Tech Pod User's Guide:

Programming the CPT

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CPT Programming

The Tech Pod is a service interface tool for setting some parameters of the CPT Controller and for monitoring its performance. To use the Tech Pod, follow these instructions.

Warning! **Voltage stored in the capacitor bank of the CPT Controller presents a risk of POTENTIALLY LETHAL ELECTRICAL SHOCK EVEN AFTER THE POWER IS DISCONNECTED. After disconnecting the power, wait approximately 2–5 minutes until the red Capacitor Charge light goes out, before servicing or removing the Controller.**

Step 1: Turn off the power to the CPT Controller.

Step 2: Open the door of CPT Controller.

Step 3: Wait 5 minutes. Verify that the red Capacitor Charge light has gone out.

Step 4: Plug in the connector from your Tech Pod to the connector on the Tech Pod interface board, which is located inside the CPT Controller door.
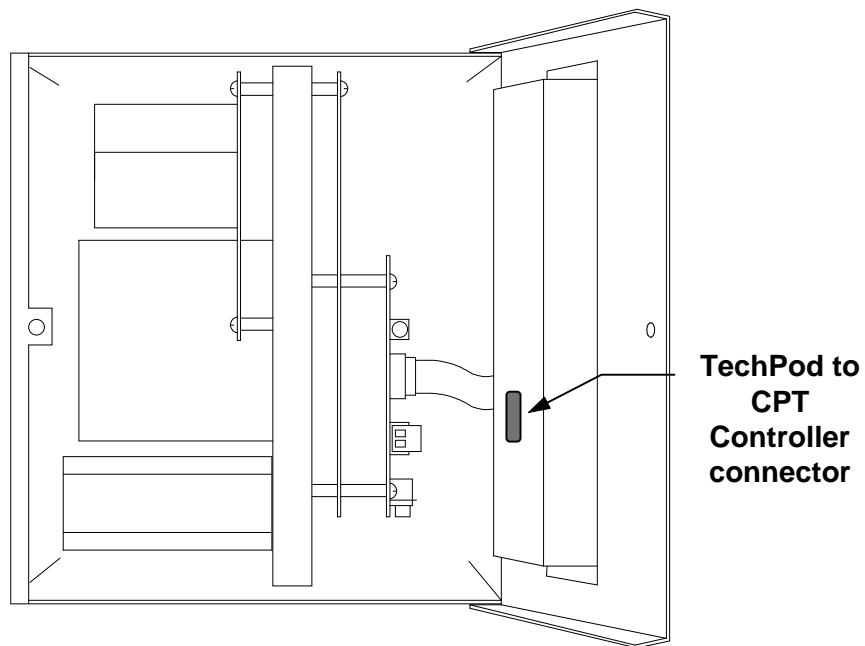

TechPod to CPT Controller connector

Figure 1: Tech Pod connector

Step 5: Turn on the power to the CPT Controller. After the power is turned on, the Tech Pod screen displays the Introduction screen shown below.

```
Marley      FuzLS100
16:24       P: 19
```

Tech Pod Modes

The Tech Pod has two modes available for various functions:

When the TechPod is first connected and powered up, it is in the Monitor mode.

Mode	Function
Monitor Mode	Views the status of the system.
Program Mode	Accesses the system for programming.
	Accesses the DIP Switch mode for troubleshooting.

Keypad Functions

The Tech Pod keypad has 16 keys. The following drawing represents the keypad on a Tech Pod.

1	2	3	PROG
4	5	6	CLR
7	8	9	
REV	0	FWD	ENTR

Figure 2 Tech Pod Keypad

The unlabeled key is not used. The other five keys and their functions are described below.

Key Label	Name of Key	Function
CLR	Clear	Returns to the Main Watch screen in Program mode.
		Returns to the initial screen in a series if there are multiple fields to be entered.
		Not active in Monitor mode.
ENTR	Enter	Stores the information entered.
FWD	Forward	Moves forward to the next screen.
PROG	Program	Accesses the Main Watch screen with the time displayed as hh:mm
REV	Reverse	Reverses to the previous screen.

The Tech Pod has a two-line, liquid-crystal display (LCD) screen that allows you to view the programmable functions. Each screen is described below.

⚘ *Notice* ⚘	**A flowchart of the TechPod programming functions is located in the back of this manual.**

Tech Pod Screens — Monitor Mode

When the Monitor mode is active, the following three screens (Introduction, Main Watch, and Software Revision) are functional.

⚘ *Notice* ⚘	**When two CPT Controllers are connected in tandem mode, the Monitor mode is the only TechPod mode available..**

Introduction Screen

The Introduction screen is displayed at startup. It shows that the Tech Pod and the Red Jacket CPT Controller are communicating. This screen displays the following information:

- ♦ Operation Mode
- ♦ Time (displayed in 24 hour format)
- ♦ Set-Point Pressure

```
Marley      FuzLS100
15:29          P 45
```

REV ←→ **FWD**
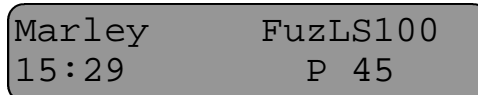
Use the **FWD** or **REV** keys to scroll to the next screen or return to the previous screen.

Main Watch Screen

The Main Watch screen allows monitoring of the current CPT system status (pump, motor, controller, pressure transducer). This screen consists of the following fields:

```
15:29   F= 0    MS=0
  D: 45     C: 24
```

REV ◄► **FWD**
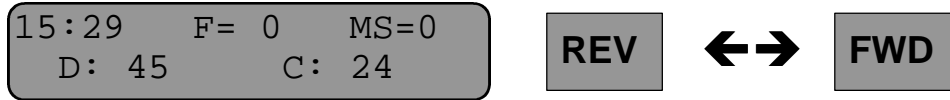
Field	Display
Time	hh:mm
Frequency	F= (0 - 100)
Motor State	MS=
	0 = Off
	1 = Ramp Up
	2 = Normal Run State
	3 = Ramp Down
Desired Pressure	D (18 - 45)
Current Pressure	C (0 - 50)

⚐ *Notice* ⚐ | **If communication is lost between the Tech Pod and the CPT Controller, the Main Watch screen displays question marks (???)**

Use the **FWD** or **REV** keys to scroll to the next screen or return to the previous screen.

Software Revision Screen

The Software Revision screen displays the revision version of the Tech Pod and CPT Controller software.

```
  Software Revs:
T= 1-01     MC=1-01
```

REV ←→ **FWD**

Display	Field
T=	Tech Pod software version
MC=	CPT Controller software version

Use the **FWD** or **REV** keys to scroll to the next screen or return to the previous screen.

Tech Pod Screens — Program Mode

⚠ *Notice* ⚠ | **When two CPT Controllers are connected in tandem mode, these programming functions are not available.**

The Monitor mode is the only available mode.

Shown below is the monitor screen for available in tandem applications.

No settings can be changed, but the frequency of each pump and the current and desired pressure settings can be monitored

The screen below shows the display when only the primary pump is powered up.

```
P: 0 / 0    ?: 0 / 0
 C = 00      D = 00
```
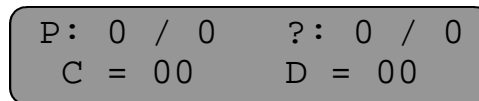
The following screen shows the display when both pumps are powered up.

```
P: 0 / 0    s: 0 / 0
 C = 00      D = 00
```
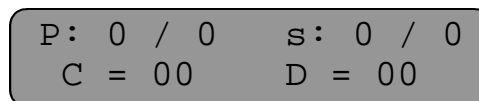
Tandem Monitor Mode

P:	Primary Pump Frequency
S:	Secondary Pump Frequency
C =	Current Pressure
D =	Desired Pressure

The S and P readouts will alternate side to side depending on which pump is actually running.

To program a CPT Controller from a Tech Pod, press the **PROG** key while in the Introduction screen.

```
Marley      FuzLS100
15:29        P 45
```
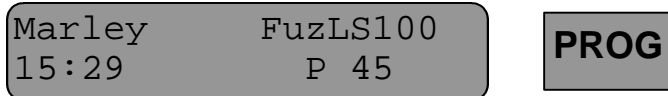
PROG

⚠ *Notice*   **Press Clear when in program mode to return to the Main Watch Screen. It may be necessary to press Clear twice from some screens.**

Main Watch Screen/Program Mode

The **Program** screens begin at the Main Watch screen (shown below) with the time displayed as hh**#**mm. The **#** sign indicates the CPT Controller is ready for programming.

```
15#35   F= 0    MS= 0
  D: 45       C: 24
```

REV ←→ **FWD**
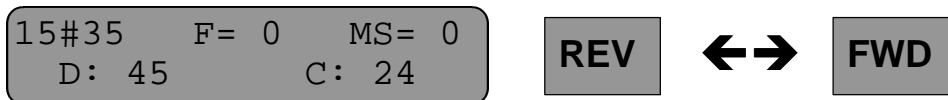
Use the **FWD** or **REV** keys to scroll to the next screen or return to the previous screen.

Pump ID Screen

The Pump ID screen allows you to select the proper pump control mode. This screen displays the current mode.

```
PumpID=    FuzLS100
        Update?
```
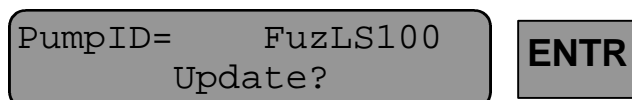
ENTR

If you want to change the current mode, press the **ENTR** key while the "Update?" prompt is displayed.

```
PumpID = FuzLS100
  Next/Prev/Enter
```

REV ⬅➡ **FWD**

When in this screen you can select the either of the following modes:

Mode	Display
Constant Pressure Mode	FuzLS100
Fixed Frequency Mode	Dip Switch

The Constant Pressure Mode works off the Dispense Enable and Pressure Transducer signals.

The Fixed Frequency Mode runs the pump at a constant frequency and is used for purging air from lines and troubleshooting.

Use the **FWD** or **REV** keys to scroll between the Constant Pressure Mode and the Fixed Frequency Mode.

The pump pressure can be set using the TechPod. If the CPT Controller loses power for any reason, the pressure setting reverts to the rotary dial setting.

The pressure can also be set manually inside the CPT Controller enclosure using the small rotary dial located on the front edge of the processor board.(Refer to figure 3)

Rotary Dial

Figure 3: CPT Controller and Rotary dial

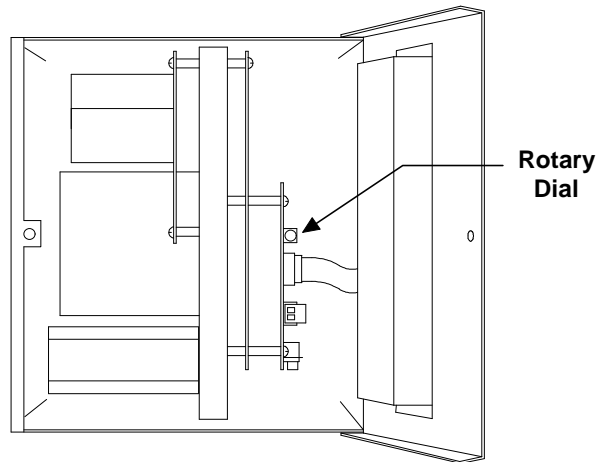If you select the Constant Pressure mode by pressing **Enter**, the Tech Pod returns to the Pump ID screen. You can press **Clear** to return to the Main Watch window to check the pressure, which is displayed in pounds per square inch (psi).

Slew Test Mode

Some earlier software versions have a Slew Test Mode. This mode will continuously cycle the frequency from 0 - 100 Hz. This mode is not for field use and is being deleted from the software.

If you see this mode on the screen, press the **FWD** key to move to the Dip Switch mode.

Fixed Frequency Mode(Dip Switch Mode)

The Dip Switch Mode screen is shown below

```
Pump ID = Dip Switch
   Next/Prev/Enter
```

This puts the Tech Pod in DIP Switch mode, which allows you to set a fixed frequency for testing purposes. This can be useful to purge air from lines.

If you select the Fixed Frequency Mode(DIP Switch mode) by pressing **Enter**, the Tech Pod returns to the Pump ID screen. You can return to the Main Watch window to check the frequency, which is displayed in hertz (Hz).

After returning to the Pump ID screen, press the **FWD** key to go to the System Pressure screen.

Press **Clear** to go to the Main Watch screen.

System Pressure Screen

The System Pressure screen allows you to set a new pressure. This screen has two fields:

```
System Pressure
Old = 45   New =
```

REV ←→ **FWD**

Field	Display
Current pressure	Old=
New pressure	New=

While on this screen, enter the pressure you want by using the number keys. The new pressure setting is displayed in the **New=** location. Pressing the **Enter** key stores the value, which is then displayed in the **Old=** location.

⬠ *Notice*	**The pressure setting cannot exceed 45 psi. If you enter a number greater than 45, it will be stored as 45.**

Use the **FWD** or **REV** keys to scroll to the next screen or return to the previous screen.

DIP Switch Frequency Screen

The DIP Switch Frequency screen allows you to run the pump motor at a fixed frequency. While on this screen, enter the frequency you want by using the number keys. This screen has two fields:

```
'Dip switch' Freq
 Cur= 0    New=
```

ENTR

REV ⬅➡ **FWD**
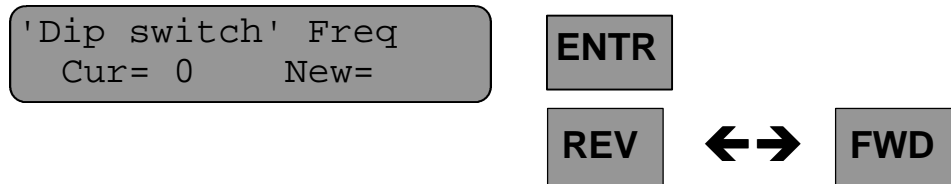
Field	Display
Current frequency	Cur=
Desired frequency	New=

The numbers you key in are displayed in the **NEW=** location. Press the **Enter** key to store the new value, which is then displayed in the **CUR=** location.

Warning!	**DIPSWITCH Mode MUST BE disabled before leaving the site.**

Be sure to disable this feature or the pump will run continuously and leak detection WILL NOT FUNCTION!

⬩ *Notice*	**DIPSWITCH Mode runs the pump independently of dispense enable and pressure transducer signals.**

Leak Detection is *DISABLED* while in this mode!!

Use the **FWD** or **REV** keys to scroll to the next screen or return to the previous screen.

Dry-Run State Screen

The Dry-Run State screen allows you to enable or disable dry-run detection. While on this screen press the **1** key to enable dry-run detection. The screen displays **ENA** to indicate detection has been turned on. Press the **0** key to disable the dry-run detection. The screen displays **DIS** to indicate detection has been disabled.

```
    Dry Run State
ENA  (1=Ena, 0=Dis)
```
REV ←→ **FWD**

Status	Key	Display
Off	0	Dis
On	1	Ena

Use the **FWD** or **REV** keys to scroll to the next screen or return to the previous screen.

Controller Date/Time Screen

The Controller Date/Time screen allows you to view the current date and time settings of the controller.

```
   Cntlr Date/Time
 2/04/98    15:39
```
REV ←→ **FWD**

If the date or time settings are not correct, you can change them using the TechPod and then upload your entries to the controller by following the instructions on the next two screens.

Use the **FWD** or **REV** keys to scroll to the next screen or return to the previous screen.

Update Techpod?

The Update Techpod? screen allows you to update the date and time on the Tech Pod. Each of the screens enters one of the fields in the Date/Time screen: Month, Day, Year, Hour, and Minute.

```
   Update Techpod?
 2/04/98   15:30
```
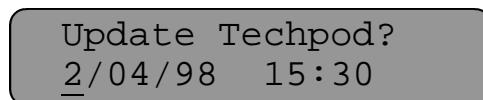
To skip through any date or time field, press **Enter**. Pressing **Clear** once redisplays the initial Controller Date/Time screen. Pressing **Clear** again redisplays the Main Watch screen in Program mode.

If the CPT Controller date/time is incorrect, but the TechPod date time is the correct one, follow this shortcut procedure to update the CPT Controller.

1. Press the FWD key and then the ENTR key.

2. This will automatically update the CPT Controller.

All of the following examples illustrate this date:

February 4, 1998, 3:30PM

Pressing the **ENTR** key will move from one date/time entry screen to the next. A table of valid date/time values is shown below.

Valid Date/Time Entries	
Month	Entries of 1 - 12 are valid. If a number greater than 12 is entered, the month will be stored as 1. For months 1 - 9, you may enter a 0 before the number but it is not required.
Day	Valid entries are any one or two digit number corresponding to a date in the particular month you have entered. Any other entry will be stored as 1.
Year	Enter the last one or two digits of the year. The TechPod is fully 'Year 2000' compatible.
Hour	Entries from 0 - 23 are valid. Any other entry is stored as 12.
Minute	Entries from 0 - 59 are valid. Any other entry is stored as 00.

Update Month Screen

This screen allows a new month to be entered. The current stored month is displayed as a numeric value of **1** through **12**. Key in the numeric month, in either 1- or 2-digit format, and then press **Enter**. For example, enter **2** for February.

```
Update Techpod?
2/04/98  15:30
```

ENT
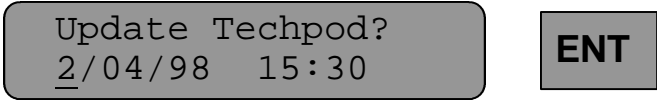
Update Day Screen

This window allows a new day to be entered. The current stored day is displayed as a numeric value from **1** through **31**. Key in the numeric day, in either 1- or 2-digit format, and then press **Enter**. For the example above, enter 4 for the day.

```
Update Techpod?
2/04/98  15:30
```

ENT

Update Year Screen

This window allows a new year to be entered. Key in the year, in 1- or 2-digit format, and then press **Enter**. The current stored year is displayed as **98** for the above example.

```
Update Techpod?
2/04/98  15:30
```

ENT

Update Hour Screen

This window allows a new hour to be entered. Enter the hour, in 24-hour format, followed by **Enter**. For the example below (3:30 p.m.), the current stored hour field displays **15**.

```
Update Techpod?
2/04/98  15:30
```

ENT

Update Minute Screen

This window allows a new minute setting to be entered. Key in the numeric minutes and then press **Enter**. The current stored minute field displays **30** for the example below (3:30 p.m.).

```
Update Techpod?
2/04/98  15:30
```

ENT

Press the **FWD** key to go to the Update Controller? screen.

Press the **REV** key to go to the Dry-Run Status screen.

REV ←→ **FWD**

Update Controller? Screen

To upload the date and time entries from the Tech Pod to the CPT Controller, press the **Enter** key while in this screen. The date and time fields you entered on the previous screens will be updated in the CPT Controller. There is no response or signal indicating the update has taken place. When you return to the Main Watch screen, however, the new date and time will be displayed as current.

```
Update    Cntlr
2/04/98   15:30
```

REV ←→ **FWD**

Use the **FWD** or **REV** keys to scroll to the next screen or return to the previous screen.

Review Log Entries Screen

The Review Log Entries screen allows you to look at the last 100 events that have been logged. Pressing the **Enter** key displays the most recent log entry.

```
Review  Log
Entries   (Y=Entr)
```
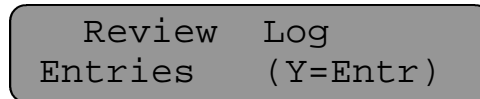
For example, if 100 events have been logged, the entry for log event 100 will be displayed. If only 23 events have been logged, the last log entry will be numbered 23.

⚠ *Notice* ⚠	**When two CPT Controllers are configured in tandem operation, it is impossible to access the log entries. This is because in tandem configuration, the processors of both CPT Controllers are continually communicating with each other, leaving no processing time to communicate with the TechPod.**
	If it is necessary to access the log entries, the CPT Controllers must be configured TEMPORARILY for stand alone operation.
	Once the log entries have been accessed, RECONFIGURE the DIP switch bank on the processor boards for tandem operation.
	(Refer to the CPT Controller Installation and Operation Manual for detailed instructions on configuring for stand-alone and tandem operation.)

Log Entry Screens

While in the Log Entry screen, press the **REV** key to go to the previous log event. This function does not loop back when the earliest log event is reached. It is necessary to press the **FWD** key to return to later log events.

Press the **FWD** key to go to the next log event.

See the **"Log Event Descriptions"** section later in this manual for an explanation of these log entries.

While in the Log Entry screens, pressing the **Clear** key once ends the log review and redisplays the initial Review Log screen. Pressing **Clear** again redisplays the Main Watch screen.

Initial Review Log Entries Screen

After returning to the initial Review Log Entries screen, press the **REV** key to go to the Update Controller? screen.

From the Review Log Entries screen, press the **FWD** key to go to the Software Revision screen.

Log Event Descriptions

The following tables list the error messages displayed on the TechPod screen and describe the events causing the error messages.

Log Only Events

Tech Pod Display	Description of Event
UNKN	Event unknown.
LOG CLR	Log was cleared.
RESET SW	System was reset.
LD ENABL	Leak detection was enabled.
LD DISAB	Leak detection was disabled.
NEURONOK	Communication between processors is established.
NEURONCOM	Communication error within the processor.
PEER OK	*(Tandem) Peer communication restored.
CURLIMIT	Controller is in current-limit state.
PU OK xx	Power-up with peer communication, with neuron communication, with line-leak detection enabled.
PU l xx	Power-up with peer communication, with neuron communication, with no line-leak detection enabled.
PU n xx	Power-up with peer communication, no neuron communication, with line-leak detection enabled.
PU nl xx	Power-up with peer communication, no neuron communication, no line-leak detection enabled.
PUp xx	Power-up with no peer communication, with neuron communication, with line-leak detection enabled.
PUp l xx	Power-up with no peer communication, with neuron communication, no line-leak detection enabled.
PUpn xx	Power-up with no peer communication, no neuron communication, with line-leak detection enabled.
PUpnl xx	Power-up with no peer communication, no neuron communication, no line-leak detection enabled.

*In tandem operation, the master and auxiliary controllers must constantly communicate.

Soft Faults

Tech Pod Display	Description of Event
NEURCOMM	*(Tandem) If communication between the two processors fails, then leak detection does not operate.
PEERCOMM	*(Tandem) Communication was lost between the two controllers. Leak detection does not operate.
SF OVTMP	[†]Over-temperature; Power module experienced a temperature >100°C.
SF OVCUR	[†]Power module experienced an over-current event.
SF OPINV	[†]Open circuit; No motor/pump load current detected.
SF EXTIM	Pump is on excessive amount of time (extended pump run time).
SF NODSP	No dispenser activity.
SF MCPRB	Mechanical pump problem.
SF PRXDC	Pressure transducer failure (pump still running) with leak detection disabled.
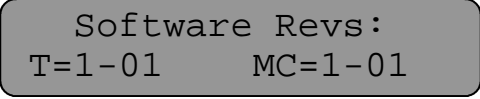
In tandem operation, the master and auxiliary controllers must constantly communicate.

[†]*The motor shuts down on the fifth occurrence of these events.*

Hard Faults

Tech Pod Display	Description of Event
HF LN/LK	Line-leak detected.
HF DRYRN	Dry run state detected.
HFEX OC	Locked rotor; Short circuit; Excessive number of over-current faults.
HF EX OT	Excessive number of over-temperature faults.
HF EX OL	Excessive number of open circuit faults.
HF NOPSI	Failure to pressurize line.
HF XDUCR	Pressure transducer failure (with leak detection enabled).
HF NOCUR	No motor/pump load current detected.
HF REVRO	Reverse rotation.
HF REVSL	Reverse rotation on auxiliary.
HF PHOFF	Amps calibration incorrect.
HF LIMIT	Limit error.
HF FPLIB	Floating point library error.

Software Revision Screen

```
    Software Revs:
 T=1-01     MC=1-01
```

Press the **FWD** key to go to the Main Watch screen.

Press the **REV** key to go to the Review Log screen.

Ending the Program Mode

To take the TechPod out of Program Mode, unplug it from the TechPod interface board.

TECHPOD PROGRAMMING FLOWCHART

```
        ┌──────────────────────┐
        │ Marley   FuzLS100    │──PROG──→┌──────────────────────┐
   FWD  │ 12:06         p 45   │         │ 12#09  F= 0  MS=0    │
        └──────────────────────┘         │    D: 45     C: 31   │
  (REV)         │ FWD                     └──────────────────────┘
                ↓                                   │ FWD
        ┌──────────────────────┐                    ↓
        │ 12:07  F=  0   MS=0  │    ┌─────────────────────────────────────────────┐
        │   D: 45      C: 31   │    │ PumpID=  FuzLS100 (SlewTest)(Dip Switch)     │←──────┐
        └──────────────────────┘    │              Update?                         │       │
                │ FWD               └─────────────────────────────────────────────┘       │
                ↓                          │ FWD              │ ENTR                        │
        ┌──────────────────────┐           ↓                  ↓                             │
        │ Software Revs:       │    ┌──────────────────┐  ┌──────────────────────┐         │
        │ T=1-01    MC=1-01    │    │ System Pressure  │  │ PumpID=   FuzLS100   │──ENTR──┤
        └──────────────────────┘    │ Old= 45,   New=  │  │   Next/Prev/Enter    │         │
                                    └──────────────────┘  └──────────────────────┘         │
                                           │ FWD                 │ FWD                      │
                                           ↓                     ↓                          │
                                    ┌──────────────────┐  ┌──────────────────────┐         │
                                    │ 'Dip Switch' Freq│  │ PumpID=   SlewTest   │──ENTR──┤
                                    │ Cur= 0,   New=   │  │   Next/Prev/Enter    │         │
                                    └──────────────────┘  └──────────────────────┘         │
                                           │ FWD                 │ FWD                      │
                                           ↓                     ↓                          │
                                    ┌──────────────────┐  ┌──────────────────────┐         │
                          FWD       │ Dry Run State    │  │ PumpID=   Dip Switch │──ENTR──┘
                                    │ ENA (1=Ena, 0=Dis)│  │   Next/Prev/Enter    │
                                    └──────────────────┘  └──────────────────────┘
                                           │ FWD
                                           ↓
                                    ┌──────────────────┐
                                    │ Cntlr Date/Time  │
                                    │ 3/11/98    12:15 │
                                    └──────────────────┘
                                           │ FWD
                                           ↓
                                    ┌──────────────────┐
                                    │ Update Techpod   │
                                    │ 3/10/98    14:36 │
                                    └──────────────────┘
                                           │ FWD
                                           ↓
                                    ┌──────────────────┐
                                    │ Update Cntlr?    │
                                    │ 3/10/98    14:36 │
                                    └──────────────────┘
                                           │ FWD
                                           ↓
                                    ┌──────────────────┐
                                    │ Review Log       │
                                    │ Entries  (Y=Entr)│
                                    └──────────────────┘
                                           │ FWD
                                           ↓
                                    ┌──────────────────┐
                                    │ Software Revs:   │
                                    │ T=1-01    MC=1-01│
                                    └──────────────────┘
```
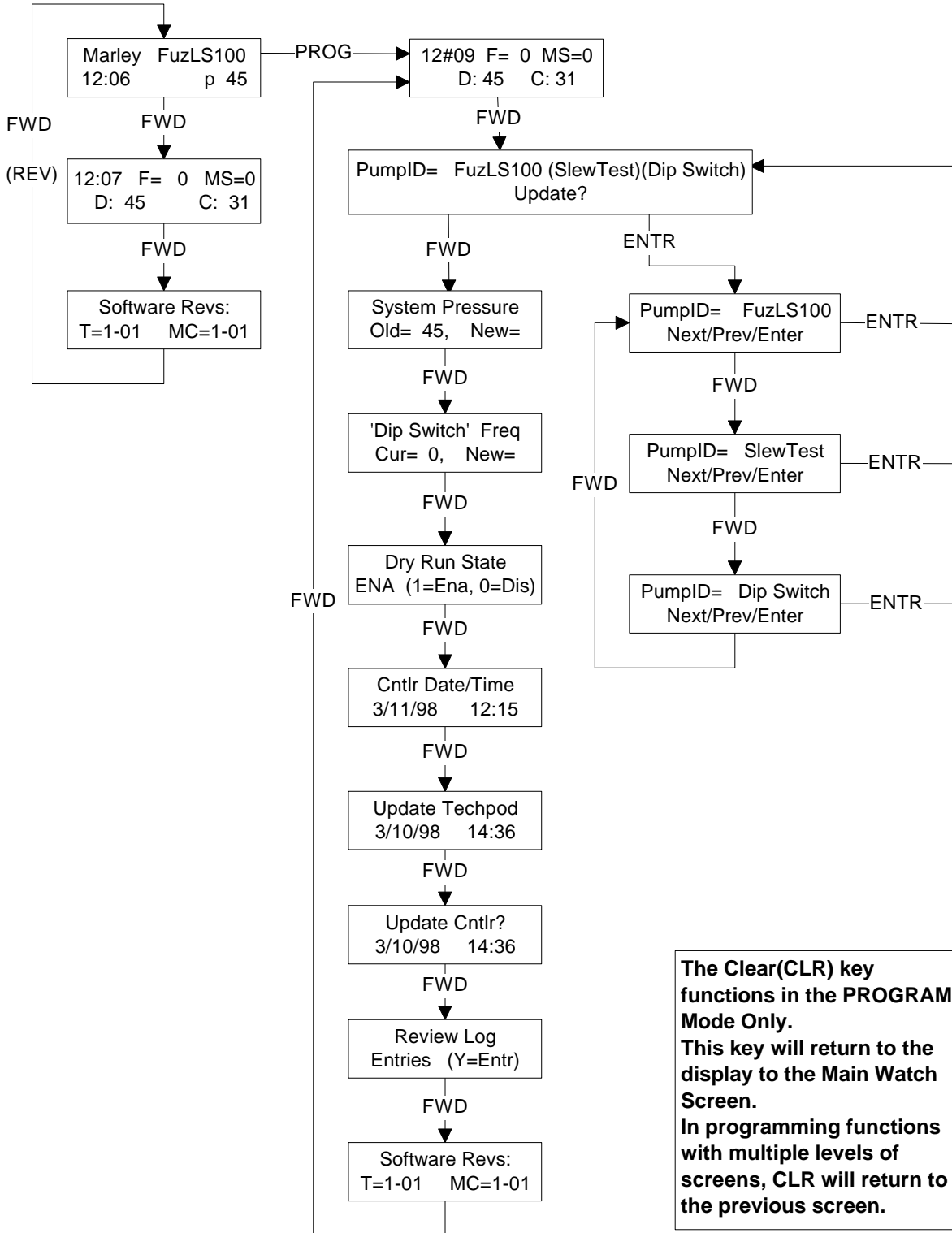
The Clear(CLR) key functions in the PROGRAM Mode Only.
This key will return to the display to the Main Watch Screen.
In programming functions with multiple levels of screens, CLR will return to the previous screen.

ARE260-249 Rev. D