# 3700R/3700FR Refrigerated Sampler

This pocket guide is not intended to replace the instruction manual. Read the instruction manual thoroughly before operating the sampler.


Teledyne Isco, Inc., 4700 Superior St.,
Lincoln, Nebraska, U.S.A. 68504
Phone: (402) 464-0231
Toll Free: (800) 228-4373
FAX: (402) 465-3022

www.isco.com

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## *Section 1 Setup Procedures*

This section explains how to attach the suction line and discusses placement of the line and intake. It also contains notes on flow meter, Field Printer, and laptop computer connections.

## 1.1 Attaching the Suction Line

The suction line is the piece of tubing extending from the pump tubing intake to the liquid source. There are three standard suction lines: vinyl tubing in $^{1}/_{4}$ inch (0.64 cm) or $^{3}/_{8}$ inch (0.94 cm) inside diameters, or FEP Teflon® in $^{3}/_{8}$ inch inside diameter.

Vinyl suction line is attached to the pump tubing with the tube coupling. The black clamp of the coupling secures the pump tube to the coupling. The white clamp secures the suction line. To attach the line or tubing to the coupling, push the line of tubing onto the coupling ferrule and tighten the clamp. To loosen a clamp, twist the clamp until its teeth disengage.

The Teflon line is attached to the pump tubing by inserting the line into the pump tubing and securing it with a suitable clamp.

## 1.2 Placement of Suction Line and Intake

Route the line from sampler to sampling point so it is always sloped downhill. Avoid coiled suction line which may hold residual liquid. This minimizes cross contamination. Be sure the vertical distance between the level of the liquid source and the pump is less than 26 feet. The pump will not deliver samples for heads greater than 26 feet.

The suction line tends to float in deep flow streams, dislodging the line and strainer. Table 1-1 shows the maximum depths you can submerge the lines and strainers without risks of flotation. At depths exceeding the safe depths, anchor the line and strainer securely.

The $^{3}/_{8}$ inch ID vinyl suction lines are shipped from the factory with our standard weighted polypropylene strainer installed on one end of the suction line and a tubing coupling on the other end.

Additionally, Teledyne Isco offers two low flow stainless steel strainers for $^{1}/_{4}$ inch ID and $^{3}/_{8}$ inch ID suction lines. For installation in Teflon suction line, heat the end of the suction line to make it more flexible, then carefully screw the strainer's threaded connector into the suction line.

**Table 1-1 Safe Depths of Submersion for Suction Line**

| Strainer | Vinyl 1/4" (6 mm) | Vinyl 3/8" (9 mm) | Teflon 3/8" (9 mm) |
|---|---|---|---|
| Standard Weighted Polypropylene | ------- | 22 feet (6.7 m) | 15 feet (4.5 m) |
| Stainless Steel Low Flow | 14 feet (4.3 m) | 22 feet (6.7 m) | 15 feet (4.5 m) |
| CPVC | ------- | 4 feet (1.2 m) | 4 feet (1.2 m) |

For sampling from highly acidic flow streams, a weighted plastic CPVC strainer is available.

## 1.3 Flow Meter Connection

For flow-proportional sampling, attach the flow-meter connect cable to the flow meter and to the 6-pin flow meter connector on the rear of the sampler.

If a cable is not attached to the flow-meter connector, keep the protective cap tightly screwed in place to keep the control box watertight.

## 1.4 Placing the Sampler into Operation

After programming the sampler, start the sampling program with the Start Sampling key. Programming is discussed in Section 2.

## 1.5 Restarting

The sampler may be started again by pressing the Start Sampling key. Reprogram the start time, if necessary.

## 1.6 Operation of the 3700R and 3700FR Refrigerator

To operate the refrigerator, turn the thermostat knob to the desired sample temperature. The interior air temperature should reach the set value within 20 to 30 minutes. The refrigerator's thermostat is calibrated in sample temperature. That is, if the temperature is set at 4°C (39°F), the temperature of the sample after being in the refrigerator will be 4°C ± 1°C, although the refrigerator air temperature may vary more than this due to the nature of the refrigeration cycle.

**☑ *Note***

If the thermostat knob is turned to the lowest setting, the sample may freeze.

## 1.7 Field Printer and Computer Connections

To collect data from the sampler, attach the field printer or interrogator cable to the sampler's 6-pin printer connector.

Both the field printer and the interrogator cable are compatible with Isco's 25-foot extension cable. If preferred, install the extension cable on the sampler's printer connector and route the cable to an alternate location.

**⚠ CAUTION**

If an interrogator cable is not attached to the printer connector on the sampler or the unattached end of the extension cable, keep the connector cap tightly screwed in place. This will prevent moisture damage to the connectors and to the control box.

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## *Section 2 Programming*

The sampler's programming process is self-prompting. Prompts displayed on the LCD step you through the program in a logical order, indicating the needed value or option. The sampler will reject any unacceptable settings. Settings can be changed at any time. If the sampler is turned off or power disconnected, settings are retained in memory by a lithium battery. Before programming the sampler, you should be familiar with the keypad as discussed in section 2.2.1.

## 2.1 Operating States

The sampler has three operating states:

1. The standby state: the sampler is waiting for instructions from the keypad.
2. The run state: the sampler is running a sampling routine, displaying status messages on the LCD, and storing sampling results in memory.
3. The interactive state: the sampler is being programmed.

## 2.2 Interactive State

The interactive state allows you to program the sampler. It is divided into two branches: the configure sequence and the program sequence. The configure sequence contains the input displays which allow you to configure the sampler to your unique requirements.

The program sequence is used to define the sampling routine in one of two programming modes: basic and extended. The basic mode is used for conventional sampling routines; the extended mode for more complex routines. (Select the mode in the Programming Mode configure option.) Sampling capabilities available through the basic and extended program modes are summarized in Table 2-1. Setup options available in the configure sequence are listed in Table 2-2.

**Table 2-1 Sampling Capabilities**

| Pacing: | Mode | Feature |
|---|---|---|
| Time-pacing: Uniform Time Intervals | Basic & Extended | Samples taken at regular time intervals from 1 minute to 99 hours, 59 minutes. |
| Time-pacing: Nonuniform Clock Time Intervals | Extended | Samples taken at irregular intervals by specifying the time and date of each sample. Dates can be entered up to 1 month in advance of current date. |

| Table 2-1 Sampling Capabilities (Continued) | | |
|---|---|---|
| **Pacing:** | **Mode** | **Feature** |
| Time-pacing: Nonuniform Intervals in Minutes | Extended | Samples taken at irregular time intervals by specifying the amount of time in minutes (from 1 to 999 minutes) between each sample. |
| Flow-pacing: | Basic & Extended | Samples taken at regular flow intervals. The sampler will totalize intervals of 1 to 9999 pulses. |
| STORM Pacing: | Extended | Combines time and flow pacing in one routine. Timed samples taken at regular time intervals from 1 minute to 999 minutes. Flow-weighted samples taken at regular flow intervals. The sampler will totalize intervals of 1 to 9999 pulses. |
| **Distribution:** | | |
| Sequential | Basic & Extended | One sample volume placed in each bottle. |
| Samples per Bottle Multiplexing | Basic & Extended | More than one sample volume placed in each bottle. |
| Bottles per Sample Multiplexing | Basic & Extended | Sample volumes placed in more than one bottle at each sample event. |

**Table 2-1 Sampling Capabilities (Continued)**

| Pacing: | Mode | Feature |
|---|---|---|
| Multiple Bottle Compositing | Extended | More than one sample placed in a set of bottles. Bottle sets can be switched after a specified number of samples or after a period of time. |
| **Volumes and Accuracy:** | | |
| Sample Volume | Basic & Extended | Volumes from 10 to 9990 ml can be entered. |
| Suction Head | Basic & Extended | Suction heads from 1 to 20 feet can be entered. |
| Calibration | Basic & Extended | Sample volumes can be calibrated, if desired. |
| **Key Times:** | | |
| Start Times | Basic & Extended | Specific start times can be entered for both time- and flow-paced routines. If no start time is entered, the Start Time Delay will be used. |
| First Switch Time | Extended | Sets time of first time-base bottle switch so that switch times can be placed on schedule. |
| Stop/Resume Times | Extended | Intermittent sampling routines defined with sampling stop and resume times. Up to 12 stop times and 12 resume times can be entered. |

## Table 2-2 Configure Option Functions

| Configure Option | Mode | Function |
|---|---|---|
| Set Clock | Basic & Extended | Sets the sampler's real time clock. |
| Bottles and Sizes | Basic & Extended | Sets the number and size of bottles used. |
| Suction Line | Basic & Extended | Sets the line type (vinyl or Teflon), line diameter ($^1/_4$ or $^3/_8$ inch), and line length (3 to 99 ft.). |
| Liquid Detector | Basic & Extended | Enables/disables the liquid detector, sets the number of rinses (0 to 3), enables/disables the suction head entry, and sets the number of retries (0 to 3). |
| Programming Mode | Basic & Extended | Sets the programming mode: basic or extended. |
| Load Stored Program | Extended | Loads one of up to three previously saved sampling programs. |
| Save Current Program | Extended | Saves current sampling program. |
| Flow Mode Sampling | Extended | Directs sampler to take a sample at the beginning of a flow-paced program and/or at time-switches. |
| Nonuniform Time | Extended | Directs sampler to accept nonuniform intervals as clock times or in minutes. |

**Table 2-2 Configure Option Functions (Continued)**

| Configure Option | Mode | Function |
|---|---|---|
| Calibrate Sampler | Basic & Extended | Enables/disables the calibration sequence. |
| Sampling Stop/Resume | Extended | Enables/disables Sampling Stops and Resumes feature. |
| Start Time Delay | Basic & Extended | Sets the start time delay (from 0 to 9999 minutes). |
| Enable Pin | Basic & Extended | Enables/disables master/slave sampling. Directs the sampler to sample when disabled and/or enabled. Allows you to restart the sampling interval upon enable. |
| Event Mark | Basic & Extended | Allows you to select one of four types of event marks. |
| Purge Counts | Basic & Extended | Adjusts the pre- and postsample purge counts. |
| Tubing Life | Basic & Extended | Displays the pump tubing life information. Resets the tubing life count. |
| Program Lock | Basic & Extended | Enables/disables the password protection for input displays. |
| Sampler ID | Basic & Extended | Allows you to enter a 10 character ID number. |
| Run Diagnostics | Basic & Extended | Tests the RAM, ROM, distributor & pump. Allows for re-initialization. |

### 2.2.1 Keypad Description

Control keys manually control the sampler, numeric keys enter program values, programming keys direct programming activities.

**Control Keys**

- **On/Off** – The On/Off key turns the sampler on or off. (If you turn the sampler off during a routine, you can resume the routine with the Resume Sampling key.)
- **Pump Forward** – In standby, the Pump Forward key runs the pump forward until the Stop key is pressed.
- **Pump Reverse** – In standby, the Pump Reverse key runs the pump in reverse until the Stop key is pressed.
- **Stop** – The Stop key stops a running pump. In the run state, it halts the routine, placing the sampler in standby. Press the Stop key at an input display to see the display's reference number.
- **Start Sampling** – In standby, the Start Sampling key starts the sampling program. When entering a sampler ID number, the Start Sampling key types a space.
- **Resume Sampling** – When "PROGRAM HALTED" is displayed, press the Resume Sampling key to resume the program from the point it halted. When entering a

sampler ID number, the Resume Sampling key types a period.

- **Manual Sample** – The Manual Sample key takes a manual sample. The Manual Sample key is valid in the standby and run states, and when calibrating the sampler. When entering a sampler ID number, the Manual Sample key types a dash (-).
- **Next Bottle** – The Next Bottle key moves the distributor to the next bottle. If the distributor is over the last bottle, it will move to position 1.

**Program Keys**

- **Display Status** – Press the Display Status key in standby or in the run state to view the program settings or the sampling results.
- **Exit Program** – Press the Exit Program key in the program sequence to return to standby. Press the Exit Program key in the run state to halt the program.
- **Clear Entry** – When entering a number, Clear Entry clears the new entry and returns the original entry.
- **Enter/Program** – Press the Enter/Program key in standby to enter the interactive state. At an input display, press the Enter/Program key to store an entered value or selection, and proceed to the next step.

**Numeric Keys**

- **Digit Keys** – The digit keys are used to enter quantities.
- **Left Arrow** – The Left Arrow key selects program options in the interactive state. When several numeric entries are displayed, the Left Arrow steps back to a previously entered value. When entering a number, the Left Arrow erases the most recently entered digit.
- **Right Arrow** – The Right Arrow key selects a program option in an input display and steps through display status information.

### 2.2.2 Displays

There are two types of displays: displays which present information about the sampler's status and displays which prompt for input.

- **Informational Displays** – Informational displays communicate information about the sampler's status. For example, when a sampling program is finished, a display communicates: "DONE," the number of samples taken, and the current time and date.
- **Input Displays** – Input displays can be identified easily because they contain a blinking word or number. The blinking word or number serves as a prompt for input and is said to be "selected." Nearly all input displays

have a number assigned to them. The number is used to cross-reference the input displays with a explanatory listing found in Appendix A at the back of this guide. Access a display's number by pressing the Stop key.

There are two types of input displays: displays which prompt you for a choice and displays which prompt for numeric input. In an input display prompting for a choice, the blinking word indicates the currently selected choice. If the blinking word is acceptable, press the Enter/Program key. If the blinking word is not acceptable, press the Left Arrow or Right Arrow key until the preferred choice is blinking, then press the Enter/Program key.

A numeric input display prompts for input by blinking the currently stored number. If the blinking number is acceptable, press the Enter/Program key. To enter a new number, press the appropriate numeric keys followed by the Enter/Program key. The sampler will not accept a number that exceeds the range of values placed in parentheses. If an entered number exceeds the range, the sampler will beep and the original number will reappear. Then, enter a new number.

**Editing Numbers**

The Left Arrow and Clear Entry key edit numeric entries if used after you press a numeric key and before you press the Enter/Program key. The clear entry key clears

any typed number and the original number will reappear.

The Left Arrow erases the most recently typed number. Some numeric input displays prompt for multiple values – for example: hours, minutes, month, day, and year. (Enter times in 24-hour format.) The Arrow keys move back and forth between each entries.

## 2.3 Programming Procedures

This section contains the procedures used to program the sampler. The procedure used to program the sampler in the extended mode is slightly different than the procedure used to program the sampler in the basic mode. Differences are noted by placing the extended mode procedure in italics.

When programming the sampler in the extended mode, follow the basic procedure, modifying it according to the noted differences.

Before programming the sampler, check the configure option settings. Press the Left Arrow or Right Arrow key at the “SELECT OPTION” displays in the configure sequence to scroll through the list of options without viewing each input display.

To access an input display, press the Enter/Program key while viewing the option name. Press the Exit Program key to return to the list of configure options without changing the setting.

**Procedure**

1. Identify the number and size of the bottles. Determine the inside diameter, type, and length of the suction line.
2. Turn the sampler on with the On/Off key. The “STANDBY” message will appear. If the sampler is turned off while running a routine, the “PROGRAM HALTED” message will be displayed. Both messages indicate the sampler is in standby.
3. Check the configuration settings. From standby, press the Enter/Program key to access the interactive state. Select “configure” to access the configure sequence. Check the Bottles and Sizes and Suction Line option settings; the settings must match the bottles and suction line identified in step 1. Select “BASIC” or “EXTENDED” in the Programming Mode configure option. Revise other configure option settings as needed. Press the Exit Program key to return to standby.
4. From standby, press the Enter/Program key to access the interactive state. Select “PROGRAM” to access the program sequence.

**☑ *Note***

To return to a previous display while programming; press the Exit Program key. The sampler will return to standby. Repeat steps 1 and 2 to check the configure options. Repeat step 4 to check the program settings; press the Enter/Program key until you find the display you want to work with.

5. Enter the Sample Pacing settings. Select either time- or flow-pacing. Then, enter the time or flow-pulse interval between samples.

   *IN THE EXTENDED MODE*
   *Select time, flow, or storm pacing. If you select time-pacing, you will be prompted to select one of two types of time-pacing: uniform or nonuniform. Select "UNIFORM" to pace the sampler at regular intervals; enter the time interval. Select "NONUNIFORM" to pace the sampler at irregular intervals. If you have configured the sampler for Clock Time intervals, enter specific times and dates for each sample event. If you have configured the sampler for Minutes, enter the quantity of samples at each interval.*

   *If you select STORM pacing, the next display will prompt you for the delay to the first group sample. The STORM programming sequence is divided into two sections. The first section determines the settings for the first bottle group; the second section contains the settings for the second bottle group. Each section requires separate settings for the delay to the first sample of each group, the sample volume, and sample distribution. The first bottle group always receives time-paced samples. The second group can receive either time-paced or flow-paced samples, depending on your selection in the second section of the STORM programming sequence. The STORM settings for volume*

*and distribution are identical to those used in the basic and extended mode.*

6. Enter the Sample Distribution settings. The first display of the Sample Distribution section asks if you want to multiplex samples. Select "NO" for sequential sampling; the sampler will then prompt you for the Sample Volume settings. Select "YES" for multiplexed sampling. The next display will prompt you to select either "BOTTLES PER SAMPLE" or "SAMPLES PER BOTTLE." See Figure 1 for multiplexing types.

   *IN THE EXTENDED MODE*
   *Entering the extended Sample Distribution setting requires three steps. 1) enter the number of bottles per sample event; 2) select the method used to switch bottles or sets. You can switch multiplexed bottles or bottle sets after a programmed time period (select "TIME") or after a programmed number of samples have been deposited (select "SAMPLES" or "SAMPLES/BTL"); 3) enter the number of samples to be deposited or the time period during which each bottle or set is to receive samples.*

   *Follow the same procedure for STORM-pacing. The sampler will prompt you for separate distribution settings for each section of the STORM sequence.*

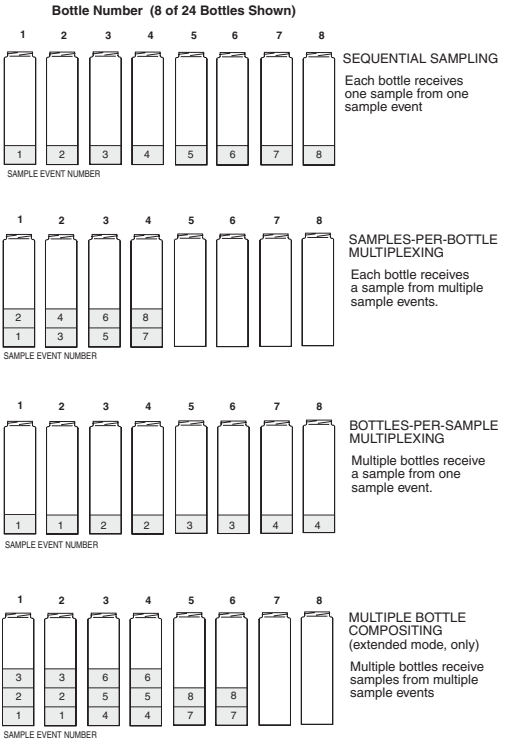



*Figure 2-1 Sample Distribution Diagrams*

7. Enter the Sample Volume settings. Because the programmed sample volume is a "nominal" value, enter a volume somewhat less than the capacity of the bottle to

minimize the effects of cumulative error. If bottles-per-sample multiplexing is being used to add preservatives to a bottle set, take the volume of the preservative into account.

The sampler can be configured through the Liquid Detector configure option to add the suction-head input display to the program sequence. This display follows the sample volume input display.

**☑ Note**

Under most conditions, you should not need to use the suction head setting. This allows the liquid detector to determine the operating suction head each time a sample is taken, allowing the sampler to deliver consistently accurate samples in varying head conditions. When the head is unknown or variable, always omit the suction head setting. (Omit the head setting with the following selections in the Liquid Detector configure option: enable the detector [Display 240] and do not enter the head manually [Display 242]).

To calibrate the sample volume, select "ENABLE" in the Calibrate Sampler configure option. The calibration displays follow the sample volume displays (and the suction head settings, if used).

8. Enter the Key Times settings. You will be asked if you want to enter a start time for the routine. If you select "YES," you will be prompted for the start time and date. If you select "NO," the sampler will use the start time delay.

*IN THE EXTENDED MODE*
*Stops and Resumes are available when enabled in the Sampling Stop/Resume configure option. The Stops and Resumes settings follow the start time settings and, when time switching is used, the first switch time settings.*

9. The sampler will automatically return to standby. Press Start Sampling to start the routine. Enter the starting bottle number. If you make no response within 60 seconds, the sampler automatically begins with bottle 1. If you start the routine after the programmed start time, the sampler will allow you to enter a new start time.

## 2.4 Foreign Language Displays and Metric Units of Measure

The sampler presents displays in English, Spanish, French, and German. Samplers presenting Spanish, French, and German displays support metric units for suction line and suction head measurements. Samplers operating with English displays support either English or metric units of line and head measurements. (Sample volumes are always entered in milliliters).

To program the sampler for foreign language displays, place the sampler in standby. Then, press Stop five times. The standby display will be replaced by an input display with these options: [English, German, Spanish, French].

Select the preferred language from this display. If you select Spanish, French, and German, the sampler will automatically convert English units of measure to metric units and return to standby.

If you select English, a second display will appear. Select English or metric units of measure from this display. The sampler will convert the units of measure as required and return to standby.

## Example 2-1 Basic Programming Mode

### Time-Paced Sampling, 4 Samples/Hour, 4 Samples/Bottle

1.

```
. . . STANDBY . . .
10:34:50  19-APR-04
```

Press Enter/Program to enter the interactive state.

2.

```
[PROGRAM, CONFIGURE]
SAMPLER
```

Select "PROGRAM" to access the program sequence.

3.

```
[TIME, FLOW]
PACED SAMPLING
```

Select "TIME."

## Example 2-1 Basic Programming Mode (Continued)

4.

```
SAMPLE EVERY
0 HOURS, 1 MINUTES
```

Enter “0” to set the hours at zero. Press Enter/Program to store “0” and move to the minutes entry.

5.

```
SAMPLE EVERY
0 HOURS, 15 MINUTES
```

Enter “15” to set the minutes entry to 15.

6.

```
MULTIPLEX SAMPLES?
[YES, NO]
```

Select “YES” for samples-per-bottle multiplexing.

7.

```
[BOTTLES PER SAMPLE,
SAMPLES PER BOTTLE]
```

Select “Samples Per Bottle.”

8.

```
4 SAMPLES PER
BOTTLE (1 - 50)
```

Enter “4” to set the number of samples per bottle to 4.

9.

```
SAMPLE VOLUMES OF
200 ml (10 - 990)
```

Enter the sample volume of “200” ml.

## Example 2-1 Basic Programming Mode (Continued)

10.

```
ENTER START TIME?
[YES, NO]
```

Select “YES” so you can enter the specific start time.

11.

```
TAKE FIRST SAMPLE AT
6:00    20-APR-04
```

Enter the desired start time. For this example, the start time is 6:00 on April 20.

12.

```
PROGRAMMING SEQUENCE
  COMPLETE . . .
```

After this message is displayed briefly, the sampler will automatically return to the standby state.

13.

```
. . . STANDBY . . .
10:37:23    19-APR-04
```

To run the program, press the Start Sampling key after the sampler is installed.

14.

```
START SAMPLING
AT BOTTLE 1 (1-24)
```

To start the sampling routine with the first bottle, accept the blinking “1” by pressing the Enter/Program key. To start the routine with another bottle, enter the starting bottle number here.

## 2.5 Calibrating the Sampler

Even without calibrating, the sampler will deliver accurate volumes. If your sample volumes vary significantly with the entered values, check the suction line first. Be sure the line slopes continuously downhill and is draining completely after each pumping cycle. Check the suction line entries in the configure sequence to see that they are accurate. When calibrating samples, best results are obtained when the unit is installed on site. Be sure the calibrating head matches the actual head; if the sampling will occur at a head of 10 feet, calibrate the sample volume at a head of 10 feet. Because the sample volume can be calibrated to ± 10 ml, a graduated cylinder should be used to facilitate measurement.

**☑ *Note***

To use the calibration feature, the Calibrate Sampler configure option must be set to "ENABLE."

### Example 2-2 Calibrating

1. 
```
. . . STANDBY . . .
9:34:50      19-APR-04
```
Press Enter/Program to access the interactive state.

2. 
```
[PROGRAM, CONFIGURE]
SAMPLER
```
Select "Program" for the program sequence.

## Example 2-2 Calibrating (Continued)

3.

```
[TIME, FLOW]
PACED SAMPLING
```

Enter settings or step through the program until the “Calibrate Sampler?” display appears.

4.

Other program sequence displays.

5.

```
CALIBRATE SAMPLER?
[YES, NO]
```

Select “Yes.”

6.

```
PRESS MANUAL SAMPLE
KEY WHEN READY . . .
```

Before pressing the Manual Sample key, place a container underneath the distributor.

7.

```
. . . MANUAL SAMPLE . . .
PUMPING  200 ml
```

The sampler will deliver the sample volume.

8.

```
200 ml VOLUME
DELIVERED
```

Measure the actual volume delivered and enter that value here.

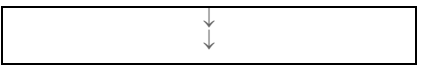
**Example 2-2 Calibrating (Continued)**

9.

```
CALIBRATE SAMPLER?
    [YES, NO]
```

Repeat the procedure if needed, then select "NO."

10.



Other program sequence displays.

11.

```
 . . . STANDBY . . .
9:39:50      19-APR-04
```

The sampler will return to standby. Press the Start Sampling key to run the program.

## 2.6 Standby State

This section discusses the displays and messages used in the standby state.

### 2.6.1 Start Sampling After Program Halted

A program can be halted with the Stop or Exit Program key. "PROGRAM HALTED" is displayed to notify you of the halt status. Start the program again with the Start Sampling key; the sampler will prompt you to start or to resume the program. Select "START" to start from the beginning. "START" will re-initialize the display status memory. Select "RESUME" to resume the program from the point at which it halted. If you make no selection within 60

seconds, the controller will automatically select the currently blinking choice.

### 2.6.2 Done

The sampler will inform you it has completed a program by displaying “DONE.” If a problem were encountered during the routine, the display below alternates with the “DONE” display.

**Problem Occurred**

The “PROBLEM OCCURRED” display indicates a missed sample. The sampler logs the probable cause in memory. This information is available through the display status procedure. Causes are listed in section 2.6.5.

### 2.6.3 Display Status and Printing with Field Printers

Access a summary of the program settings and the results of the most recent sampling routine with the Display Status key. Display status information remains in memory until you start another program. If a sampling routine is in progress when you press the Display Status key, the sampling routine will be suspended until you exit Display Status.

If the pump count reaches the Tubing Life Warning setting, the Pump Tubing Warning will be displayed when you press the Display Status key. The next display, “[REVIEW, PRINT] PROGRAM INFORMATION,” allows you to select “REVIEW” to review the program settings and sampling results.

The sampler will present Display #150 which contains three options: “NO,” “SETTINGS,” and “RESULTS.” Select “NO” to return to the previous operating state. If you entered display status from the run state, the sampling routine will resume at the point at which it was interrupted. Select “SETTINGS” to see the program settings. Use the Left Arrow, Right Arrow, and the Enter/Program keys to review the settings. When the Right Arrow key or the Enter/Program key is pressed at the last setting display, the “[REVIEW, PROGRAM]” input display will reappear.

Select “RESULTS” to view the results of the sampling routine. Use the Left Arrow, Right Arrow, and the Enter/Program keys to move through the results. The results include the following items: program start time and date, sample volume, source of each sample event (listed in section 2.6.4), cause of any missed samples (listed in section 2.6.5), start time of each sample event, number of pump counts to liquid detection for each event, pumping time for each sample event, and time the routine was completed.

If you select “PRINT” from the [REVIEW, PRINT] display, the sampler will present Display #149. This display contains three options: “NO,” “SETTINGS,” and “RESULTS.” Select “NO” to return to standby. Select “SETTINGS” or “RESULTS” to send the program settings or results reports to a connected Field Printer.

### 2.6.4 Source of Sample Event

Nine sources are reported:

- **Time** – The sample event was one of the program's time-paced samples.
- **Flow** – The sample event was one of the program's flow-paced samples.
- **Start** – The sample event was initiated at the programmed start time.
- **Resume** – The sample event compensated for a sample missed while the sampler was halted. If more than one sample were missed, only one sample event will be taken.
- **Power** – The sample event compensated for a sample missed while the sampler was without power. If more than one sample were missed, only one sample will be taken.
- **Enable** – The sample event occurred when the sampler became enabled by a flow meter or Liquid Level Actuator, or at a programmed resume time.
- **Manual** – The sample event was initiated with the Manual Sample key and was counted as one of the programmed sample events.
- **Time Switch** – The sample event was initiated at the programmed switch time.
- **Disable** – The sample event was initiated when the sampler became

disabled by a flow meter or Liquid Level Actuator, or at a programmed stop time.

### 2.6.5 Cause of Missed Samples

The probable cause of a missed sample follows the SAMPLE NUMBER/SOURCE display. Eleven causes are reported:

- **Pump 'STOP' Key Hit** – The sampler was halted with the Stop key during the sample event.
- **Pump Jammed** – The sampler was unable to take the sample because the pump jammed.
- **Started Too Late** – This message is reported for all samples skipped because of an expired start time.
- **Program Halted** – The sample event was interrupted by the Stop or Exit Program key.
- **Power Lost** – The sampler's power source was disconnected.
- **Sampler Inhibited** – The sampler was prevented from taking the sample by an inhibit signal sent to the sampler by the flow meter or Liquid Level Actuator.
- **Distributor Jammed** – The distributor jammed.
- **Probable Overflow** – Overflow is determined by multiplying the sample volume by the number of samples deposited in a bottle and comparing the

product to the volume of the bottle entered in the Bottle and Sizes configure option. If the product exceeds the bottle volume, no sample will be taken and the sampler will record the “Probable Overflow!” message.

- **No More Liquid** – The sampler’s pump was unable to deliver a full sample volume because the sampler pumped all liquid from the flow stream.
- **No Liquid Detected** – No liquid was detected.
- **Sampler Shut ‘Off’** – The sampler was halted with the On/Off key during the sample event.

## 2.7 Run State

A sampler in the run state is executing the sampler’s program. To start a sampling program and place the sampler into the run state, press the Start Sampling key. The sampler will present a number of displays which allow you to monitor the sampler’s progress. See Tables 2-1 and 2-2.

If a problem is encountered which causes missed samples, an asterisk will appear in the lower right corner of the display.

If the sampler is interfaced with a flow meter or Liquid Level Actuator, or other equipment capable of transmitting an inhibit signal, the sampler will not begin the program until the

inhibit signal is suspended. The display will read, “SAMPLER INHIBITED.”

## Example 2-3 Run State Displays for Time-Paced Sampling

1.

```
          BOTTLE 5
AT 5:44       5:42:33
```

Indicates the bottle number of the next sequential sample. The second line reports the scheduled sample event time followed by the current time.

2.

```
       BOTTLES  1- 4
AT  6:00     5:55:33
```

Indicates the scheduled time and receiving bottle numbers for an upcoming sample event. The program requires 4 bottles/sample event.

3.

```
     1  OF  4,  BOTTLE 1
     AT  6:00     5:55:33
```

Indicates the number of the upcoming sample, the total number of samples each bottle is to receive, and the current bottle number. The program requires 4 samples/bottle.

4.

```
     1 OF 4,  BTLS  1- 4
     AT  6:00     5:55:33
```

## Example 2-3 Run State Displays for Time-Paced Sampling (Continued)

Indicates the sample and bottle numbers of the next sample event. The bottle set has 4 bottles.

5.

```
SAMPLE 3, BOTTLE 1
AT  6:00   5:42:33
```

Indicates the sample and bottle number of the next sample event The current time is shown in the lower right corner. The program requires 1 bottle/sample event. Bottles be switched on a time basis. Alternates with the display in 6.

6.

```
NEXT BOTTLE CHANGE
AT 10:00         19-APR
```

Indicates the time of the next bottle switch.

7.

```
SAMPLE 2, BTLS 1 - 4
 AT  6:00   5:42:33
```

Indicates the sample and bottle numbers of the next sample event. The current time is shown in the lower right corner. The program requires 4 bottles/sample event. Sets are switched on a time basis. Alternates with the display in 8.

8.

```
NEXT SET CHANGE
AT 8:00          19-APR
```

## Example 2-3 Run State Displays for Time-Paced Sampling (Continued)

Indicates the time of the next bottle set switch.

9.

```
        BOTTLE 1
PUMPING  200 ml
```

Indicates a sample in progress.

## Example 2-4 Run State Displays for Flow-Paced Sampling

1.

```
START AT 6:00     19-APR
5:42:43           19-APR
```

Indicates the programmed start time of a flow-paced sampling program when no sample is to be taken at the start time. The first line reports the programmed start time and date, the second line reports the current time and date.

2.

```
        BOTTLE 1
AT  6:00    5:42:33
```

Indicates the programmed start time of a flow-paced sampling program when a sample is to be taken at the start time. The current time is shown in the lower right corner.

3.

```
        BOTTLE 1
AFTER      5 PULSES
```

## Example 2-4 Run State Displays for Flow-Paced Sampling (Continued)

Indicates the bottle number of the next sequential sample. The second line reports the number of flow pulses remaining until the next sample event.

4.

```
BOTTLES 5- 7
AFTER 25 PULSES
```

Indicates the bottles which will receive samples at the next sample event. The second line reports the pulses remaining until the next sample event.

5.

```
1 OF 4, BOTTLE 1
AFTER 10 PULSES
```

Indicates the number of the upcoming sample, the total number of samples each bottle is to receive, and the current bottle number.

6.

```
1 OF 4, BTLS 1- 4
AFTER 1000 PULSES
```

Indicates the sample and bottle numbers of the next sample event. The bottle set consists of 4 bottles. The program requires 4 samples be placed in each bottle of the set.

7.

```
SAMPLE 2, BOTTLE 1
AFTER 10 PULSES
```

## Example 2-4 Run State Displays for Flow-Paced Sampling (Continued)

Indicates the sample and bottle number of the next sample event. The program requires 1 bottle/sample event. Bottles are switched on a time basis. Alternates with the display in 8.

8.

```
NEXT BOTTLE CHANGE
AT 10:00          19-APR
```

Indicates the time of the next bottle switch.

9.

```
SAMPLE 2, BTLS 1 - 4
AFTER 10 PULSES
```

Indicates sample and bottle numbers of the next sample. The program requires 4 bottles/sample event. Bottle sets are switched on a time basis. Alternates with the display in 10.

10.

```
NEXT SET CHANGE
AT 10:00          19-APR
```

Indicates the time of the next bottle set switch.

11.

```
BOTTLE 1
PUMPING  200 ml
```

Indicates a sample in progress.

# 3700R/3700FR Refrigerated Sampler

## *Section 3 Service*

### 3.1 Cleaning Suction Line and Bottles

Clean the suction line and pump tubing by placing the end of the suction line in a cleaning solution and pumping this solution through the tubing using the pump forward and pump reverse keys. Follow with a clean water rinse.

The 350 ml and 2.5 gal glass sample bottles can be washed with a brush and soapy water, washed in a dishwasher, or autoclaved. (The plastic lids should not be autoclaved.) The plastic bottles (1000 ml, 2.5 gal, 4 gal) can be washed in a dishwasher but cannot be autoclaved.

### 3.2 Removing Pump Tubing

To remove the pump tubing.

1. Disconnect power before exchanging the pump tubing. The pump is extremely powerful. If the sampler activates the pump while you are manipulating the tubing, serious injury can result.

2. Unscrew the distributor arm retaining nut and remove the arm. Do not manually rotate the distributor arm. Severe damage to the distributor drive mechanism may result.
3. Pull the pump tube out of the arm and coil spring. Pull the tube out of the pump tube port.
4. Detach the outer case of the liquid detector by loosening the two thumbscrews. Pull the tubing away from the detector.
5. Remove the outer pump lid by loosening the four captivated thumbscrews. Extract the tubing from the pump. Rotate the pump rollers manually to facilitate the removal of the tubing.
6. Remove the suction line.

## 3.3 Installing New Pump Tubing

To install new pump tubing:

1. The pump tube is marked with two black bands. As you face the liquid detector, position the bands as illustrated in Figure 3-1.
2. Replace the pump lid and the case of the liquid detector. For proper operation of the liquid detector, tighten the thumbscrews securely.
3. Feed the free end of the tube down through the pump tube port.

4. Pull the tube through the coil spring, and carefully insert the tube into the body of the distributor arm so that the end of the tube is flush to $^{1}/_{16}$ inch below the end of the arm.
5. Re-install the suction line and the distributor arm on the distributor shaft. Secure the distributor arm retaining nut.
6. Inspect the length of exposed tube inside the refrigerator. It should continuously slope downward to the point where it enters the distributor arm.
7. Reset the Pump Tube count in the Tubing Life configure option to zero.

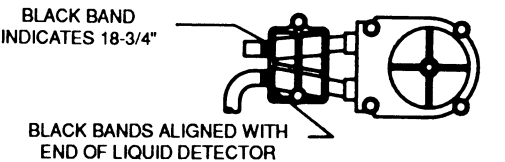



*Figure 3-1 Replacing the Pump Tubing*

## 3.4 Replacement of Suction Line

The vinyl suction line is removed from the pump tubing by detaching the tube coupling. The Teflon suction line is removed by loosening the clamp securing the line to the pump tube and pulling the suction line out of the pump

tube. New line is attached by reversing this procedure.

## 3.5 Cleaning the Refrigerated Sampler

The refrigerator's exterior may be periodically cleaned with soapy water using a sponge or non-metallic brush to keep it free from corrosive solutions, grease, oil, etc. After cleaning, it should be wiped dry. Automotive wax may be applied to the interior and exterior surfaces of the refrigerator to make them easier to clean. Do not direct a hose spray toward the underside or into the front grille of the refrigerator. The thermal-formed, high impact ABS interior may also be cleaned with soapy water as necessary.

**⚠ WARNING**

**Be sure to disconnect the refrigerator's power before performing any service activities.**

The condenser coil and surrounding areas should be cleaned annually; more frequently under severe operating conditions. To clean,

1. Remove the screws that hold the back panel on to the refrigerator and remove the panel.
2. Vacuum the fan, compressor, and surrounding areas.
3. Check the fan for freedom of movement. Oiling the fan motor is not necessary because the motor bearings are sealed. If

the fan motor does not rotate freely, it should be replaced.

4. Replace the back panel.
5. Remove the front grille and filter. Vacuum the condenser coil and surrounding areas.
6. Replace the filter and grille.

## 3.6 Cleaning the Filter in the 3700FR

In order to prevent damage due to overheated components, the filter should be cleaned every three months; more frequently under severe operating conditions. To clean:

1. Remove the thumbscrews holding on the refrigerator's grille.
2. Remove the grille and filter then steam clean or wash in hot soapy water. After washing, treat the filter with a standard filter coat.

# 3700R/3700FR Refrigerated Sampler

## *Appendix A Display Index*

### A.1 Display Reference Index

The following pages list each input display in numeric order. Each display is accompanied by a brief explanation.

1

```
[PROGRAM, CONFIGURE]
SAMPLER
```

This display appears after you press the Enter/Program key while in standby. Select “PROGRAM” to access the program sequence. Select “CONFIGURE” to access the configure sequence.

3

```
----- COUNTS FORWARD
```

This display appears when you stop the pump with the Stop key after having pressed the Pump Forward key. It reports the number of pump counts detected while the pump was in operation. Exit with any key except Stop and On/Off.

3

```
----- COUNTS REVERSE
```

This display appears when you stop the pump with the Stop key after having pressed the Pump Reverse key. It reports the number of pump counts detected while the pump was in operation. Exit with any key except Stop and On/Off.

10

```
[TIME, FLOW]
PACED SAMPLING
```

This display appears after you select “PROGRAM” in Display 1. Select “TIME” for time-paced sampling. Select “FLOW” to program the sampler for flow-paced sampling.

11

```
[UNIFORM, NONUNIFORM]
TIME INTERVALS
```

This display appears only in the extended programming mode and follows Display 10 when you select “TIME.” Select “UNIFORM” for uniform time intervals, “NONUNIFORM” for nonuniform intervals.

12

```
[TIME, FLOW, STORM]
PACED SAMPLING
```

This display appears only when the sampler is configured for the extended programming mode and for 2, 4, 8, 12, or 24 bottles. Select “TIME” for time-paced sampling. Select “FLOW” for flow-paced sampling, and “STORM” for storm sampling.

14

```
[TIME, FLOW]
SECOND BOTTLE GROUP
```

This display appears after you select “STORM” in Display 12. Use it to select time pacing or flow pacing for the second bottle group of a STORM routine.

15

```
--MINUTE DELAY TO
FIRST GROUP SAMPLE
```

This display appears after you select “STORM” in Display 12. Enter the amount of time between the time the sampler is enabled and the first sample of the first bottle group.

16

```
[DURING, AFTER]
TIME MODE
```

This display appears when you select "FLOW" in Display 14. Select DURING to fill the first and second bottle groups concurrently. Select AFTER to fill the second bottle group after the first bottle group.

17

```
---- MINUTE DELAY TO
SECOND GROUP SAMPLE
```

This display appears after you select "STORM" in Display 12. Enter the amount of time between the time the sampler is enabled and the first sample event for the second bottle group.

20

```
MODIFY SEQUENCE?
[YES, NO]
```

This display follows Display 11 when you select "NONUNIFORM." Select "YES" to modify the existing nonuniform intervals. Select "NO" to leave the nonuniform intervals unchanged.

21

```
SAMPLE EVERY
--HOURS -- MINUTES
```

In the basic programming mode, this display appears after you select "TIME" in Display 10. In the extended mode, this display appears when you select "UNIFORM" in Display 11. Enter the uniform time interval.

22

```
SAMPLE EVERY
---- PULSES (1 - 9999)
```

This display follows Display 10 when you select “FLOW.” Enter the flow pulse interval.

23

```
TAKE -- TIMED
SAMPLE EVENTS (1 - MAX)
```

This display follows Display 15. Use this display to enter the number of timed sample events in a storm program.

24

```
SAMPLE INTERVALS OF
--- MINUTES ( 1 - 999)
```

This display follows Display 23. Enter the time interval between time-paced sample events in a storm program.

25

```
TAKE --- SAMPLES
(1 - MAX )
```

This display follows Display 20 when you select “YES” to modify the nonuniform time sequence. Enter the number of sample events. MAX varies according to the bottle size entered in Display 223.

26

```
TAKE SAMPLES AT
1. HH:MM  DD-MMM
```

This display follows Display 25. Enter the nonuniform clock times and dates for each sample event.

27

```
QUANTITY AT INTERVAL
1. -- AT --- MINUTES
```

Enter the number of samples to be taken at each nonuniform time interval. The total quantity entered will be one less than the total number of samples because the first sample, taken at the start time, counts as one.

30

```
-- BOTTLES PER
SAMPLE EVENT (1 - MAX )
```

This display appears for samplers configured for 24 bottles (Displays 221 or 222). Enter the number of bottles to receive a sample volume at each sample event.

31

```
-- SAMPLES PER
BOTTLE (1 - MAX )
```

In the basic mode, this display appears when you select “SAMPLES PER BOTTLE” in Display 36. In the extended mode, it appears when the sampler is set up for one bottle set. Enter the number of samples to be deposited in each bottle.

35

```
MULTIPLEX SAMPLES?
[YES, NO]
```

Select “YES” if you want the routine to perform bottles-per-sample or samples-per-bottle multiplexing. Select “NO” if you want the routine to perform sequential sampling.

36

```
[BOTTLES PER SAMPLE,
SAMPLES PER BOTTLE]
```

This display appears when you select “YES” in Display 35. Select “BOTTLES PER SAMPLE” for bottles-per-sample multiplexing. Select “SAMPLES PER BOTTLE” for samples-per-bottle multiplexing.

40

```
CHANGE BOTTLES BASED
ON [TIME, SAMPLES]
```

This display appears in the extended mode when the number of bottles per sample event is “1.” Select “TIME” to switch bottles after a period of time. Select “SAMPLES” to switch bottles after a number of samples have been deposited.

41

```
CHANGE SETS BASED
ON [TIME, SAMPLES/BTL]
```

Select “TIME” to switch bottle sets after a specified period of time. Select “SAMPLES/BTL” to switch bottle sets after a specified number of samples have been placed in a set of bottles.

42

```
CHANGE BOTTLES EVERY
-- HOURS -- MINUTES
```

This display appears after you select “TIME” in Display 40. Enter the amount of time each bottle is to receive samples.

43

```
CHANGE SETS EVERY
-- HOURS -- MINUTES
```

This display appears after you select “TIME” in Display 41. Enter the amount of time each bottle set is to receive samples.

44

```
CHANGE BOTTLES EVERY
-- SAMPLES
```

This display appears after you select “SAMPLES” in Display 40. Enter the number of samples each bottle is to receive.

45

```
CHANGE SETS EVERY
-- SAMPLES
```

This display appears after you select “SAMPLES/BTL” in Display 41. Enter the number of samples each bottle set is to receive.

46

```
FIRST BOTTLE CHANGE
AT HH:MM  DD-MMM
```

This display appears when you select “YES” in Display 95. Enter the time of the first bottle switch. The remaining bottle changes will occur according to settings entered in Display 42.

47

```
FIRST SET CHANGE AT
HH:MM  DD-MMM
```

This display appears when you select “YES” in Display 95. Enter the time of the first bottle set switch. The remaining bottle set changes will occur according to settings entered in Display 43.

48

```
SAMPLE CONTINUOUSLY?
[YES, NO]
```

This display appears when the sampler is configured for 2, 4, 8, 12 or 24 bottles and when the sampler is programmed for time, nonuniform time, or flow pacing. Select "YES" to sample continuously. Select "NO" to stop the sampling routine after the sampler fills the last set of bottles.

50

```
SAMPLE VOLUMES OF
--- ml EACH (10 - MAX )
```

Enter the size of the sample volume. MAX will vary according to the number of samples per bottle and bottle size but will never exceed 990 milliliters.

60

```
--- COMPOSITE
SAMPLES (0 - MAX )
```

This display appears when you configure the controller for composite sampling by selecting "1" in Displays 221 or 222. Enter the number of composite samples. Enter "0" to take samples until a float shut-off terminates the routine.

70

```
SUCTION HEAD OF
-- FEET (1 - MAX )
```

This display appears when you select "YES" in Display 242 or select "DISABLE" in Display 240. Enter the measured suction head. MAX will be the smaller of the suction line length or "20."

80

```
CALIBRATE SAMPLE
VOLUME?  [YES, NO]
```

This display appears in the program sequence when you select “ENABLE” in Display 290. Select “YES” to use the calibration sequence, “NO” to omit the calibration sequence.

81

```
PRESS MANUAL SAMPLE
KEY WHEN READY . . .
```

This display is part of the calibration sequence. Press the manual sample key when a collection bottle is underneath the distributor and the suction line is in place.

82

```
--- ml VOLUME
DELIVERED
```

This display is part of the calibration sequence. When it first appears, it reports the programmed sample volume. If the measured volume differs from the reported volume, enter the measured volume here.

83

```
---ml! ARE YOU
SURE? [YES, NO]
```

This display is part of the calibration sequence and appears if the measured volume and the programmed volume differ by a factor of two or more. Select “YES” to confirm the entry in Display 82. Select “NO” to return to Display 80.

90

```
ENTER START TIME?
[YES, NO]
```

Select “YES” to enter a start time. Select “NO” to begin the sampling routine according to the delay set in Display 310.

91

```
TAKE FIRST SAMPLE AT
HH:MM DD-MMM
```

This display appears when you select “YES” in Display 90. Enter the start time and date for the first sample event. This display will appear if you start the routine after a programmed start time so you can reenter the start time.

92

```
START FLOW COUNT AT
HH:MM DD-MMM
```

This display appears when you select “YES” in Display 90. Enter the start time and date for the flow pulse countdown. This display appears if you start the routine after a programmed start time so you can reenter the start time.

93

```
STORM ENABLED AFTER
HH:MM DD-MMM
```

This display is the last display of the storm branch. It appears when you select “YES” in display 90. Enter the start time for the storm sampling routine. The sampler will disregard enable or disable signals from the flow meter until the start time you enter here.

95

```
ENTER FIRST SWITCH
 TIME?  [YES, NO]
```

This display appears when you select “TIME” in either Display 40 or 41. Select “YES” to specify a clock time for the first bottle or bottle set switch. Select “NO” to begin the switch interval at the routine's start time.

100

```
-- STOP or RESUME
 TIMES  (0 - 24)
```

This display appears when you select “ENABLE” in Display 300. Enter the number of stop and resume times.

101

```
STOP SAMPLING AT
 1.HH:MMDD-MMM
```

This display appears when the setting in Display 100 is greater than zero. Enter the appropriate stop time.

102

```
RESUME SAMPLING AT
 1.HH:MMDD-MMM
```

This display appears when the setting in Display 100 is greater than one. It follows Display 101. Enter the appropriate resume time.

110

```
MAX FLOW INTERVAL OF?
-- HOURS,  -- MINUTES
```

This display follows Display 22. Enter the maximum amount of time you want between flow-paced sample events in a storm program. If the time period is exceeded, the sampler will terminate the routine.

140

```
[START, RESUME]
SAMPLING PROGRAM
```

This display appears when a routine is halted and you press the Start Sampling key. Select “START” to start the sampling program at the beginning, “RESUME” to continue the sampling program at the point at which it was halted.

141

```
START SAMPLING
AT BOTTLE --  (1 - MAX )
```

This display appears after you start a routine and the sampler is configured for multiple bottles. Enter the starting bottle location for the sampling routine. MAX varies according to number of bottles and the number of bottles per sample event.

142

```
CHANGE START TIME?
[YES, NO]
```

This display appears when you start a routine after the programmed start time. Select “YES” to enter a new start time. Select “NO” to start the routine immediately; some sample events may be missed or late.

143

```
CHANGE SWITCH TIME?
[YES, NO]
```

This display appears when you start a routine after the programmed first switch time. Select “YES” to enter a new switch time. Select “NO” to switch one bottle set and start the routine immediately.

148

```
[REVIEW, PRINT]
PROGRAM INFORMATION
```

Select “REVIEW” for summary of the current program settings and for sampling results. Select “PRINT” to send the current status, program settings, and sampling results to an Isco Field Printer.

149

```
PRINT PROGRAM [NO,
SETTINGS, RESULTS]
```

This display appear after you select “Print” in Display 148. Select “NO” to return to standby. Select “SETTINGS” to print the settings report. Select “RESULTS” to print the results report.

150

```
REVIEW PROGRAM [NO,
SETTINGS, RESULTS]
```

This display appears after you press display status. Select “NO” to return to the previous operating state. Select “SETTINGS” to view program settings. Select “RESULTS” to view the results completed when you pressed display status.

151

```
SETTINGS DISPLAYS
```

Display 151 is used to identify the displays used to summarize the current program settings which appear when you select “SETTINGS” in Display 150.

152

```
RESULTS DISPLAYS
```

Display 152 is used to identify sampling results displays which appear when you select “RESULTS” in Display 150.

200

```
SELECT OPTION (← →)
name of configure option
```

Display 200 is used to identify the displays for each configure option. Press Enter/Program to access the input displays. Use the Arrow keys to move through the options.

210

```
HH:MM   MM/DD/YY
HH:MM   MM/DD/YY
```

Set Clock configure option. Enter the time and date to set the controller's clock. Use 24 hour time.

220

```
[PORTABLE, REFRIG.]
SAMPLER
```

Bottles and Sizes configure option. Select “PORTABLE” when you are using a 3700 Portable Sampler. Select “REFRIG.” when you are using a 3700 refrigerated sampler.

221

```
[1, 2, 4,  8, 12, 24]
BOTTLES
```

Bottles and Sizes configure option. This display appears after selecting “REFRIG.” in Display 220. Select the number of bottles in the bottle base. Note the 12 bottle configuration is only available for 3700FR.

222

```
[1, 4, 12, 24] BOTTLES
```

Bottles and Sizes configure option. This display appears when you select "PORTABLE" in Display 220. Select the number of bottles in the base.

223

```
BOTTLE VOLUME IS
----- ml
```

Bottles and Sizes configure option. Enter the volume in milliliters.

224

```
---- ml . . . ARE YOU
SURE?  [YES, NO]
```

Bottles and Sizes configure option. This display appears when you enter a bottle volume, in Display 223, that exceeds a standard Isco bottle size.

230

```
SUCTION LINE ID IS
[1/4, 3/8] INCH
```

Suction Line configure option. Select "1/4" if you are using $^{1}/_{4}$ inch suction line, "3/8" if you are using $^{3}/_{8}$ inch suction line.

231

```
SUCTION LINE IS
[VINYL, TEFLON]
```

Suction Line configure option. This display appears when you select "1/4" in Display 230. Select "VINYL" if you are using vinyl suction line, "TEFLON" if you are using Teflon suction line.

232

```
SUCTION LINE LENGTH
IS -- FEET (3 - 99)
```

Suction Line configure option. Enter the length of the suction line. The length should not include the tube coupling or the strainer.

240

```
[ENABLE, DISABLE]
LIQUID DETECTOR
```

Liquid Detector configure option. Select “ENABLE” to turn the Liquid Detector on, “DISABLE” to turn the Liquid Detector off. If you turn the detector off, you will be required to enter the suction head (Display 70) in the program sequence.

241

```
- RINSE CYCLES (0 - 3)
```

Liquid Detector configure option. This display appears when you select “ENABLE” in Display 240. Enter the number of rinse cycles. Rinse cycles condition the suction line to reduce cross contamination.

242

```
ENTER HEAD MANUALLY?
[YES, NO]
```

Liquid Detector configure option. This display appears when you select “ENABLE” in Display 240. Select “YES” to add the suction head setting (Display 70) to the program sequence. Select “NO” to omit the setting.

243

```
RETRY UP TO - TIMES
WHEN SAMPLING (0 - 3)
```

Liquid Detector configure option. This display appears when you select “ENABLE” in Display 240. Enter the number of retries: the number of times the sampler will try to detect the presence of liquid for each sample event.

250

```
[BASIC, EXTENDED]
PROGRAMMING MODE
```

Programming Mode configure option. Select “BASIC” if you want to use the basic programming mode. Select “EXTENDED” if you want to use the extended programming mode.

255

```
LOAD PROGRAM
[#1, #2, #3, NONE]
```

Load Stored Program configure option. Select the sampling program you want to use by selecting its number. Select “NONE” to exit the display without loading a program.

260

```
SAVE PROGRAM AS
[#1, #2, #3, NONE]
```

Save Current Program configure option. Select the number you want to use to identify the current program with when saved. Select “NONE” to exit the display without saving a program.

270

```
TAKE SAMPLE AT START
TIME? [YES, NO]
```

Flow Mode Sampling configure option. This setting affects flow-paced sampling routines. Select “YES” to take the first sample at the start time, “NO” to take the first sample at the end of the first flow interval.

271

```
TAKE SAMPLE AT TIME
SWITCH? [YES, NO]
```

Flow Mode Sampling configure option. This setting affects flow-paced, time-switched sampling routines only. Select “YES” to take a sample at switch times. Select “NO” if no sample event is desired at the switch times.

280

```
ENTER INTERVALS IN
[CLOCK TIME, MINUTES]
```

Nonuniform Time configure option. Select “CLOCK TIME” to enter the nonuniform time intervals as clock times (Display 26). Select “MINUTES” to set the nonuniform intervals in minutes (Display 27).

290

```
[ENABLE, DISABLE]
CALIBRATE SAMPLER
```

Calibrate Sampler configure option. Select “ENABLE” to add the calibration sequence to the program sequence. Select “DISABLE” to omit the calibration sequence.

300

```
[ENABLE, DISABLE]
SAMPLING STOP/RESUME
```

Sampling Stop/Resume configure option. Select “ENABLE” to add the Sampling Stop and Resume settings to the program sequence. Select “DISABLE” to omit the settings.

301

```
SAMPLE AT STOP?
[YES, NO]
```

Sampling Stop/Resume configure option. This display appears when you select “ENABLE” in Display 300. Select “YES” to take a sample at stop times. Select “NO” if no sample event is desired at the stop times.

302

```
SAMPLE AT RESUME?
[YES, NO]
```

Sampling Stop/Resume configure option. This display appears when you select “ENABLE” in Display 300. Select “YES” to take a sample at the resume times. Select “NO” if no sample event is desired at the resume times.

310

```
---- MINUTES DELAY
TO START  (0 - 9999)
```

Start Time Delay configure option. Enter the amount of time, in minutes, you want to delay the start time. This entry affects programs that do not have a programmed start time.

321

```
SAMPLE UPON DISABLE?
[YES, NO]
```

Enable Pin configure option. Select “YES” to take a sample at the time the sampler becomes inhibited. Select “NO” if no sample event is desired when the sampler becomes inhibited.

322

```
SAMPLE UPON ENABLE?
[YES, NO]
```

Enable Pin configure option. Select “YES” to take a sample when the sampler becomes enabled. No sample will be taken if the signal initiates the start time delay countdown. Select “NO” if you do not want to sample upon enable.

323

```
RESET SAMPLE
INTERVAL? [YES, NO]
```

Enable Pin configure option. Select “YES” to restart the sample interval countdown at the time the sampler becomes enabled. If “NO” is selected, the interval countdown is determined by the setting in Display 324.

324

```
INHIBIT COUNTDOWN?
[YES, NO]
```

Enable Pin configure option. This display appears when “NO” was selected in Display 323. Select “YES” to halt the pacing interval when the sampler is disabled. Select “NO” to continue the countdown.

330

```
[CONTINUOUS SIGNAL,
      PULSE]
```

Event Mark configure option. Select "CONTINUOUS SIGNAL" to send a variable duration event mark signal out pin E of the flow meter connector. Select "PULSE" to send a 3 second event mark signal.

331

```
DURING [PUMP CYCLE,
 FWD PUMPING ONLY]
```

Event Mark configure option. Select "PUMP CYCLE" to send the signal continuously during the entire pump cycle. Select "FWD PUMPING ONLY" to send the signal while the pump is delivering a volume.

332

```
AT THE BEGINNING OF
[PURGE, FWD PUMPING]
```

Event Mark configure option. Select "PURGE" to transmit an event mark pulse signal to a flow meter at the beginning of the presample purge. Select "FWD PUMPING" to transmit a pulse when the pump switches forward.

340

```
--- PRE-SAMPLE
COUNTS (0 - 9999)
```

Purge Counts configure option. Enter the number of pre-sample pump counts needed to purge the suction line. This value is set to 150 when the controller is re-initialized.

341

```
--- POST-SAMPLE
COUNTS (0 - 9999)
```

Purge Counts configure option. Enter the number of post-sample pump counts needed to purge the suction line. The number that initially appears is derived from the suction line ID and length entered in Displays 230 and 232.

350

```
------ PUMP COUNTS,
WARNING AT ------
```

Tubing Life configure option. This informational display reports the number of pump counts elapsed since the last reset and the number of counts required to trigger the Pump Tubing Warning. Exit this display by pressing any key.

351

```
RESET PUMP COUNTER?
[YES, NO]
```

Tubing Life configure option. After changing the pump tube, select “YES” to reset the pump counter to zero. Select “NO” to leave the counter unchanged.

352

```
------ PUMP COUNTS
TO WARNING
```

Tubing Life configure option. Enter the number of pump counts needed to trigger the pump count warning if the factory setting is not suitable. This value is set to 500,000 when the sampler is re-initialized.

360

```
[ENABLE, DISABLE]
PROGRAM LOCK
```

Program Lock configure option. Select "ENABLE" to turn the program lock on: input displays will be protected by a pass-number: 3700. Select "DISABLE" to turn the program lock off.

365

```
SAMPLER ID NUMBER IS?
----------
```

Sampler ID configure option. Enter the ID for the sampler. Use any of the numeric keys. Press Start Sampling for a space. Press Resume Sampler for a period. Press Manual Sample to enter a dash (-).

370

```
TEST DISTRIBUTOR?
[YES, NO]
```

Run Diagnostics configure option. Select "YES" to run the distributor test. Select "NO" to skip the test. The distributor is tested by moving it to position 24 then back to position 1.

371

```
RE-INITIALIZE?
[YES, NO]
```

Run Diagnostics configure option. Select "YES" to re-initialize the sampler. Select "NO" to the leave the controller unchanged.