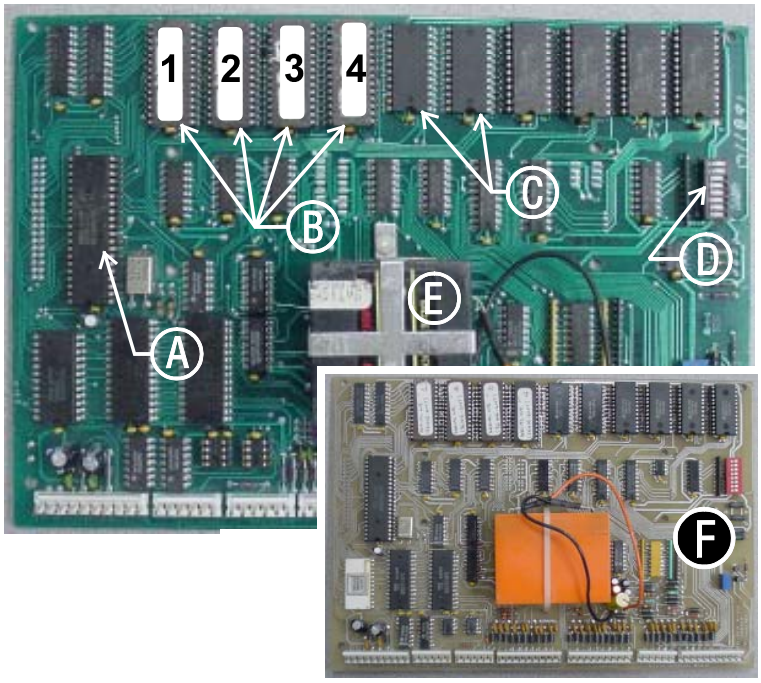


Legend

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

Figure 4: 8085 Processor Boards (Except Coin Machine)

Typical 08BSP_ and 08BSPx_ Processor Boards



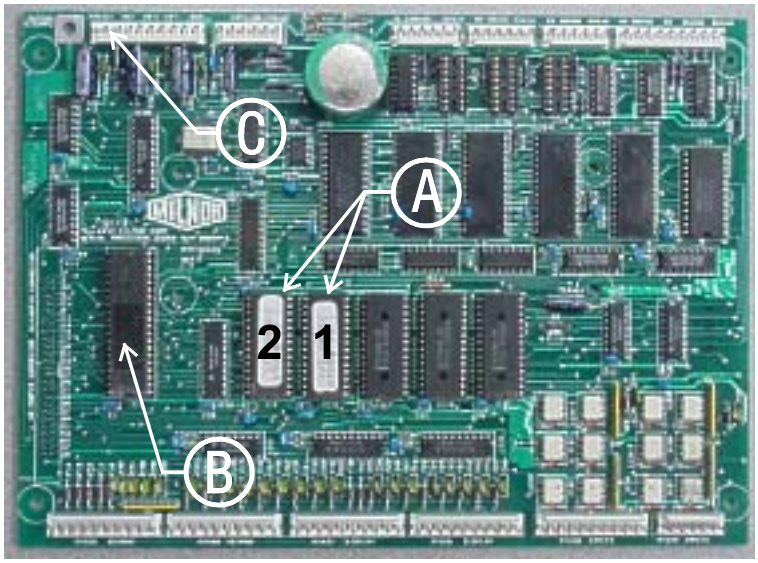
Legend

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

2.2. 8088 Processor Boards without Memory Expansion Board—See Table 2 "EPROM Locations for 8088 Processor Applications" and Figure 6. If the set consists of only one EPROM, install it in socket A of Figure 6 . 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 5: Typical 8088 Processor Board without Memory Expansion Board

08BSPC_ Processor Board



Legend

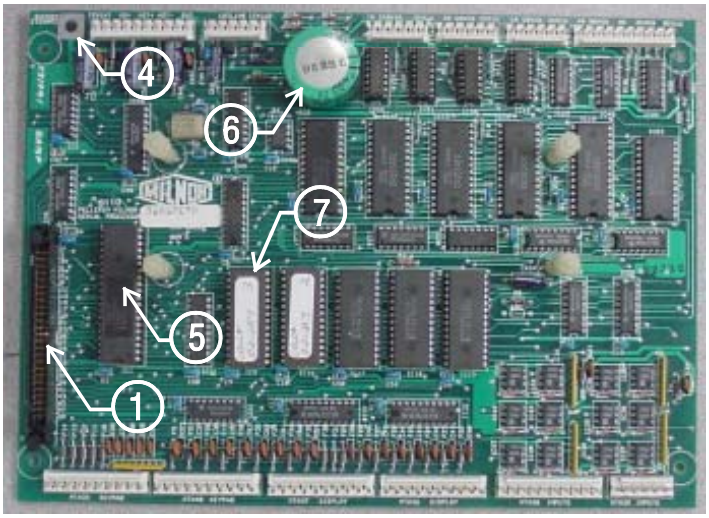
A. EPROMs
B. 8088 processor chip
C. MTA31 for voltage verification

Table 2: EPROM Locations for 8088 Processor Applications

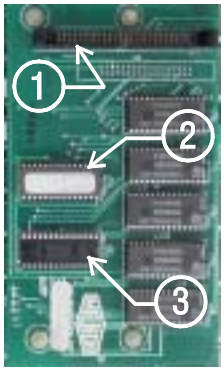
	EPROM Location by Socket			
EPROMS in Set	**A**	**B**	**IC-1**	**IC-2**
4 chips	4	3	2	1
3 chips	3	2	1	—
2 chips	2	1	—	—
1 chip	1	—	—	—

Figure 6: 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

2.3. 8088 Processor Boards with Memory Expansion Board—See Table 2 and Figure 6. 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.

2.4. 80186 Processor Boards—This processor board (see Figure 7) 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, both of which have Milnor part numbers starting with “08BSPE”. If the seventh character is a number “1,” the board is a later version with a single four-channel communications chip. If the seventh character of the part number is a 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 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.

Supplement 1

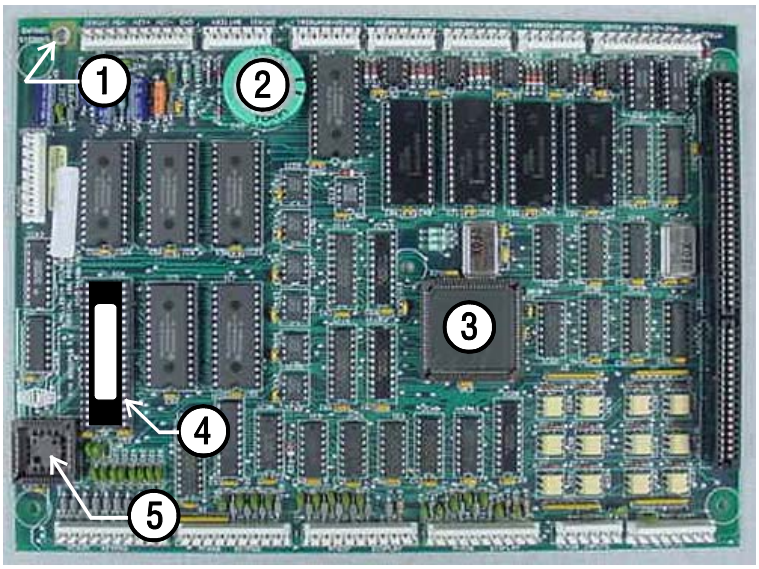
Rules for Replacing 80186 Processor Boards

Processor board “08BSPET” is obsolete. Depending on machine model and build date, this board can be replaced by either “08BSPE1T” or “08BSPE2T”, but new software is required. Contact Milnor's service engineering department to determine the appropriate replacement board and software.

Processor board “08BSPE1T” has been superseded by board “08BSPE2T”(see Figure 9). If your machine uses a two-line or four-line vacuum fluorescent text display, either “...E1T” or “...E2T” will work with your existing software. The most important difference between these two boards is jumper *J1* on the “...E2T” board for selecting the flat panel **color graphic** LCD display. This jumper must be set to the *TXT* or *NO* position for machines with a vacuum fluorescent display, or in the *GPX* (graphics) position for machines with a color LCD display.

Figure 7: Obsolete 80186 Processor Board

08BSPE_ Processor Board

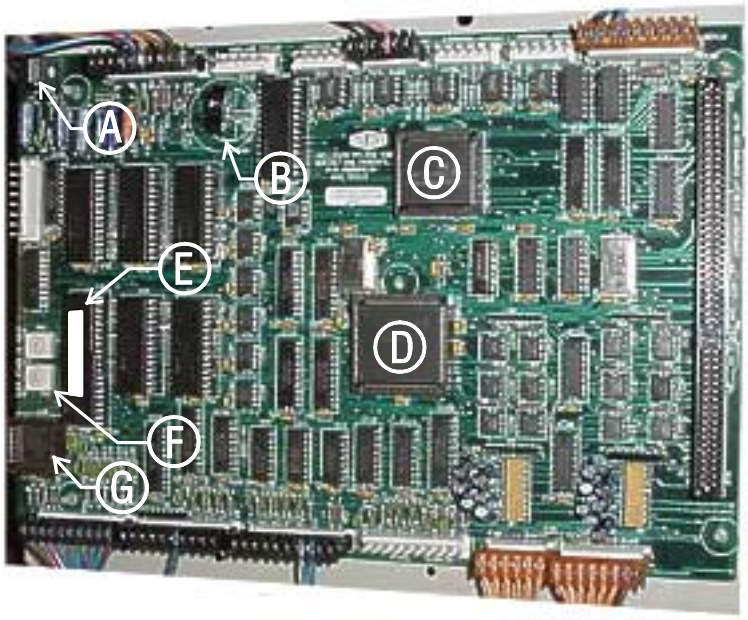


Legend

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

Figure 8: 80186 Processor Board

08BSPE1_ Processor Board

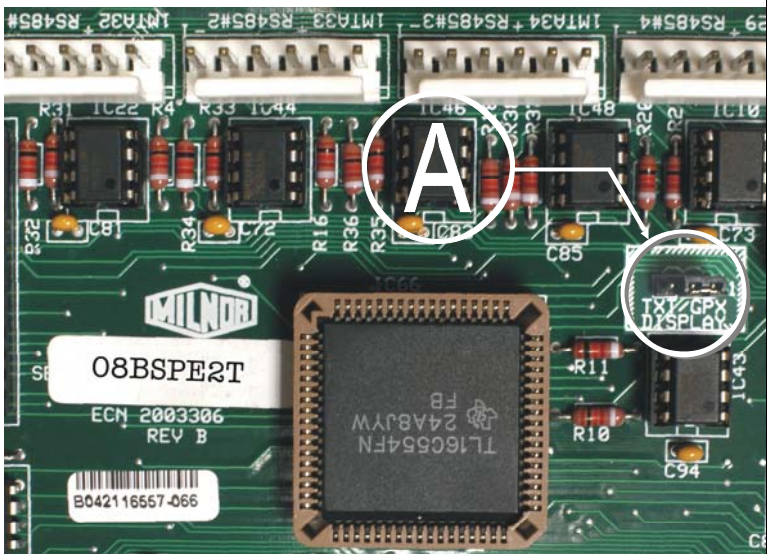


Legend

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 9: 08BSPE2_ 80186 Processor Board

Detail



Legend

A. Jumper for selecting display type

— End of BICMUM01 —