Table Of Contents

Table Of Contents - Cont.

Table Of Contents - Cont.

List of Figures

List of Tables

3.   DIGISPENSE 3009 CONTROLLER MODULE

3.1   DESCRIPTION

The Digispense 3009 Controller Module, hereafter referred to as the Controller Module, contains all the control, monitoring, and interface components for the dispensing operations. The Controller Module measures 8 1/4" (210mm) wide, 11 1/2" (292mm) deep, 5 3/4" (146mm) high (feet included) and weighs approximately 9.5 pounds (4.3 kilograms). The operator controls and interface connections are located on the front and rear panels.

3.1.1   Front Panel Controls And Indicators (Figure 3.1)

The front panel contains the operator interface for controlling the system. The following items are located on the front panel.

1. Function Push-buttons
2. Display
3. Start Push-button
4. Active Indicator
5. Stop Push-button
6. Idle Indicator
7. Arrow Push-buttons
8. Enter Push-button

3.1.1.1 Function Push-buttons (Figure 3.1 Item 1)

These push-buttons change the value or initiate the operation for the item displayed directly above the push-button.

3.1.1.2 Display (Figure 3.1 Item 2)

This alphanumeric liquid crystal display is sixteen lines of forty characters each. The Controller Module status is shown on upper right hand corner of the display.
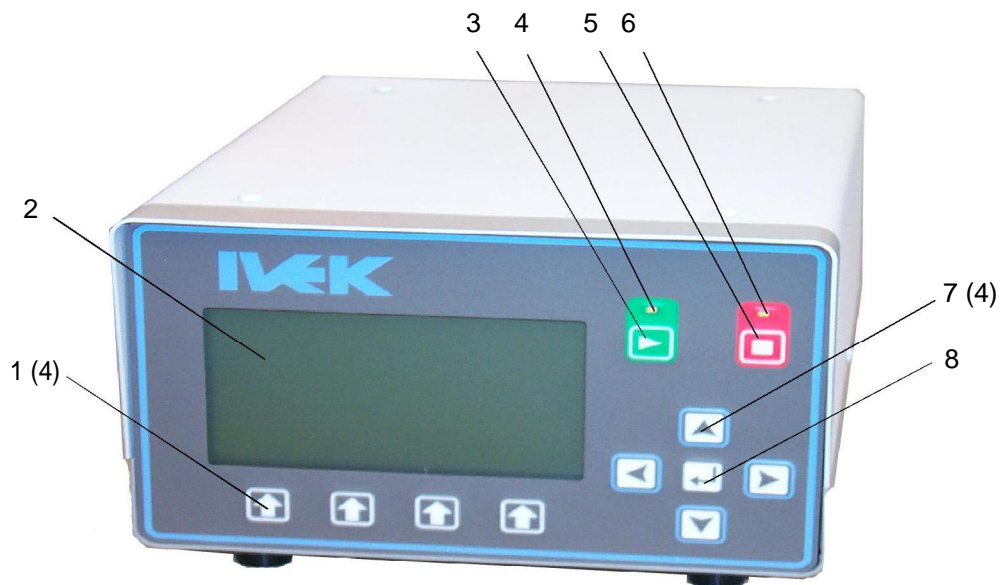
Figure 3.1 Digispense 3009 Controller Module Front Panel

3.1.1.3 Start Push-button (Figure 3.1 Item 3)

This push-button begins the pumping operation. The LED above the push-button illuminates when the pump is operating.

3.1.1.4 Start LED (Figure 3.1 Item 4)

The Start LED illuminates when the pump is operating and blinks when a fault occurs.

3.1.1.5 Stop Push-button (Figure 3.1 Item 5)

This push-button stops the pumping operation. The LED above the push-button illuminates when the pump is stopped.

3.1.1.6 Stop LED (Figure 3.1 Item 6)

The Stop LED illuminates when the pump is stopped.

3.1.1.7 Arrow Push-buttons (Figure 3.1 Item 7)

The Arrow Push-buttons move the cursor on the display and are used to change values.

3.1.1.8 Enter Push-button (Figure 3.1 Item 8)

The Enter Push-button has two functions; the first function selects a value to change that has been highlighted using the arrow push-buttons, the second function stores the changed value in the Controller Module.

3.1.2   Rear Panel Detail (Figure 3.2)

The rear panel contains the interface connections for controlling the system. The following components are located on the rear panel.

1. Fan
2. AUX OUT Terminal Strip
3. CC TRIG Terminal Strip
4. RS232 Connector
5. AUX COMM Connector
6. LOGIC I/O Connector
7. MOTOR Connector
8. Power Entry Module

3.1.2.1 Fan (Figure 3.2 Item 1)

The fan keeps the devices in the Controller Module from getting too hot. Make sure the area around the fan is clear of obstructions.

3.1.2.2 AUX OUT Terminal Strip (Figure 3.2 Item 2)

The AUX OUT (Auxiliary Output) terminal strip has two screw terminals (+/-) used to either control the Prime function on an AP Pump Module or enable auxiliary IVEK equipment. Refer to section 3.3.9.2.

3.1.2.3 CC TRIG Terminal Strip (Figure 3.2 Item 3)

The CC TRIG (Contact Closure Trigger In) terminal strip has two screw terminals (+/-) used for triggering operation in Dispense or Meter mode. Prime operations cannot be initiated with this signal. Refer to section 3.3.9.1.

3.1.2.4 RS232 Connector (Figure 3.2 Item 4)

The RS232 interface provides control of all available functions. The hardware is configured as Data Communications Equipment (DCE) standard. Refer to section 3.2.10.

3.1.2.5 AUX COMM Connector (Figure 3.2 Item 5)

The AUX COMM (Auxiliary Communication) connector will be used for a future enhancement.

3.1.2.6 LOGIC I/O Connector (Figure 3.2 Item 6)

The Logic I/O connector is used for making the electrical connection to the LOGIC I/O Interface Device. Refer to section 3.3.9.3.

3.1.2.7 MOTOR Connector (Figure 3.2 Item 7)

The Motor connector is used for making the electrical connections to the Motor/Base Module.

CAUTION

Never connect or disconnect the cable from this connector while power is on. Damage to the equipment may result.

3.1.2.8 Power Entry Module (Figure 3.2 Item 8)

The power entry module contains a receptacle for a standard IEC power cord, an On (1) Off (0) switch, fuse holder and fuse.

The design of the power entry module requires the line cord be disconnected before the line fuse is removed. Refer to section 3.7 for fuse information.
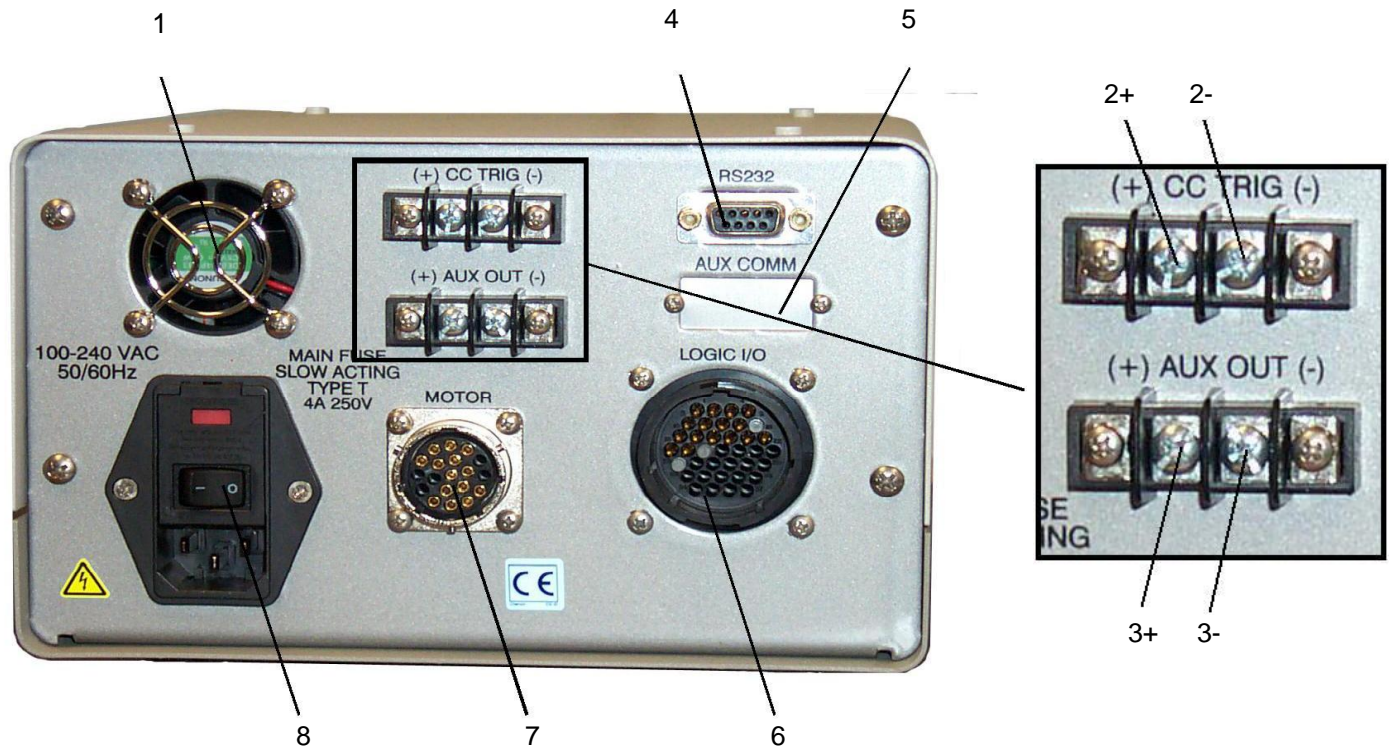
Figure 3.2 Digispense 3009 Controller Module Rear Panel

3.1.3 Fluid Movement

Fluid movement in the system is achieved by the displacement actions of the pump. A piston rotates in the pump chamber moving fluid in and out of ports. The piston rotates to move a flat on the piston between the two ports to achieve the desired fluid movement through the system. The movement of the piston is initiated by a Motor Base Module driven by a motor. The Controller Module provides the control and power to the motor to achieve the desired fluid movement.

Fluid movement is controllable from two different contexts: Production Mode and Fluidic Setup Mode. Production Mode is intended for normal controlled fluidic movement operations and Fluidic Setup Modes are intended for preparing the entire fluidic system for those controlled operations.

3.1.4 Dispense Rate

The optimum value of the Dispense Rate needs to balance decreasing cycle times with an increasing risk of cavitations of the fluid reducing repeatability. Also, since motor torque decreases with increasing speeds, the probability of stalling the motor in the Motor Base Module increases, especially when the viscosity of the fluid is high.

	Advantages	**Disadvantages**
Decreased Rates	Lower probability of stalls& fluid cavitations	Longer cycle time
Increase Rates	Shorter cycle time	Higher probability of stalls & fluid cavitations

3.1.5 Direction

The direction setting determines the direction of fluid movement through the Pump Module.

When the direction is forward, the piston rotates clockwise which causes fluid to move into one port and out of the other.

When the direction is reverse, the piston rotates counter-clockwise which causes fluid to move through the ports in the opposite direction relative to the forward setting.

3.1.6 Acceleration

The Acceleration setting determines how quickly the motor reaches the dispense rate from a stopped position. It is also used to determine deceleration; how quickly the motor slows down when heading towards stop. Increasing the acceleration may help increase the shearing of certain fluids from the tip improving repeatability. However, with higher accelerations, high viscosity fluids may be more susceptible to causing the Motor Base Module motor to stall.

	Advantages	**Disadvantages**
Decreased Acceleration	Lower probability of stalls	Less shear at tip
	Lower probability of fluid cavitations	Slightly longer cycle time
Increased Acceleration	More shear at tip	Higher probability of stalls
	Slightly shorter cycle time	Higher probability of fluid cavitations

3.1.7 Drawback

Drawback is provided in Dispense and Meter modes to allow the fluid to move in the opposite direction after a dispense to better separate the fluid at the tip. Often, high viscosity or "stringy" fluids are susceptible to poor separation at the end of a dispense. Drawback provides a snapping motion in the fluid to attempt to shear it off at the tip. There are three parameters available for configuration of Drawback: Drawback Volume, Drawback Rate, and Drawback Dwell.

The Drawback Volume determines the amount of fluid to move backwards after a dispense. Typically, this is configured for a small fraction of the dispense volume.

The Drawback Rate determines the rate of fluid movement during the backwards drawback.

The Drawback Dwell determines the amount of time the fluid movement pauses between the end of the cycle and the beginning of the next cycle. Typically, this is left at the default value, but may be increased if it benefits the application.

3.1.8 Torque

The torque setting determines the peak current available to the motor. Increasing the torque decreases the probability of stalling with high viscosity fluids. Decreasing the torque increases efficiency by decreasing steady state heat loss in the motor when using low viscosity fluids.

	Advantages	**Disadvantages**
Decreased Torque	Reduced heat loss in the motor	Higher probability of stalls
Increased Torque	Lower probability of stalls	Increased heat loss in the motor

3.2   STANDARD OPERATION

The Controller Module provides the controls for producing liquid flow via a positive displacement pumping mechanism. The systems utilize solid-state electronics, stepping motor drives, and precision machined ceramic pump heads. These components combine to provide exceptional accuracy and precision (0.1% or less is achievable), high reliability, and low maintenance.

Volume commands for the Controller Module use number of full strokes. Rate commands are in revolutions per minute.

Pumping is started using the Start push-button [image] based on the screen being viewed (Prime, Dispense, Meter). Push

the Stop push-button [image] to stop Meter operation or to stop Prime and Dispense operation before their respective volume setting is reached.

3.2.1 Dispense Mode

Dispense Mode is the typical operating mode to use when dispensing fixed amounts of fluids. The amount of fluid to dispense is determined by the calibration of the pump and the configured Dispense Volume. Each stroke of the pump dispenses the calibrated pump volume. The repeatability of the dispense volume is dependent on many factors including: tubing setup, selected tip, fluid characteristics, and pump characteristics, and fluidic movement profile. Parameters such as Dispense Rate, Drawback, Drawback Rate, Drawback Dwell, and Acceleration, provide configuration of the fluidic movement profile to provide the flexibility to meet the needs of various applications. The minimum volume of fluid that may be dispensed is 1 calibrated chamber volume, and the maximum volume of fluid that may be dispensed is 10,000 calibrated chamber volumes.

3.2.2 Meter Mode

Meter Mode allows for variable fluid movement. The beginning and ending of the fluid movement may be initiated by either the front panel start-stop buttons, RS232 commands or Logic I/O signals. However, the most precise control of the start and stop of metering is via the Logic I/O signals.

Once initiated, fluid will Meter until stopped. If Drawback is enabled, it will be performed upon the stopping of the Dispense. There are two stop modes available in Meter Mode: Stop Position and Stop Meter.

Stop Position is the most typical mode and ensures that upon a stop command, the pump continues to the configured Stop Position. This implies that a Meter operation will always dispense an integer multiple of calibrated chamber volumes.

Stop Immediate, on the other hand, will cause the pump to stop immediately upon receiving the stop command (plus a little movement required for de-acceleration). This is typically used in conjunction with a dual-ended motor/base to simulate continuous metering. This implies that the dispense volume will not be a multiple of the calibrated chamber volume.

3.2.3 Prime Mode

Prime Mode is the most typically used Fluidic Setup Mode and is used to prime the fluidic tubing and components from the reservoir through to the tip before Production Mode operation. Having Prime as a separate mode from Dispense and Meter Mode permits selection of optimum values for priming, which may be different than optimum values for Dispense and Meter. It is also often used in the Reverse Direction to remove the fluid from the fluidic system after Production Mode operations are completed.

The minimum volume of fluid that may be moved during a prime operation is 1 calibrated chamber volume and the maximum volume that may be moved is 60,000 calibrated chamber volumes. Once initiated, the Prime operation will move the desired amount of fluid through the system unless stopped early.

NOTE

It is recommended to perform a Dispense in the desired Production Mode after a Prime operation in order to properly setup the fluid for repeatable dispenses.

3.2.4 Display

The display provides an operator interface to all operating parameters in the Controller Module. New values can be entered and current values displayed for all the functions of the system. The current operating mode and system status are shown on the display. The display contains multiple interface screens each providing information to the operator.

The display shows system status, settings and general information. The display is divided into six fields as shown. Following is a description of what will be displayed in each field.

NOTE

References to push-buttons for fields 3 through 6 refer to the push-button located below a word on the display. For example, the push-button located under 'REFERENCE' will be called the Reference push-button. These are referred to as Function Push-Buttons 1 through 4 (FPB1 - FPB4).

Field 1 - This field displays screen name and status information.

Field 2 - This field displays all the operating parameters.

Fields 3 thru 6 - These fields provide function legends for the four function push-buttons directly below the screen.

NOTE

A legend does not appear if the function is not permitted due to permission levels (section 3.2.6), Configurable Input 2 (section 3.3.9.3) or the value of the Serial Interface "k1" command (Table 3.7).
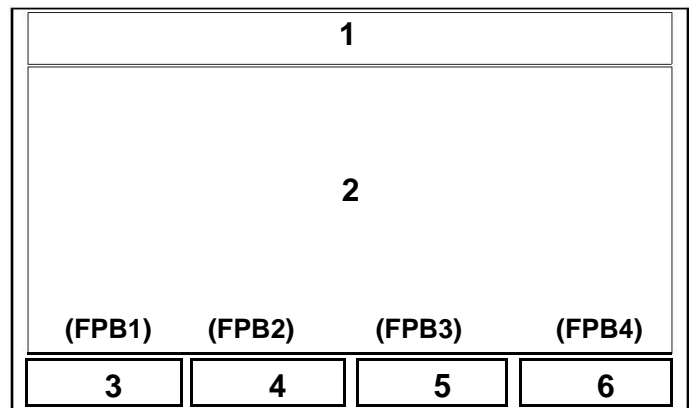
Field 5 is the F3 key described in the Reset Parameter Warning screen (section 3.3.7.20).

3.2.5 Help

Help is available when selecting or entering new values by pressing the FPB1 push-button. Information pertaining to the selected value will be displayed. Press the FPB1 key again to clear the help information from the screen.

3.2.6 Permission Levels

There are three levels of permission; Operator, I/O Test and Supervisor. Each level allows access to selected items on the display.

The permission level can be changed in the Change Permission screen (Section 3.2.7.8).

The highest level is **Supervisor**. This level allows access to all items on all screens.

The **I/O Test** level allows access to the same items as the Operator except it also allows access to the I/O Test screen. The **Operator** level does not allow changing system parameters. Recipes can be selected and loaded, but not changed.

3.2.7 Screens

There are twenty screens used to setup, operate and exit the system. The most commonly used screens are shown in Figure 3.3. Each screen contains information relating to operating the system. Table 3.1 lists each screen alphabetically and provides a brief overview of its function. Figure 3.3 shows the basic screens and provides a map of how to get to each screen. Transition between screens is limited by permission level, operating mode and interface signals.

Screen	Description
Change Permission	Allows changing the Permission level.
Dispense	Displays total strokes, cycles, and allows changing volume, recipe, direction, rate and drawback settings.
Drawback	Allows changing drawback volume, drawback rate and drawback dwell.
Enter New Value	Used for entering a numerical value.
Fault	Displays the current fault if present.
Meter	Displays total strokes, cycles, and allows changing recipe, direction, rate and drawback settings.
Power up	Displays the controller type.
Prime	Allows changing recipe, direction, rate and duration.
Recipe	Used for saving a new recipe or retrieving an existing recipe.
Select New Value	Used for selecting a new value from a list.
Setup A	Displays recipe #, Permission level and allows changing Mode, Auto Retrigger and Production Dwells settings.
Warning Recipe Exists	Appears when you try to save a recipe using a previously used number.

Table 3.1 Screen Information
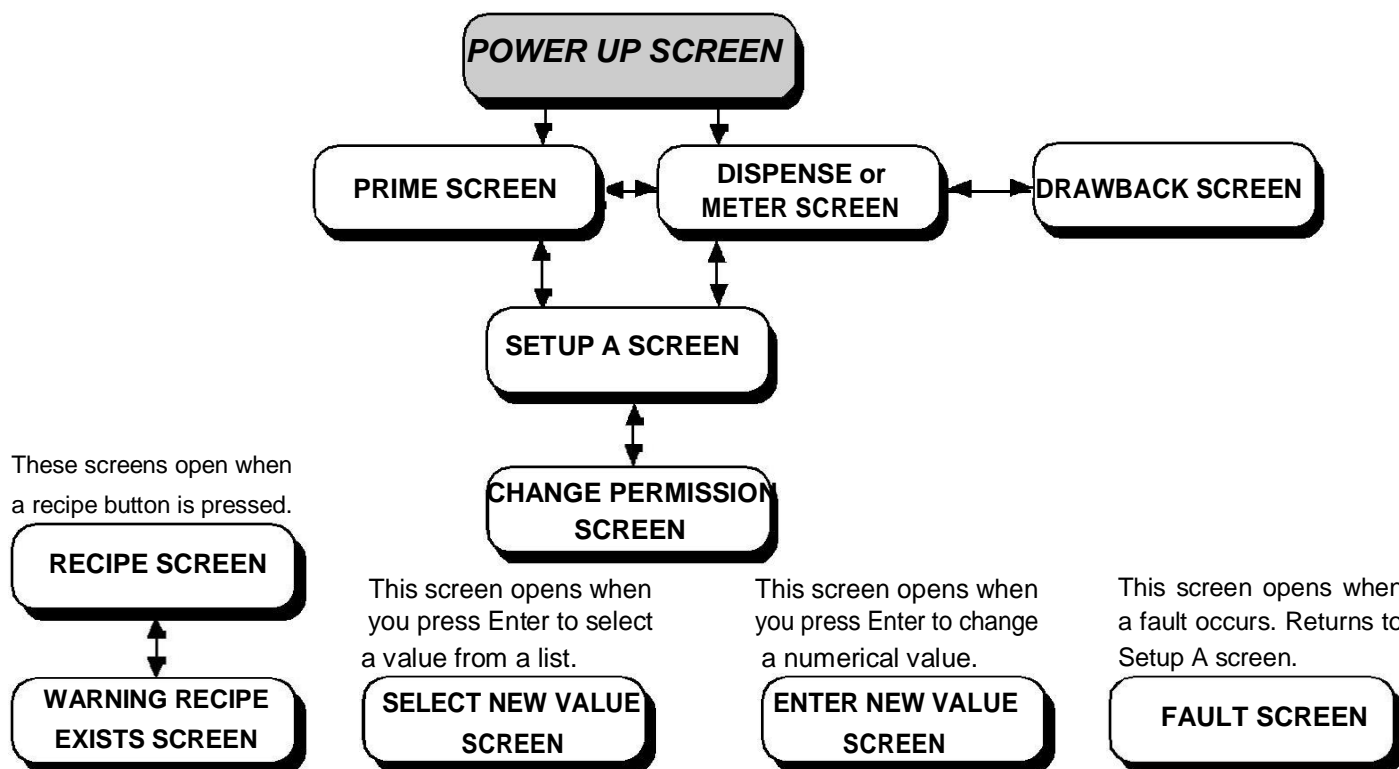
Figure 3.3 Standard Use Screen Navigation

3.2.7.1 Power Up Screen

D = Display   **P = Push-button Accessible**   Supervisor
C = Display/Change   **N = Not Accessible/Viewable**   I/O Test
                                                                 Operator

```
0  DIGISPENSE 3009              <— status —>
2
3
4              IVEK CORPORATION
5              http://www.ivek.com
6
7        RECIPE     =   ##
8     MOTOR/BASE    =   #
9
10
11
12  Press function button below to proceed
13
if prime mode and dispense mode
14     *PRIME      *DISPENSE        CONTRAST
15     SCREEN       SCREEN           ADJUST
```

----- Displays the Controller Module Status........ | D | D | D |

----- Displays the current recipe........................ | D | D | D |
----- Displays the motor/base selection.............. | D | D | D |

The following screens are accessible from
this screen based on the system status.

```
OR if dispense mode and disabled fluidic setup mode
14              DISPENSE          CONTRAST
15              SCREEN             ADJUST
```

Agitate... | P | P | P |

```
OR if prime mode and disabled production mode
14     PRIME                      CONTRAST
15     SCREEN                      ADJUST
```

Contrast Adjust .... | P | P | P |

```
OR if disabled fluidic setup mode and production mode
14     SETUP A                    CONTRAST
15     SCREEN                      ADJUST
```

Dispense .... | P | P | P |

```
OR if NO motor/base selected
14     PRIME       DISPENSE   SETUP C   CONTRAST
15     SCREEN       SCREEN    SCREEN     ADJUST
```

Fault .... | P | P | P |

Meter .... | P | P | P |

```
OR if reference recommended
14     PRIME       DISPENSE   REFERENCE CONTRAST
15     SCREEN       SCREEN               ADJUST
```

Prime.. | P | P | P |

Setup C .... | P | P | P |

```
OR if faulted
14                      FAULT     CONTRAST
15                      SCREEN     ADJUST
```

NOTE

** Field 3 will display PRIME SCREEN when in Prime
mode or AGITATE SCREEN when in Agitate mode.*

** Field 4 will display DISPENSE SCREEN when
in Dispense mode or METER SCREEN when in
Meter mode.*

Power Up Screen Description - The Power Up screen displays the current recipe and Motor Base selection. The permission level determines which push-buttons are available as shown.

The Start push-button is not functional while this screen is visible.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

Recipe - The Recipe line shows the current recipe selected in the Recipe screen. "0" indicates values changed since last "Get Recipe".

Motor Base - The Motor Base line shows the current Motor Base selected in the Setup C screen. Refer to Table 3.3 for the Motor Base selections.

3.2.7.2 Prime Screen

	D = Display	P = Push-button Accessible
	C = Display/Change	N = Not Accessible/Viewable

	Supervisor
	I/O Test
	Operator

```
 0  PRIME                          <— status —>
 2
 3         VOLUME PRIMED = ##,### STROKES
 4
 5
 6                RECIPE = ##
 7     PRIME DIRECTION = FORWARD
 8       PRIME VOLUME = ##### STROKES
 9       PRIMING RATE = #### RPM
10
11
12
13
if dispense mode
14   *DISPENSE    SETUP A      CHANGE       GET
15    SCREEN      SCREEN      DIRECTION    RECIPE

OR if disabled production mode
14                SETUP A      CHANGE       GET
15                SCREEN      DIRECTION    RECIPE

OR if NO motor/base selected
14   DISPENSE    SETUP A      SETUP C      GET
15    SCREEN      SCREEN      SCREEN      RECIPE

OR if reference required
14   DISPENSE    SETUP A     REFERENCE     GET
15    SCREEN      SCREEN                  RECIPE

OR if direction change disabled
14   DISPENSE    SETUP A                   GET
15    SCREEN      SCREEN                  RECIPE

OR if get recipe disabled
14   DISPENSE    SETUP A      CHANGE
15    SCREEN      SCREEN      DIRECTION

OR if direction change and get recipe disabled
14   DISPENSE    SETUP A
15    SCREEN      SCREEN
```

Description	Operator	I/O Test	Supervisor
----- Displays the Controller Module Status........	D	D	D
----- Displays the volume dispensed during prime	D	D	D
----- Displays the current recipe.........................	D	D	D
----- Display/change the prime direction.............	D	D	C
----- Display/change the prime duration	D	D	C
----- Display/change the priming rate	D	D	C

The following screens are accessible from this screen based on the system status.

	Operator	I/O Test	Supervisor
Dispense	P	P	P
Change Direction...	D	D	C
Get Recipe	P	P	P
Meter	P	P	P
Setup A	P	P	P
Setup C	P	P	P

NOTE

* Field 3 will display DISPENSE SCREEN when in Dispense mode or METER SCREEN when in Meter mode.

Prime Screen Description - The Prime screen displays the current Priming parameters and allows a user with Supervisor permission to change the parameters. The current permission level determines which push-buttons are available as shown.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

Volume Primed - The Volume Primed is the total number of revolutions of the motor in during the current/last Prime operation. The total strokes counter will go up to a maximum of 60,000.

Recipe - The Recipe line shows the current recipe selected in the Recipe screen. "0" indicates values changed since last "Get Recipe".

Prime Direction - The Prime Direction is the direction of liquid flow through the Pump Module in Prime mode. The direction is either Forward or Reverse. To change the direction either refer to "To change a value" or press the Change Direction push-button.

Prime Volume - The Prime Volume is the number of strokes (revolutions) the motor will turn during a Prime operation. The range is 1 to 60,000 with an increment value of 1.

Priming Rate - The Priming Rate is the speed of the motor in revolutions per minute (RPM) during a Prime operation. The range is 1 RPM to 1,500 RPM with an increment value of 1.

To change a value;

1. Press the Arrow push-buttons to highlight the parameter.
2. Press the Enter push-button to bring up either the Select New Value or Enter New Value screen.
3. In the Select New Value screen use the up and down arrow push-buttons to select the value. In the Enter New Value screen press the Minimum or Maximum push-buttons to select the desired value or use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value.
4. Press the Enter push-button.

NOTE

Changing Prime Volume, Prime Rate or Prime Direction does not affect the settings of Dispense and Meter mode. However, they do affect Agitate mode.

3.2.7.3 Dispense Screen

	D = Display	**P = Push-button Accessible**	**Supervisor**
	C = Display/Change	**N = Not Accessible/Viewable**	**I/O Test** / **Operator**

```
0  DISPENSE                    <— status —>
2
3        TOTAL VOLUME = ######### STROKES
43       TOTAL CYCLES = ##########
5
6              RECIPE = ##
7           DIRECTION = FORWARD
8     DISPENSE VOLUME = #### STROKES
9  DISPENSE/METER RATE = #### RPM
10           DRAWBACK = DISABLED
11
12
13
if prime mode
14    *PRIME      SETUP A               GET
15    SCREEN      SCREEN              RECIPE
```

Description	Operator	I/O Test	Supervisor
----- Displays the Controller Module Status........	D	D	D
----- Displays the total number of strokes...........	D	D	D
----- Displays the total number of cycles	D	D	D
----- Displays the current recipe........................	D	D	D
----- Display/change direction	D	D	C
----- Display/change the dispense volume	D	D	C
----- Display/change the dispense/meter rate.....	D	D	C
----- Display/switches to the drawback screen ...	D	D	C

```
OR if disabled fluidic setup mode
14                SETUP A               GET
15                SCREEN              RECIPE
```

```
OR if NO motor/base selected
14    PRIME       SETUP A     SETUP C     GET
15    SCREEN      SCREEN      SCREEN    RECIPE
```

```
OR if reference recommended
14    PRIME       SETUP A    REFERENCE    GET
15    SCREEN      SCREEN                 RECIPE
```

```
OR if get recipe disabled
14    PRIME       SETUP A
15    SCREEN      SCREEN
```

The following screens are accessible from this screen based on the system status.

	Operator	I/O Test	Supervisor
Prime..	P	P	P
Setup A	P	P	P
Get Recipe	P	P	P
Agitate...	P	P	P
Setup C	P	P	P

NOTE

* Field 3 will display PRIME SCREEN when in Prime mode or AGITATE SCREEN when in Agitate mode.

Dispense Screen Description - The Dispense screen displays the current Dispense parameters and allows a user with Supervisor permission to change the parameters. The current permission level determines which push-buttons are available as shown.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

Total Volume - Total Volume is the total number of strokes of the motor in Dispense (and Meter) modes. The total strokes counter will go up to 3,999,999,999 before restarting at 0.

Total Cycles - Total Cycles is the total number of completed dispense/meter cycles in Dispense (and Meter) modes. The total cycles counter will go up to a maximum of 3,999,999,999 before restarting at 0.

Recipe - The Recipe line shows the current recipe selected in the Recipe screen. "0" indicates values changed since last "Get Recipe".

Direction - The Direction is the direction of liquid flow through the Pump Module for Dispense (and Meter) modes. The direction is either Forward or Reverse.

Dispense Volume - The Dispense Volume is the number of strokes required for a dispense. The range is 1 to 10,000 with an increment value of 1.

Dispense/Meter Rate - The Dispense/Meter Rate is the speed of the motor in revolutions per minute (RPM) during the Dispense (and Meter) operation. The range is 1 RPM to 1,500 RPM with an increment value of 1.

Drawback - Selecting Drawback will bring you to the Drawback screen. If the Drawback Volume setting is 0.00 the Meter screen will show drawback as disabled. Any other Volume setting will show drawback as Enabled.

To change a value;

1. Press the Arrow push-buttons to highlight the parameter.
2. Press the Enter push-button to bring up either the Select New Value or Enter New Value screen.
3. In the Select New Value screen use the up and down arrow push-buttons to select the value. In the Enter New Value screen press the Minimum or Maximum push-buttons to select the desired value or use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value.
4. Press the Enter push-button.

NOTE

Changing Direction, Dispense/Meter Rate or Drawback does not affect the settings of Prime or Agitate mode. However, they do affect Meter mode.

3.2.7.4 Meter Screen

	D = Display	P = Push-button Accessible
	C = Display/Change	N = Not Accessible/Viewable

```
0  METER                              <— status —>
2
3          TOTAL VOLUME = ######### STROKES
4          TOTAL CYCLES = ##########
5
6                RECIPE = ##
7             DIRECTION = FORWARD
8  DISPENSE/METER RATE = #### RPM
9           METER STOP = STOP POSITION
10            DRAWBACK = DISABLED
11
12
13
if prime mode
14   *PRIME      SETUP A                    GET
15   SCREEN      SCREEN                  RECIPE
```

```
OR if disabled fluidic setup mode
14               SETUP A                    GET
15               SCREEN                  RECIPE
```

```
OR if NO motor/base selected
14   PRIME       SETUP A     SETUP C        GET
15   SCREEN      SCREEN      SCREEN     RECIPE
```

```
OR if reference required
14   PRIME       SETUP A    REFERENCE       GET
15   SCREEN      SCREEN     REQUIRED    RECIPE
```

```
OR if get recipe disabled
14   PRIME       SETUP A
15   SCREEN      SCREEN
```

Description	Operator	Supervisor	I/O Test
----- Displays the Controller Module Status........	D	D	D
----- Displays the total number of strokes...........	D	D	D
----- Displays the total number of cycles	D	D	C
----- Displays the current recipe.........................	D	D	D
----- Display/change direction	D	D	C
----- Display/change the rate	D	D	C
----- Display/change the meter stop mode	D	D	C
----- Display/switches to the drawback screen ...	P	P	C

The following screens are accessible from this screen based on the system status.

	Operator	Supervisor	I/O Test
Prime..	P	P	P
Setup A	P	P	P
Get Recipe	P	P	P
Agitate...	P	P	P
Setup C	P	P	P

NOTE

* Field 3 will display PRIME SCREEN when in Prime mode or
AGITATE SCREEN when in Agitate mode.

Meter Screen Description - The Meter screen displays the current Metering parameters and allows a user with Supervisor permission to change the parameters. The current permission level determines which push-buttons are available as shown.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

Total Volume - Total Volume is the total number of strokes of the motor in Meter (and Dispense) modes. The total strokes counter will go up to a maximum of 3,999,999,999 before restarting at 0.

Total Cycles - Total Cycles is the total number of dispenses in Meter (and Dispense) modes. The total cycles counter will go up to a maximum of 3,999,999,999 before restarting at 0.

Recipe - The Recipe line shows the current recipe selected in the Recipe screen. "0" indicates values changed since the last "Get Recipe".

Direction - The Direction is the direction of liquid flow through the Pump Module for Meter (and Dispense) modes. The direction is either Forward or Reverse.

Meter Stop - The Meter Stop determines where the piston stops in Meter mode (either Stop Position or Immediate). If Drawback is enabled in Meter mode, this setting is ignored and "Stop Position" is used.

Dispense/Meter Rate - The Dispense/Meter Rate is the speed of the motor in revolutions per minute (RPM) during the Meter (and Dispense) operation. The range is 1 RPM to 1,500 RPM with an increment value of 1.

Drawback - Selecting Drawback will bring you to the Drawback screen. If the Drawback Volume setting is 0.00 the Meter screen will show drawback as disabled. Any other Volume setting will show drawback as Enabled.

To change a value;

1. Press the Arrow push-buttons to highlight the parameter.
2. Press the Enter push-button to bring up either the Select New Value or Enter New Value screen.
3. In the Select New Value screen use the up and down arrow push-buttons to select the value. In the Enter New Value screen press the Minimum or Maximum push-buttons to select the desired value or use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value.
4. Press the Enter push-button.

NOTE

Changing Direction, Dispense/Meter Rate or Drawback does not affect the settings of Prime or Agitate mode. However, they do affect Dispense mode.

3.2.7.5 Setup A Screen

			Operator	**I/O Test**	**Supervisor**
D = Display	**P = Push-button Accessible**				
C = Display/Change	**N = Not Accessible/Viewable**				

```
0  SETUP A                    <— status —>
2
3               RECIPE = ##
4
5      PRODUCTION MODE = DISPENSE
6   FLUIDIC SETUP MODE = PRIME
7
8        AUTO RETRIGGER = DISABLED
9    PRODUCTION DWELLS = DISABLED
10
11 POWER-UP PERMISSION = LAST AT POWER OFF
12 CURRENT PERMISSION = OPERATOR
13
if prime mode
14     *PRIME      SETUP B              SAVE
15     SCREEN      SCREEN             RECIPE

OR if disabled production mode and fluidic setup mode
14      GET        SETUP B              SAVE
15     RECIPE      SCREEN             RECIPE

OR if dispense mode and disabled fluidic setup mode
14    *DISPENSE    SETUP B              SAVE
15     SCREEN      SCREEN             RECIPE

OR if faulted
14      GET        SETUP B     FAULT     SAVE
15     RECIPE      SCREEN     SCREEN   RECIPE

OR if prime mode and save recipe disabled
14     PRIME       SETUP B
15     SCREEN      SCREEN
```

Description	Operator	I/O Test	Supervisor
----- Displays the Controller Module Status........	D	D	D
----- Displays the current recipe........................	D	D	D
----- Display/change the production mode..........	D	D	C
----- Display/change the fluidic setup mode	D	D	C
----- Display/change the auto retrigger setting....	D	D	C
----- Display/change the production dwells setting	P	P	P
----- Display/change the power up permission ...	D	D	C
----- Display/change the current permission	D	D	C

The following screens are accessible from
this screen based on the system status.

	Operator	I/O Test	Supervisor
Agitate..	P	P	P
Save Recipe	P	P	P
Prime...	P	P	P
Setup B	P	P	P
Dispense	P	P	P
Meter...	P	P	P
Change Permission	P	P	P

NOTE

** Field 3 will display PRIME SCREEN when in Prime mode or
AGITATE SCREEN when in Agitate mode.*

** When Fluidic Setup Mode is disabled, Field 3 will display
DISPENSE SCREEN when in Dispense mode or METER
SCREEN when in Meter mode.*

Setup A Screen Description - The Setup A screen displays some of the higher level settings for the Controller Module and allows a user with Supervisor permission to change the parameters. The current permission level determines which push-buttons are available as shown.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

Recipe - The Recipe line shows the current recipe selected in the Recipe screen. "0" indicates values changed since last "Get Recipe".

Production Mode - The Production Mode indicates the current mode of operation. The mode can either be Dispense, Meter or Disabled.

Fluidic Setup Mode - The Fluidic Setup Mode indicates the current mode of operation. The mode can either be Prime, Agitate or Disabled.

Auto Retrigger - Refer to Section 3.3.7.10.

Production Dwells - Refer to Section 3.3.7.11.

Power-Up Permission - The Power-Up Permission configures the current setting for the permission when the Controller Module is powered on. The mode can be either Operator or Last At Power Off.

Current-Permission - Refer to Section 3.2.7.8.

To change a value;
1. Press the Arrow push-buttons to highlight the parameter.
2. Press the Enter push-button to bring up either the Select New Value or Enter New Value screen.
3. In the Select New Value screen use the up and down arrow push-buttons to select the value. In the Enter New Value screen press the Minimum or Maximum push-buttons to select the desired value or use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value.
4. Press the Enter push-button.

3.2.7.6 Drawback Screen

	D = Display	P = Push-button Accessible	Supervisor
	C = Display/Change	N = Not Accessible/Viewable	I/O Test
			Operator

	Operator	I/O Test	Supervisor
0 **DRAWBACK** ←— status —→ ----- Displays the Controller Module Status........	D	D	D
DRAWBACK VOLUME = #.## STROKES ----- Display/change the drawback volume	D	D	C
DRAWBACK RATE = #### RPM ----- Display/change the drawback rate..............	D	D	C
DRAWBACK DWELL = #.## SEC ----- Display/change the drawback dwell............	D	D	C
BACK ----- Display/change the drawback dwell............	N	N	P

Drawback Screen Description - The Drawback screen displays the current Drawback parameters and allows a user with Supervisor permission to change the parameters. The current permission level determines which push-buttons are available as shown. Refer to section 3.1.7 for description of Drawback.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

Drawback Volume - The Drawback Volume is the number of strokes drawn back during a drawback cycle. A drawback volume of zero disables drawback while a drawback volume greater than zero enables drawback. The range is 0.00 to 5.00 with an increment value of 0.01.

Drawback Rate - The Drawback Rate is the rate of the pump in RPM during a drawback operation. The range is 1 to 1500 with an increment value of 1.

Drawback Dwell - The Drawback Dwell is the number of seconds between the end of a dispense and the beginning of the drawback cycle. The range is 0.00 to 2.55 with an increment value of 0.01.

<div align="center">**NOTE**</div>

When using a 34 Frame Motor the minimum setting must be 0.05 or greater.

To change a value;

1. Press the Arrow push-buttons to highlight the parameter.
2. Press the Enter push-button to bring up either the Select New Value or Enter New Value screen.
3. In the Select New Value screen use the up and down arrow push-buttons to select the value. In the Enter New Value screen press the Minimum or Maximum push-buttons to select the desired value or use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value.
4. Press the Enter push-button.

<div align="center">**NOTE**</div>

Changing Drawback Volume, Drawback Rate or Drawback Dwell affects the drawback settings for both Dispense and Meter modes. The drawback settings do not affect Prime or Agitate modes as these modes do not provide Drawback.

3.2.7.7 Select New Value and Enter New Value Screens

D = Display   P = Push-button Accessible
C = Display/Change   N = Not Accessible/Viewable

Supervisor
I/O Test
Operator

```
0  ENTER NEW VALUE

2
3      Value Label (units)
4      0###########
5
6
7      ########### MAXIMUM
8      ########### MINIMUM
9
10     ########### INCREMENT
11
If help NOT pressed
12
13
If help pressed
12 Help message line 1 for value…
13 Help message line 2 for value…
14
15    HELP     MINIMUM    MAXIMUM    CANCEL
```

----- Displays the parameter to be changed .... | D | D | D
----- Display/change the value .... | D | D | C

----- Displays the maximum value.................... | D | D | D
----- Displays the minimum value..................... | D | D | D

----- Displays the increment value................... | D | D | D

----- Returns to the previous screen.................. | P | P | P
----- Sets the value to the maximum setting .... | P | P | P
----- Sets the value to the minimum setting .... | P | P | P
----- Displays information on selected value....... | P | P | P

Supervisor
I/O Test
Operator

```
0  SELECT NEW VALUE

2
3 Value Label
4      Selection 1
5      Selection 2
6
7
8
9
10
11
If help NOT pressed
12
13
If help pressed
12 Help message line 1 for selection…
13 Help message line 2 for selection…
14
15    HELP                        CANCEL
```

----- Display/select the available values .... | D | D | C

----- Returns to the previous screen................... | P | P | P

----- Displays information on selected value....... | P | P | P

Enter New Value Description - The Enter New Value screen allows entry of a numerical value within the indicated range. This screen is only accessible with Supervisor permission.

Upon reaching the Enter New Value screen press the Minimum or Maximum push-buttons to select the desired value or use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value. Press the Enter push-button to store the new value and return to the previous screen or press cancel to ignore the change.

Parameter - The first two lines of this screen display the parameter to be changed and the current value.

Maximum - Displays the maximum possible value for the parameter.

Minimum - Displays the minimum possible value for the parameter.

Increment - Displays the incremental value for the parameter.

Select New Value Screen Description - The Select New Value screen selects a value from a list of values. This screen is only accessible with Supervisor permission.

Upon reaching the Select New Value screen use the up and down arrow push-buttons to select the value. Press the Enter push-button to store the new value and return to the previous screen.

Parameter - The first line of this screen displays the parameter to be changed. The available choices start at the second line.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

3.2.7.8 Change Permission Screen

		Supervisor		
D = Display	**P = Push-button Accessible**	I/O Test		
C = Display/Change	**N = Not Accessible/Viewable**	Operator		

Screen	Description	Operator	I/O Test	Supervisor
0 **CHANGE PERMISSION**				
2				
3 **0#### ENTER PASSWORD**	----- Display/change the password....................	D	D	C
4				
5 **INVALID PASSWORD (conditionally visible)**	----- Displays invalid password message	D	D	D
6				
7				
8				
9 **CURRENT PERMISSION = OPERATOR**	----- Displays the current permission.................	D	D	D
10				
11				
If help NOT pressed				
12				
13				
If help pressed				
12 **Help message line 1…**				
13 **Help message line 2…**				
14 **TO CHANGE**				
15 **HELP OPERATOR PASSWORD BACK**	----- Returns to the setup A screen	N	N	P
	----- Switches to the change password screen ...	N	N	P
	----- Changes the permission to operator...........	N	N	P
	----- Displays information on permissions	N	N	P

Change Permission Screen Description - The Change Permission screen is used to change the permission to a lower or higher level. This allows additional or more restrictive access to parameters and screens. The current permission level determines which push-buttons are available as shown.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

Enter Password - This field is used to enter the password for the desired permission level. Each permission level has a unique password to prevent unauthorized access to certain parameters. The permission level can either be Operator, I/O Test or Supervisor. Use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value. The minimum value for a password is '10'.

NOTE

Entering a password causes the password field to reset to the minimum value.

3.2.7.9 Recipe Screen

| D = Display | P = Push-button Accessible |
| C = Display/Change | N = Not Accessible/Viewable |

	Supervisor	I/O Test	Operator
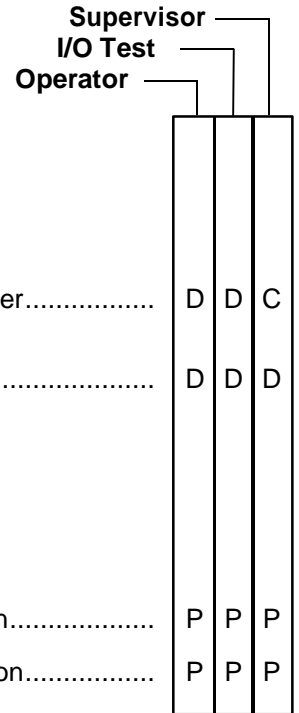
```
0  RECIPE

2
3  SAVE AS (OR GET FROM)
4
5
6      RECIPE = ##
7
8
9  BLANK RECIPE, SELECT AGAIN (conditionally visible)
10
11
If help NOT pressed
12
13
If help pressed
12 Help message line 1…
13 Help message line 2…
14
15     HELP                        CANCEL
```

----- Display/enter the recipe number.................. D D C

----- Displays error message .... D D D

----- Returns to the previous screen................... P P P

----- Displays recipe help information................. P P P

3.2.7.10 Warning Recipe Exists Screen

| D = Display | P = Push-button Accessible |
| C = Display/Change | N = Not Accessible/Viewable |

	Supervisor	I/O Test	Operator

```
0  WARNING

2  RECIPE EXISTS

4
5  "REPLACE" TO REPLACE WIT HNEW VALUES
6  "CANCEL" TO SELECT NEW RECIPE NUMBER
7
8
9
10
11
12
13
14
15     REPLACE                     CANCEL
```

----- Returns to the previous screen................... N N P

----- Replaces the existing recipe with a new one N N P

Recipe Screen Description - The Recipe screen is used to select an existing recipe to load into the Controller Module, save a changed recipe to the same number or a new number, or save a new recipe to an existing number or a new number. The current permission level determines which push-buttons are available as shown.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

NOTE

The supervisor permission is the only level allowing saving recipes. Any permission level may get recipes.

Warning Recipe Exists Screen Description - The Warning Recipe Exists screen is intended to prevent accidently overwriting an existing recipe. This screen will appear and offer a choice of either replacing the existing recipe or canceling and not replacing the existing recipe. The current permission level determines which push-buttons are available as shown.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

3.2.7.11 Fault Screen

	D = Display	**P = Push-button Accessible**	Supervisor
	C = Display/Change	**N = Not Accessible/Viewable**	I/O Test
			Operator

```
0  FAULT                    <— status —>   -----  Displays the Controller Module status ........   D  D  D

2
3  Piston Home Fault                        -----  Displays the fault description.....................   D  D  D
4  Error Code: #########                    -----  Displays the fault error code......................   D  D  D
5
6
7
8
9
10
11 "CLEAR FAULT" = CLEAR FAULT & REFERENCE
12 "SETUP A SCREEN" = CHANGE VALUES FIRST
13
14    SETUP A      CLEAR
15    SCREEN       FAULT                     -----  Clears the displayed fault...........................   P  P  P

                                            -----  Switches to the Setup A screen..................   P  P  P
```

Fault Screen Description - The Fault screen displays faults which cause the system to stop operating. The current permission level determines which push-buttons are available as shown.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

The Fault description lists the operational fault. The error code is a numerical value and is to be used by IVEK Technical Service personnel. Normal operational faults will cause an error code of '0'.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

3.2.8 Setup

The following steps will guide you through a basic setup for turning your system on for the first time:

1. **On the rear of the Controller Module**

    a. Make sure the 1/0 (On/Off) switch is set to 0 (Off).
    b. Connect the power cord to the Controller Module and the power source.
    c. Connect the Motor Cable, the larger connector connects to the Controller Module.

2. **On the Motor/Base Module**

    a. Connect the other end of the Motor Cable
    b. Set the AP Style displacement adjust to 4.5 or
    c. Set the Heavy Duty Style displacement adjust to 10

3. **On the Pump Module**

NOTE

Make sure the inlet tubing is larger than, or the same size as, the outlet tubing. Start with the reservoir even with or slightly higher than the Pump Module and the Pump Module even with or slightly higher than the dispense tip. Adjust as necessary to fit your application.

    a. Connect the inlet fitting and tubing
    b. Connect the gland inlet fitting and tubing (*optional)
    c. Connect the outlet fitting and tubing
    d. Connect the gland outlet fitting and tubing (*optional)

3.2.9 Start-up

Switch the 1/0 power switch to the '1' position. The Power Up screen will appear and the Idle indicator will illuminate. This screen displays the firmware version and allows access to the Prime screen and Dispense or Meter screen. Refer to Section 3.2.1 for a description of each field.

Go to the Dispense section (3.2.9.2) or Meter section (3.2.9.3 if the system has previously been primed. If not, follow the instructions in the following section.

NOTE

All controllers are sent in Supervisor Level.

3.2.9.1 Prime

Press the PRIME SCREEN push-button to enter Prime mode.

Position the pump for priming (outlet above or even with the inlet) fill all reservoirs with liquid, and make sure all liquid lines are connected and secure. Press the START push-button to begin priming. The system can not be initiated using the rear panel "CC TRIG" signal. The system will prime based on the Priming Rate and Prime Volume settings. Pressing the STOP push-button can stop the priming any time.

NOTE

To determine the correct inlet side, the motor connector must be located as shown in the following photos.

Inlets

Inlets

Dual End Motor/Base Modules

Motor Connector **(2a)**
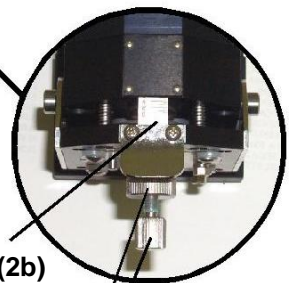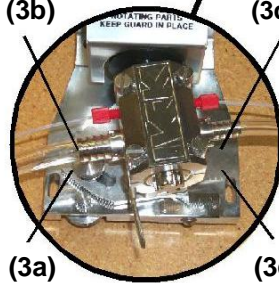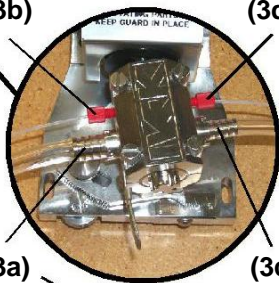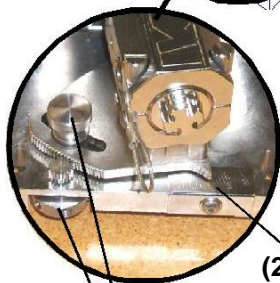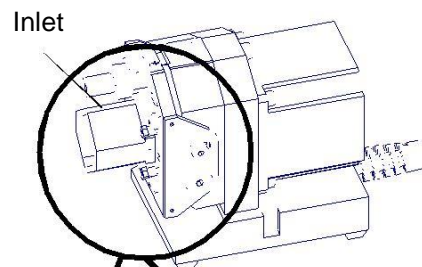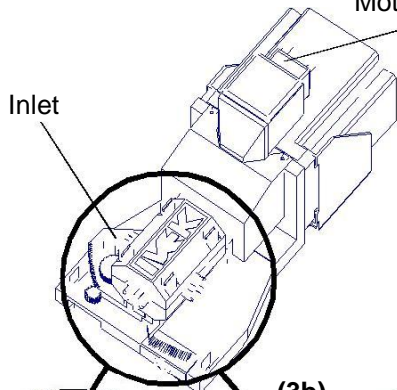
Motor Connector **(2a)**

Inlet

Inlet

Single End Motor/Base Modules

(3b)   (3d)   (3b)   (3d)

(2c)   (3a)   (3c)   (3a)   (3c)   (2b)

Unlock and Lock Here   **Matches step #**   Unlock and Lock Here

Adjust Displacement Here   **in instructions**   Adjust Displacement Here

(1b) (1a)   (1c)

(+) CC TRIG (-)   RS232

AUX COMM

(+) AUX OUT (-)

100-240 VAC   MAIN FUSE
50/60Hz   SLOW ACTING   LOGIC I/O
          TYPE T   MOTOR
          4A 250V

CE
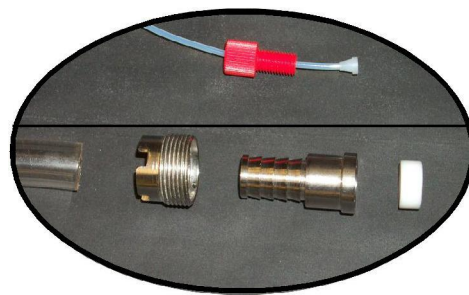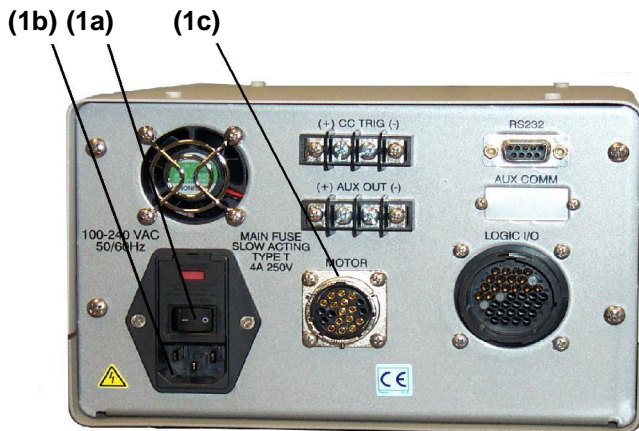
Standard AP Style Fitting and Heavy Duty Gland Fittings

Standard Heavy Duty Style Fitting

3.2.9.2 Dispense

Press the DISPENSE SCREEN push-button to enter Dispense mode. If the left most push-button is labeled METER SCREEN, or has no label, go to SETUP A screen and change Production Mode to DISPENSE.

To start dispensing press the START button or supply a trigger to the rear panel. The system will dispense the liquid amount specified in the Dispense Volume setting at the rate specified in the Dispense/Meter Rate setting.

When drawback is used, the Dispense Volume setting specifies the net fluid displaced, the actual forward motion is the sum of the specified dispense volume and the drawback volume.

3.2.9.3 Meter

Press the METER SCREEN push-button to enter Meter mode. If the left most push-button is labeled DISPENSE SCREEN, or has no label, go to SETUP A screen and change Production Mode to METER.

To start metering press the START button or supply a trigger to the rear panel. The system will dispense the liquid based on the Dispense/Meter Rate setting and the displacement of the Motor/Base module. To stop metering operation remove the rear panel trigger signal, or push the Stop push-button.

3.2.10 Faults

Faults cause the Fault screen (section 3.2.7.11) to appear. If a fault occurs, the type of fault will be displayed on the screen. Once the problem is corrected, press the Reference push-button. Refer to section 3.3.12 for a list and description of each fault.

3.3   ADVANCEDOPERATION

The Controller Module provides the controls for producing liquid flow via a positive displacement pumping mechanism. The systems utilize solid-state electronics, stepping motor drives, and precision machined ceramic pump heads. These components combine to provide exceptional accuracy and precision (0.1% or less is achievable), high reliability, and low maintenance.

Volume commands for the Controller Module use number of full revolutions. Rate commands are in revolutions per minute.

Pumping is started using the Start push-button ![start button] based on the screen being viewed (Prime, Dispense, Meter). Push

the Stop push-button ![stop button] to stop Meter operation or to stop Prime and Dispense operation before their respective volume setting is reached.

3.3.1   Production Mode

Production Mode provides precision dispensing and metering operations for dispensing fluid with either fixed or variable volumes. While only one Production Mode is active at a time, recipes can be used to quickly change between modes of operation when necessary.

3.3.1.1 Dispense Mode

Dispense Mode is the typical operating mode to use when dispensing fixed amounts of fluids. The amount of fluid to dispense is determined by the calibration of the pump and the configured Dispense Volume. Each stroke of the pump dispenses the calibrated pump volume. The repeatability of the dispense volume is dependent on many factors including: tubing setup, selected tip, fluid characteristics, and pump characteristics, and fluidic movement profile. Parameters such as Dispense Rate, Drawback, Drawback Rate, Drawback Dwell, and Acceleration, provide configuration of the fluidic movement profile to provide the flexibility to meet the needs of various applications. The

minimum volume of fluid that may be dispensed is 1 calibrated chamber volume, and the maximum volume of fluid that may be dispensed is 10,000 calibrated chamber volumes.

3.3.1.2 Meter

Meter Mode allows for variable fluid movement. The beginning and ending of the fluid movement may be initiated by either the front panel start-stop buttons, RS232 commands or Logic I/O signals. However, the most precise control of the start and stop of metering is via the Logic I/O signals.

Once initiated, fluid will Meter until stopped. If Drawback is enabled, it will be performed upon the stopping of the Dispense. There are two stop modes available in Meter Mode: Stop Position and Stop Meter.

Stop Position is the most typical mode and ensures that upon a stop command, the pump continues to the configured Stop Position. This implies that a Meter operation will always dispense an integer multiple of calibrated chamber volumes.

Stop Immediate, on the other hand, will cause the pump to stop immediately upon receiving the stop command (plus a little movement required for de-acceleration). This is typically used in conjunction with a dual-ended motor/base to simulate continuous metering. This implies that the dispense volume will not be a multiple of the calibrated chamber volume.

3.3.1.3 Auto Retrigger

Auto Retrigger provides the capability to have the Controller Module automatically repeat the initiation of Dispense Mode operations (ignored by Meter Modes or Fluidic Setup Modes). This is useful for applications such as filling X by Y matrix wells manually.

There are two Auto Retrigger modes available: Count and Infinite. Count provides the ability to auto retrigger a fixed number of dispense operations as determined by the Auto Retrigger Count parameter. The Auto Retrigger Count variable should be set to the desired number of total Dispense operations. The first Dispense operation must be manually triggered. At the end of the first Dispense operation, a configurable Auto Retrigger Dwell time will cause the unit to remain in idle until the period expires. Upon the expiration of the Auto Retrigger Dwell timer, another Dispense operation will be automatically initiated. This process will repeat until the Auto Retrigger Count number of operations have occurred. If using in an X by Y matrix application, the Auto Retrigger Count should be set to the value of X times Y (i.e., the total number of wells in the matrix).

The Infinite setting provides the same feature, but the Auto Retrigger Count setting is ignored and the unit will continue the Auto Retrigger sequence until stopped.

3.3.1.4 Operation Dwells

The Pre-op Dwell and Post-op Dwell provide a delay before and after a Production Mode operation (does not affect Fluidic Setup Mode operations). This is typically used to provide a delay between the activation/deactivation of a logic output signal and the actual pump movement. A typical application for this is when the Auxiliary Output is used to gate the power of auxiliary equipment such as an ultrasonic atomization nozzle. The delay provides enough time for the nozzle to become active before the fluid movement occurs, and enough time for the fluid movement to cease before the nozzle deactivates.

3.3.2   Fluidic Setup Mode

Fluidic Setup Modes are intended to prepare the fluidic system for Production Mode operations. There are two Fluidic Setup Modes: Prime and Agitate. While only one mode is available at a time, quick transition between Fluidic Setup Modes may be achieved using recipes.

3.3.2.1 Prime Mode

Prime Mode is the most typically used Fluidic Setup Mode and is used to prime the fluidic tubing and components from the reservoir through to the tip before Production Mode operation. It is also often used in the Reverse Direction to remove the fluid from the fluidic system after Production Mode operations are completed.

The amount of fluid moved is configured by the Prime Volume parameter. The range of the Prime Volume is from 1 to 60,000 with an increment value of 1. Once initiated, the Prime operation will move the desired amount of fluid through the system unless stopped early.

NOTE

It is recommended to perform a "Waste" operation in the desired Production Mode after a Prime operation in order to properly setup the fluid for repeatable Dispenses.

3.3.2.2 Agitate Mode

Agitate Mode is useful for keeping fluid moving during extended periods of idleness of the fluidic system. Fluids containing suspended particles may benefit from the constant fluid movement offered by the Agitate Mode.

The Agitate operation consists of three portions: Isolation, Agitating, Return.

Isolation provides the ability to move the fluid away from the discharge tip before Agitating the fluid. The Isolation Volume has a range of 1 to 60,000 with an increment value of 1.

The Agitation portion consists of four components: Reverse, Dwell, Forward, Dwell. Agitation is a repeating of the sequence Reverse, Dwell, Forward, Dwell; until stopped. During Reverse, a volume of fluid, as configured by the Agitation Volume, is moved in the Reverse direction, followed by a dwell (relative to a Forward Dispense/Meter). The direction changes and the Agitate Volume is moved back in the Forward direction. The sequence of Reverse, Dwell, Forward, Dwell then repeats until stopped.

Once stopped, the Return portion is automatically initiated. The Return portion simply moves the fluid back to the starting position.

NOTE

It is recommended to perform one or more "Waste" operations in the desired Production Mode after an Agitate operation in order to properly setup the fluid for repeatable Dispenses.

3.3.3   Display

The display provides an operator interface to all operating parameters in the Controller Module. New values can be entered and current values displayed for all the functions of the system. The current operating mode and system status are shown on the display. The display contains multiple interface screens each providing information to the operator.

The display shows system status, settings and general information. The display is divided into six fields as shown. Following is a description of what will be displayed in each field.

NOTE

References to push-buttons for fields 3 thru 6 refer to the push-button located below a word on the display. For example, the push-button located under 'REFERENCE' will be called the Reference push-button.

Field 1 - This field displays screen name and status information.
Field 2 - This field displays all the operating parameters.
Fields 3 thru 6 - These fields provide function legends for the four function push-buttons directly below the screen.

NOTE

A legend does not appear if the function is not per-mitted due to permission levels (section 3.2.6), Configurable Input 2 (section 3.3.9.3) or the value of the Serial Interface "k1" command (Table 3.7).

Field 5 is the F3 key described in the Reset Parameter Warning screen (section 3.3.7.20).

1
2

(FPB1)	(FPB2)	(FPB3)	(FPB4)
3	4	5	6
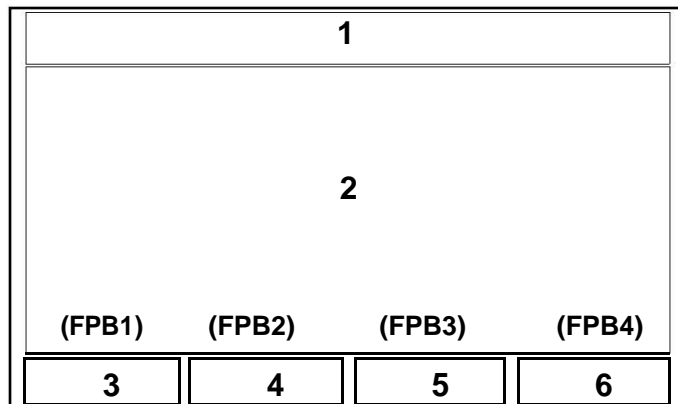
3.3.4 Help

Help is available when selecting or entering new values by pressing the FPB1 push-button. Information pertaining to the selected value will be displayed. Press the FPB1 key again to clear the help information from the screen.

3.3.5 Permission Levels

There are three levels of permission; Operator, I/O Test and Supervisor. Each level allows access to selected items on the display.

The permission level can be changed in the Change Permission screen (Section 3.2.7.8).

The highest level is **Supervisor**. This level allows access to all items on all screens. The **I/O Test** level allows access to the same items as the Operator except it also allows access to the I/O Test screen.

The **Operator** level does not allow changing system parameters. Recipes can be selected and loaded, but not changed.

3.3.6 Recipes

A recipe is a collection of the operating parameters required to operate the system. The operating parameters include volume, rate, direction and drawback. For each recipe, the parameters are stored in the recipe database. There are 32 recipes available (1-32). A "0" indicates a value change since the last "Get Recipe".

3.3.7 Screens

There are twenty screens used to setup, operate and exit the system as shown in Figure 3.4. Each screen contains information relating to operating the system. Table 3.2 lists each screen alphabetically and provides a brief overview of its function. Figure 3.4 shows the screens and provides a map of how to get to each screen. Transition between screens is limited by permission level, operating mode and interface signals.

Screen	Description
Change Password	Allows changing the password.
Change Permission	Allows changing the Permission level.
Clear Totalizer	Clears the Total Volume and Total Cycles counters.
Dispense	Displays total strokes, cycles, and allows changing volume, recipe, direction, rate and drawback settings.
Drawback	Allows changing drawback volume, drawback rate and drawback dwell.
Enter New Password	Used for changing an existing password.
Enter New Value	Used for entering a numerical value.
Fault	Displays the current fault if present.
I/O Test	Test the functionality of the Inputs and Outputs.
Meter	Displays total volume, total cycles and allows changing recipe, direction, rate and drawback settings.
Power up	Displays the controller type.
Prime	Allows changing recipe, direction rate, and prime volume.
Recipe	Used for saving a new recipe or retrieving an existing recipe.
Reset Parameters Warnings	Erases all recipes and resets passwords.
Select New Value	Used for selecting a new value from a list.
Setup A	Displays recipe #, Permission level and allows changing Mode, Auto Retrigger and Production Dwells settings.
Setup B	Allows changing Ready Output Config, Auxiliary Output, Output 3 Config, Input 2 Config, Input 3, Input 4 and Output 4 settings.
Setup C	Allows changing Motor/Base, Stalls per Fault, Stop Position, Torque and Acceleration.
System Info Screen	Displays firmware and assert information.
Warning Recipe Exists	Appears when you try to save a recipe using a previously used number.

Table 3.2 Screen Information

POWER UP SCREEN

FPB1   FPB2

PRODUCTION MODE SCREENS ←FPB4

GET RECIPE SCREEN

FPB2

FLUIDIC MODE SCREENS ← FPB4

GET RECIPE SCREEN

FPB1   FPB2

FPB4

SAVE RECIPE SCREEN

SETUP A SCREEN

AUTOTRIGGER SCREEN

PROD DWELLS SCREEN

FPB1   FPB2

CHANGE PERMISSION SCREEN

SETUP B SCREEN ← FPB4 → **I/O TEST SCREEN**

FPB1   FPB2

CLEAR TOTALIZER SCREEN

SETUP C SCREEN ← FPB4

FPB1   FPB2

SYSTEM INFO SCREEN ← FPB4 → **CONTRAST ADJUST SCREEN**

FPB = Function Push-Button

FPB1 traverses up the "Screen Ladder"

FPB2 traverses down the "Screen Ladder"

FPB3 has multiple functions depending on the screen and operating state of the control-ler.

FPB4 goes to parallel screens.

Figure 3.4 Mode & Setup Screen Navigation

3.3.7.1 Power Up Screen

	Operator	I/O Test	Supervisor
D = Display P = Push-button Accessible			
C = Display/Change N = Not Accessible/Viewable			

```
0  DIGISPENSE 3009              ←— status —→
2
3
4              IVEK CORPORATION
5              http://www.ivek.com
6
7       RECIPE    =  ##
8    MOTOR/BASE   =  #
9
10
11
12  Press function button below to proceed
13
if prime mode and dispense mode
14      *PRIME      *DISPENSE        CONTRAST
15      SCREEN       SCREEN           ADJUST
```

----- Displays the Controller Module Status........ | D | D | D |

----- Displays the current recipe......................... | D | D | D |
----- Displays the motor/base selection.............. | D | D | D |

The following screens are accessible from this screen based on the system status.

```
OR if dispense mode and disabled fluidic setup mode
14              DISPENSE         CONTRAST
15              SCREEN            ADJUST
```

```
OR if prime mode and disabled production mode
14      PRIME                    CONTRAST
15      SCREEN                    ADJUST
```

```
OR if disabled fluidic setup mode and production mode
14      SETUP A                  CONTRAST
15      SCREEN                    ADJUST
```

```
OR if NO motor/base selected
14      PRIME       DISPENSE     SETUP C    CONTRAST
15      SCREEN       SCREEN      SCREEN      ADJUST
```

```
OR if reference recommended
14      PRIME       DISPENSE    REFERENCE  CONTRAST
15      SCREEN       SCREEN                 ADJUST
```

```
OR if faulted
14                   FAULT       CONTRAST
15                   SCREEN       ADJUST
```

	Operator	I/O Test	Supervisor
Agitate...	P	P	P
Contrast Adjust	P	P	P
Dispense	P	P	P
Fault	P	P	P
Meter	P	P	P
Prime..	P	P	P
Setup C	P	P	P

NOTE

* Field 3 will display PRIME SCREEN when in Prime mode or AGITATE SCREEN when in Agitate mode.

* Field 4 will display DISPENSE SCREEN when in Dispense mode or METER SCREEN when in Meter mode.

Power Up Screen Description - The Power Up screen displays the current recipe and Motor Base selection. The permission level determines which push-buttons are available as shown.

The Start push-button is not functional while this screen is visible.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

Recipe - The Recipe line shows the current recipe selected in the Recipe screen. "0" indicates values changed since last "Get Recipe".

Motor Base - The Motor Base line shows the current Motor Base selected in the Setup C screen. Refer to Table 3 .3 for the Motor Base selections.

3.3.7.2 Prime Screen

	D = Display	P = Push-button Accessible
	C = Display/Change	N = Not Accessible/Viewable

	Operator	I/O Test	Supervisor

```
0  PRIME                    ←— status —→
2
3         VOLUME PRIMED = ##,### STROKES
4
5
6                  RECIPE = ##
7     PRIME DIRECTION = FORWARD
8        PRIME VOLUME = ##### STROKES
9        PRIMING RATE = #### RPM
10
11
12
13
if dispense mode
14   *DISPENSE    SETUP A    CHANGE      GET
15    SCREEN      SCREEN    DIRECTION   RECIPE

OR if disabled production mode
14                SETUP A    CHANGE      GET
15                SCREEN    DIRECTION   RECIPE

OR if NO motor/base selected
14   DISPENSE    SETUP A    SETUP C     GET
15    SCREEN      SCREEN     SCREEN    RECIPE

OR if reference required
14   DISPENSE    SETUP A    REFERENCE   GET
15    SCREEN      SCREEN               RECIPE

OR if direction change disabled
14   DISPENSE    SETUP A                 GET
15    SCREEN      SCREEN               RECIPE

OR if get recipe disabled
14   DISPENSE    SETUP A    CHANGE
15    SCREEN      SCREEN    DIRECTION

OR if direction change and get recipe disabled
14   DISPENSE    SETUP A
15    SCREEN      SCREEN
```

Description	Operator	I/O Test	Supervisor
----- Displays the Controller Module Status........	D	D	D
----- Displays the volume dispensed during prime	D	D	D
----- Displays the current recipe.........................	D	D	D
----- Display/change the prime direction.............	D	D	C
----- Display/change the prime duration	D	D	C
----- Display/change the priming rate	D	D	C

The following screens are accessible from this screen based on the system status.

	Operator	I/O Test	Supervisor
Dispense	P	P	P
Change Direction...	D	D	C
Get Recipe	P	P	P
Meter...	P	P	P
Setup A	P	P	P
Setup C	P	P	P

NOTE

Field 3 will display DISPENSE SCREEN when in Dispense mode or METER SCREEN when in Meter mode.

Prime Screen Description - The Prime screen displays the current Priming parameters and allows a user with Supervisor permission to change the parameters. The current permission level determines which push-buttons are available as shown.

Status - The status indicates the operational state of the system. Refer to section 3.2.8 for an explanation of each status type.

Volume Primed - The Volume Primed is the total number of revolutions of the motor during the current/last prime operation. The total strokes counter will go up to a maximum of 60,000.

Recipe - The Recipe line shows the current recipe selected in the Recipe screen. "0" indicates values changed since last "Get Recipe".

Prime Direction - The Prime Direction is the direction of liquid flow through the Pump Module in Prime mode. The direction is either Forward or Reverse. To change the direction either refer to "To change a value" or press the Change Direction push-button.

Prime Volume - The Prime Volume is the number of strokes (revolutions) the motor will turn during a Prime operation. The range is 1 to 60,000 with an increment value of 1.

Priming Rate - The Priming Rate is the speed of the motor in revolutions per minute (RPM) during a Prime operation. The range is 1 RPM to 1,500 RPM with an increment value of 1.

To change a value;

1. Press the Arrow push-buttons to highlight the parameter.
2. Press the Enter push-button to bring up either the Select New Value or Enter New Value screen.
3. In the Select New Value screen use the up and down arrow push-buttons to select the value. In the Enter New Value screen press the Minimum or Maximum push-buttons to select the desired value or use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value.
4. Press the Enter push-button.

NOTE

Changing Prime Volume, Prime Rate or Prime Direction does not affect the settings of Dispense and Meter mode. However, they do affect Agitate mode.

3.3.7.3 Agitate Screen

	Supervisor
D = Display	**P = Push-button Accessible**	**I/O Test**
C = Display/Change	**N = Not Accessible/Viewable**	**Operator**

```
0  AGITATE                    <— status —>
2
3        VOLUME AGITATED = ###### STROKES
4
5
6                  RECIPE = ##
7    AGITATE DIRECTION = FORWARD
8      AGITATE VOLUME = #### STROKES
9        AGITATE RATE = #### RPM
10
11      AGITATE DWELL = #.## SEC.
12    ISOLATION VOLUME = ##### STROKES
13
if dispense mode
14   *DISPENSE   SETUP A              GET
15    SCREEN     SCREEN             RECIPE

OR if disabled production mode
14              SETUP A              GET
15              SCREEN             RECIPE

OR if NO motor/base selected
14   DISPENSE   SETUP A   SETUP C    GET
15    SCREEN    SCREEN    SCREEN   RECIPE

OR if reference recommended
14   DISPENSE   SETUP A  REFERENCE   GET
15    SCREEN    SCREEN             RECIPE

OR if get recipe disabled
14   DISPENSE   SETUP A
15    SCREEN    SCREEN
```

	Operator	I/O Test	Supervisor
----- Displays the Controller Module Status........	D	D	D
----- Displays the agitated volume......................	D	D	D
----- Displays the current recipe........................	D	D	D
----- Display/change the agitate direction...........	D	D	D
----- Display/change the agitate volume.............	D	D	C
----- Display/change the agitate rate	D	D	C
----- Display/change the agitate dwell	D	D	C
----- Display/change the isolation volume..........	D	D	C

The following screens are accessible from this screen based on the system status.

	Operator	I/O Test	Supervisor
Dispense	P	P	P
Setup A	P	P	P
Get Recipe	P	P	P
Meter..	P	P	P
Setup C	P	P	P

NOTE

*Field 3 will display DISPENSE SCREEN when in
Dispense mode or METER SCREEN when in Meter
mode.*

Agitate Screen Description - The Agitate screen displays the current Agitate parameters and allows a user with Supervisor permission to change the parameters. The current permission level determines which push-buttons are available as shown.

The Start and Stop push-buttons control Agitate operation while this screen is visible.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

Volume Agitated - The Volume Agitated line shows the total number of strokes of the motor during agitation operation. The total strokes counter will go up to a maximum of 120,000 and will return to 0 upon completion of the agitate cycle (unless terminated pre-maturely).

Recipe - The Recipe line shows the current recipe selected in the Recipe screen. "0" indicates values changed since last "Get Recipe".

Agitate Direction - The Agitate Direction is the direction of liquid flow through the Pump Module for the Agitate mode. The direction is either Forward or Reverse.

Agitate Volume - The Agitate Volume is the amount of fluid to agitate in strokes during an agitate cycle. The range is 1 to 60,000 with an increment value of 1.

Agitate Rate - The Agitate Rate is the rate of the motor in RPM's during the agitate cycle. The range is 1 to 1,500 with an increment value of 1.

Agitate Dwell - The Agitate Dwell is the time between the forward and reverse cycles in seconds. The range is 0.00 sec to 300.00 sec with an increment value of 0.01.

Isolation Volume - The Isolation Volume is the amount of liquid isolated prior to the agitate cycle in strokes. The range is 0 to 60,000 with an increment value of 1.

To change a value;

1. Press the Arrow push-buttons to highlight the parameter.
2. Press the Enter push-button to bring up either the Select New Value or Enter New Value screen.
3. In the Select New Value screen use the up and down arrow push-buttons to select the value. In the Enter New Value screen press the Minimum or Maximum push-buttons to select the desired value or use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value.
4. Press the Enter push-button.

NOTE

Changing Agitate Volume, Agitate Rate or Agitate Direction does not affect the settings of Dispense and Meter mode. However, they do affect Prime mode.

3.3.7.4 Dispense Screen

Supervisor
I/O Test
Operator

	D = Display	**P = Push-button Accessible**
	C = Display/Change	**N = Not Accessible/Viewable**

```
0  DISPENSE                    <— status —>
2
3          TOTAL VOLUME = ######### STROKES
43          TOTAL CYCLES = ##########
5
6                 RECIPE = ##
7              DIRECTION = FORWARD
8       DISPENSE VOLUME = #### STROKES
9  DISPENSE/METER RATE = #### RPM
10             DRAWBACK = DISABLED
11
12
13
if prime mode
14    *PRIME      SETUP A                  GET
15    SCREEN      SCREEN                 RECIPE
```

```
OR if disabled fluidic setup mode
14                SETUP A                  GET
15                SCREEN                 RECIPE
```

```
OR if NO motor/base selected
14    PRIME       SETUP A    SETUP C       GET
15    SCREEN      SCREEN     SCREEN      RECIPE
```

```
OR if reference recommended
14    PRIME       SETUP A   REFERENCE      GET
15    SCREEN      SCREEN                 RECIPE
```

```
OR if get recipe disabled
14    PRIME       SETUP A
15    SCREEN      SCREEN
```

Description	Operator	I/O Test	Supervisor
----- Displays the Controller Module Status........	D	D	D
----- Displays the total number of strokes...........	D	D	D
----- Displays the total number of cycles	D	D	D
----- Displays the current recipe........................	D	D	D
----- Display/change direction	D	D	C
----- Display/change the dispense volume	D	D	C
----- Display/change the dispense/meter rate.....	D	D	C
----- Display/switches to the drawback screen ...	D	D	C

The following screens are accessible from this screen based on the system status.

	Operator	I/O Test	Supervisor
Prime..	P	P	P
Setup A	P	P	P
Get Recipe	P	P	P
Agitate...	P	P	P
Setup C	P	P	P

NOTE

* Field 3 will display PRIME SCREEN when in Prime mode or AGITATE SCREEN when in Agitate mode.

Dispense Screen Description - The Dispense screen displays the current Dispense parameters and allows a user with Supervisor permission to change the parameters. The current permission level determines which push-buttons are available as shown.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

Total Volume - Total Volume is the total number of strokes of the motor in Dispense (and Meter) modes. The total strokes counter will go up to 3,999,999,999 before restarting at 0.

Total Cycles - Total Cycles is the total number of completed dispense/meter cycles in Dispense (and Meter) modes. The total cycles counter will go up to a maximum of 3,999,999,999 before restarting at 0.

Recipe - The Recipe line shows the current recipe selected in the Recipe screen. "0" indicates values changed since last "Get Recipe".

Direction - The Direction is the direction of liquid flow through the Pump Module for Dispense (and Meter) modes. The direction is either Forward or Reverse.

Dispense Volume - The Dispense Volume is the number of strokes required for a dispense. The range is 1 to 10,000 with an increment value of 1.

Dispense/Meter Rate - The Dispense/Meter Rate is the speed of the motor in revolutions per minute (RPM) during the Dispense (and Meter) operation. The range is 1 RPM to 1,500 RPM with an increment value of 1.

Drawback - Selecting Drawback will bring you to the Drawback screen. If the Drawback Volume setting is 0.00 the Meter screen will show drawback as disabled. Any other Volume setting will show drawback as Enabled.

To change a value;

1. Press the Arrow push-buttons to highlight the parameter.
2. Press the Enter push-button to bring up either the Select New Value or Enter New Value screen.
3. In the Select New Value screen use the up and down arrow push-buttons to select the value. In the Enter New Value screen press the Minimum or Maximum push-buttons to select the desired value or use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value.
4. Press the Enter push-button.

<div align="center">**NOTE**</div>

Changing Direction, Dispense/Meter Rate or Drawback does not affect the settings of Prime or Agitate mode. However, they do affect Meter mode.

3.3.7.5 Meter Screen

	D = Display	**P = Push-button Accessible**	**Supervisor**		
	C = Display/Change	**N = Not Accessible/Viewable**	**I/O Test**		
			Operator		

METER Screen	Description	Operator	I/O Test	Supervisor
`0  METER          ←— status —→`	----- Displays the Controller Module Status........	D	D	D
`2`				
`3      TOTAL VOLUME = ######### STROKES`	----- Displays the total number of strokes...........	D	D	D
`4      TOTAL CYCLES = ##########`	----- Displays the total number of cycles	D	D	C
`5`	----- Displays the current recipe........................	D	D	D
`6           RECIPE = ##`	----- Display/change direction	D	D	C
`7        DIRECTION = FORWARD`	----- Display/change the rate	D	D	C
`8 DISPENSE/METER RATE = #### RPM`	----- Display/change the meter stop mode	D	D	C
`9       METER STOP = STOP POSITION`				
`10        DRAWBACK = DISABLED`	----- Display/switches to the drawback screen ...	P	P	C
`11`				
`12`				
`13`				
`if prime mode`				
`14    *PRIME    SETUP A            GET`				
`15    SCREEN    SCREEN           RECIPE`				

OR if disabled fluidic setup mode	Description	Operator	I/O Test	Supervisor
`14              SETUP A            GET`	The following screens are accessible from this screen based on the system status.			
`15              SCREEN           RECIPE`				

OR if NO motor/base selected		Operator	I/O Test	Supervisor
`14    PRIME    SETUP A    SETUP C    GET`	Prime..	P	P	P
`15    SCREEN    SCREEN    SCREEN   RECIPE`				

OR if reference required		Operator	I/O Test	Supervisor
`14    PRIME    SETUP A   REFERENCE   GET`	Setup A	P	P	P
`15    SCREEN    SCREEN   REQUIRED   RECIPE`	Get Recipe	P	P	P

OR if get recipe disabled		Operator	I/O Test	Supervisor
`14    PRIME    SETUP A`	Agitate..	P	P	P
`15    SCREEN    SCREEN`	Setup C	P	P	P

NOTE

** Field 3 will display PRIME SCREEN when in Prime mode or
AGITATE SCREEN when in Agitate mode.*

Meter Screen Description - The Meter screen displays the current Metering parameters and allows a user with Supervisor permission to change the parameters. The current permission level determines which push-buttons are available as shown.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

Total Volume - Total Volume is the total number of strokes of the motor in Meter (and Dispense) modes. The total strokes counter will go up to a maximum of 3,999,999,999 before restarting at 0.

Total Cycles - Total Cycles is the total number of dispenses in Meter (and Dispense) modes. The total cycles counter will go up to a maximum of 3,999,999,999 before restarting at 0.

Recipe - The Recipe line shows the current recipe selected in the Recipe screen. "0" indicates values changed since the last "Get Recipe".

Direction - The Direction is the direction of liquid flow through the Pump Module for Meter (and Dispense) modes. The direction is either Forward or Reverse.

Meter Stop - The Meter Stop determines where the piston stops in Meter mode (either Stop Position or Immediate). If Drawback is enabled in Meter mode, this setting is ignored and "Stop Position" is used.

Dispense/Meter Rate - The Dispense/Meter Rate is the speed of the motor in revolutions per minute (RPM) during the Meter (and Dispense) operation. The range is 1 RPM to 1,500 RPM with an increment value of 1.

Drawback - Selecting Drawback will bring you to the Drawback screen. If the Drawback Volume setting is 0.00 the Meter screen will show drawback as disabled. Any other Volume setting will show drawback as Enabled.

To change a value;

1. Press the Arrow push-buttons to highlight the parameter.
2. Press the Enter push-button to bring up either the Select New Value or Enter New Value screen.
3. In the Select New Value screen use the up and down arrow push-buttons to select the value. In the Enter New Value screen press the Minimum or Maximum push-buttons to select the desired value or use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value.
4. Press the Enter push-button.

NOTE

Changing Direction, Dispense/Meter Rate or Drawback does not affect the settings of Prime or Agitate mode. However, they do affect Dispense mode.

3.3.7.6 Setup A Screen

	Supervisor
D = Display **P = Push-button Accessible**	I/O Test
C = Display/Change **N = Not Accessible/Viewable**	Operator

```
0  SETUP A                    <— status —>
2
3              RECIPE = ##
4
5      PRODUCTION MODE = DISPENSE
6   FLUIDIC SETUP MODE = PRIME
7
8        AUTO RETRIGGER = DISABLED
9   PRODUCTION DWELLS = DISABLED
10
11 POWER-UP PERMISSION = LAST AT POWER OFF
12 CURRENT PERMISSION = OPERATOR
13
if prime mode
14    *PRIME       SETUP B              SAVE
15    SCREEN       SCREEN              RECIPE
```

```
OR if disabled production mode and fluidic setup mode
14     GET         SETUP B              SAVE
15    RECIPE       SCREEN              RECIPE
```

```
OR if dispense mode and disabled fluidic setup mode
14   *DISPENSE     SETUP B              SAVE
15    SCREEN       SCREEN              RECIPE
```

```
OR if faulted
14     GET         SETUP B      FAULT    SAVE
15    RECIPE       SCREEN      SCREEN   RECIPE
```

```
OR if prime mode and save recipe disabled
14    PRIME        SETUP B
15    SCREEN       SCREEN
```

	Operator	I/O Test	Supervisor
----- Displays the Controller Module Status........	D	D	D
----- Displays the current recipe........................	D	D	D
----- Display/change the production mode..........	D	D	C
----- Display/change the fluidic setup mode	D	D	C
----- Display/change the auto retrigger setting....	D	D	C
----- Display/change the production dwells setting	P	P	P
----- Display/change the power up permission ...	D	D	C
----- Display/change the current permission	D	D	C

The following screens are accessible from
this screen based on the system status.

	Operator	I/O Test	Supervisor
Agitate..	P	P	P
Save Recipe	P	P	P
Prime..	P	P	P
Setup B	P	P	P
Dispense	P	P	P
Meter...	P	P	P
Change Permission	P	P	P

NOTE

** Field 3 will display PRIME SCREEN when in Prime mode or
AGITATE SCREEN when in Agitate mode.*

** When Fluidic Setup Mode is disabled, Field 3 will display
DISPENSE SCREEN when in Dispense mode or METER
SCREEN when in Meter mode.*

Setup A Screen Description - The Setup A screen displays some of the higher level settings for the Controller Module and allows a user with Supervisor permission to change the parameters. The current permission level determines which push-buttons are available as shown.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

Recipe - The Recipe line shows the current recipe selected in the Recipe screen. "0" indicates values changed since last "Get Recipe".

Production Mode - The Production Mode indicates the current mode of operation. The mode can either be Dispense, Meter or Disabled.

Fluidic Setup Mode - The Fluidic Setup Mode indicates the current mode of operation. The mode can either be Prime, Agitate or Disabled.

Auto Retrigger - Refer to Section 3.3.7.10.

Production Dwells - Refer to Section 3.3.7.11.

Power-Up Permission - The Power-Up Permission configures the current setting for the permission when the Controller Module is powered on. The mode can be either Operator or Last At Power Off.

Current-Permission - Refer to Section 3.2.7.8.

To change a value;
1. Press the Arrow push-buttons to highlight the parameter.
2. Press the Enter push-button to bring up either the Select New Value or Enter New Value screen.
3. In the Select New Value screen use the up and down arrow push-buttons to select the value. In the Enter New Value screen press the Minimum or Maximum push-buttons to select the desired value or use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value.
4. Press the Enter push-button.

3.3.7.7 Setup B Screen

	D = Display	P = Push-button Accessible	Supervisor
	C = Display/Change	N = Not Accessible/Viewable	I/O Test
			Operator

```
0  SETUP B                    <— status —>
2      AUXILIARY OUTPUT  = DISABLED
3 READY OUTPUT CONFIG  = FLUID=BSY  FLT=BSY
4             OUTPUT 2  = FAULT OUTPUT
5      OUTPUT 3 CONFIG  = BUSY DISCHARGE
6      OUTPUT 4 CONFIG  = DISABLED
7
8            INPUT CC  = PROD MODE TRIGGER
9             INPUT 1  = PROD MODE TRIGGER
10     INPUT 2 CONFIG  = FLUID MODE TRIGGER
11     INPUT 3 CONFIG  = CLEAR FAULT & REF
12     INPUT 4 CONFIG  = FLUID MODE TRIGGER
13
if NOT faulted
14   SETUP A      SETUP C              I/O TEST
15   SCREEN       SCREEN               SCREEN
```

Description	Operator	I/O Test	Supervisor
----- Displays the Controller Module Status........	D	D	D
----- Display/change the auxiliary output	D	D	C
----- Display/change the ready output config......	D	D	C
----- Displays the output 2 setting	D	D	D
----- Display/change the output 3 config.............	D	D	C
----- Display/change the output 4 config.............	D	D	C
----- Displays the input CC setting	D	D	D
----- Displays the input 1 setting	D	D	D
----- Display/change the input 2 config...............	D	D	C
----- Display/change the input 3 config...............	D	D	C
----- Display/change the input 4 config..............	D	D	C

The following screens are accessible from this screen based on the system status.

	Operator	I/O Test	Supervisor
Setup A	P	P	P
Setup C	P	P	P
I/O Test	P	P	P

Setup B Screen Description - The Setup B screen displays the logic I/O settings and allows a user with Supervisor permission to change the parameters. The current permission level determines which push-buttons are available as shown.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

Auxiliary Output - The Auxiliary Output selects the signal for an additional output signal. The output signal can either be Enable Fluid Ops (similar to previous AP Prime), Enable Both, Enable Prod Ops or Disabled.

Ready Output Config - The Ready Output Config sets the configuration of the Ready Output signal to indicate either Ready or Busy during PRIME and FAULT.

Output 2 - The Output 2 setting is preset for Fault Output and cannot be changed.

Output 3 Config - The Output 3 Config settings determines the signal type for the 3rd output. The output signal can be either Busy Discharge, Busy Prod Only, Busy Moving, Ready Idle, Ready for Prod, Reference Stat or Disabled.

Output 4 Config - The Output 4 Config settings determines the signal type for the 4th output. The output signal can be either Busy Discharge, Busy Prod Only, Busy Moving, Ready Idle, Ready for Prod, Reference Stat or Disabled.

Input CC - The Input CC setting is preset for Prod Mode Trigger and cannot be changed.

Input 1 - The Input 1 setting is preset for Prod Mode Trigger and cannot be changed.

Input 2 Config - The Input 2 Config settings determines the signal type for the 2nd input. The input signal can be either Clear Fault & Reference, Fluid Mode Trigger or Enable Motion. Refer to section 3.3.9.3.

Input 3 Config - The Input 3 Config settings determines the signal type for the 2nd input. The input signal can be either Clear Fault & Reference, Fluid Mode Trigger or Enable Motion. Refer to section 3.3.9.3.

Input 4 Config - The Input 4 Config settings determines the signal type for the 2nd input. The input signal can be either Clear Fault & Reference, Fluid Mode Trigger, Enable Motion, "EN FP RS", "EN FP RS, VC", "EN FP RS, VC, PD","EN FP RG&S", "EN FP RG&S, VC", "EN FP RG&S, VC, PD" . Refer to section 3.3.9.3.

To change a value;

1. Press the Arrow push-buttons to highlight the parameter.
2. Press the Enter push-button to bring up either the Select New Value or Enter New Value screen.
3. In the Select New Value screen use the up and down arrow push-buttons to select the value. In the Enter New Value screen press the Minimum or Maximum push-buttons to select the desired value or use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value.
4. Press the Enter push-button.

3.3.7.8 Setup C Screen

	D = Display	P = Push-button Accessible		Supervisor	
	C = Display/Change	N = Not Accessible/Viewable		I/O Test	
			Operator		

```
 0  SETUP C                    ←— status —→
 2
 3         MOTOR BASE  =  #
 4
 5    STALLS PER FAULT  =  # STALLS
 6
 7      STOP POSITION  =  ## DEG
 8
 9            TORQUE  =  MEDIUM
10
11     ACCELERATION  =  MEDIUM
12
13
14  SETUP B      SYSTEM    REFERENCE    CLEAR
15  SCREEN       INFO                TOTALIZER
```

Description	Operator	I/O Test	Supervisor
----- Displays the Controller Module Status........	D	D	D
----- Display/change the motor/base type...........	D	D	C
----- Display/change the stalls per fault setting...	D	D	C
----- Display/change the stop position................	D	D	D
----- Display/change the torque setting	D	D	C
----- Display/change the acceleration setting......	D	D	C

The following screens are accessible from this screen based on the system status.

	Operator	I/O Test	Supervisor
Setup B	P	P	P
System Info	P	P	P
Clear Totalizer	P	P	P

Setup C Screen Description - The Setup C screen displays some additional settings for the Controller Module and allows a user with Supervisor permission to change the parameters. The current permission level determines which push-buttons are available as shown.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

Motor Base - The Motor Base setting displays the current Motor Base selection. This setting has to match the Motor Base the Controller is connected to for the system to operate properly. The selection can be either 0, 1, 2, 3, 4, 5, 6 or 7. Refer to Table 3.3 at the end of these screen descriptions.

Stalls Per Fault - The Stalls Per Fault setting displays the current selection for the number of stalls to initiate a fault. The selection can be any number from 1 and 15.

Stop Position - The Stop Position setting displays the current piston stop position. The selection can be any number from 0 and 330. Zero is at the crossover from intake to discharge in forward direction and the value increases clockwise, regardless of the operating direction. When Forward direction is used for Dispense or Meter, the default value of 90 is suggested, but a value between 30 and 150 may improve performance. When Reverse direction is used for Dispense or Meter, 270 is suggested, but a value between 210 and 330 may improve performance.

Torque - The Torque indicates the current torque setting for the motor. The setting can either be Low, Medium or High. Motor/ Base 6 should use the high setting. Refer to section 3.1.8 for additional information.

Acceleration - Acceleration determines how fast the motor gets up to full speed when first started. The acceleration can either be Slow, Medium, Fast or Fire-Off. Medium acceleration should work for most applications and is the system default value. Faster acceleration values, if combined with larger motor sizes or high viscosity fluids / large displacement volumes, may cause nuisance faults. Refer to section 3.1.6 for additional information.

To change a value;

1. Press the Arrow push-buttons to highlight the parameter.
2. Press the Enter push-button to bring up either the Select New Value or Enter New Value screen.
3. In the Select New Value screen use the up and down arrow push-buttons to select the value. In the Enter New Value screen press the Minimum or Maximum push-buttons to select the desired value or use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value.
4. Press the Enter push-button.

3.3.7.9 Drawback Screen

	D = Display	P = Push-button Accessible	Supervisor
	C = Display/Change	N = Not Accessible/Viewable	I/O Test
			Operator

```
 0  DRAWBACK                  <— status —>     ----- Displays the Controller Module Status........   D  D  D

 2
 3
 4    DRAWBACK VOLUME = #.## STROKES            ----- Display/change the drawback volume ........   D  D  C
 5      DRAWBACK RATE = #### RPM                ----- Display/change the drawback rate..............  D  D  C
 6     DRAWBACK DWELL = #.## SEC                ----- Display/change the drawback dwell...........   D  D  C
 7
 8
 9
10
11
12
13
14
15                              BACK           ----- Display/change the drawback dwell............  N  N  P
```

Drawback Screen Description - The Drawback screen displays the current Drawback parameters and allows a user with Supervisor permission to change the parameters. The current permission level determines which push-buttons are available as shown. Refer to section 3.1.7 for description of Drawback.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

Drawback Volume - The Drawback Volume is the number of strokes drawn back during a drawback cycle. A drawback volume of zero disables drawback while a drawback volume greater than zero enables drawback. The range is 0.00 to 5.00 with an increment value of 0.01.

Drawback Rate - The Drawback Rate is the rate of the pump in RPM during a drawback operation. The range is 1 to 1500 with an increment value of 1.

Drawback Dwell - The Drawback Dwell is the number of seconds between the end of a dispense and the beginning of the drawback cycle. The range is 0.00 to 2.55 with an increment value of 0.01.

NOTE

When using a 34 Frame Motor the minimum setting must be 0.05 or greater.

To change a value;

1. Press the Arrow push-buttons to highlight the parameter.
2. Press the Enter push-button to bring up either the Select New Value or Enter New Value screen.
3. In the Select New Value screen use the up and down arrow push-buttons to select the value. In the Enter New Value screen press the Minimum or Maximum push-buttons to select the desired value or use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value.
4. Press the Enter push-button.

NOTE

Changing Drawback Volume, Drawback Rate or Drawback Dwell affects the drawback settings for both Dispense and Meter modes. The drawback settings do not affect Prime or Agitate modes as these modes do not provide Drawback.

3.3.7.10 Auto Trig Screen

	Supervisor
D = Display P = Push-button Accessible	**I/O Test**
C = Display/Change N = Not Accessible/Viewable	**Operator**
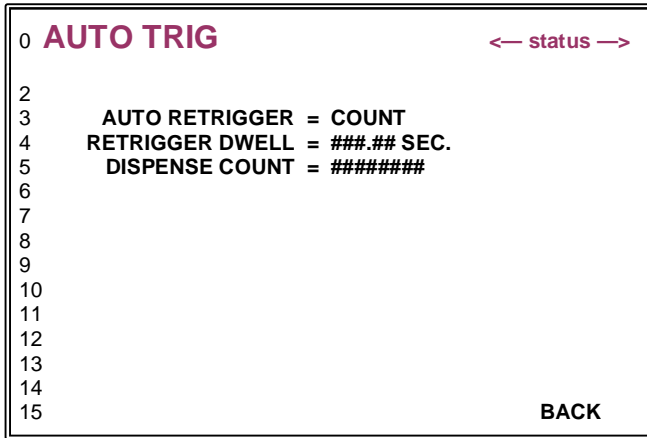
```
0  AUTO TRIG              <— status —>      ----  Displays the Controller Module Status........   D  D  D

2
3      AUTO RETRIGGER  = COUNT
4      RETRIGGER DWELL = ###.## SEC.          ----  Display/change the auto retrigger mode .....   D  D  C
5      DISPENSE COUNT  = #######              ----  Display/change the retrigger dwell..............   D  D  C
6                                             ----  Display/change the dispense count ............   D  D  C
7
8
9
10
11
12
13
14
15                            BACK            ----  Returns to the setup A screen ....................   P  P  P
```

Auto Trig Screen Description - The Auto Trig screen displays the information for Auto Trigger and allows a user with Supervisor permission to change the parameters. The current permission level determines which push-buttons are available as shown. Refer to section 3.3.1.3 for a description of Auto Trig.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

Auto Retrigger - The Auto Retrigger setting indicates the current mode of the trigger. The mode can either be Disabled, Count or Infinite. (Refer to section 3.3.1.3)

Retrigger Dwell - The Retrigger Dwell indicates the amount of time in seconds between a dispense and the next auto retrigger. The range is 0.0 seconds to 300.0 seconds with an increment value of 0.01. (Refer to section 3.3.1.3)

Dispense Count - The Dispense Count indicates the total number of dispenses to be triggered. The range is 2 to 65535 with an increment value of 1. (Refer to section 3.3.1.3)

To change a value;
1. Press the Arrow push-buttons to highlight the parameter.
2. Press the Enter push-button to bring up either the Select New Value or Enter New Value screen.
3. In the Select New Value screen use the up and down arrow push-buttons to select the value. In the Enter New Value screen press the Minimum or Maximum push-buttons to select the desired value or use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value.
4. Press the Enter push-button.

NOTE

Auto Trig settings only affect Dispense Mode operation. Auto Trig settings do not affect Meter Mode, Prime Mode, or Agitate Mode operation.

3.3.7.11 Prod Dwells Screen

D = Display   P = Push-button Accessible   Supervisor
C = Display/Change N = Not Accessible/Viewable I/O Test
   Operator

	Operator	I/O Test	Supervisor
0 **PROD DWELLS** ←— status —→ ---- Displays the Controller Module Status	D	D	D
4 PRE-OP DWELL = #.## SEC. ---- Display/change the pre-op dwell time	D	D	C
5 POST-OP DWELL = #.## SEC. ---- Display/change the post-op dwell time	D	D	C
15 BACK ---- Returns to the setup A screen	P	P	P

Prod Dwells Screen Description - The Prod Dwells screen displays the production dwell time information and allows a user with Supervisor permission to change the parameters. The current permission level determines which push-buttons are available as shown.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

Pre-Op Dwell - The Pre-Op Dwell indicates the delay time in seconds between a logic signal transition or Start and pump operation in Production mode. The range is 0.00 seconds to 2.55 seconds with an increment value of 0.01. (Refer to section 3.3.1.4)

Post-Op Dwell - The Post-Op Dwell indicates the time in seconds from the end of a production operation and the logic output signal becomes inactive. The range is 0.00 seconds to 2.55 seconds with an increment value of 0.01. (Refer to section 3.3.1.4)

To change a value;
1. Press the Arrow push-buttons to highlight the parameter.
2. Press the Enter push-button to bring up either the Select New Value or Enter New Value screen.
3. In the Select New Value screen use the up and down arrow push-buttons to select the value. In the Enter New Value screen press the Minimum or Maximum push-buttons to select the desired value or use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value.
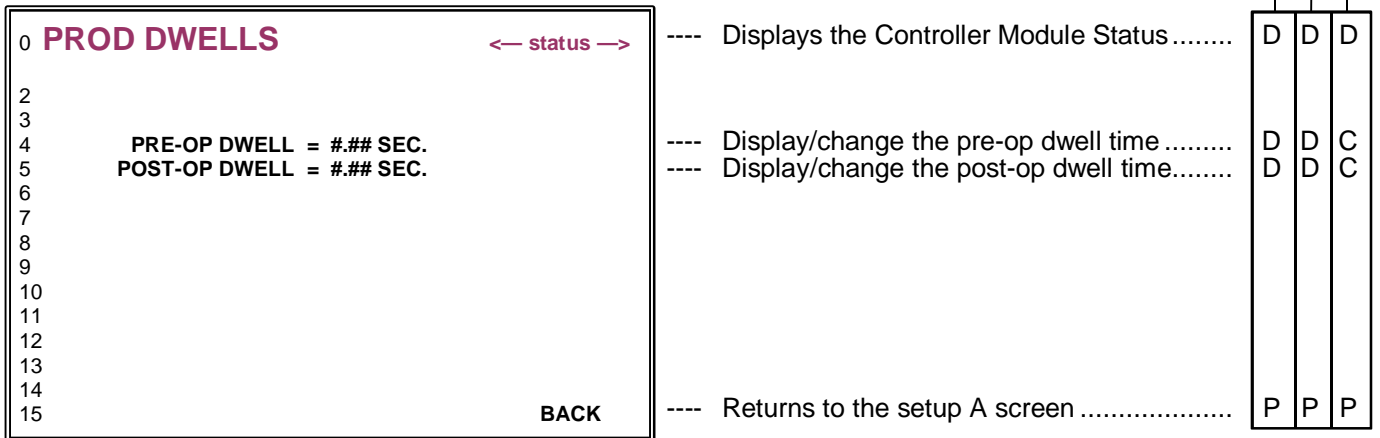4. Press the Enter push-button.

NOTE

Production Dwell settings only affect Dispense Mode and Meter Mode operations. Production Dwell settings do not affect Prime Mode or Agitate Mode operation.

3.3.7.12 System Info Screen

D = Display   **P = Push-button Accessible**
C = Display/Change   **N = Not Accessible/Viewable**

Supervisor
I/O Test
Operator

```
0  SYSTEM INFO                    <— status —>
2
3     FIRMWARE VERSION = HT######
4        FIRMWARE CRC = ###########
5       SERIAL NUMBER = ###########
6
7           ASSERTS SW = ###########
8      ASSERTS SW CODE = ###############
9           ASSERTS HW = ###############
10     ASSERTS HW CODE = ###########
11
12            http://www.ivek.com
13
if NOT faulted
14     SETUP C                      CONTRAST
15     SCREEN                       ADJUST

OR if faulted
14     SETUP C          FAULT       CONTRAST
15     SCREEN           SCREEN      ADJUST
```

Description	Operator	I/O Test	Supervisor
----- Displays the Controller Module Status........	D	D	D
----- Displays the firmware version.....................	D	D	D
----- Displays the firmware CRC	D	D	D
----- Displays the serial number	D	D	D
----- Displays the asserts SW	D	D	D
----- Displays the asserts SW code....................	D	D	D
----- Displays the asserts HW	D	D	D
----- Displays the asserts HW code....................	D	D	D

The following screens are accessible from
this screen based on the system status.

	Operator	I/O Test	Supervisor
Setup C	P	P	P
Contrast Adjust	P	P	P
Fault	P	P	P

System Info Screen Description - The System Info screen displays information about the Controller Module. The current permission level determines which push-buttons are available as shown.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

Firmware Version - The Firmware Version displays the current version of firmware installed on the Controller Module.

Firmware CRC - The Firmware CRC confirms the integrity of the firmware in the controller.

Serial Number - The Serial Number is a unique identifier assigned to the Controller Module and should be used when calling IVEK Corporation with problems or questions. The serial number should match the serial number on the tag located on the rear of the Controller Module.

Asserts SW - For IVEK use only.

Asserts SW Code - For IVEK use only.

Asserts HW - For IVEK use only.

Assert HW Code - For IVEK use only.

3.3.7.13 Select New Value and Enter New Value Screens

	D = Display	P = Push-button Accessible	Supervisor
	C = Display/Change	N = Not Accessible/Viewable	I/O Test
			Operator

```
0  ENTER NEW VALUE

2
3      Value Label (units)
4      0###########
5
6
7      ########### MAXIMUM
8      ########### MINIMUM
9
10     ########### INCREMENT
11
If help NOT pressed
12
13
If help pressed
12 Help message line 1 for value…
13 Help message line 2 for value…
14
15    HELP      MINIMUM     MAXIMUM    CANCEL
```

	Operator	I/O Test	Supervisor
----- Displays the parameter to be changed	D	D	D
----- Display/change the value	D	D	C
----- Displays the maximum value.....................	D	D	D
----- Displays the minimum value......................	D	D	D
----- Displays the increment value....................	D	D	D
----- Returns to the previous screen..................	P	P	P
----- Sets the value to the maximum setting.......	P	P	P
----- Sets the value to the minimum setting........	P	P	P
----- Displays information on selected value.......	P	P	P

	Supervisor
	I/O Test
	Operator

```
0  SELECT NEW VALUE

2
3 Value Label
4      Selection 1
5      Selection 2
6
7
8
9
10
11
If help NOT pressed
12
13
If help pressed
12 Help message line 1 for selection…
13 Help message line 2 for selection…
14
15    HELP                        CANCEL
```

	Operator	I/O Test	Supervisor
----- Display/select the available values	D	D	C
----- Returns to the previous screen...................	P	P	P
----- Displays information on selected value.......	P	P	P

Enter New Value Description - The Enter New Value screen allows entry of a numerical value within the indicated range. This screen is only accessible with Supervisor permission.

Upon reaching the Enter New Value screen press the Minimum or Maximum push-buttons to select the desired value or use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value. Press the Enter push-button to store the new value and return to the previous screen or press cancel to ignore the change.

Parameter - The first two lines of this screen display the parameter to be changed and the current value.

Maximum - Displays the maximum possible value for the parameter.

Minimum - Displays the minimum possible value for the parameter.

Increment - Displays the incremental value for the parameter.

Select New Value Screen Description - The Select New Value screen selects a value from a list of values. This screen is only accessible with Supervisor permission.

Upon reaching the Select New Value screen use the up and down arrow push-buttons to select the value. Press the Enter push-button to store the new value and return to the previous screen.

Parameter - The first line of this screen displays the parameter to be changed. The available choices start at the second line.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

3.3.7.14 Change Permission Screen

				Supervisor
D = Display	**P = Push-button Accessible**		I/O Test	
C = Display/Change	**N = Not Accessible/Viewable**	Operator		

```
0  CHANGE PERMISSION

2
3        0#### ENTER PASSWORD               ----- Display/change the password....................   D  D  C
4
5 INVALID PASSWORD (conditionally visible)   ----- Displays invalid password message ..........   D  D  D
6
7
8
9 CURRENT PERMISSION = OPERATOR              ----- Displays the current permission.................   D  D  D
10
11
If help NOT pressed
12
13
If help pressed
12 Help message line 1…
13 Help message line 2…
14           TO         CHANGE
15   HELP    OPERATOR   PASSWORD   BACK      ----- Returns to the setup A screen ....................   N  N  P
                                            ----- Switches to the change password screen ...   N  N  P
                                            ----- Changes the permission to operator...........   N  N  P
                                            ----- Displays information on permissions ..........   N  N  P
```

Change Permission Screen Description - The Change Permission screen is used to change the permission to a lower or higher level. This allows additional or more restrictive access to parameters and screens. The current permission level determines which push-buttons are available as shown.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

Enter Password - This field is used to enter the password for the desired permission level. Each permission level has a unique password to prevent unauthorized access to certain parameters. The permission level can either be Operator, I/O Test or Supervisor. Use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value. The minimum value for a password is '10'.

NOTE

Entering a password causes the password field to reset to the minimum value.

3.3.7.15 Change Password and Enter New Password Screens

D = Display   **P = Push-button Accessible**
C = Display/Change   **N = Not Accessible/Viewable**

Supervisor
I/O Test
Operator
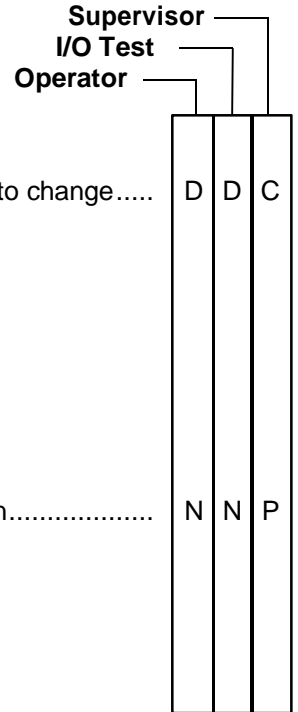
```
0   CHANGE PASSWORD

2
3   OPERATOR (select w/arrows)
4   I/O TEST
5   SUPERVISOR
6
7
8
9
10
11
12
13
14
15                              DONE
```

----- Display/select the permission to change..... | D | D | C |

----- Returns to the previous screen................... | N | N | P |

Supervisor
I/O Test
Operator
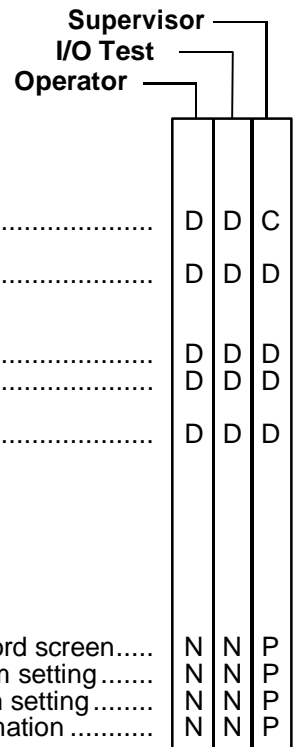
```
0  ENTER NEW PASSWORD

2
3  NEW PASSWORD
4      0####
5  DUPLICATE PASSWORD, ENTER NEW VALUE
                    (conditionally visible)
6
7      #### MAXIMUM
8      #### MINIMUM
9
10     #### INCREMENT
11
If help NOT pressed
12
13
If help pressed
12 Help message line 1…
13 Help message line 2…
14
15   HELP      MINIMUM    MAXIMUM    CANCEL
```

----- Display/change the password.................... | D | D | C |

----- Displays error message .... | D | D | D |

----- Displays the maximum value..................... | D | D | D |
----- Displays the minimum value...................... | D | D | D |

----- Displays the increment value..................... | D | D | D |

----- Returns to the change password screen..... | N | N | P |
----- Sets the value to the maximum setting....... | N | N | P |
----- Sets the value to the minimum setting........ | N | N | P |
----- Displays password help information .... | N | N | P |

Change Password and Enter New Password Screens Description - The Change Password screen selects the permission level and the Enter New Password screen allows a user with Supervisor permission to change the password. This screen is only accessible with Supervisor permission.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

New Password - The Password is changed here or press the Minimum or Maximum push-button to enter that value.

Minimum - Displays the minimum possible value for the password. The minimum value is 10.

Maximum - Displays the maximum possible value for the password. The maximum value is 65535.

Increment - Displays the incremental value for the password. The increment value is 1.

To change the password;

1. Use the up and down arrow push-buttons to select the permission.
2. Press the Enter push-button to bring up the Enter New Password screen.
3. Press the Minimum or Maximum push-buttons to select the desired value or use the left and right arrow push-buttons to select the digit and the up and down arrow push-buttons to change the digit's value.
4. Press the Enter push-button.

<div align="center">**NOTE**</div>

The last password cannot be retrieved. Keep a record of changed passwords in a secure place.

IVEK cannot retrieve lost passwords, they can only be reset. Resetting the parameters resets all passwords and setups back to factory defaults and clears all recipes. Refer to section 3.3.7.15.

3.3.7.16 Contrast Adjust Screen

D = Display   P = Push-button Accessible
C = Display/Change   N = Not Accessible/Viewable

Supervisor
I/O Test
Operator
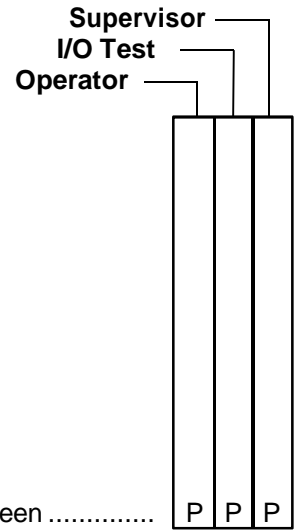
```
0  CONTRAST ADJUST

2
3  Press UP Arrow to increase contrast
4  Press DOWN Arrow to increase contrast
5
6  Press SELECT to save and exit
7  Press CANCEL to exit without saving
8
9
10
11
12
13
14
15                              CANCEL
```

----- Returns to the system info screen .... | P | P | P |

Contrast Adjust Screen Description - The Contrast Adjust screen is used to change the contrast on the screen to compensate for changes in light levels within the room and changes in the display due to temperature. The current permission level determines which push-buttons are available as shown.

NOTE

The Contrast Adjust screen may not be available on all units.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

Use the up arrow to increase the contrast and the down arrow to decrease the contrast. Once acceptable, press the select push-button to keep the contrast setting or cancel to revert back to the original setting.

NOTE

The contrast may change with temperature.

3.3.7.17 Recipe Screen

	D = Display	**P = Push-button Accessible**	
	C = Display/Change	**N = Not Accessible/Viewable**	

	Operator	I/O Test	Supervisor

```
0  RECIPE

2
3  SAVE AS (OR GET FROM)
4
5
6      RECIPE = ##            ----- Display/enter the recipe number.................  D  D  C
7
8
9  BLANK RECIPE, SELECT AGAIN (conditionally visible)  ----- Displays error message ...........................  D  D  D
10
11
If help NOT pressed
12
13
If help pressed
12 Help message line 1…
13 Help message line 2…
14
15     HELP                         CANCEL   ----- Returns to the previous screen..................  P  P  P
                                             ----- Displays recipe help information................  P  P  P
```

3.3.7.18 Warning Recipe Exists Screen

	D = Display	**P = Push-button Accessible**	
	C = Display/Change	**N = Not Accessible/Viewable**	

	Operator	I/O Test	Supervisor

```
0  WARNING

2  RECIPE EXISTS

4
5  "REPLACE" TO REPLACE WIT HNEW VALUES
6  "CANCEL" TO SELECT NEW RECIPE NUMBER
7
8
9
10
11
12
13
14
15    REPLACE                       CANCEL   ----- Returns to the previous screen..................  N  N  P
                                             ----- Replaces the existing recipe with a new one  N  N  P
```

Recipe Screen Description - The Recipe screen is used to select an existing recipe to load into the Controller Module, save a changed recipe to the same number or a new number, or save a new recipe to an existing number or a new number. The current permission level determines which push-buttons are available as shown.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

NOTE

The supervisor permission level is the only level allowed for saving recipes. Any permission level may get recipes.

Warning Recipe Exists Screen Description - The Warning Recipe Exists screen is intended to prevent accidently overwriting an existing recipe. This screen will appear and offer a choice of either replacing the existing recipe or canceling and not replacing the existing recipe. The current permission level determines which push-buttons are available as shown.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

3.3.7.19 Clear Totalizer Screen

Supervisor
D = Display   **P = Push-button Accessible**   **I/O Test**
C = Display/Change   **N = Not Accessible/Viewable**   **Operator**
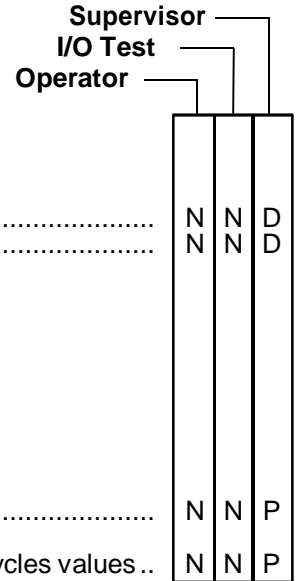
```
0  CLEAR TOTALIZER

2
3        TOTAL VOLUME = ########## STROKES        ----- Displays the total volume ...........................  N  N  D
4        TOTAL CYCLES = #########                 ----- Displays the total cycles............................  N  N  D
5
6
7
8
9
10
11
12
13
14
15   CLEAR                        BACK             ----- Returns to the setup C screen....................  N  N  P

     -------------------------------------------  ----- Clears the total volume and cycles values ..  N  N  P
```

3.3.7.20 Reset Parameter Warning Screen

Supervisor
D = Display   **P = Push-button Accessible**   **I/O Test**
C = Display/Change   **N = Not Accessible/Viewable**   **Operator**
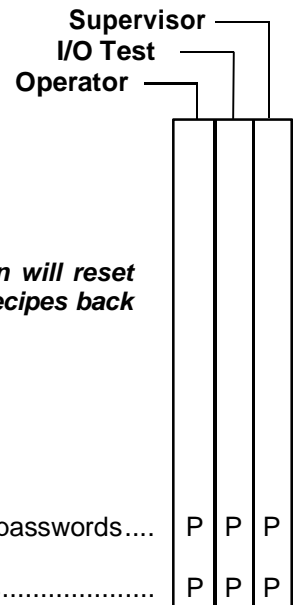
```
0  RESET PARAMETERS

2  WARNING                                                    CAUTION
3
4
5                                              Pressing the ERASE push-button will reset
6  PUSH "ERASE" TO ERASE ALL RECIPES           all parameters, passwords and recipes back
7  AND RESET PASSWORDS!                        to the original factory settings.
8
9  PUSH "KEEP" TO KEEP RECIPES AND
10  PASSWORDS
11
12
13
14
15   KEEP                        ERASE          ----- Erases all recipes and resets passwords....  P  P  P

     -------------------------------------------  ----- Keeps recipes and passwords...................  P  P  P
```

Clear Totalizer Screen Description - The Clear Totalizer screen displays the total volume and cycles since the last clear and allows these values to be reset to 0. The current permission level determines which push-buttons are available as shown.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

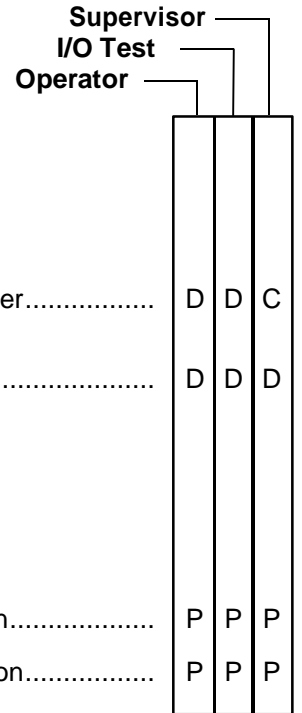**Reset Parameter Warning Screen Description -** The Reset Parameter Warning screen is intended to prevent accidently resetting all the Controller Module parameters. This screen opens when the FPB3 and Down Arrow buttons are held continuously for six seconds during power up. The choice is either keeping the current parameters or resetting all the parameters to their default value. The current permission level determines which push-buttons are available as shown.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

3.3.7.21 Fault Screen

			Supervisor		

```
                        D = Display          P = Push-button Accessible        I/O Test
                        C = Display/Change   N = Not Accessible/Viewable       Operator
```

	Operator	I/O Test	Supervisor
Displays the Controller Module status	D	D	D
Displays the fault description	D	D	D
Displays the fault error code	D	D	D
Clears the displayed fault	P	P	P
Switches to the Setup A screen	P	P	P

```
0  FAULT                    <— status —>     ----- Displays the Controller Module status ........ D D D
2
3  Motor Stall Fault                         ----- Displays the fault description ..................... D D D
4  Error Code: #########                     ----- Displays the fault error code ...................... D D D
5
6
7
8
9
10
11 "CLEAR FAULT" = CLEAR FAULT & REFERENCE
12 "SETUP A SCREEN" = CHANGE VALUES FIRST
13
14    SETUP A      CLEAR
15    SCREEN       FAULT                      ----- Clears the displayed fault .......................... P P P

                                             ----- Switches to the Setup A screen ................ P P P
```

Fault Screen Description - The Fault screen displays faults which cause the system to stop operating. The current permission level determines which push-buttons are available as shown.

The Start push-button is not functional, but the Stop push-button is functional while this screen is visible.

The Fault description lists the operational fault. The error code is a numerical value and is to be used by IVEK Technical Service personnel. Normal operational faults will cause an error code of '0'.

Status - The status indicates the operational state of the system. Refer to section 3.3.8 for an explanation of each status type.

3.3.7.22 I/O Test Screen

D = Display	**P = Push-button Accessible**	
C = Display/Change	**N = Not Accessible/Viewable**	

Supervisor
I/O Test
Operator

```
 0  I/O TEST

 2
 3    TRIGGER IN = OFF          INPUT 3 = OFF
 4       INPUT 2 = OFF          INPUT 4 = OFF
 5    CC TRIG IN = OFF
 6                            READY OUT = OFF
 7                            FAULT OUT = OFF
 8                         CONFIG OUT 3 = OFF
 9                         CONFIG OUT 4 = OFF
10                         AUXILIARY OUT = OFF
11              RS232              RS485
12  IN       <no input>        <disabled>
13  OUT       232 test
14
15                                      BACK
```

Description	Operator	I/O Test	Supervisor
----- Displays the trigger in and input 3 setting....	N	D	D
----- Displays the input 2 and input 4 settings	N	D	D
----- Displays the CC trig in setting	N	D	D
----- Display/change the ready out......................	N	D	C
----- Display/change the fault out.......................	N	C	C
----- Display/change the config out 3	N	C	C
----- Display/change the config out 4	N	C	C
----- Display/change the auxiliary out.................	N	C	C
----- Displays in test data....................................	N	D	D
----- Displays out test data.................................	N	D	D
----- Returns to the setup B screen.....................	N	P	P

I/O Test Screen Description - The I/O Test screen is used for trouble shooting the inputs and outputs of the Controller Module. Each input and output can be exercised to verify functionality. The current permission level determines which push-buttons are available as shown.

The Start and Stop push-buttons are not functional with this screen. The screen will not affect the inputs and outputs while an operation is in progress. Therefore, any operations in progress must be stopped before testing the inputs and outputs.

Trigger In, Input 2, Input 3, Input 4, CC Trig In - The status of the input signals are displayed here. The status will be either OFF if no external signal is applied or ON if a signal is applied.

Ready Out, Fault Out, Configurable Out 3, Configurable Out 4, Auxiliary Out - The status of the output signals are displayed and changed here. A status of OFF indicates the output is not conducting and a status of ON indicates the output is conducting.

RS232 - The RS232 In displays data being received through the interface, "<no input>" appears and scrolls off as characters are received. The text "232 test" flashes on the screen at RS232 Out as the text is sent through the interface.

RS485 - The RS485 connection has not been configured and is reserved for a future enhancement.

To change a value;

1. Press the Arrow push-buttons to highlight the parameter.
2. Press the Enter push-button to bring up the Select New Value screen.
3. Press the Arrow push-buttons to select the desired value.
4. Press the Enter push-button.

Motor/ Base Value	Description	Motor/Base Part Number	Motor/Base Description
0	none selected	(none)	(none)
1	Microspense AP (6-lead)	102006-1### 102009-1### 102118-1 102144-1# 102150-01 102150-02 102150-03 102150-10 102193-1 102194-1#	Rotary Adjust, Size 23, Double End, Step Rotary Adjust, Size 23, Single End, Step Microspense AP, Sgl End; Stepper Motor Microspense AP, Dbl End; Stepper Motor Microspense AP Sgl End Panel Mounted; ST 14Ga Microspense AP Sgl End Panel Mounted; ST 16Ga Microspense AP Sgl End Panel Mounted; ST 18Ga Microspense AP Sgl End Panel Mounted; ST 12Ga Microspense AP, Sgl End,W/120 CCW Flag Mod; Stepper AP, Dbl End, 120° CCW Flag; Step Mtr
2	Microspense AP RE (6-lead)	102006-2### 102009-2### 102118-2 102144-2# 102150-04 102150-05 102150-06 102150-11 102193-2 102194-2#	Rotary Adjust, Size 23, Double End, RE Rotary Adjust, Size 23, Single End, RE Microspense AP Sgl End; Rare Earth Motor Microspense AP Dbl End; RE Microspense AP Sgl End Panel Mounted; RE 14GA Microspense AP Sgl End Panel Mounted; RE 16GA Microspense AP Sgl End Panel Mounted; RE 18GA Microspense AP Sgl End Panel Mounted; RE 12GA Motor/Base Module, AP,Sgl End, W/120 CCW Flag Mod; Step, RE AP, Dbl End, 120° CCW Flag; RE Step Mtr
3	Microspense AP (4-lead)	102208 102209-#	Motor/Base Module, Microspense AP, Sgl End, Style 3 Motor/Base Module, Microspense AP, Dbl End Style 3;
4 1 Stack	Standard and HD 132383-01 (6-lead)	092117-##1 092128-##1# Motor/Base, H.D. W/AP Mtng., Dbl	Motor/Base Module, Sgl End Heavy Duty (HD); 1-ST Motor/Base Module, Dbl End, Heavy Duty; 1-Stack Motor
5 2 Stack	Standard and HD 132275 (6-lead)	092117-##2 092128-##2# Enclosure Assembly, Pump, 1 Channel 132383-02	Motor/Base Module, Sgl End Heavy Duty; 2-Stack Motor/Base Module, Dbl End, Heavy Duty; 2-Stack Motor Motor/Base Module, W/AP MTNG., Dbl End; 2 Stk Stepper
6 3 Stack	Standard and HD 3 Stack (6-lead)	092117-##3 092128-##3# 092301-##3 132383-03	Motor/Base Module, Sgl End, Heavy Duty; 3-Stack Motor/Base Module, Dbl End, Heavy Duty; 3-Stack Motor Motor/Base Module, Sgl End, HD W/Cust Spindle Fab; Motor/Base Module, H.D. W/AP Mtng., Dbl End; 3 Stack Stepper
7	Heavy Duty (4-lead)	092297-## 092298-###	Motor/Base Module, Sgl End, Heavy Duty, Style 3; Motor/Base Module, Dbl End, Heavy Duty, Style 3;

NOTE: If the model number for your Motor/Base is not in the table, contact IVEK Technical Service with both the model number and serial number.

Table 3.3 Motor/Base Value Selection

3.3.8   Status

The status indicates the operational state of the system. The status is displayed in the upper right hand corner of the display on the Power-Up, Prime, Bubble Clear, Agitate, Dispense, Drawback, Meter, Meter Mult, Setup A, Auto Trig, Setup B, Setup C, Encoder, System Info, and Fault screens. The status will be one of the following:

IDLE   No operations are active, pump is selected, motion is not disabled, no operating faults exists

PRIMING   The Prime operation is active.
DISPENSING   A Dispense operation is active.
METERING   A Meter operation is active.
DRAWBACK DWELL The Dispense or Meter operation is currently dwelling before drawback
DRAWBACK   The Dispense or Meter operation is currently performing a drawback
CLEARING FAULT   A fault is being cleared
FAULTED   An operating fault exists
REFERENCING   A Reference operation is active
MOTION STOPPED   All motion has been disabled via either a logic signal or a serial command
NOTCONFIGURED   Motor/Base selection is set to 0
INITIALIZING   The system is initializing upon power-up
PRE-OP DWELL   A pre-operation dwell is occurring during a Production Mode operation
POST-OP DWELL   A post-operation dwell is occurring during a Production Mode operation
AUTOTRIG IDLE   A dwell is occurring between Auto Triggered Dispense operations
ISOLATING   The Isolation portion of an Agitate operation is active
AGITATING   The Agitate portion of an Agitate operation is active
RETURNING   The Return portion of an Agitate operation is active

3.3.9   Rear Panel Interfaces

The rear panel has two terminal strips and two connectors for interfacing with additional equipment. The terminal strips provide a connection for an external trigger and a configurable output. The connectors provide a Logic I/O interface and a RS232 serial interface.

3.3.9.1 CC TRIG Terminal Strip

If an external contact closure is to be used to initiate Dispense or Meter operation, connect it to the CC TRIG terminal strip. Do not connect any external power source to this terminal strip. The internal power source for this signal is optically isolated from the internal control electronics (isolated power shared with RS232 Serial Interface). See section 3.3.9.1 for signal descriptions.

3.3.9.2 AUX OUT Terminal Strip

Select the function of the Auxiliary Output on the Setup B screen (see 3.3.7.7). This signal will switch an externally-powered device. The AP function is used with Microspense AP Motor/Base to automatically change the pump displacement during priming. Configure the Auxiliary Output for "En Fluidic" mode when using the AP function.

An external power supply, pneumatic solenoid valve and compressed air source are required. (See the Microspense AP Motor/ Base chapter for more information.) The Nozzle Enable function is used to enable electrically-actuated nozzles. Timing adjustment of the Auxiliary Output is provided by the Production Dwells. The pre-op dwell allows the signal to energize for up to 2.55 seconds before fluid movement, and the post-op dwell allows the signal to remain energized for up to 2.55 seconds after fluid movement. Configure the Auxiliary Output for En Prod when using the Nozzle Enable function.

Input 2 Config h12	Input 3 Config h13	Input 4 Config h14	Screen Text	Value for Serial Interface	Input Function
X	X	X	CLEAR FAULT & REF	0	Activate input to clear fault and initiate reference if required
X	X	X	FLUIDIC MODE TRIGGER	1	Activate input to initiate the currently configured Fluidic Setup Mode operation
X	X	X	ENABLE MOTION	2	Activate input to enable motion and deactivate to disable motion. Disabling motion while idle will inhibit operations from triggering. Disabling motion while an operation is active will generate a Motion Disabled During Operation Fault.
		X	EN FP RS	3	Activate input to Enable Front Panel Recipe Save function button
		X	EN FP RS VC	4	Activate input to Enable Front Panel Recipe Save function button and Value Changes
		X	EN FP RS VC PD	5	Activate input to Enable Front Panel Recipe Save function button, Value Changes, and Prime Direction function button
		X	EN FP RG&S VC	6	Activate input to Enable Front Panel Recipe Get & Save buttons and Value Changes
		X	EN FP RG&S VC PD	7	Activate input to Enable Front Panel Recipe Get & Save buttons, Value Changes, and Prime Direction function buttons
		X	EN FP RG&S VC PD S	8	Activate input to Enable Front Panel Recipe Get & Save buttons, Value Changes, Prime Direction function buttons, and Start and Stop buttons

Ready Output Table				
Operating States Sub-states	FLUID=RDY FLT=RDY	FLUID=RDY FLT=BSY	FLUID=BSY FLT=RDY	FLUID=BSY FLT=BSY
Idle	C	C	C	C
Idle, Reference Recommended	C	C	C	C
Idle, Production Mode Disabled	C	C	C	C
Idle, Fluidic Mode Disabled	C	C	C	C
Idle, Motor/Base Not Selected	NC	NC	NC	NC
Idle, Motion Stopped	NC	NC	NC	NC
Idle, Autotrigger Dwell	NC	NC	NC	NC
Initializing	NC	NC	NC	NC
Faulted	C	NC	C	NC
Referencing	C	NC	C	NC
Fluidic Mode Active	C	C	NC	NC
Production Mode Operating	NC	NC	NC	NC

3.3.9.3 LOGIC I/O Interface

The LOGIC I/O Interface provides connections between the Controller Module and the customer's PLC. Trigger input, ready out and fault out signals are communicated to and from the PLC.

Signal Functions

Trigger In - The 'Trigger In' signal initiates a cycle based on the current value for MODE (Dispense, Meter or Disabled). The trigger has no effect if 'Disabled'.

Dispense Mode - When the Controller Module is properly configured for Dispense mode, the Controller Module is triggered at the transition when a signal is applied to the system trigger. When autoretrigger is enabled, the autoretrigger sequence begins at the transition when a signal is applied to the system trigger. The autoretrigger sequence will end when the signal is removed from the system trigger. Note: if a dispense operation is in progress during the removal of the system trigger signal, the operation will continue until the configured dispense volume is fully dispensed.

Meter Mode - When the Controller Module is properly configured for Meter mode, the Controller Module is triggered as long as a signal is applied to the system trigger. If the Stop Mode is configured for Stop Position, the pump will continue to the Stop Position after the trigger signal is removed. If the Stop Mode is configured for Stop Immediate, the pump will stop immediately upon removal of the trigger signal (with a little distance required for de-acceleration).

Config In 2 - The Config In 2 signal initiates either a Clear Fault & Ref, Fluidic Mode Trigger, or can be used to enable motion.

Config In 3 - The Config In 3 signal initiates either a Clear Fault & Ref, Fluidic Mode Trigger, or can be used to enable motion.

Config In 4 - The Config Inp 4 setting determines the signal function for the 4th input. Refer to the following table for selections. For "front panel enable" functions, the indicated functions are only enabled when the input is applied, all other front panel functions are enabled regardless of the input (with the correct permission level).

Fault Output Table	
Fault Output	**Fault**
Idle	C
Idle, Reference Required	C
Idle, Production Mode Disabled	C
Idle, Fluidic Mode Disabled	C
Idle, Not Configured	C
Idle, Motion Stopped	C
Initializing	C
Faulted	NC
Referencing	C
Fluidic Mode Active	C
Production Mode Active	C
* Fault logic such that a broken connection between controller and PLC will appear as a Fault	

Output 3 & 4 Table		
Output 3 & Output 4	**Other Settings**	**Reference Recommended**
Idle	*	NC
Idle, Reference Recommended	*	C
Idle, Production Mode Disabled	*	NC
Idle, Fluidic Mode Disabled	*	NC
Idle, Not Configured	*	NC
Idle, Motion Stopped	*	NC
Initializing	*	NC
Faulted	*	NC
Referencing	*	C
Fluidic Mode Active	*	NC
Production Mode Active	*	NC
* Production Discharge, Production, Moving, Idle, Ready for Production same as Ready Output, see table above.		

Ready Out - The 'Ready Out' signal indicates the active/idle state of the Controller Module. The output is true when the Controller Module is 'ready'. This output is false if the Controller Module is not 'ready'. The output state during Prime and when faulted are user-selectable using the "Ready Output Config" setting (via the front panel or serial interface)

Fault Out - The 'Fault Out' signal indicates a fault has been detected in the operation of a Motor/Base Module. This output is complemented, i.e., the output is true when no fault exists and is false when one or more faults exist.

Config Out 3 - The Config Out 3 settings determines the signal type for the 3rd output.

Config Out 4 - The Config Out 4 settings determines the signal type for the 4th output.

Signal Levels

All signals are optically isolated. The power for all signals is provided by the customer's equipment.

All inputs accept a 24 VDC signal and require 20 mA.

All outputs conduct when the signal is 'true' and do not conduct when the signal is 'false' (see FAULT OUT). Outputs can switch a signal of up to 24 VDC and 20mA. The output consists of the emitter and collector connections to an IC opto-isolator.

Connections

All connections are through a 37-pin circular plastic connector, with the mating connector (AMP # 206150-1), backshell (AMP
206138-1), pins (AMP # 66105-4), and key (AMP # 200821-1) supplied with the unit. Table 3.4 shows the connector pin layout.

Table 3.4 LOGIC I/O Interface

PIN	SIGNAL	PIN	SIGNAL
1	TRIGGER IN +	20	(reserved)
2	TRIGGER IN -	21	(reserved)
3	CONFIG IN 2 +	22	(reserved)
4	CONFIG IN 2 -	23	Key
5	CONFIG IN 3 +	24	(reserved)
6	CONFIG IN 3 -	25	(reserved)
7	CONFIG IN 4 +	26	(reserved)
8	CONFIG IN 4 -	27	(reserved)
9	Key	28	(reserved)
10	READY OUT +	29	(reserved)
11	READY OUT -	30	(reserved)
12	FAULT OUT+	31	(reserved)
13	FAULT OUT -	32	(reserved)
14	CONFIG OUT 3 +	33	(reserved)
15	CONFIG OUT 3 -	34	(reserved)
16	CONFIG OUT 4 +	35	(reserved)
17	CONFIG OUT 4 -	36	(reserved)
18	Key	37	(reserved)
19	(reserved)		

3.3.10 RS232 Serial Interface

The RS232 serial interface provides control of all functions available, with electrical isolation between the RS232 input signals and the internal control electronics (isolated power shared with CC TRIG input). The hardware is configured as RS232 Data Communications Equipment (DCE) standard with the pin configuration shown in Table 3.5.

Table 3.5 Connections (DCE, 25 pin D-sub female)

Pin	Signal	Direction
1	SHLD	Shield - not connected
2	TD	To Controller Module
3	RD	From Controller Module
5	GND	

No hardware signals are currently used for handshaking.

The parameters of the communications interface must be set as follows.

- 9600 BAUD
- 8 BIT
- NO PARITY
- ONE STOP BIT

After dispense or metering operation is triggered, the values for that operation are fixed. This allows new parameter values for the following operation to be downloaded before the current operation is complete.

The Controller Module serial interface does not 'broadcast' messages, such as fault conditions, but only responds when it receives a command.

3.3.10.1 Command Structure

The command is a string of ASCII characters. The use of the ASCII backspace or rub out characters as a means of entry correction is not supported.

Commands are not directly echoed as they are received. The terminal being utilized to send commands should be setup for local echo of sent characters.

<name>   Represents an argument
[ ]   Represents an optional argument
,   Field delimiter character for numerical arguments.
<CR>   End of command represented by ASCII carriage return character (no line feed).

The complete command form is:

[<cmd>[<value1>[,<value2>[,<value3>]]]<CR>

<cmd>   Command
First alphabetic character seen in the command string will be evaluated as the command character. All non-alphabetic characters before the first alphabetic character are ignored.
All subsequent alphabetic characters will cause the entire command to be ignored and the response will include the 'second command character' warning.
Command characters **are case sensitive**. (lower case only)
An error response will be generated for any command string not containing a valid command. An exception is a <CR> response will be generated for each command string containing only a <CR>.

<value1> First numerical parameter
The first character received after the command character begins evaluation of the first numerical
parameter. All non-numeric values with the exception of the field delimiter character will cause an error
response.
A field delimiter character after the command character and before the first numerical character will be interpreted as the first

parameter having a value of zero. This means a zero character must be used to indicate an argument with value of zero for the first numerical parameter.

<value2> Second numerical parameter

A null argument will be evaluated as a value of zero if there are no numerical characters between the field delimiter for the first parameter and a following field delimiter. If there is a field delimiter for the first parameter, immediately followed by the end of command character, it will be evaluated as having no second parameter.

<value3> Third numerical parameter

This is a read only parameter and all numerical values will be ignored. All values in the command string which are not required by the command specified will be ignored. Following is an example of a command string.

v0,100<CR> Command v0(dispense volume), a setting of 100 strokes.

Transmission should stop when an ASCII carriage return character is sent and can resume when the ASCII carriage return of the response is received.

3.3.10.2Response String

The response from the Controller Module has a format which is very similar to the command with the addition of a fault or warning value.

<name> Represents an argument
,   Field delimiter character for numerical arguments.
<CR>   End of command represented by ASCII carriage return character (no line feed).

The complete command form is:
<cmd><value1>,<value2>,<value3><CR>

The description for the response string above follows the structure of the command string previously described except for value3 which is a warning or fault code. Some responses to errant command strings contain special identifiers in the <cmd> location.

3.3.10.3Commands

The command set controls the overall settings of the system. Tables 3.6 list the commands.

NOTE

Refer to previous description for complete command syntax ("COMMAND STRUCTURE").

<value3> has been omitted from the response in this table, but will either be a 0 if no faults or warnings exist or will provide the fault or warning number.

Table 3.6 Commands

Command	**Response**	**Description**

a => Autoload
a2 a2,<value2> Returns current Autotrigger Mode setting.
a2,<value2> a2,<value2> Autotrigger Mode.
                              <value2>:

Command	Response	Description

		0 = Disabled (default)
		1 = Count
		2 = Infinite
a3	a3,\<value2\>	Returns current Autotrigger Count setting.
a3,\<value2\>	a3,\<value2\>	Autotrigger Count.
		\<value2\>:
		2 = minimum (default)
		65535 = maximum

b => BEGIN

| b or b0 | b0,0 | Initiates a Dispense/ Meter pumping cycle. |
| b1 | b1,0 | Initiates a Prime/Agitate pumping cycle. |

c => CLEAR FAULTS

| c or c0 | c0,\<value2\> | Clears all faults and reference pumps. |

d => DIRECTION

d or d0	d0,\<value2\>	Returns current Production Mode fluid direction setting.
d0,\<value2\>	d0,\<value2\>	Sets the Production Mode fluid direction.
		\<value2\>:
		0 = Reverse
		1 = Forward (default)
d1	d1,\<value2\>	Returns current Fluidic Mode direction setting.
d1,\<value2\>	d1,\<value2\>	Sets the Fluidic Mode direction.
		\<value2\>:
		0 = Reverse
		1 = Forward (default)

e => END

| e or e0 | e0 | Ends the current pumping cycle. |
| | | In Prime mode, will continue until piston has reached the stop position. |

f => REFERENCE

| f or f0 | f0 | References the pump. |

g => TOTALIZER

g or g0	g0,\<value2\>	Returns the totalizer value in number of Strokes.
g0,\<value2\>	g0,\<value2\>	Resets the totalizer value to 0.
		\<value2\>: 0 = Resets the totalizer value to zero.
g1	g1,\<value2\>	Returns the totalizer value in number of Cycles.
g1,\<value2\>	g1,\<value2\>	Resets the totalizer value to 0.
		\<value2\>: 0 = Resets the totalizer value to zero.
g2	g2,\<value2\>	Returns the last prime volume/agitate volume read in strokes.

MAX VALUE: The totalizer will increment to a maximum value of 3,999,999,999 then 'wrap around'.

h => HARDWIRED READY SIGNAL OPERATION

h or h0	h0,\<value2\>	Returns the Auxiliary Output configuration setting.
h0,\<value2\>	h0,\<value2\>	Sets the Auxiliary Output configuration.
		\<value2\>
		0 = Disabled (default)
		1 = Conducts during Fluidic mode
		2 = Conducts during both
		3 = Conducts during Production mode

Command   Response **Description**

h1   h1,<value2> Returns the Controller address for RS485 serial interface setting.
h1,<value2> h1,<value2> Sets the Controller address for RS485 serial interface configuration.
                        <value2>
                        Future Use
h2,<value2> h2,<value2> Sets the contrast percentage.
                        <value2>
                        30 = Minimum
                        50 = (default)
                        70 = Maximum
h12   h12,<value2>Returns the Input 2 setting.
h12,<value2>h12,<value2>Sets the Input 2 configuration.
                         <value2>
                         0 = Clear fault & reference
                         1 = Fluidic trigger
                         2 = Enable motion
h13   h13,<value2>Returns the Input 3 setting.
h13,<value2>h13,<value2>Sets the Input 3 configuration.
                        <value2>
                        0   = Clear fault & reference (default)
                        1   = Fluidic trigger
                        2   = Enable motion
h14   h14,<value2>Returns the Input 4 setting.
h14,<value2>h14,<value2>Sets the Input 4 configuration.
                        <value2>
                        0 = Clear fault & reference
                        1 = Fluidic trigger (default)
                        2 = Enable motion
                        3 = Enable recipe save
                        4 = Enable recipe save & value change
                        5 = Enable recipe save, value change & prime direction
                        6 = Enable recipe save, value change & recipe get
                        7 = Enable recipe save, value change, prime direction & recipe get
                        8 = Enable recipe save, value change, prime direction, recipe get & start stop
h21   h21,<value2>Returns the Ready Output setting.
h21,<value2>h21,<value2>Sets the Ready Output configuration.
                        <value2>
                        0 = Fluidic mode=Ready/Fault = Ready
                        1 = Fluidic mode=Ready/Fault = Busy
                        2 = Fluidic mode=Busy/Fault = Ready
                        3 = Fluidic mode=Busy/Fault = Busy (default)
h23   h23,<value2>Returns the Output 3 setting.
h23,<value2>h23,<value2>Sets the Output 3 configuration.
                        <value2>
                        0 = Disabled
                        1 = Busy during discharge only
                        2 = Busy during production operation only
                        3 = Busy moving
                        4 = Ready out idle
                        5 = Ready out for production
                        6 = Reference Status

Command	Response	Description

h24   h24,<value2>Returns the Output 4 setting.
h24,<value2>h24,<value2>Sets the Output 4 configuration.
                        <value2>
                        0 = Disabled
                        1 = Busy during discharge only
                        2 = Busy during production operation only
                        3 = Busy moving
                        4 = Ready out idle
                        5 = Ready Out for production operation
                        6 = Reference Status

k => KEYLOCK
k or k0   k0,<value2> Returns the current Enable Motion setting.
k0,<value2> k0,<value2> Sets the Enable Motion configuration.
                        <value2>
                        0 = Disable
                        1 = Enable (default)
k1   k1,<value2> Returns the current Lock Front panel setting.
k1,<value2> k1,<value2> Sets the Lock Front panel configuration.
                        <value2>
                        0   = Enable All - Front Panel (default)
                        1   = Disable Recipe Save
                        2   = Disable Recipe Save & Value Change - Front Panel
                        3   = Disable Recipe Save, Value Change & Prime Direction - Front Panel
                        4   = Disable Recipe Save, Value Change & Recipe Get - Front Panel
                        5   = Disable Recipe Save, Value Change, Recipe Get
                        & Prime Direction – Front Panel
                        6   = Disable Recipe Save, Value Change, Recipe Get
                        Prime Direction & Start Stop - Front Panel
k2   k2,<value2> Returns the current Change Permission level.
                        <value2>
                        0   = Operator
                        1   = I/O Test
                        2 = Supervisor
k2,<value2> k2,<value2> Change Permission.   <value2>
                        Password for Desired Permission Level in command
                        Current Permission Level in response.
                        Maximum: 65,535
                        Minimum: 10
k3   k3,<value2> Returns the current Power Up Permission setting.
k3,<value2> k3,<value2> Sets the Power Up Permission configuration.   <value2>
                        0   = Operator
                        1   = Last at Power Off (default)

m => MODE
m or m0   m0,<value2> Returns the current mode.
m0,<value2> m0,<value2> Sets the operating mode.
                        <value2>:
                        0 = Disabled
                        2 = Dispense (default)
                        3 = Meter
m1,<value2> m1,<value2> Sets the Fluidic Mode.
                        <value2>:
                        0 = Disabled
                        1 = Prime (default)
                        6 = Agitate

Command **Response** **Description**

n => RECIPE
n or n0   n0,<value2> Returns the current recipe number.
n0,<value2>n0,<value2> Get the specified recipe.   <value2>: 1 - 32
n98,<value2>n98,<value2>Saves the current values to specified recipe if recipe number doesn't exist.
                        <value2>: 1 - 32
n99,<value2>n99,<value2>Saves the current values to specified recipe and overwrites any existing recipe. <value2>:

q => READY/BUSY   1 - 32
q or q0   q0,<value2> Indicates the current state.
                        <value2>:
                        0 = Idle
                        1 = Priming
                        2 = Dispensing
                        3 = Metering
                        4 = Drawback Dwell
                        5 = Drawback
                        6 = Fault
                        7 = Referencing
                        8 = Initializing (on power-up)
                        9 = Pre-op dwelling
                        10 = Post-op dwelling
                        11 = Auto dwelling
                        12 = Isolating (agitate mode)
                        13 = Agitating
                        14 = Returning (agitate mode)
                        18 = Agitate Dwelling
                        26 = A fault is being cleared

r => DISPENSE RATE
r or r0   r0,<value2> Returns the current Production mode rate.
r0,<value2> r0,<value2> Sets the current Production mode rate.
                        <value2>: represents a 4 digit decimal number
                        Maximum: 1500
                        Minimum: 1
                        Default: 150
r1   r1,<value2> Returns the current Fluidic mode.
r1,<value2> r1,<value2> Sets the current Fluidic mode.
                        <value2>: represents a 4 digit decimal number
                        Maximum: 1500
                        Minimum: 1
                        Default: 600

s => STATUS
s0   s0,<value2> Returns the volume remaining in
                        the pump during the current operation (strokes)
s2   s2,<value2> most recent number of rotary (spindle) stalls as <value2>.
                        Maximum: 15
                        Minimum: 0
s3   s3,<value2> Dump parameters, multiple line response.
s4   s4,<value2> Dump status, multiple line response.
s5   s5,<value2> Returns the piston location relative to the 0 degree Stop Position (millirevs).
s8   s8,<value2> Returns the current Fault Code.
s9   s9,<value2> Returns the current Error Code.
s10   s10,<value2>Returns the Assert SW Number.
s11   s11,<value2>Returns the Assert SW Code.

Command	Response	Description

s12   s12,<value2> Returns the Assert HW Number.
s13   s13,<value2> Returns the Assert HW Code.
s14   s14,<value2> Returns the Serial Number.

t => DWELL

t2   t2,<value2> Returns the current Pre-Op Dwell in seconds.
t2,<value2> t2,<value2> Sets the Pre-Op Dwell.
           <value2>:
           Maximum: 2.55
           Minimum: 0.00   (default)
t3   t3,<value2> Returns the current Post-Op Dwell in seconds.
t3,<value2> t3,<value2> Sets the Post-Op dwell.
           <value2>:
           Maximum: 2.55
           Minimum: 0.00   (default)
t4   t4,<value2> Returns the current Autotrigger Dwell in seconds.
t4,<value2> t4,<value2> Sets the Autotrigger Dwell.
           <value2>:
           Maximum: 300.00
           Minimum: 0.00   (default)
t5   t5,<value2> Returns the Agitate Dwell in seconds.
t5,<value2> t5,<value2> Sets the Agitate Dwell .
           <value2>:
           Maximum: 300.00
           Minimum: 0.00
           Default: 0.05

v => DISPENSE VOLUME

v or v0   v0,<value2> Returns the current number of strokes in Dispense mode.
v0,<value2> v0,<value2> Sets the dispense volume in strokes.
           <value2>: represents a 5 digit integer
           Maximum: 10,000
           Minimum: 1   (default)
v1   v1,<value2> Returns the current number of strokes in Fluidic mode.
v1,<value2> v1,<value2> Sets the Fluidic mode volume in strokes.
           <value2>: represents a 5 digit integer
           Maximum: 60,000
           Minimum: 1
           Default: 100
v3   v3,<value2> Returns the Fluidic Mode isolation volume.
v3,<value2> v3,<value2> Sets the Fluidic Mode isolation volume.
           <value2>:
           Maximum: 60,000
           Minimum: 0
           Default: 0

w => DRAWBACK

w or w0   w0,<value2> Returns the current Drawback Volume.
w0,<value2> w0,<value2> Sets the drawback volume in strokes.
           <value2>:
           Maximum: 5.00
           Minimum: 0.00   (default)

Command **Response** **Description**

w1   w1,<value2> Returns the current Drawback Rate.
w1,<value2> w1,<value2> Sets the drawback rate in RPM.
                        <value2>:
                        Maximum: 1500
                        Minimum: 1
                        Default: 150
w2   w2,<value2> Returns the current Drawback Dwell.
w2,<value2> w2,<value2> Sets the drawback dwell in seconds.
                        <value2>:
                        Maximum: 2.55
                        Minimum: 0.00
                        Default: 0.05

NOTE

When using a 34 Frame Motor the minimum setting must be 0.05 or greater.

y => MOTOR/BASE
y or y0   y0,<value2> Returns the current Acceleration setting.
y0,<value2>y0,<value2> Sets the acceleration configuration.
                        <value2>:
                        0 = Slow
                        1 = Medium (default)
                        2 = Fast
                        3 = Fire Off
y1   y1,<value2> Returns the current Torque setting.
y1,<value2>y1,<value2> Sets the torque configuration.
                        <value2>:
                        0 = Low
                        1 = Medium (default)
                        2 = High
y2   y2,<value2> Returns the current Motor/Base selection.
y2,<value2>y2,<value2> Sets the Motor/Base configuration. (Refer to Table 3.2)
                        <value2>:
                        Maximum: 7
                        Minimum:0 (default)
y3   y3,<value2> Returns the current Stop Position.
y3,<value2>y3,<value2> Sets the stop position in degrees.
                        <value2>:
                        Maximum: 330
                        Minimum: 0
                        Default: 90
y4   y4,<value2> Returns the current Meter Stop mode.
y4,<value2>y4,<value2> Sets the meter stop mode.
                        <value2>:
                        0 = Stop Position (default)
                        1 = Immediate
y5   y5,<value2> Returns the current Stalls per Fault.
y5,<value2>y5,<value2> Sets the stalls per fault.
                        <value2>:
                        Maximum: 15
                        Minimum: 1
                        Default: 4

Command **Response** **Description**

z => SOFTWARE VERSION

z or z0   z0,<value2>   Returns the software version as text.
z1   z1,<value2>   Returns the Current device type (DS3009)
z2   z2,<value2>   Returns the firmware CRC

3.3.11 Warnings

Warnings indicate problems in the command received, or a state of the Motor/Base Module which prohibits immediate operation. An appropriate command (other than 'clear faults') may be required to operate the pump.

1   **Command Not Valid** - Response to any unrecognized command.
2   **Value Not Valid** - Response to any out of range value.
5   **Production Mode is Disabled** - An attempt was made to run in production mode while it is disabled.
8   **Serial In Motion Not Enabled** - Serial command sent to begin motion while motion disabled due to serial command. (k0)
11 **Second Command Character** - A second command character (alphabetic character) was seen in a single command (before <CR> character). Entire command is ignored.
15 **Descriptor Not Valid** - First numerical value not valid for command letter.
16 **Recipe Is Blank**
17 **Recipe Is Not Blank**
18 **Motion Is Disable Via Logic** - Serial command sent to begin motion while motion disabled due to logic input.
19 **Motor/Base Not Selected** - Serial command sent to begin motion and motor/base is not selected. (y2)
20 **Command Missing** - The command string did not contain an alphabetic character. The '?' character will be inserted in place of the <cmd> field in the response.
21 **Command String Overflow** - The length of the command string exceeded the input buffer.
22 **Unexpected Character in Command String** - There was a character in the command string that was not alphabetic, numerical, or a field delimeter .
24 **Fluidic Mode Disabled** - A Fluidic Mode operation was initiated but Fluidic Mode is disabled.
25 **Invalid Permission for Command** - The permission setting is too low for the command sent.
26 **Can't Start, Other Operation Active** - An operation was attempted while another operation is active.

3.3.12 Faults

Faults are a result of the system detecting improper operation of the Motor/Base Module. All fault numbers will be greater than or equal to 1000. The 'clear faults' command must be used before any subsequent operation of the affected channel is performed.

1002 Motor Stall Fault - "Home" position sensor for rotary motion was not detected, most likely due to a stalled motor. Clear faults re-reference using 'c' command.
1005 Motor Drive - Signal from motor drive module - short circuit sensed at motor connections.
1013 NRAM - Error in reading from or writing to the non-volatile memory (recipes and power-up values).
1014 Motor Low Voltage - Blown motor fuse on main circuit board, malfunction in main power supply, malfunction on main circuit board.
1015 Step Motor Low Hardware (ADC) - A problem with motor control was detected.
1016 Internal Software Voltage - A error was detected in the internal software.
1017 Motion Disable during Operation - Either the Motion Enable signal or the serial command disabling motion occurred during an operation.

3.3.13 Operating The System

There are several different modes of operation providing the Controller Module with its vast functional flexibility. On initial power-up, these modes must each be sequenced in the proper order to assure proper operation.

3.3.13.1 Setup

The following steps will guide you through a basic setup for turning your system on for the first time:

1. On the rear of the Controller Module

    a. Make sure the 1/0 (On/Off) switch is set to 0 (Off).
    b. Connect the power cord to the Controller Module and the power source.
    c. Connect the Motor Cable, the larger connector connects to the Controller Module.

2. On the Motor/Base Module

    a. Connect the other end of the Motor Cable
    b. Set the AP Style displacement adjust to 4.5 or
    c. Set the Heavy Duty Style displacement adjust to 10

3. On the Pump Module

NOTE

Make sure the inlet tubing is larger than, or the same size as, the outlet tubing. Start with the reservoir even with or slightly higher than the Pump Module and the Pump Module even with or slightly higher than the dispense tip. Adjust as necessary to fit your application.

    a. Connect the inlet fitting and tubing
    b. Connect the gland inlet fitting and tubing (*optional)
    c. Connect the outlet fitting and tubing
    d. Connect the gland outlet fitting and tubing (*optional)

3.3.13.2 Start-up

Switch the 1/0 power switch to the '1' position. The Power Up screen will appear and the Idle indicator will illuminate. This screen displays the firmware version and allows access to the Prime screen and Dispense or Meter screen. Refer to Section 3.2.1 for a description of each field.

Go to the Dispense section (3.3.13.4) or Meter section (3.3.13.5) if the system has previously been primed. If not, follow the instructions in the following section.

NOTE

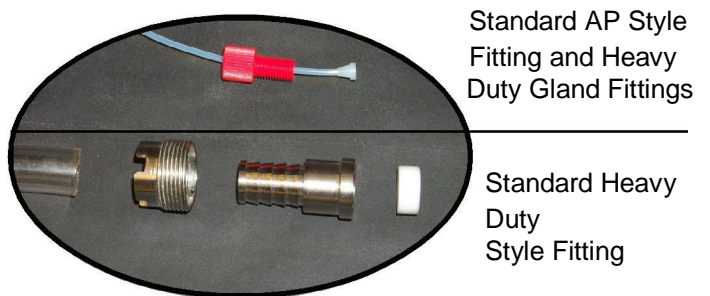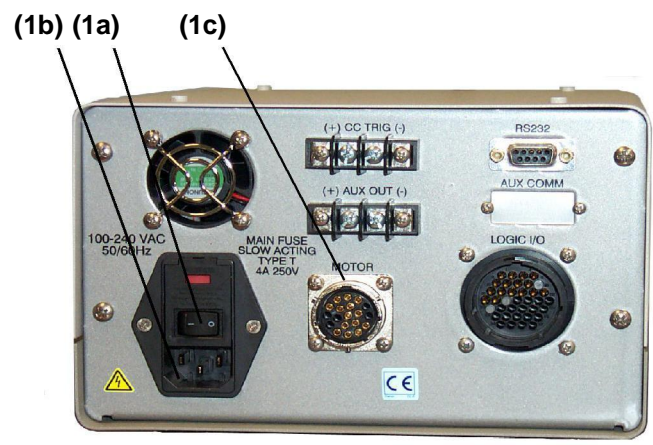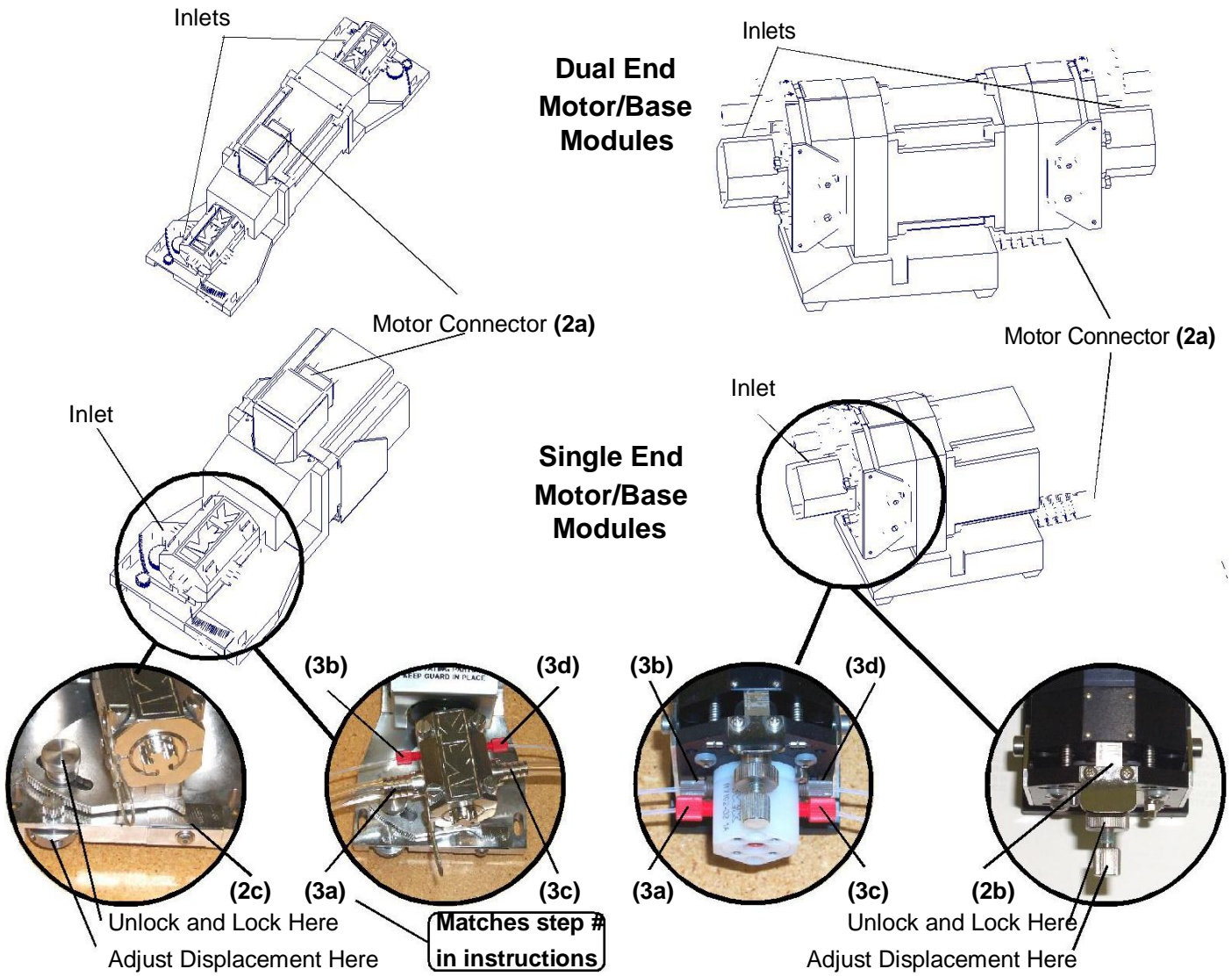*All controllers are sent in Supervisor Level.*

3.3.13.3 Prime

Press the PRIME SCREEN push-button to enter Prime mode.

Position the pump for priming (outlet above or even with the inlet) fill all reservoirs with liquid, and make sure all liquid lines are connected and secure. Press the START push-button to begin priming. The system can not be initiated using the rear panel "CC TRIG" signal. The system will prime based on the Priming Rate and Prime Volume settings. Pressing the STOP push-button can stop the priming any time.

NOTE

To determine the correct inlet side, the motor connector must be located as shown in the following photos.

Inlets

Dual End Motor/Base Modules

Inlets

Motor Connector **(2a)**

Motor Connector **(2a)**

Inlet

Single End Motor/Base Modules

Inlet

(3b) **(3d)** **(3b)** **(3d)**

(2c) **(3a)** **(3c)** **(3a)** **(3c)** **(2b)**

Unlock and Lock Here

Matches step # in instructions

Adjust Displacement Here

Unlock and Lock Here

Adjust Displacement Here

(1b) (1a) **(1c)**

(+) CC TRIG (-)

RS232

AUX COMM

(+) AUX OUT (-)

100-240 VAC
50/60Hz

MAIN FUSE
SLOW ACTING
TYPE T
4A 250V

LOGIC I/O

MOTOR

CE

Standard AP Style Fitting and Heavy Duty Gland Fittings

Standard Heavy Duty Style Fitting

3.3.13.4 Dispense

Press the DISPENSE SCREEN push-button to enter Dispense mode. If the left most push-button is labeled METER SCREEN, or has no label, go to SETUP A screen and change Production Mode to DISPENSE.

To start dispensing press the START button or supply a trigger to the rear panel. The system will dispense the liquid amount specified in the Volume setting at the rate specified in the Dispense/Meter Rate setting.

When drawback is used, the Dispense Volume setting specifies the net fluid displaced, the actual forward motion is the sum of the specified dispense volume and the drawback volume. The Drawback Rate during drawback and the Drawback Dwell (time between the forward and reverse portions of the cycle) settings are shown on the Drawback screen.

3.3.13.5 Meter

Press the METER SCREEN push-button to enter Meter mode. If the left most push-button is labeled DISPENSE SCREEN, or has no label, go to SETUP A screen and change Production Mode to METER.

To start metering press the START button or supply a trigger to the rear panel. The system will dispense the liquid based on the Dispense/Meter Rate setting and the displacement of the Motor/Base module. To stop metering operation remove the rear panel trigger signal, or push the Stop push-button.

When drawback is used, the Drawback, Drawback Rate, and the Drawback Dwell (time between the forward and drawback portions of the cycle) settings are shown on the Drawback screen.

3.4   INSTALLATION

General operating practices provide the best guidelines for locating the components of the system. The Controller Module should be located for ease of use during all phases of operation and maintenance.

3.5   MAINTENANCE

No periodic maintenance is required on the Controller Module, beyond standard practices for electronic equipment.

3.5.1   Assembly/Disassembly Procedures

The Controller Module contains the following replaceable parts.

• Main Power Fuse

3.5.1.1 Main Power Fuse

The main power fuse located in the Power Entry Module on the rear panel is replaceable. The proper fuse value is described in the Title Page section of this manual.

Disassembly

1. Remove the power cord.
2. Using a small flat blade screwdriver, open the power entry module's cover.
3. Slide the fuse tray out and remove the fuse.

Assembly

1. Install the new fuse into the fuse tray and slide the tray in. The covered side on the fuse holder should be up.
2. Close the power entry module's cover.
3. Connect the power cord.

3.6   PROBLEM GUIDE

Table 3.7 contains a list of possible problems, causes and solutions for the Controller Module.

<div style="text-align:center">

WARNING

</div>

Hazardous voltages exist inside the Controller Module. Under no circumstances should the Controller Module be opened. There are no user serviceable parts inside the Controller Module. Any unauthorized access to the inside will void the warranty.

3.7   SPECIFICATIONS

CC TRIG Signal Requirements (Standard):
   Accepts mechanical contact closure or solid state switch capable of +5 VDC @ 15mA
   (max) Power source in Digispense 3009
   DO NOT APPLY VOLTAGE

Logic I/O Trigger In Requirements:
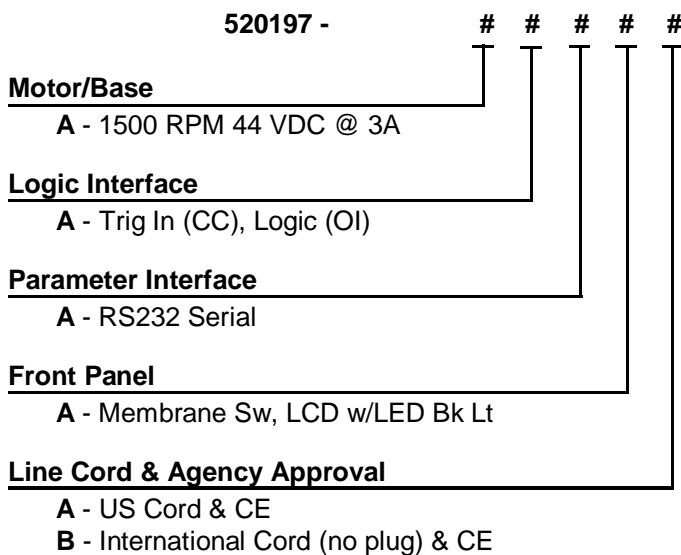   +24 VDC @ 20mA (max), Customer power source

AUX OUT Signal Requirements:
   Maximum external voltage: 48 VDC
   Maximum current: 250 mA

Motor Speed: 1 to 1500 RPM

3.8   MODEL NUMBER

The model number provides important information about the specifics of your Controller Module at time of order. Refer to this number when calling IVEK Technical support. The model number for your Controller Module is located in the Title Page section of this manual and on the rear of the Controller Module.

520197 -   **#   #   #   #   #**

Motor/Base
   A - 1500 RPM 44 VDC @ 3A

Logic Interface
   A - Trig In (CC), Logic (OI)

Parameter Interface
   A - RS232 Serial

Front Panel
   A - Membrane Sw, LCD w/LED Bk Lt

Line Cord & Agency Approval
   A - US Cord & CE
   B - International Cord (no plug) & CE

3.9   ILLUSTRATED PARTS BREAKDOWN

Contact IVEK Corporation Technical Support for information pertaining to replacement parts for this Controller Module.

Table 3.7 Common Operational Problems And Solutions		
PROBLEM	**PROBABLE CAUSE**	**POSSIBLE SOLUTION**
No power, nothing works.	AC power may be absent or inadequate. Unit not plugged in.	Ensure AC power cord is plugged into a properly grounded three-prong outlet capable of supplying 100 - 240 VAC, 50/60 Hz, rated at 4.0 amps.
	Fuse is blown.	Unplug main power cord from outlet. Remove fuse from rear panel fuse holder. Test fuse conductivity. Install good fuse in rear panel fuse holder.
	Supply Breaker is tripped.	Check or reset breaker at panel.
Power is on, controller accepts a trigger, (START indicator illuminates, STOP indicator does not), motor fails to rotate, and motor is silent.	A motor malfunction can cause this problem.	Turn off controller power. Check to ensure Motor/ Base Module is properly connected to controller. Turn on controller and try again. If the motor operates incorrectly, servicing may be necessary to the motor or the controller. Return complete Controller, Motor/Base and Pump Modules to IVEK Corporation for repair.
Power is on, controller accepts trigger, motor spindle fails to rotate and motor makes a sound that fluctuates in tone. * This condition does not harm the system.	A pump module or motor malfunction can cause this problem.	Turn off controller power. Check to ensure motor/ base module is properly connected to controller. If the motor operates correctly, the pump may need to be cleaned or serviced.
	Incorrect Motor/Base selected	In SETUP C screen, change Motor/Base to correct value per Table 3.2
	Low torque setting.	In SETUP C screen, adjust the torque setting.
	Slow acceleration setting	In SETUP C screen, adjust the acceleration setting.
Power is on, controller accepts trigger, motor spindle jumps, stops, then completes operation.	Incorrect Motor/Base selected	In SETUP C screen, change Motor/Base to correct value per Table 3.2
	Low torque setting.	In SETUP C screen, adjust the torque setting.
	Slow acceleration setting	In SETUP C screen, adjust the acceleration setting.
Controller power on and operational, but will not actuate pump motor.	Motor Cable	Check the cable connection between the Controller Module and Motor/Base Module. Inspect and repair faulty cable.
Cannot reach Dispense or Meter screen.	Production mode is disabled.	Go to Setup A screen, change mode to Dispense or Meter.
The XXXX function button is not visible.	Permission level - confirm level on SETUP A screen.	Change permission to a higher level.

Table 3.7 Common Operational Problems And Solutions - Cont.		
PROBLEM	**PROBABLE CAUSE**	**POSSIBLE SOLUTION**
	Configurable Input 4 - Confirm current configuration on SETUP B screen.	Apply signal to LOGIC I/O input 4 or change function of Input 4 with "h14" command.
	Inhibited by Serial Interface - Confirm current Lock Front Panel configuration using the 'k1' command.	Change value of 'k1' command.
	Permission level is Operator - Confirm level in Setup A screen.	Change permission level to Supervisor. In Setup A screen, press Change Permission key, type in password, press enter.
Power is on, Controller Module accepts a trigger, arrow push-button do not function.	The program memory is corrupted.	Cycle power.
Power is on, display is blank, START and STOP indicators flashing.	Power switch turned off momentarily.	Make sure nothing is placing pressure on the AC power switch in the back of the unit.
Screen displays "Power Down…." For a few seconds before changing to the Power-Up screen	AC line briefly disconnected.	Make sure AC line cable is securely fastened to back of unit and to wall outlet.
	A brownout condition occurred on the AC line.	Make sure AC power to unit is available.
	EMI or ESD event.	Make sure unit is grounded to earth through AC line and enclosure cover is on the unit. Keep unit and cable away from high EMI producing equipment and cables
Screen blank upon power-up	Contrast set too low.	Upon power-up, unit will be in Power-up screen. Press FPB4 to enter Contrast Adjust screen and then press Up Arrow until contrast is acceptable.
Screen dark upon power-up	Contrast set too high.	Upon power-up, unit will be in Power-up screen. Press FPB4 to enter Contrast Adjust screen and then press Down Arrow until contrast is acceptable.

Table 3.7 Common Operational Problems And Solutions - Cont.

PROBLEM	PROBABLE CAUSE	POSSIBLE SOLUTION
Motor Stall Fault	Motor cable	Check cableconnection between the Controller module and the Motor/Base Module. Inspect cable and repair if necessary.
	Incorrect Motor/Base selected	In SETUP C screen, change Motor/Base to correct value per Table 3.2.
	Low torque setting	In SETUP C screen, adjust the torque setting.
	Slow acceleration setting	In SETUP C screen, adjust the acceleration setting.
Motor Module Fault	Disconnected cable while powered.	Turn off power, reconnect cable, turn-on power.
	Shorted cable signal.	Check the cable connection. Inspect and repair faulty cable.
Motor Control Hardware Fault	Component failure in controller.	Recycle power. If fault continues contact IVEK Technical support.
Low Motor Voltage Fault	AC power brownout	Make sure AC power is available to the unit.
Internal Operation Fault	Internal software error	Clear fault and cycle power.
Motion Disabled during Operation Fault	Logic Enable signal disabled, k0,0 command received	Enable Logic, Enable signal , or issue k0,1, Clear Fault
Backup Recipe Fault	The recipe's backup copy is corrupted.	Re-save the recipe so that both copies will be updated and cycle power.
Recipe Read Fault	Recipe copies corrupted.	Re-configure unit with desired settings and re-save the recipe.
Recipe Read Limit Fault	A parameter stored in the recipe exceeded system limits.	Check all recipe settings and re-save the recipe.
Recipe Read Version Fault	The saved recipe is a different recipe than expected	Check all recipe settings and re-save the recipe.
Recipe Save Backup Fault	A corruption occurred during saving a recipe.	Check all recipe settings and re-save the recipe.
Unable to Save Recipe	A corruption occurred during saving a recipe.	Cycle power, re-configure for desired settings and attempt to save the recipe.
Unable to Erase All Recipes	An error occurred when resetting parameters.	Cycle power and attempt to reset parameters again.

Table 3.7 Common Operational Problems And Solutions - Cont.

PROBLEM	PROBABLE CAUSE	POSSIBLE SOLUTION
Unable to Erase At Least One Backup Recipe	An error occurred when resetting parameters.	Cycle power and attempt to reset parameters again.
Unable to Erase Any Recipes	An error occurred when resetting parameters.	Cycle power and attempt to reset parameters again.
Backup Parameter Read Fault	The parameters backup copy is corrupted.	Clear fault. Check all parameter values. Cycle power. Check all parameter values.
Parameter Value Out of Bounds Fault	A value in the saved parameters is out of bounds of the system.	Clear fault. Check all parameter values. Cycle power. Check all parameter values.
Parameter Version Fault	The saved parameters contain an unexpected version number	Clear fault. Check all parameter values. Cycle power. Check all parameter values. Reset parameters (WARNING: will reset all recipes).
Parameters Blank Fault	The stored parameters are corrupted.	Clear fault. Check all parameter values. Cycle power. Check all parameter values. Reset parameters (WARNING: will reset all recipes). Cycle power.
Backup Configuration Read Fault	An error exists in backup copy of the configuration data	Reset parameters (WARNING: will reset all parameters and recipes)
	The stored configuration data is corrupted.	Cycle power.
Configuration Read Fault	The nonvolatile memory is corrupted.	Reset parameters (WARNING: will reset all parameters and recipes)
Configuration Value Out of Bounds Fault	A stored configuration data is corrupted.	Cycle power. Reset parameters (WARNING: will reset all parameters and recipes)
Configuration Version Fault	The stored configuration data has an unexpected version	Cycle power. Reset parameters (WARNING: will reset all parameters and recipes) **If none of the above solves the problem, contact IVEK technical support for assistance.**