

3700 Portable Sampler

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

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3700 Portable Sampler

Section 1 *Setup Procedures*

This section explains how to place the sampler into operation by preparing the base section, attaching the suction line, connecting a power source, installing the sampler at the site, placing the suction line inlet in the liquid source, and interfacing an external flow meter (if used).

1.1 Preparing the Base for Sequential Sampling

The sequential base section is supplied with 24 glass bottles (350-ml) or polypropylene bottles (1000-ml). Either glass or plastic bottles can be used, but glass and plastic bottles cannot be mixed in the same base section.

The stainless steel retaining ring for the glass bottles expands to hold the bottles against the inside wall of the base. Remove the retaining ring by squeezing the ring until it contracts; then lift the ring out of the base section.

The plastic retaining ring for the plastic bottles is held in place by three draw cords attached to the bottom of the base and hooked to the retaining ring. Detach the ring by disconnecting the draw cords from the hooks on the ring. Always use the ring when ice is used to cool the samples. Otherwise, the melt water will cause the plastic bottles to float and obstruct the distributor arm.

1.2 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 $\frac{1}{4}$ inch (0.64 cm) or $\frac{3}{8}$ inch (0.94 cm) inside diameters, or FEP Teflon[®] in $\frac{3}{8}$ 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.

1.3 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 $\frac{3}{8}$ 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 $\frac{1}{4}$ inch ID and $\frac{3}{8}$ 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.

1.4 Connecting to Power Source

The 3700 Sampler must be supplied with power from an AC Power Pack, an Isco Nickel Cadmium Battery Pack, an Isco lead-acid battery, or an external 12 VDC source such as an automotive or marine battery.

1.4.1 Mounting Isco Power Sources

Place the power source in the recess at the rear of the center section. Stretch the two black rubber draw catches up and into the "U" shaped receptacles on either side of the source. Attach the connector on the short cable of the power

source to the 12 VDC connector on the control box.

1.4.2 External 12 VDC Source

The 3700 Sampler can be powered with a 12 V automotive or marine battery. A cable terminating in battery clips connects the sampler to the battery. Plug the connector on the end of the external battery cable into the “12 VDC” connector on the control box. Connect the cable clips to the battery terminals. The positive lead of the cable is painted red and stamped with a plus sign.

1.5 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.

1.6 Placing the Sampler into Operation

Install the sampler in a level position. It can be suspended during operation by the optional suspension harness. Start the sampling program with the Start Sampling key.

1.7 Restarting

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

1.8 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.

1.9 Master/Slave Connections

If operating a pair of samplers configured for Master/slave operation, connect the samplers with the Master/Slave Interconnect Cable by attaching the cable to the flow-meter connector on both samplers. Configure both samplers for the master/slave mode in the Enable Pin configure option. Start master/slave sampling

by pressing Start Sampling on both machines. The samplers cannot reverse roles if both samplers are not in the run state. The first machine started becomes the master.

1.10 Recovering the Sampler

When recovering the sampler, keep it level to avoid spilling the collected samples. Cap the sample container(s) before transporting them. If the sampler is not to be returned to the office, install a base section with empty bottles and start the sampler again.

1.11 Conversion for Composite Sampling

To convert the 3700 Sampler for composite sampling:

1. Separate the center section from the rest of the sampler. Next, remove the pump tube. Disconnect the distributor arm.
2. Turn the center section over and install the float and float cage. Install the shaft on the “diving-bell” float in the hole in the distributor shaft. Attach the float cage to the center section with the four screws and 1-inch spacers provided with the float cage kit (Figure 1-1).

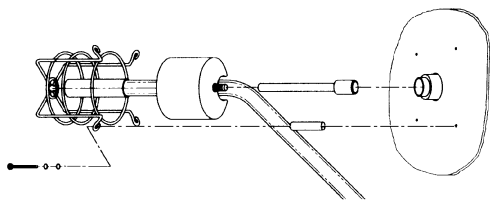


Figure 1-1 Float Cage Installation

3. Feed the 34.5-inch (88.5-cm) composite pump tube through the port in the center section, place it in the float cage tube guide, and install it in the pump.
4. Check the bottle number and size settings in the Bottles and Sizes configure option (Refer to Section 2). Set the bottle number to "1" and enter the appropriate bottle volume.

Note

Composite sampling routines can be programmed in both the basic and extended programming mode. To use nonuniform times or sampling stops and resumes in a composite sampling application, use the extended programming mode.

1.11.1 Standard base section

There are two sizes of composite containers: 2.5-gallon (9400-ml) glass or polyethylene and 4-gallon (15000-ml) polyethylene. The 2.5-gallon containers require the standard base section composite bottle locating deck. Prepare the standard base by placing the locating deck,

open side down, in the bottom of the base section. Then, place the sample container on the locating deck and re-assemble the sampler.

1.11.2 Optional Composite Base Section

The 4-gallon wide mouth composite bottle requires the composite base. No locating deck is required. Simply place the 4-gallon bottle in the composite base.

 Note

When cooling composite samples with ice, melt water may cause the bottle to float when you remove the center section.

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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 and displays. These are discussed in later sections.

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 that configure the sampler to your unique requirements. The program sequence has two programming modes: basic and extended. The basic mode is used for conventional sampling routines. The extended mode is for more complex routines. (Select the mode in the Programming Mode configure option.)

In both programming modes, the program sequence is divided into four sections: Sample Pacing (interval between samples), Sample Distribution (number of samples in each bottle), Sample Volume (sample size in ml), and Key Times (start times and, in the extended mode, stop and resume times).

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.
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.

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

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.
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.

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

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.

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

Configure Option	Mode	Function
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.
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.

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

Configure Option	Mode	Function
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, and programming keys direct programming activities.

Control Keys

- **On/Off** – The ON/OFF key turns the sampler on (placing the sampler in standby) or off. If you turn the sampler off during a routine, 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 the pump when it is running. In the run state, it halts the routine and transfers the sampler to 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, the distributor will move to position one.

Program Keys

- **Display Status** – Press the DISPLAY STATUS key in standby 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, press the CLEAR ENTRY key to clear the new entry. The display will return to the original entry.
- **Enter/Program** – Press the ENTER/PROGRAM key in standby to enter the interactive state. At an input display, press ENTER/PROGRAM to store a value or selection.

Numeric Keys

- **Digit Keys** – The digit keys are used to enter quantities.
- **Left Arrow** – The LEFT ARROW key selects one of two or more program options displayed in the interactive state. When more than one numeric entry is displayed, the LEFT ARROW steps back to a previously entered value. When entering a number, the LEFT ARROW will erase the most recently entered digit.

- **Right Arrow** – The RIGHT ARROW key selects a program option 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 an 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.

- **Displays With Choices** – 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.

- **Numeric Input Displays** – 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. 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 to store the number. 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: hours, minutes, day, month, and year. The LEFT ARROW key and RIGHT

ARROW keys move back and forth between each of the five entries. Pressing the RIGHT ARROW or ENTER/PROGRAM key on the last entry will store the values and advance to the next display. Enter times in 24-hour format; enter dates in European format: DD-MMM-YY.

2.3 Programming Procedures

The procedure for programming the sampler in 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. Two programming examples are included at the end of the procedure.

Procedure

1. Identify the number and size of the bottles. Determine the inside diameter, type, and length of the suction line. Convert the sampler for composite sampling, if necessary.
2. Turn the sampler on with the ON/OFF key. The "STANDBY" message will appear. If the sampler were 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.

- a. From standby, press the ENTER/PROGRAM key to access the interactive state.
 - b. Select “CONFIGURE” to access the configure sequence.
 - c. Press the LEFT ARROW or RIGHT ARROW key at the “SELECT OPTION” displays to scroll through the list of options without viewing each input display. To access a configure-option input display, press the ENTER/PROGRAM key at the option name.
 - d. Check the Bottle Size and Suction Line configure option settings. The settings must match the bottle and suction line identified in step 1.
 - e. Select “BASIC” or “EXTENDED” in the Programming Mode configure option.
 - f. Revise other configure option settings as needed.
 - g. Press the EXIT PROGRAM keys 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

If you want to return to a previous display while programming, press the EXIT PROGRAM key. The sampler will return to standby. Press the

ENTER/PROGRAM key until you locate the display in question.

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 flow-pacing, the next display will prompt you for the pulse 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.

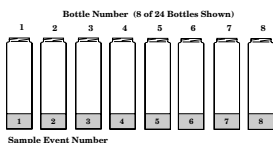
6. Enter the Sample Distribution settings. The first display of the Sample Distribution section asks if you want to multiplex samples. Select no for sequential sampling; the sampler will then prompt you for the Sample Volume settings. Select Yes for multiplexed sampling. The next display will prompt you to select either Bottles Per Sample or Samples Per Bottle. See Figure 2-1 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 samples have been deposited (select Samples or Samples/bottle); 3) enter the number of samples to be deposited or the time period during which each bottle or set is to receive samples.

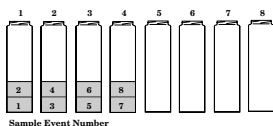
Follow the same procedure for storm-pacing. The sampler will prompt you for separate distribution settings for each section of the Storm sequence.

Sequential Sampling



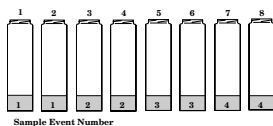
Each bottle receives one sample from one sample event.

Samples-per-bottle Multiplexing



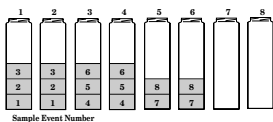
Each bottle receives a sample from multiple sample events.

Bottles-per-sample Multiplexing



Multiple bottles receive a sample from one sample event.

Multiple Bottle Compositing



Multiple bottles receive samples from multiple sample events.

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

The Stops and Resumes settings are available only when you have enabled the Sampling Stop/Resume configure option. The Stops and Resumes settings follow the start time settings. When entering Stop/Resume settings, first enter the number of stops and resumes, from 0 to 24. (Enter "0" if you want to omit the settings without disabling the Stops/Resumes option in the configure sequence.) Next, enter the stop and resume clock times. The first entry will be a stop time.

9. The sampler will automatically return to standby. Press START SAMPLING to start the routine. 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.
10. Use the run state displays to monitor the sampler's progress. Examples 2-4 through 2-6 list the run state displays.

Example 2-1 Time Paced Programming

This example uses the Basic Programming mode to program the sampler for time paced sampling. The programming steps instruct the sampler to collect a sample four times every hour and deposit four samples in each bottle.

1.

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

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."

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.

Example 2-1 Time Paced Programming (Continued)

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.

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.

Example 2-1 Time Paced Programming (Continued)

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.

Example 2-2 Calibration Procedure

This example demonstrates the method used to calibrate the sampler for a 200 ml sample volume. The Calibrate Sampler configure option must be enabled in the configure sequence before the calibration displays shown below will appear.

1.

9:34:50 STANDBY 19-APR-04

Press Enter/Program to access the interactive state.

2.

[PROGRAM, CONFIGURE] SAMPLER

Access the program sequence by selecting "PROGRAM."

3.

[TIME, FLOW] PACED SAMPLING

Step through the program until the "CALIBRATE SAMPLER?" input display appears.

4.

↓ ↓

Other program sequence displays.

5.

CALIBRATE SAMPLER? [YES, NO]

Select "YES."

Example 2-2 Calibration Procedure (Continued)

6. PRESS MANUAL SAMPLE
KEY WHEN READY . . .

Before pressing the Manual Sample key, make sure a collection container is underneath the pump tube.

7. . . . MANUAL SAMPLE . . .
PUMPING 200 m^l

The sampler will deliver the programmed sample volume.

8. **200** m^l VOLUME
DELIVERED

Measure the actual volume delivered and enter that value here.

9. CALIBRATE SAMPLER?
[YES, **NO**]

Repeat the procedure if desired or select "NO."

10. ↓
↓

Other program sequence displays.

11. 9:39:50 STANDBY . . .
19-APR-04

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

Example 2-3 Composite Sampling

This example uses the Basic Programming mode to program the sampler for composite sampling. The programming steps instruct the sampler to collect a sample four times every hour and deposit all samples in a single bottle.

1.

```
      . . . STANDBY . . .  
10:38:50 19-APR-04
```

Press the Enter/Program key to access the interactive state.

2.

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

Select "Program" to access the program sequence.

3.

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

Select "Time."

4.

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

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

5.

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

Enter "15" to set the minutes entry to 15.

Example 2-3 Composite Sampling (Continued)

6.

48 COMPOSITE
SAMPLES (0-200)

Enter the number of samples to be collected: "48."

7.

SAMPLE VOLUMES OF
250 ml EACH (10 - 310)

Enter the sample volume: "250."

8.

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

Select "Yes" to enter the start time for the routine.

9.

TAKE FIRST SAMPLE AT
6:00 20-APR

Enter the start time and date: 6:00 on April 20.

10.

PROGRAMMING SEQUENCE
COMPLETE . . .

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

11.

. . . STANDBY . . .
10:40:23 19-APR-04

After the sampler is properly installed, press the Start Sampling key to run the program.

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 for 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.

2.5 Standby State

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

2.5.1 Start Sampling After Program Halted

Halt a running program with the STOP or EXIT PROGRAM key. "PROGRAM HALTED" will be displayed to notify you of the halt status. Start the program again with the START SAMPLING key; the sampler will ask you to start the program from the beginning or to resume the program from the point at which it halted. 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 sampler will automatically select the currently blinking choice. The sampler can also be restarted with the RESUME key.

2.5.2 Done

The sampler will inform you it has completed a program by displaying "DONE." If a problem were encountered during the routine, one of two displays listed below may alternate 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 2.5.5.

Float Tripped

Samplers converted for composite sampling display the Float/weight Tripped message when the overflow float terminates the routine.

2.5.3 Display Status

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 as soon as you press the DISPLAY STATUS key. The next display, "REVIEW PROGRAM," gives you three choices: "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.

Select "SETTINGS" to view the program settings. Use the LEFT ARROW, RIGHT ARROW, and the ENTER/PROGRAM keys to scan 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 scan the results. The results include: program start time and date, sample volume, source (see section 2.5.4), cause of any missed samples (see section 2.5.5), start time, number

of pump counts to liquid detection, pumping time, and time the routine was completed.

2.5.4 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 occurred at the program's start time.
- **Resume** – The sample event compensated for a sample missed while the sampler was halted.
- **Power** – The sample event compensated for a missed sample missed while the sampler was without power.
- **Enable** – The sample event occurred when: the sampler became enabled by a device connected to pin F of the flow meter connector, 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 device connected to pin F of

the flow meter connector, or, at a programmed stop time.

2.5.5 Cause of Missed Samples

The probable cause of a missed sample follows the sample number/source display of the display status results. Twelve 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.

- **Float/Weight Tripped** – Samplers converted for composite sampling display the Float Tripped message when the overflow float terminates the routine.
- **No More Liquid** – The sampler’s pump drained the flow stream before it delivered a full sample volume.
- **No Liquid Detected** – No liquid was detected.
- **Sampler Shut Off!** – The sampler was halted with the ON/OFF key during the sample event.

 Note

If the sampler misses a sample, it places an asterisk (*) in the lower right corner of the display.

2.6 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 Examples 2-4 through 2-6.

There are two instances where the sampler will enter the run state after the Start Sampling key is pressed, but will not begin the sampling program:

- If the sampler is acting as a slave in a Master/Slave pair, the slave will not begin the program until it receives an enable signal from the master. While waiting for the enable signal, the display will read “Master/Slave Mode...Waiting For Master.”
- If the sampler is interfaced with a flow meter, a 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 as long as it receives the inhibit signal.

Example 2-4 Run State Displays: 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
  
```

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

Example 2-4 Run State Displays: Time Paced Sampling (Continued)

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

Indicates the time of the next bottle set switch.

9.

BOTTLE 1 PUMPING 200 ml

Indicates a sample in progress.

Example 2-5 Run State Displays: 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, 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	

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.

Example 2-5 Run State Displays: Flow Paced Sampling (Continued)

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

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.

Example 2-5 Run State Displays: Flow Paced Sampling (Continued)

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.

Example 2-6 Run State Displays: Composite Sampling

1.

SAMPLE 1 OF 12 AT 6:00 5:43:33
--

Indicates the sample number of the next sample and the total number of samples. The current time is shown in the lower right corner.

2.

SAMPLE 1 OF 12 AFTER 10 PULSES

Indicates the sample number of the next sample and the total number of samples required. The number of pulses to the next sample appears on the bottom line.

3.

BOTTLE 1 PUMPING 200 ml

Indicates a sample in progress.

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Section 3 Service

3.1 Cleaning the 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. Wash the glass bottles with a brush and soapy water, a dishwasher, or use an autoclave. The plastic bottles and lids can be washed in a dishwasher but cannot be autoclaved.

3.2 Pump Tubing



WARNING

Disconnect power before replacing the pump tubing. The pump is extremely powerful. If the sampler activates the pump while you are manipulating the tubing, you can be seriously injured.

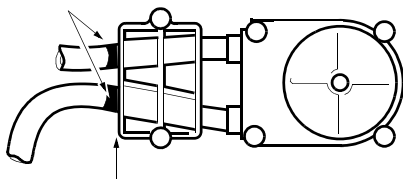
To remove the pump tubing:

1. Disconnect power.
2. Detach the outer case of the liquid detector by loosening the two thumbscrews. Pull the tubing away from the detector.
3. Remove the outer pump lid and pull the tubing from the pump. Rotate the pump rollers manually to help remove the tubing.

To install new pump tubing:

1. The pump tube is marked with two black bands. Facing the liquid detector, place the end band against the upper inlet of the detector and the inner band at the outlet. See Figure 3-1.

Black bands indicate
 $18\frac{3}{4}$ inches



Align black bands with
end of liquid detector

Always maintain $18\frac{1}{2}$ to 19 inches of tubing
inside the pump measured from the edge of
the liquid detector block.

Figure 3-1 Pump Tube Installation

2. Replace the pump lid and the case of the liquid detector.

Note

For proper operation of the liquid detector, tighten the detector's thumbscrews securely.

3. Feed the tube down through the center section, turn the center section over and pull the tube through the spring. Insert the tube into the distributor arm so that the end of the tube is flush with the end of the arm.
4. Reinstall the suction line and the distributor arm. Secure the distributor arm retaining nut. The exposed tube should continuously slope downward from the center section the distributor arm.
5. Reset the pump tube count in the Tubing Life configure option to zero.

3.3 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.

3.4 Cleaning the Sampler

Clean the top cover, center section, and base section with warm soapy water or by spraying

them with a hose. Be sure a power source is attached to the 12 VDC connector and the flow meter connector is tightly capped.

3.5 Charging the Nickel-Cadmium Battery

Charge the Nickel-Cadmium Battery Pack with the Isco AC Power Pack or Isco Battery Charger. Connect the plug on the battery cable to the mating receptacle on the AC Power Pack or the Battery Charger. Charge the battery for 15 to 18 hours. While charging, the battery will feel cool to the touch. Discontinue charging when the battery temperature rises. Because a nickel-cadmium battery produces almost constant voltage, even under load, you cannot use voltage measurements to determine the charge. Repeated overcharging reduces the life of the battery.

3.6 Charging the Lead-Acid Battery

Charge the lead-acid battery with an Isco AC Power Pack. Measure the output voltage to determine the charge level of the lead-acid battery. A chart on the battery lists the charge level and the time required to recharge.

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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 when you select "PROGRAM" in Display 1. Select "TIME" for time-paced sampling, or select "FLOW" for flow-paced sampling.

- 11 [UNIFORM, NONUNIFORM]
TIME INTERVALS
- This display appears only in the extended programming mode and follows Display 10 when you have selected "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 4, 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 have selected "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 have selected "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 have selected "TIME" in Display 10. In the extended mode, this display appears when you have selected "UNIFORM" in Display 11. Enter the uniform time interval.

-
- 22

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

This display follows Display 10 when you have selected "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 sample events for the first bottle group 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.

- 25

TAKE --- SAMPLES (1 - MAX)

This display follows Display 20 when you have selected "YES" to modify the nonuniform time sequence. Enter the number of sample events. *MAX* varies with 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 minutes interval. The value 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 have selected 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 have selected 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-MM

This display appears when you have selected 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-MM

This display appears when you have selected 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 4, 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 with the number of samples per bottle and bottle size.

60

--- COMPOSITE
SAMPLES (0 - MAX)

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 have selected "YES" in Display 242 or have selected "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 have selected "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

--- m^l VOLUME
DELIVERED

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

83

---m^l ! 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 entered in Display 310.

91

TAKE FIRST SAMPLE AT
HH:MM DD-MMM

This display appears when you have selected "YES" in Display 90. Enter the start time and date for the first sample event. This display will appear if you have started the routine after a programmed start time. Reenter the new start time.

92

START FLOW COUNT AT
HH:MM DD-MMM

This display appears when you have selected "YES" in Display 90. Enter the start time and date for the flow pulse countdown. This display appears when you have started the routine after a programmed start time. Reenter the new start time.

93

STORM ENABLED AFTER
HH:MM DD-MM

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 have selected 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 have selected "ENABLE" in Display 300. Enter the number of stop and resume times. Enter "0" to skip the stops and resumes settings without disabling the feature in the Stops/Resumes configure option.

101

STOP SAMPLING AT
1. HH:MM

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

102

RESUME SAMPLING AT
1. HH:MM

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 from 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 have started a routine after the programmed start time. Select Yes to enter a new start time. Select No to start the routine immediately.

143

CHANGE START TIME?
[YES, NO]

This display appears when you have started 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.

148

[REVIEW, PRINT]
PROGRAM INFORMATION

Select "REVIEW" for the 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 which identify each configure option. Press ENTER/PROGRAM to access the input displays for each option. Use the LEFT ARROW and the RIGHT 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 military time. Note that the configure options does not use the European date format.

220 [PORTABLE, REFRIG.]
SAMPLER

Bottle Size configure option. Select "PORTABLE" when you are using a 3710 Portable Sampler. Select "REFRIG." when you are using a 3710 refrigerated sampler.

221 [1, 2, 4, 8, 12, 24]
BOTTLES

Bottles and Sizes configure option. This display appears when you have selected Refrig. in Display 220. Select the number of bottles in the bottle base. Note that 12 bottle configuration is only available for the 3700FR.

222 [1, 4, 12, 24] BOTTLES

Bottles and Sizes configure option. This display appears when you have selected Portable in Display 220. Select the number of bottles in the base.

223 BOTTLE VOLUME IS
----- m]

Bottle Size configure option. Enter the bottle volume in milliliters.

224 ----- m] . . . ARE YOU
SURE? [YES, NO]

Bottle Size configure option. This display appears when you have entered 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 have selected "3/8" 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 detector on, "DISABLE" to turn the detector off. If you turn the detector off, you will be required to enter the suction head measurement (Display 70) in the program sequence.

241

- RINSE CYCLES (0 - 3)

Liquid Detector configure option. This display appears when you have selected "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 have selected "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 have selected "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 number of the sampling program you want to use. 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 have selected "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 have selected "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 setting affects programs that do not have a programmed start time.

320

MASTER/SLAVE MODE? [YES, NO]

Enable Pin configure option. Select "YES" to turn the Master/Slave mode on. Select "NO" to turn the Master/Slave mode off.

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" to take no 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 pre-sample 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 required to trigger the pump count warning. This value is reset to 500,000 when the controller 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: 3710. 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.

